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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

DATE: Thursday, February 7, 1991

The contents of this transcript of the proceedings of the United States Nuclear Regulatory Commission's Advisory Committee on Reactor Safeguards, (date) Thursday, February 7, 1991, as reported herein, are a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected or edited, and it may contain inaccuracies.

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMI3SION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

370th ACRS MEETING

Nuclear Regulatory Commission
Conference Room P-110
7920 Norfolk Avenue
Bethesda, Maryland

Thursday, February 7, 1991

The above-entitled proceedings commenced at 8:30 o'clock a.m., pursuant to notice, D. Ward, Chairman, presiding.

PRESENT FOR THE ACRS:

D. Ward	W. Kerr
P. Shewmon	C. Michelson
J. Carroll	E. Wilkins, Jr.
I. Catton	C. Wylie
H. Lewis	R. Fraley

PARTICIPANTS:

T. King	N. Chokshi
L. Shao	J. Flack
A. Murphy	B. Beckner
J. Chen	B. Marcus
J. Trotter	E. Marinos
T. Kenyon	J. Joyce
G. Bagchi	J. Hannon

PROCEEDINGS

[8:30 a.m.]

MR. WARD: The meeting will now come to order. This is the first day of the 370th meeting of the Advisory Committee on Reactor Safeguards. During today's meeting, the Committee will discuss or hear reports on the following subjects:

First, individual plant examination for external events; second, EPRI requirements for advanced light water reactors; third, containment design criteria for future light water reactors; fourth, implementation of Regulatory Guide 1.97; and fifth, ACRS activities.

Topics for tomorrow's discussion are listed on the schedule posted on the bulletin board at the rear of the room. This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act.

Mr. Raymond F. Fraley is the designated federal official for the initial portion of the meeting.

We've received no written statements or requests for time to make oral statements from the members of the public regarding today's sessions. A transcript of portions of the meeting is being kept, and I request that each speaker use one of the microphones and identify herself or himself and speak with sufficient clarity and volume so that he or she can be readily heard.

Before going to the first item on the agenda -- the technical agenda, I have several items of interest to mention.

First, Dr. Lewis' book on technological risk is now in the ACRS Library. It's -- you might have to get on the waiting list if you want to get it, there's a lot of demand for it up there I understand from Ethel.

MR. LEWIS: I want the record to show I did not pay Dave to say that.

MR. MICHELSON: I thought we were going to get free copies.

MR. LEWIS: People kept raising that question, and the stated answer is that, as surprising as it may appear to you, I have more friends than copies.

MR. WARD: We have, relative to new members, we have a couple of visitors during the meeting this week. Mr. Spencer will be here from about 10:00 a.m. to 2:00 p.m. today. I'd like some of you to talk with him. Please, if you'll contact Mable, she can arrange a -- a time so that we get as many people as possible can talk with him.

Mr. Kress will be here tomorrow. The same deal, from about 10:00 a.m. to 2:00 p.m. So, please try to talk to one or both of these gentleman.

Chet Siess won't be here today. We do have a favorable report that his wife is doing much better and he

expresses appreciation for the flowers we sent, as a Committee. He does expect to be here next month.

The first topic today was the IPEEE, and I understand Carl Michelson will handle that for Dr. Siess.

The -- in March, I think it's about the 26th, the Aging Research Annual Meeting is going to be held. I know some of you have been interested and have attended that last year. Mr. Igne has provided copies of the agenda to members of the Subcommittee on Aging, but anybody else who wants it can see Al, he'll give you a copy.

Let's see. It's my pleasure to announce that the ACRS members are going to get a raise in pay. Some of the members of the audience may be surprised that we get paid, but we do. There is a -- I think there's a general four percent raise for NRC employees, but also there's some caps removed or adjusted. As a result, ACRS members are actually going to get a 25 percent raise. So, that's pretty substantial. I think that's pretty darn good I pulled it off my first month as Chairman, so --

[Laughter.]

MR. CATTON: We really appreciate it.

MR. WARD: Okay. I think that -- I gather that was effective the first of the year.

Let see. Oh, we have a new co-op working with us. Roberta Romero is a senior engineering student at the

University of Texas at El Paso. She's in metallurgy and materials and I think she's right here. Roberta, would you stand up? So, we'll be glad to have you here and I think Dr. Shewmon may be able to benefit from your advice.

I also understand that Mark Stella will be returning next month to a job, another appointment as an ACRS Fellow, or Senior Fellow, I guess it is.

We -- looking at the agenda, it appears that we will need to have the Saturday session as scheduled. We have several letters and some of them really don't come up till kind of late in the day tomorrow. So, in all probability, we'll need Saturday morning to work on those.

Relative to the Containment Letter, which we'll be considering again today and also have some time for tomorrow, there's a letter I'd like you to look at, if you have a chance.

There's a letter we got from FPRI, from Bill Sugnet, in response to what they heard -- what's -- I guess, some representatives for their organization, heard when we discussed and read our first draft of the containment criteria letter at the last meeting. They have some concerns about some of the things. So, Dean Houston is going to pass it out a little later in the morning, and some of you might be interested. I hope some of you will read that, I think it will be of interest.

Anything else that we need to bring up before going to the IPEEE discussion? Ernest?

MR. WILKINS: Do you have any information about Larry Minnick's condition?

MR. WARD: I don't. Does anyone else? Is Ray here? I'm sorry, I don't, Ernest.

Okay. Let's go to the first agenda item, and Mr. Michelson.

MR. MICHELSON: Thank you, Mr. Chairman.

The first agenda item deals with the IPEEE Prograr which we first saw extensively in the form of a generic letter in November of '88. In May of '90, the Committee wroce a letter on the program. A workshop was held in Pittsburgh in September, and we now have a revised material which appears in tab two. The staff is here this morning to make a presentation on the material and answer any questions that we may still have.

So with that, Tom King, I think, is going to lead the staff's presentation.

[Slide.]

MR. KING: My name's Tom King. I am with the Office of Research, Division of Safety Issue Resolution.

We have in that division the responsibility for finalizing the generic letter and guidance document and getting it out for IPEEE.

This morning what we're going to do is quickly I'll give an introduction and the status and schedule, where we're going from here on the IPEEE.

Larry Shao is going to talk about the workshop that we had, the major comments and changes we've made to the package, and the Andy Murphy and John Chen will go through the three major subsections of the package, seismic, fires, high winds, floods, transportation, and talk about the major changes that have been made since the draft version that you saw back in May.

In the handout it's got all the slides for everybody. We sent you a copy of the entire draft package on January 11th. There have been some word engineering changes that have taken place since then but there's been no substantive change to the package. The technical content is essentially the same.

[Slide.]

MR. KING: The purpose of the briefing today, as I said, we want to summarize the status of where the package stands, major comments that we received, and the changes that we made.

We're going to emphasize the changes in the presentation.

We do request a letter from the full Committee after this meeting if that's possible.

MR. CARROLL: The changes that you refer to, Tom, are they reflected in what we have in our binder?

MR. KING: Yes. Yes, the changes are reflected in your binder.

You mean are they highlighted in your binder?

The SECY paper, there should have been a SECY paper attached to the generic letter and draft NUREG-1407, which highlights the major changes and we tried to highlight in boldface type --

MR. CARROLL: Oh, okay, yes. That's fine.

MR. KING: -- in the package, okay.

MR. CARROLL: That was also in the January 11th.

MR. KING: That was the January 11th package that we sent you.

MR. CARROLL: I mean the one we got earlier.

MR. MICHELSON: The one we got in the mail is the same one, I think. There may be changes from what we got in the mail. I haven't had time --

MR. CARROLL: That's what I was trying to establish.

MR. KING: What I'm saying is the package you got January 11th there's been some word engineering changes but no substantive technical change to the package.

MR. MICHELSON: And the word engineering is reflected in the one we have in our binder, or do you know?

MR. KING: Well, I'm not sure what you have in your binder. I thought you had the January 11th version in your binder.

MR. CARROLL: We do.

MR. KING: Okay. I'm saying there's been some word engineering changes since then as it worked its way through concurrence but no change to the technical content.

MR. CARROLL: All right.

[Slide.]

MR. KING: By way of background, the purpose of the IPEEE hasn't changed from what we originally proposed and really is essentially the same purpose that the entire IPEEE both internal and external events has.

That's summarized in four items.

It's to have licensees develop an appreciation of severe accident behavior for their plants; to help them understand the most likely severe accident sequences that can occur at their plants; understand the overall likelihood of core damage and radioactive material release and ultimately to reduce the overall likelihood of core damage and radioactive material release where that's appropriate.

[Slide.]

MR. KING: The scope of the IPEEE, the overall scope is not just for the package you saw back in May, although some of the depth and the details of the review

have been modified, particularly in the seismic margins method area and we'll talk about that later.

Basically the scope is seismic events, internal fires, high winds, floods, transportation, nearby facility hazards, and then in the other sites, unique hazard that a particular licensee may have or a guidance document provides guidance for the first three. The site-unique one is up to the licensee to identify and address.

MR. WARD: Tom, let me ask you a question about the scope. When the IPE process was initially -- I mean just the IPE process initially developed, there was a lot of conversation about it. An important purpose was to look for outliers, things that -- not necessarily in the mainstream of understanding about risk but things that might be missed absent a systematic search.

I don't find any language like that here.

Is there a change?

MR. KING: Well, I think "outliers" -- the word's been replaced by vulnerabilities.

That's the word we use. Let me go back to page --

MR. CARROLL: You say vulnerabilities on page 3.

MR. KING: To identify vulnerabilities to severe accidents. That's really synonymous with outliers, which I think is the word that is used in the Commission's policy statement.

Yes, the intent is still to look for those. We're just calling them vulnerabilities.

MR. KERR: A vulnerability is synonymous with an outlier?

MR. KING: We don't use the word "outlier" in the package anywhere.

MR. KERR: But I thought you said that the word "vulnerability" is synonymous with "outlier" -- that may be an NRC definition but it certainly isn't the way the English language is normally interpreted.

MR. KING: Well, I think in the sense the word "outlier" was used in the Commission's policy statement, the way that's been implemented and translated into language in the IPEEE, what we're asking the licensees to look for is vulnerabilities. That's the word we're using.

MR. WARD: You don't think the Commission really meant outliers, I guess?

MR. KING: Well, I think the way we're using the word "vulnerabilities" I think that that essentially translates to "outliers."

MR. KERR: As the Queen said, words mean what I want them to mean.

[Slide.]

MR. KING: Let me go on briefly as to what's happened since May.

When you saw the original draft package and commented on it, it went to the Commission.

At the end of May we received a Staff requirements memorandum in the middle of July from them which approved issuing the documents for comment and conducting the workshop. It also requested that the final documents be sent back to the Commission for their review prior to issuing them as final, that that be done via negative consent paper, and that that package address additional ACRS comments as well as the workshop results, so that's the package in front of you is an attempt to do that.

As was mentioned earlier, we had the workshop in September -- a lot of interest, a lot of attendees. Larry Shao is going to talk some more about what came out of that workshop.

MR. LEWIS: If Chet Siess were here, he would point out that the word "verbally" --

MR. KING: Oral and written.

MR. CARROLL: This is going to be a long two days.

MR. LEWIS: I thought we might as well get off on the right foot.

[Slide.]

MR. KING: Where we stand today is, we have developed the revised package that addresses the comments that we have received. We've made changes to the package as

a result of some of those comments. All of the comments are summarized at Appendix D to the NUREG 1407 which is included in your package.

Our current schedule calls for providing the package to the EDO the end of this month. It goes to the Commission in early March and we hope we have timely action by the Commission and will be able top issue it to the industry in late March.

One item that's continuing is to complete our review of NUMARC and EPRI's proposed fire methodology which we now believe we can have done by July of this year. You will see a more detailed schedule later on the steps that are involved in doing that.

We're requesting that licensees submit their plans for doing the IPEEE 180 days after the final generic letter is issued. So, if it gets out in March, that would be in September. The IPEEE actual work is done and the information submitted three years after the issuance of the generic letter. MR. CARROLL: Is industry more comfortable with those schedules than they were with the earlier ones?

MR. KING: Industry had asked that the three years be extended to something like four or five years, but we have a direction from the Commission to complete things, including our review, by mid-'95, so we have to stick with

the three years. We originally had 60 days in the package. We've extended it to 180 days, primarily because of industry's comment that the fact that we're still looking at the fire methodology that NUMARC have developed, they would like to be able to make a decision as to if they can use that or not, which means that if we're going to not act on it till July, they need some time beyond that to actually look at it and make a decision. That's why we've gone to 180 days.

Just a quick word about what the staff is going to do with this information when it comes in: We have not yet developed our detailed staff review plans, although we would expect the review process we conduct to be similar to what we're doing now for the internal events IPEEEs which are --

All submittals receive a screening review and depending upon the results of that screening review, certain submittals are selected for more in-depth review. We plan to write a supplement to each plant's SERs by way of documenting the results of the IPEEE internal event review, as well as the external event review.

Again, if the staff would disagree with the licensee's conclusions in terms of additional improvements that are needed, we would pursue anything beyond what the licensee has included in his submittal through the backfit rule. That's the same process we're following for the

internal events.

With that, I'm going to have Larry Shao talk about the workshop and cover the major comments as well as changes that we've made.

[Slide.]

MR. SHAO: My name is Larry Shao. I was the Chairman of the External Events Steering Group. The External Events Steering Group provided the technical input to the IPEEE generic letter. Today, I'm going to talk about the summary of the workshop which took place on September 10th to 13th, 1990 at Pittsburgh.

Also, I'm going to briefly discuss the major public comments.

[Slide.]

MR. SHAO: What are the purpose of the workshop? The purpose of the workshop are to give the NRC staff an opportunity to clarify the objective of the generic letter and to clarify the guidance and proposed procedures. The staff want to make sure the industry understand the package and what they have to do.

The workshop also give the public and the industry an opportunity to discuss and comment on the package. Altogether, there were about 250 participants, consisting of people from the federal and state government, utilities, architect/engineers, consultant companies.

There were several major general comments. The first comment is just like the generic letter for the RP for internal event. The IPEEE generic letter were be sent as 50.54 F letter which is essentially an information request.

NUBARG which stand for Nuclear Utility Backfitting and Reform Group, they commented that the 10CFR109 backfit analysis should be performed before the IPEEE generic letter is issued. The NUBARG comments were very carefully reviewed by the Office of General Counsel.

The ODC response was, the IPEEE generic letter is not a backfit, as this letter does not involve any modification or addition to hardware or design. It just asks for search for vulnerabilities. Any modification or addition to the plant will be voluntary on the part of the licensee.

If the staff asks for any modification or changes, then it is subject to backfit analysis. I have a copy of the OGC letter. If you are interested, I can make a copy for you.

The second important general comment was the staff estimate for connecting the IPEEE is too low. The staff estimate was derived from the resources spent on performing external event PRA for NUREG 1150, from the Hatch seismic study and by talking to various industry organizations.

The staff estimate to conduct IPEEE is about man-

year. The industry thinks it's much higher.

MR. KERR: You recognize that one part of the staff insists that one can't draw any general conclusions about other plants from the plants treated in 1150, I take it?

MR. SHAO: I realize, but I think on the resources part of it, I think for the 1150, they did a survey and at Peach Bottom and we got approximately how much time they spent on the IPEEE area. It was much smaller than the 6 manyear, but we doubled it anyway, so --

Also, we talked to the different architectural engineer of some utilities. We think we're in the ballpark, but industry doesn't agree; they think it's much higher that 6 manyear.

The third general comment is NUMARC want to extend the completion date. As Tom said, according the Commission mandate, all RPs should be completed by 1995. However, the staff will give extensions on a case-by-case basis. Supposing the utility has several units to work on or maybe they are really busy with some project modification or other safety issues, they just don't have time to work on it.

The last general comment was the industry thinks the 60 days for initial response time is too short, so we extended it to 180 days.

[Slide.]

MR. MICHELSON: You did intend to introduce yourself?

MR. MURPHY: Yes, I will.

MR. MICHELSON: Okay. Thank you.

MR. MURPHY: Just as soon as I figure out who I am.

MR. MICHELSON: All right.

MR. WILKINS: We haven't even started to ask you questions.

MR. MURPHY: I am Andrew Murphy, Branch Chief of the Structural and Seismic Engineering Branch. I was the Chairman and Co-Chairman, with Leon Reiter, for the Seismic Subcommittee working for the External Events Steering Group, and I will be making a presentation on, in fact, the changes that we have implemented based upon public comments and internal staff comment on the seismic portion of the generic letter and the guidance document.

Just by quick review, the guidance document has noted that there are two acceptable ways of carrying out the seismic portion of the IPEEE. The first is with a probabilistic analysis. The second is with the seismic margin method, and here, we have accepted both the NRC and the EPRI methodology for doing these but have requested some enhancements.

MR. WARD: Andy, now if they do a PRA -- I mean a

seismic PRA, what do you have to say about which curve they -- seismic hazard curve they use?

MR. MURPHY: Let me get a couple of slides into this, and we can get really going.

MR. WARD: Okay.

[Slide.]

MR. MURPHY: The major comments that came in upon the seismic portion of the IPEEE were objections to using both the hazard curves and for comments about the scope of the relay chatter evaluation. I will talk on both those topics, starting now, with the comments on the seismic hazard and using the two curves.

[Slide.]

MR. MURPHY: Basically, the comment was, as it said, the industry felt that the use of the two curves was unwarranted and too burdensome.

We think part of that comment was that, initially, they didn't understand how much effort we thought was involved in carrying out the two sets of calculations.

We thought that they would be a minimal amount of additional effort. I would hate to try to put numbers and exact times on them, but we didn't think that they were -- would be significant. But industry disagreed with us.

So, the response of the staff was that the option would be given of the IPEEE seismic review being done with

the more conservative of the two seismic hazard curves that are available, and the emphasis is on more conservative, rather than on conservative.

I don't know at what level of conservatism either one of them have. All we're doing is saying to use the more conservative one, so that we will know that we've captured all the vulnerabilities that would be --

MR. WILKINS: I am now ready to make the comment that I refrained from making earlier.

MR. MURPHY: Okay.

MR. WILKINS: You're supposed to use the more conservative. Is there a theorem that says that one of them is more conservative than the other?

MR. MURPHY: The only way we're --

MR. WILKINS: How do you know which is -- in the absence of such a theorem, how do you know which is more conservative until you have done both?

MR. MURPHY: We are simply saying one is more conservative than the other because it's higher and lower on the graph.

MR. WILKINS: No, no, no, no, no.

MR. MURPHY: I understand.

MR. WILKINS: You didn't hear my question.

MR. MURPHY: Yes, sir. I did.

MR. WILKINS: Which is more conservative? Can you

answer that now, in advance?

MR. CHOKSHI: This is Nilesh Chokshi from the staff.

The higher one will give you the higher numbers.

MR. WILKINS: You are not paying any attention to what I said. Now, please listen. I'll try it one more time.

Can you tell me today, in this room, whether the EPRI or the LLNL is more conservative?

MR. CHOKSHI: No.

MR. WILKINS: Then how can the utility decide in advance of doing both calculations which is the more conservative?

MR. CHOKSHI: I think what we can say is which one is higher and which one is lower.

MR. WILKINS: How can he say that?

MR. CHOKSHI: Because you have the two hazard estimates.

MR. SHAO: There are two curves for each plant, for each site of a plant. There are two curves drawn for each site, and the higher curve usually give --

MR. LEWIS: If I can contribute a little bit, they don't mean conservative. They just mean bigger. They don't know that it comes from conservatism. They just know that it's bigger.

MR. WILKINS: They know that the answer is bigger.

MR. LEWIS: That's all they know. They do not --

MR. WILKINS: Before they do it.

MR. LEWIS: They use the word "conservative," but they don't know that that's what it is.

MR. MURPHY: Do you understand that we already have these curves all calculated out?

MR. WILKINS: No. That's clearly my problem. In other words, they already have these answers.

MR. MURPHY: They already have all of the seismic hazard --

MR. KERR: They don't have the risks calculated. They have the earthquake curve calculated but not the associated risk.

MR. LEWIS: I think Ernest has put his finger on a fairly important point.

They're taking for granted that it's a consequence of conservatism, and that's far from assured. It could be just a mistake.

MR. SHAO: There are so many sites in the United States. Each site has two curves drawn. One is drawn by EPRI; one is drawn by Livermore.

So, the high curve, we think, is more conservative.

MR. CARROLL: But it isn't always the EPRI curve

that's high.

MR. MURPHY: There is a little bit of change in frequency, but generally, if you want to characterize them, most of the time you'd be correct in calling the Livermore more conservative -- no -- higher, excuse me.

MR. LEWIS: If you were to simply take the Livermore results and triple them, that would be even more conservative. Right?

MR. MURPHY: It would be even higher, yes.

MR. LEWIS: You do learn.

MR. MURPHY: Yes. I try.

MR. MURPHY: Okay. That's the comment and response.

The staff requested the calculations, that two calculations be done to, in our minds, highlight the uncertainty in the bottom-line numbers. We didn't want to give these bottom-line numbers life of their own.

The second point was to highlight the robustness of the results using both sets of calculations.

MR. KERR: What is meant by highlighting the uncertainty in terms of something that is accomplished there?

MR. MURPHY: Highlighting the uncertainty, what we are just trying to say is to make certain, just as the word implies, that it's noticed, that it's seen, that it's

visible.

MR. KERR: No. But what does that accomplish in terms of increased safety at the plants, which I assume is your ultimate objective?

MR. MURPHY: Our ultimate objective is, in part, that the differences and the uncertainties that are associated with the seismic hazard curves be properly compared with the other uncertainties, the other risks, so that -- to quote my colleague, Leon Reiter, that we're not comparing apples and oranges.

We just want to make certain that people are intelligent about what information they have in their hands and how they make use of it. That's it.

MR. KERR: Do you think that there is anybody out there who is doing these calculations that thinks that these hazard -- either one of these hazard curves is exact?

MR. MURPHY: I don't think -- I can't name names, no. I don't think there is anybody that I can specifically point out that says this is the correct answer, period.

MR. KERR: Then why will doing the two sets of calculations make them recognize, somehow, that there is uncertainty?

MR. MURPHY: I guess I'd say we're getting into the philosophy and the psychology here.

I think what we're saying is that if you have been

given a single number, even with some error bands on it, uncertainty bands on it, you are far more likely to run and sa, - no, not necessarily you, but people are far more likely to say this is a good number, this is a number we should be using, and just go ahead with it, and forget, neglect, or play down the role of the uncertainty. That's all.

[Slide.]

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MR. CHOKSHI: No.

MR. WILKINS: Then how can the utility decide in advance of doing both calculations which is the more conservative?

MR. CHOKSHI: I think what we can say is which one is higher and which one is lower.

MR. WILKINS: How can he say that?

MR. CHOKSHI: Because you have the two hazard

estimates.

MR. SHAO: There are two curves for each plant, for each site of a plant. There are two curves drawn for each site, and the higher curve usually give --

MR. LEWIS: If I can contribute a little bit, they don't mean conservative. They just mean bigger. They don't know that it comes from conservatism. They just know that it's bigger.

MR. WILKINS: They know that the answer is bigger.

MR. LEWIS: That's all they know. They do not --

MR. WILKINS: Before they do it.

MR. LEWIS: They use the word "conservative," but they don't know that that's what it is.

MR. MURPHY: Do you understand that we already have these curves all calculated out?

MR. WILKINS: No. That's clearly my problem. In other words, they already have these answers.

MR. MURPHY: They already have all of the seismic hazard --

MR. KERR: They don't have the risks calculated. They have the earthquake curve calculated but not the associated risk.

MR. LEWIS: I think Ernest has put his finger on a fairly important point.

They're taking for granted that it's a consequence

of conservatism, and that's far from assured. It could be just a mistake.

MR. SHAO: There are so many sites in the United States. Each site has two curves drawn. One is drawn by EPRI; one is drawn by Livermore.

So, the high curve, we think, is more conservative.

MR. CARROLL: But it isn't always the EPRI curve that's high.

MR. MURPHY: There is a little bit of change in frequency, but generally, if you want to characterize them, most of the time you'd be correct in calling the Livermore more conservative -- no -- higher, excuse me.

MR. LEWIS: If you were to simply take the Livermore results and triple them, that would be even more conservative. Right?

MR. MURPHY: It would be even higher, yes.

MR. LEWIS: You do learn.

MR. MURPHY: Yes. I try.

MR. MURPHY: Okay. That's the comment and response.

The staff requested the calculations, that two calculations be done to, in our minds, highlight the uncertainty in the bottom-line numbers. We didn't want to give these bottom-line numbers life of their own.

The second point was to highlight the robustness of the results using both sets of calculations.

MR. KERR: What is meant by highlighting the uncertainty in terms of something that is accomplished there?

MR. MURPHY: Highlighting the uncertainty, what we are just trying to say is to make certain, just as the word implies, that it's noticed, that it's seen, that it's visible.

MR. KERR: No. But what does that accomplish in terms of increased safety at the plants, which I assume is your ultimate objective?

MR. MURPHY: Our ultimate objective is, in part, that the differences and the uncertainties that are associated with the seismic hazard curves be properly compared with the other uncertainties, the other risks, so that -- to quote my colleague, Leon Reiter, that we're not comparing apples and oranges.

We just want to make certain that people are intelligent about what information they have in their hands and how they make use of it. That's it.

MR. KERR: Do you think that there is anybody out there who is doing these calculations that thinks that these hazard -- either one of these hazard curves is exact?

MR. MURPHY: I don't think -- I can't name names,

no. I don't think there is anybody that I can specifically point out that says this is the correct answer, period.

MR. KERR: Then why will doing the two sets of calculations make them recognize, somehow, that there is uncertainty?

MR. MURPHY: I guess I'd say we're getting into the philosophy and the psychology here.

I think what we're saying is that if you have been given a single number, even with some error bands on it, uncertainty bands on it, you are far more likely to run and say -- no, not necessarily you, but people are far more likely to say this is a good number, this is a number we should be using, and just go ahead with it, and forget, neglect, or play down the role of the uncertainty. That's all.

MR. LEWIS: I do have a lot of respect for Leon Reiter, who is a fine fellow, but speaking for myself, I have no trouble comparing apples with oranges. You also have no trouble.

MR. MURPHY: But anyway, that's why the staff put the two of them in there, okay? The justification that we came to within our minds as to why we could allow the use of one of the curves and the higher one was that there was no technical basis for selecting one over the other.

The higher estimate -- see, we got it right

finally -- the higher estimate will capture all of the potential sequences that we're looking for, the dominant sequences that are going to lead to core damage.

MR. LEWIS: Okay. I can't resist responding to that because that's a substantive point. The argument that you should always take the higher one because it will capture more sequences can be carried logically to my original suggestion, which is to take any of them, triple it, because that will also capture even more sequences.

Capturing sequences that are not real is not a benefit for the health and safety of the public. The purpose of an analysis of this kind is to make a fair estimate of what the risks are, what the sequences are that are important.

There's a cut-off somewhere that takes out the sequences which are not important. You don't cover them all, nobody ever pretends to, and to deliberately choose a higher one because it gives you more sequences is simply misuse of probablistic risk assessment. I got to say that.

MR. MURPHY: I don't think -- the staff wants to use both of them, in part because of some of the arguments that you are making.

MR. LEWIS: I don't think so.

MR. MURPHY: Fine. That's your opinion. That if you have got two pieces of information, you have two sets of

hazard curves, we suspect, as shown by the NUREg -1150 example at Peach Bottom and Surry, that the curves are similar in shape and will expose the same sets of sequences and components.

The concern as you pointed out is that if you use one over the other, there may be sequences that are important that gets loss. The staff is interested --

MR. LEWIS: How do you know they're important? That's my whole point. They may not be important if the other one is right.

MR. MURPHY: That's correct, they may not be important. That's why after you have found them, which takes some effort, you have to understand where they came from, why they are there, and if they are not important, you reject them.

MR. LEWIS: I'm not going to argue with you, but I will assert that that is a misuse of probablistic risk assessment because you carry it absolutely to the point of saying you should double every probability you get because that will expose more.

Whatever you do, you will expose more sequences on the way down, and what you need is a consistent rationale for cutting it off, and it's got to be based on the best knowledge you have of the system, not just going for the lowest. That's my view, and I don't particularly want to

argue it.

MR. CHOKSHI: May I say something? This is Nilesh Chokshi again. I think you are right, but we are not arbitrarily raising the level of hazard. We are starting with the two sets of hazard given by experts. We have two estimates, and that's where we are starting from.

I think you are absolutely right, if you start it arbitrarily -- say I want to use something higher to capture all potential sequences. Both curves are supposedly estimates made by experts. That's the first point.

I think the second point, that is the reason we would like to use both, and then you can see when the results come out, Are we getting off at right places? What sequences are we getting from this higher curve versus lower code? Are they reasonable?

MR. LEWIS: I will make one more effort to say what I was trying to say. Any rationale that treats them evenly by throwing darts or something like that would not trouble me because there is genuine uncertainty here. What troubles me here is automatically taking the largest and then pretending to have a rationale for it which is not a rationale that will survive scrutiny. That's my only point.

MR. SHAO: Actually, we don't want to pick the largest. We wanted a true curve. Suppose you're in the Florida area or in the very low seismic sound, they can do

the high curve and everything is okay. Then they don't have to do any more work.

MR. LEWIS: I only want to stipulate that having the last word doesn't mean I agree with you.

MR. CATTON: Just out of curiosity, how much does it cost to do each of the calculations? Is it an expensive --

MR. MURPHY: I mean the difference between doing one calculation and two is the question.

MR. CATTON: In cost?

MR. CHOKSHI: I would say a dollar figure would be something like in the $10,000, $20,000 range.

MR. CATTON: I think, if we discuss it anymore, we're wasting more money than not.

MR. CARROLL: Particularly with our pay raise.

[Laughter.]

MR. CATTON: You're right.

MR. WILKINS: By the way, these guys got a raise, too.

MR. CATTON: Well, we're wasting even more money, then.

MR. SHAO: By the way, the 1150 is done in the same way, the 1150.

MR. MICHELSON: Go ahead.

[Slide.]

MR. MURPHY: Okay. The next item that we'll discuss is the relay chatter, and I'll just give it to you quickly here. The comments that came in from industry, basically, at the workshop was that the relay chatter review requires a considerable resource expense. The case of Hatch was used as an example, and the numbers were quite large.

They also came in with the comment that even with Hatch, the problems that were identified were recoverable using existing procedures. In other words, if a relay did chatter and something happened, that the relays that chattered could be reset or mitigated before there was an opportunity for there to be a serious problem.

The staff response was, We recognize the resource issue, and we proposed a graded approach to reducing the burden for most plants. This is -- and that what we came back with was that there would be a division of our plants and that we would have these things called a full-scope set of plants, which we'll get into a little bit later. We'll do a more thorough review to provide additional confidence that the conclusions in 2 above are generic.

This was based upon a scope being consistent between the seismic margins and the PRAs. So both sets would be doing the same kind of review.

MR. MICHELSON: How do you determine that existing procedures will take care of your relay chatter problem

until you identify the relay chatter possibilities?

MR. MURPHY: This was done based on the experience of Hatch.

MR. MICHELSON: That's just one plant.

MR. MURPHY: Pardon?

MR. MICHELSON: That's just one plant.

MR. MURPHY: Hatch, Limerick, and Diablo Canyon.

MR. MICHELSON: Well, that's three plants out of the total.

MR. MURPHY: That's three plants. This was the three plants for which in-depth, we'll call them in-depth reviews of the relay chatter problem were looked at. These three cases --

MR. MICHELSON: So on the basis of that sample, you're concluding that, generically, all plants should be able to recover with existing procedures?

MR. MURPHY: No.

MR. MICHELSON: Is that right? Oh.

MR. MURPHY: What we're doing is saying that at this time, we're taking the position that it's probably an undue burden to force a full chatter relay on all the utilities. But what we're doing, and we'll see in later slides, is setting up a series of full-scope plants which have a mix of different vendors and different type plants, that we'll look at this thing in more detail.

MR. MICHELSON: Okay. You'll take a bigger sample?

MR. MURPHY: Right.

MR. MICHELSON: Okay.

MR. MURPHY: And then if there is a problem detected in the larger sample, it will be incumbent upon the staff to go back and require --

MR. MICHELSON: This will be tacked down before 1995 if it shows up?

MR. WARD: That's right.

MR. MICHELSON: So it's just moving it out without asking everybody to be included in the sample.

MR. MURPHY: Exactly.

MR. MICHELSON: How big a sample are you taking? you're concluding

MR. SHAO: We are looking in detail at seven plants.

MR. MICHELSON: Maybe I'm getting ahead of your presentation.

MR. MURPHY: You're getting a little bit ahead.

MR. MICHELSON: I thought you were going on to something else.

MR. CATTON: I'm a little behind. How do you define the relay chatter? Does it bang a lot of times, or is it just one opening and shutting, or what?

MR. MURPHY: There is a definition that involves so many chatters. Nilesh, what are the exact numbers?

MR. CHOKSHI: What was the question?

MR. MURPHY: The actual definition of relay chatter.

MR. CATTON: I'm just curious. I realize that these relays were being testing. They would put in a constant loading and give different frequencies over a period of time. It seems to me that that's not what an earthquake does, so I'm just curious as to how you define relay chatter when you go looking for it.

MR. CHOKSHI: Well, here, the first approach is to foresee whether relay is susceptible to chatter, emit chatters.

MR. CATTON: When you look to see whether it's susceptible to chatter, how do you do that?

MR. CHOKSHI: Test data.

MR. CATTON: Test data. But how do you run your tests? That's a constant "g" level at some frequency for a period of time, isn't it?

MR. MURPHY: There is an industry standard. IEEE 501 has --

MR. CATTON: I'm asking out of ignorance. I don't know what these things are.

MR. MURPHY: There is an industry standard that

defines relay chatter under a different series of sequence of tests.

MR. CATTON: But you don't put in what you think a seismic event might look like.

MR. MURPHY: Yes.

MR. CATTON: Do they do that?

MR. MURPHY: Yes.

MR. CATTON: So you get a large impulse, and then it sort of drops off?

MR. CHOKSHI: Yes. Exactly. Yes. We actually calculate that.

MR. CATTON: Okay.

MR. MICHELSON: Has that same procedure been used for instrument contacts, because relay chatter by definition includes all kinds of contacts --

MR. MURPHY: Right, it does.

MR. MICHELSON: -- both relays and instruments and so forth.

MR. MURPHY: Yes.

MR. MICHELSON: And it's very dependent -- whether it's a problem is dependent upon the time response of the system to which the particular contact is inserted into. Some of them are microsecond response times, some of them are high millisecond response times. That makes a big difference.

MR. MURPHY: Yes, it does.

MR. MICHELSON: That is a problem with the old tests they did. A lot of them, they looked at the results and looked at their circuit, and said it's a nonproblem. But somebody else using the same relay in a different time response circuit, it became a problem. And people said oh, that's a seismically-qualified relay. It really wasn't, for the circuits you were going to use it in. And people lost that and just started saying, taking off the shelf these so-called seismically-qualified relays, and they weren't qualified for their circuit, they were qualified for somebody else's circuit.

MR. CHOKSHI: I think you are right. And that's one of the reasons why it's so expensive. The way the analysis is being done --

MR. MICHELSON: Oh, it's very expensive.

MR. CHOKSHI: -- assume all relay is chatter in the first cut, and then look at the consequences on a system-by-system basis, then look at whether you can weaken the time frame. So you have to do almost all circuit analysis. And that's why it takes so much results.

MR. MICHELSON: I was hoping the IPEEE at least would find all the mercury switches that might still be in the plants, including the ones you found at Peach Bottom, I think, during the 1150, or in that time frame.

MR. CHOKSHI: I think you will see that in a later slide, what we are going to look at.

MR. MURPHY: Like Nilesh said, we're going to get away from exact relay chatter scope at the moment.

MR. MICHELSON: So you are going to use really your experience with this next seven, did I understand, plants?

MR. SHAO: Seven Eastern plants.

MR. MICHELSON: Seven Eastern. Plus what?

MR. SHAO: And Western plants.

MR. MICHELSON: Okay. Seven more.

MR. CARROLL: Are the people that got chosen to be among the seven happy with your choice?

[Laughter.]

MR. MURPHY: We haven't asked them yet.

MR. CARROLL: They must have been volunteers.

MR. MURPHY: They were volunteered, by us.

MR. MICHELSON: That includes all four vendor types in the sample?

MR. KING: It's more than seven. It's seven Eastern plants plus probably, what, five or so Western plants.

MR. MICHELSON: Oh. So it's seven plus.

MR. WILKINS: Seven Eastern and all the Western. Right? All the Western plus seven Eastern. I found the

list in here. I just can't find it again.

MR. MURPHY: It's the end of Chapter, Section 3.

[Slide.]

MR. MURPHY: The margins approach.

There are in effect two major, we'll call them two major changes to the margin approach.

The first was the using the seismic hazard and seismic design basis for determining the scope of the review.

In the first cut, we had used seismic hazard alone. Based upon this, we came up with a revised scope for the relay chatter review, and in effect this introduced what we call a concept of a focused-scope review. This was a concept or an idea that was suggested by NUMARC, both in comments and in public meetings.

MR. MICHELSON: Now what is the focused-scope review?

MR. MURPHY: We'll get to that in a minute.

MR. MICHELSON: Oh.

[Slide.]

MR. MURPHY: So based upon the public comments, what we did was we took the .3G bin and subdivided that. By way of reminder, the staff had proposed three bins for the margins review, a .5G, a .3G, and a reduced scope. And the reduced scope was basically the plants that, if you want,

were in Florida and Texas, low-seismicity plants. Okay. We took what was the one bin, the .3G bin, and we subdivided that into a full-scope and a focused-scope. The basic difference or the principal difference between the two bins was the level of relay chatter review that was done.

We made our decisions on the plants that were going into the full-scope review based upon plants with relatively higher seismic hazard and relatively lower seismic design basis.

MR. WARD: Do you mean that combination?

MR. MURPHY: Yes, sir.

[Slide.]

MR. MICHELSON: That is sort of based on the assumption that all plants have the same kind of accelerations at that particular level in a cabinet and so forth? You can have a low seismic plant with a very high seismic vulnerability in a given cabinet, depending on its design and so forth, can't you? Relatively speaking, you can run into that.

MR. MURPHY: That particular item is covered in what is done for the relay review. The elevation above, I think it's 40 feet, is taken into consideration.

MR. MICHELSON: Okay.

MR. WARD: Could you explain to me how a plant has a high seismic hazard and a low seismic design basis?

MR. MURPHY: That's what we're getting at right here.

MR. WARD: Oh.

MR. MURPHY: And again, those are definitely relative terms.

So again, the staff made an assignment of subdividing the .3G bin. And the criteria is one that was initially proposed by NUMARC and was very similar to the criteria that the staff initially used for binning the plants to begin with.

What we did was, we developed a composite conditional probability of exceeding the seismic design basis that four special ordinates for the EPRI, the Livermore, with four ground experts and with five ground experts, we examined this at the median level, the mean, and at the 85th percentile.

So in effect what we did was we came up with a number, a composite, conditional probability for nine cases. EPRI mean, EPRI median, EPRI 84th percentile. Livermore five experts, Livermore four experts, for the same thing. And what we did was again, as we did before, we simply made lists of these and looked at the list to see where the relative plants came.

Based upon that examination, there was a clear demarcation between what we call the top six plants and the

rest of them, or the top six sites and the rest of them.

MR. WARD: That sounds suspiciously like you averaged the seismic hazard curves.

MR. MURPHY: No, we didn't average them.

MR. WARD: Oh.

MR. MURPHY: We didn't do any mathematical manipulation with these conditional composite probabilities, once we had them in our hot little hands. All we did was make lists. And when we looked at the lists, you got, in effect you got a checkmark if you were high on the list; you didn't get a checkmark if you were low on the list.

The six plants that we looked at and put into the full-scope bin were all consistently at th e top of the list. And on that basis, we were saying that they had a high seismic, a relatively high seismic hazard and a relatively low seismic design basis.

MR. WARD: Okay. So you've already done some decision-making based on composite conditional probability of exceeding some hazard criteria?

MR. MURPHY: Right.

MR. WARD: Which sounds, again, like averaging the curves.

MR. MURPHY: In the sense that you looked at them all together and you eyeball-averaged them, fine, that's one way of looking at it. In the sense that you added them all

up and divided by nine, that was not done.

MR. ROTHMAN: Each of those hazards was looked at independent. And there had to be agreement that the plant was at the top of the list for all three. There was no averaging done. There was consistency between the different hazard curves. If it was an outlier, let's say, for one hazard curve and not the other two, then it was not considered at the top of the list.

MR. MURPHY: Then the bottom third says, the resolution of the Eastern U.S. seismicity issue identified five plants at five sites as outliers. There's that word again. These were decided that these plants would do a full-scope margins review, if that's the way they chose to do their IPEEE. Based upon that review, one additional plant was added to the list of six, giving us the seven Eastern plants that are being requested to do a full-scope margins review at the .3G level.

MR. MICHELSON: Is it clear from your generic letter that if the results of this examination show some real seismic relay chatter vulnerabilities, that other licensees will then be added to the list? Is that somewhere in this generic letter? Because I didn't find it on a very quick perusal.

MR. KING: No. What we're going to do is, if the examination of these additional plants show that relay

chatter is a problem, we're going to raise it as a generic issue. We're not going to reopen the IPEEE and go back --

MR. MICHELSON: Okay. You're not going to add to the IPEEE, you're going to go back and introduce it as a new generic issue?

MR. KING: Introduce it as a new generic issue and deal with it that way.

MR. WARD: So these seven plants were chosen, based on this sort of argument rather than an argument that they were somehow representative -- that their designs were representative of the whole population?

MR. MURPHY: That's correct. They were selected, and then, in hindsight, we went back and looked at them to see what kind of mix we had of vendors, plant type and that sort of thing. Based upon that, we were reasonably satisfied that we had a good mix; that it would help us, in hindsight, answer the question of whether or not Comment 2 on the generic applicability of recovery was appropriate.

This decision was made and then we looked at it afterwards to see if we were satisfied with what we had.

MR. MICHELSON: In doing the IPEEE, if a utility finds a vulnerability, do they have to report it before they fix it, or can they fix it and then report they have none?

MR. KING: They can fix it and report they fixed it. We encourage them to --

MR. MICHELSON: But they must report any they find -- MR. KING: Yes.

MR. MICHELSON: -- before the fix them?

MR. KING: No.

MR. MICHELSON: I mean, that the have found it?

MR. KING: Yes.

MR. MICHELSON: Okay.

MR. KING: We encourage them to fix it without waiting.

MR. MICHELSON: Okay.

MR. KERR: What is meant by encouraging them to fix it? What sort of encouragement do you provide?

MR. KING: We put a sentence or two in the generic letter that says we would like to see the go ahead and make the fixes as soon as they decide it's a vulnerability, without having to submit something to us.

MR. KERR: Thank you.

MR. SHEWMON: Have we defined what a vulnerability was, or have you in this. As I recall, a year or so ago, there was a certain element of faith that when we saw one, we'd recognize it, but nobody could give a very quantitative definition. Has it changed?

MR. MURPHY: That's correct. The staff has not defined vulnerability, either in the IPE or the IPEEE. That's a -- if you want to say, a definition left to the

utility.

MR. SHAO: All of these are on what we call a reporting level, just a reporting level.

MR. KERR: You are not going to question the utility's judgment, once they identify a vulnerability?

MR. MURPHY: No, that's not true. If the --

MR. KERR: Then you've got to have a definition of a vulnerability if you aren't.

MR. KING: We're going to use the backfit rule. If we disagree with what the licensee has done, we're going to use the backfit rule to determine --

MR. KERR: But you're going to use it because you detect a vulnerability which they didn't see.

MR. KING: Or they saw it and didn't do something about it.

MR. KERR: That means that you have to have your own definition -- some sort of working definition of what a vulnerability is.

MR. KING: It's called the backfit rule.

MR. KERR: The backfit rule is a rule you use after you have identified something that needs fixing. The backfit rule doesn't identify it.

MR. KING: We're looking at the results of an IPEEE submittal and we see something that would, we believe, pass the backfit test and the licensee hasn't done something

about it, we will pursue it through that avenue.

MR. KERR: Go ahead.

[Slide.]

MR. MURPHY: Basically, the staff is not going to define vulnerability. We probably can't be forced into it yet. This is what we propose to do for our relay chatter evaluation --

MR. KERR: Excuse me. I really think this is important because what's going to happen is that the group of people who have looked at this a lot and has decided that they really can't define a vulnerability, is now going to pass on the responsibility of defining a vulnerability to a different group of people that has not looked at it and thought about it nearly as much as you guys have.

It's therefore going to be a rather arbitrary thing. I think it's important that you think about this if you are really going to do what you tell me you're going to do.

MR. MURPHY: I fully understand the comment.

MR. MICHELSON: Let me ask this: the utilities are going to do this analysis and they're going to decide whether it's a vulnerability. I guess when they see something they suspect, they'll call it a potential vulnerability and then they'll chew around on it for a while and then decide whether to consider it a vulnerability or

not.

You haven't provided any ground rules by which the judgment is reached that it is a vulnerability.

MR. KING: We've asked them to define what they consider to be a vulnerability.

MR. MICHELSON: If I were a utility, I could -- depending on my degree of conservatism, I might report nothing to you as a vulnerability and then the next utility that would look at the same situation might report a long list or vulnerabilities.

MR. KING: That's true.

MR. MICHELSON: I don't know what the results of this 7 sample even means.

MR. SHAO: For instance, let's say we have margin survey for a few plants like Hatch, Maine Yankee and a couple others. When they go through -- they look at the vulnerability. There are three things the utility just fix it, like the anchorage and things like DC. They think it's a vulnerability and they just fix it.

There were no argument.

MR. MICHELSON: They wouldn't even report it to you if they just --

MR. SHAO: They report to us and fix.

MR. MICHELSON: Wait a minute now. They only report to you what they finally arrive at as vulnerability.

MR. KING. No, that's not true.

MR. MICHELSON: Oh?

MR. KING: There's a set of reporting criteria that they have to report, sequences that contribute so much to core damage frequency and so --

MR. MICHELSON: You report anything they find that they might fix?

MR. KING: They have to report -- there's a set of reporting criteria that tells them what they have to report. Within that set of things that they have to report, they may identify a few or a lot of those as being vulnerabilities that they fixed or didn't fix, and they --

MR. MICHELSON: I guess the reporting criteria is almost a definition of vulnerability then? Maybe I need to see the -- did we get the reporting criteria somewhere in this?

MR. KING: Yes. They're in one of the appendices or enclosures to the generic letter.

MR. MICHELSON: That may be where the definition of vulnerability is.

MR. KING: No, you can't consider those vulnerabilities. They're reporting criteria.

MR. MICHELSON: They're less -- they're potential vulnerabilities or something.

MR. KING: They're things that we want the

licensee to look at and that we want to look at.

MR. CATTON: How many iterations of the PRA are they allowed before they submit it?

MR. KING: I am not sure I follow your question. I mean, could they go through and fix everything and then come back and say --

MR. CATTON: No, you run the PRA and then you say, gee, that's sticking up a little bit and maybe I better take a look at the conservatism and you wiggle it a little bit and they all go away.

MR. KING: That's up to them. We haven't set any criteria on how many iterations they --

MR. CATTON: So how do you know that you're getting equality from all of the different utilities? Is the same person going to do all the PRAs?

MR. KING: No, but we haven't --

MR. CATTON: Then you have no idea.

MR. KING: We have identified certain guidance documents that define how to do a PRA and what should be in a PRA.

MR. KERR: You do not want the utility to take the bottom-line number seriously anyway.

MR. MICHELSON: Go ahead.

[Slide.]

MR. MURPHY: Relay chatter evaluation: Reduced

scope plants, these are the ones -- well, we'll call them Texas and Florida, mainly.

Under that, we've got two sets. We've got two sets under all of them, some of those that are covered already by the A-46 review.

The A-46 plants obviously have to do the A-46 review for relay chatter. The non-A-46 in the reduced scope areas have no action.

For the focused scope plants, these are the ones that were not identified. This is the bulk. Approximately 50 sites in the east United States do a focused scope review. The A-46 plants have to do the A-46 review.

If the low ruggedness relays are found, they have to expand the scope from the A-46 review to the scope of the IPEEE, which means instead of just doing a single success path, they have to do the alternate success path that's required by the margins or the IPEEE program.

MR. MICHELSON: What is low seismic ruggedness? Is there some kind of a definition?

MR. MURPHY: Yes, there is. There is a set or a list of relays that specifically fall into that classification.

MR. MICHELSON: That are known, from testing, to be of low seismic ruggedness?

MR. MURPHY: Known from testing and from -- I

believe from experience, as well.

MR. MICHELSON: Now, of course, relays, again, means instruments and the whole spectrum.

MR. MURPHY: Everything.

MR. MICHELSON: That spectrum wasn't very well tested in the past when it comes to instrument contacts. There was much better testing when it came to relays.

Is there a good set of data on all potential contacts in a plant that might be susceptible to chatter?

MR. CHOKSHI: We had done a lot of testing.

MR. MICHELSON: We've done a lot of testing, but on the variety of things that are out there and not just on relays?

MR. CHOKSHI: Well, I think that's part of the reason that we wanted them to do this. The full-scope plants --

MR. MICHELSON: We're not going to do any testing, though. So, they don't know what -- they're going to go to your table, I guess, for low seismic ruggedness or your guidelines.

MR. CHOKSHI: The plants in the full scope will look at everything. So, we are, you know, counting on those.

As of now, we have a list of relays known to be low capacity.

MR. MICHELSON: Yes.

MR. CHOKSHI: And that's not necessarily a complete list, and we are still doing some tests, more tests.

MR. MICHELSON: But on that list, there are not such things as mercury bowl contact-type relays and so forth, necessarily, because nobody ever, in their right minds, even bothered to test them. They already knew what they would do, but yet they showed up in plants.

Now, how was that sort of thing found such as was found at Peach Bottom?

MR. CHOKSHI: Well, that particular has been known from experience.

MR. MICHELSON: Well, you don't need any experience to know how they behave when you shake them a little bit.

MR. CHOKSHI: Those things will be probably removed.

MR. MICHELSON: I bet you they aren't on your list.

MR. CHOKSHI: I don't recall now. It's a well-known relay problem.

MR. MICHELSON: So, the bad actors somehow everybody knows already and is going to look for them.

MR. MURPHY: Okay.

The full-scope plants, which includes those in the 0.3G bin and also those in the 0.5G bin, which includes some of the western sites, for the A-46, they have to follow the A-46 review, the procedures.

They have to review the IPEEE systems using those that are part of or included in the scope of the A-46 review but at the assigned IPEEE level: i.e., either at the 0.3G or the 0.5G level. And for the non-A-46 plants, they have to review the relays, all the relays at the -- all the relays within the IPEEE systems at the IPEEE assigned value; i.e., at either 0.3 or 0.5G.

That's basically my presentation.

MR. MICHELSON: Let me ask you: When you look at the G values alone, of course, that doesn't settle the issue of whether or not there is a problem with the fast response of the electronics on that particular system.

How do they include that? Because a lot of these in the past were qualified because the -- it was mostly electromagnetic systems, and they were very slow response compared with relay chatter frequency. But if somebody's gone back and put a digital system in or something and these instrument contacts start chattering into a digital system, the response is entirely different.

MR. CHOKSHI: I think the assumption, the way the reviews will be done is to assume first the chatter. Look

at the circuits, see what are the consequences.

MR. MICHELSON: Well, is that the rule, that you first assume all relays chatter?

MR. CHOKSHI: That's how, basically, the margin --

MR. MICHELSON: Is that in the guidelines? Is that what this says to do?

MR. CHOKSHI: EPRI margin method has digital guidelines on doing the review.

MR. MICHELSON: But that's only true of these seven plants plus the western ones?

MR. MURPHY: They're the full review, right.

MR. MICHELSON: They'll do it right.

MR. CHOKSHI: Plus A-46 plants will do the review.

MR. MICHELSON: Those sample plants will assume that every relay -- every instrument contacts, all contacts chatter.

MR. CHOKSHI: That's how it has been done.

MR. MICHELSON: Contact by contact. That's a large job.

MR. CHOKSHI: Yes.

MR. MURPHY: Yes, sir. That was the complaint.

MR. MICHELSON: I wonder if they understood it was that large a job.

MR. SHAO: When they did the hatch, they found out it's a big job.

MR. MURPHY: Okay. That's my presentation.

MR. CARROLL: Just to follow up on Carl, so you're absolutely certain that people are looking inside of instruments. You walk in a power plant, and there are relay boards. There's also a hell of a lot of relays inside of things.

MR. MURPHY: I've got to say I believe that's correct. Will I say it's absolutely certain? I'm just not, right this second, prepared.

MR. CARROLL: Was this issue discussed at the workshops? Did people get into that kind of detail?

MR. MURPHY: I don't believe that particular issue was explicitly addressed at the workshop. I believe some of that was discussed at a couple of the public meetings that we had, basically, with NUMARC, discussing the relay scope review.

MR. MICHELSON: Fortunately, there are also a lot of black boxes in plants that -- that the utility even replaces as a black box, if anything goes wrong with it, but not necessarily full knowledgeable of all the circuitry within the box, because they don't repair it and they don't maintain it. They just replace it if it gives a problem.

Do they know what's inside the box in enough detail to analyze the response of the box?

MR. KERR: If it's a safety-grade box, doesn't it

have to be qualified?

MR. MICHELSON: That's the question. Was it qualified? How was it qualified? Under what group does it come?

If you've got test data on the box, you're in great shape, on the electronic response of the box, not on the physical response. Sometimes people made sure the box didn't come apart, but it didn't necessarily monitor all the electronics during the shaking.

MR. MURPHY: That's what they're expected to do.

MR. MICHELSON: If it's done right.

MR. CARROLL: The full-scope program requires you to assume the relay chatters and really follow it out through the circuit to see what effects result from that.

MR. MURPHY: I believe that is correct. That is specific guidelines within -- at this time, within the EPRI guidance document on how to carry out the relay review for the margins program.

Nilesh, do you have the specifics on it?

MR. CHOKSHI: That procedure was carried out at the hatch, a trial review for the margin method, and it basically looked at all circuits.

MR. MURPHY: Which is why they came up, like I said, with a tremendous amount of expense and burden associated with that.

MR. MICHELSON: And you have to give them a frequency response of each contact, also, because depending on the electronics, that frequency may be a non-problem.

MR. CARROLL: When circuit "A" malfunctions because of relay chatter, it may have some impact on circuit "B" and "C" and "D".

MR. MURPHY: That's right.

MR. CARROLL: And you've got to assume all of these are --

MR. MURPHY: You've got to chase forever.

MR. MICHELSON: I think he was making a larger point, though. Are you doing it as a simultaneous examination or as a one-at-a-time contact chatter exam?

MR. CHOKSHI: In Diablo Canyon, which I am familiar with, all relays were assumed to chatter.

MR. MICHELSON: At the same time.

MR. CHOKSHI: At the same time. And then you look at combination of relays, which can get you in trouble.

MR. MICHELSON: So, you have to look at relay races and all the other things.

MR. CHOKSHI: Sneak circuit and all kind of things.

MR. MURPHY: Right.

MR. MICHELSON: Sounds great.

MR. MURPHY: Okay.

The next speaker will be John Chen.

MR. WARD: Let's take a 15-minute break.

[Brief recess.]

MR. WARD: Mr. Michelson, back to you for --

MR. MICHELSON: Why don't you proceed. I believe the next speaker is ready to move.

[Slide.]

MR. CHEN: My name is John Chen, I'm with Severe Action Issue Branch.

What I'm going to tell you is basically, summarize what we did on the fire and the high-wind flood areas.

Basically, we feel, as a result of this workshop and also the comment we received, we don't see any major comment which cause us to make any kind of major changes in the guidance documents as well as the generic letter.

In the fire area, one of the important comment raised during the workshop and later on we received in the public comments, is related to NUMARC's fire methodology. That's currently in the developing.

Another one is we made a lot of procedure clarifications in Appendix D of the NUREG 1407. We basically provided a lot of clarification about procedures, how you're going to carry on your work.

As far as fire, our planning is because of the current procedures, it's not compatible with our current

schedule, it's not compatible with our issuance of the IPEEE.

[Slide.]

MR. CHEN: So our -- what we plan is endorse, after our evaluation and acceptance of the fire endorse, in a separate letter. This probably will come in -- probably will come in July.

MR. CATTON: Have your questions gone to NUMARC yet?

MR. CHEN: We sent out a question back in September, and we received their revised five write-up. We're also waiting for their submittal related to database, also related to their demonstration plan review, Palo Verde and Duane Arnold.

We now -- we are reviewing their write-up for the "FIVE." At the same time, we are reviewing the validation of their calculation for the look-up tables.

MR. MICHELSON: Now, you will -- you will write an SER for the "FIVE?"

MR. CHEN: That's comparable to SER, is a letter in evaluation of --

MR. MICHELSON: That is some time in July?

MR. CHEN: Before -- I think it some time -- will be issued in July. That's our current plan.

MR. MICHELSON By issue, you mean that's the

first we'll see it or is that when the public gets it?

MR. CHEN: Our plan, let me put a few things in here. We are anticipating to receive the data base, originally in -- well, we're hoping to receive in February. I think, right now, we'll talk about February in here. We also will receive the demonstration report in March. Then we will firm up our draft position some time in April. We're hoping that we will come to ACRS before June, and we'll also meet CRGR to express -- to get their review. After that, then we can issue the letter to say our endorsement, as well as if there's any enhancement, we'll see what we needed, will be in that letter.

MR. CATTON: Were you at our subcommittee meeting of the 17th of January?

MR. CHEN: No.

MR. CATTON: There was a lot of discussion about the numbers that come out of a PRA versus commonly held beliefs about risk associated with fire. We really didn't get anywhere, at least, I still don't know why. But, the consultant that we had, who's Jim Quiutiere, was at the National Bureau of Standards, now, I guess, is at the Fire Engineering Department or something, at the University of Maryland.

He postulated a series of questions that maybe if you asked of the PRA at the front-end, might eliminate some

of this. I can just -- you can get a copy of his report, if you want. But some of them are like -- things like, what is the actuation time of alarms, sprinkler heads, etcetera, to a given fire. By given fire, that means fire somewhere of some magnitude. That means you have to make an estimate in a given area of what the magnitude is going to be, and you can't just use data that there have been so many fires in a given plant. You can't just randomly use it. You have to say something about the fire.

The second question deals with that. What is a typical fire, in terms of energy and smoke release? If you're going to have a fire in a given location, say something about its energy and smoke release, because then that impacts the first question for the various locations that are of importance.

There were -- there are some other things like consequences of hot smoke exposure to equipment and so forth.

MR. CHEN: But those are what --

Our work we line up for now is -- we are now currently review --

MR. CATTON: Are these up-front kinds of questions that you look for?

MR. CHEN: I think what you just described are four things.

MR. CATTON: Well, there are six of them, but I'll -- you can get a copy of this.

MR. CHEN: Okay. What you described is really essential to PRA procedures, what you are going to carry out to assess all those problems.

MR. MICHELSON: Have you looked at fire PRAs?

MR. CATTON: As near as I can tell --

MR. MICHELSON: You don't find that sort of thing in a fire PRA, at least presently or at least the ones I've looked at. Maybe -- I keep asking, please tell me which one to look at that has that sort of thing in it, and I'd be happy to look at it.

MR. CHEN: If you look at it -- if you look at the procedures described in NUREG CR4040 --

MR. MICHELSON: No, I'm talking about the PRA now, not the procedures that somebody might have used in doing this. It's the PRA, itself, that I look for, because that's what people get their bottom lines from.

MR. CHEN: No, that's why I'm saying this procedure has been applied to five --

MR. CATTON: Now, wait. Does the procedure include questions like those being answered?

MR. CHEN: Yes.

MR. CATTON: So you actually do then calculate the magnitude of a fire in a given room and the impact on

everything that's in it?

MR. CHEN: Yes.

MR. CATTON: Impact on barriers? Well, this is a little bit contrary to what we learned on the 17th.

MR. CHEN: No, barrier -- that's -- you did not state it in your first four items.

MR. CATTON: No, I said there were more questions; barriers was one of them.

MR. CHEN: Okay. But what you described -- first you identified the location of the fire and how significant this fire will be, how it's going to impact your systems, and what the consequences will be. All those procedures are described --

MR. CATTON: Do you calculate the energy release of smoke generation?

MR. CHEN: Yes.

MR. CATTON: You locate the fire, then you ask what's the impact on the surrounds, then you put that into your PRA.

MR. CHEN: Yes. Those are all --

MR. CATTON: You do that?

MR. CHEN: -- the procedures -- standards procedures in the PRAs.

MR. MICHELSON: Do the PRAs reflect these procedures then? I would expect to find these calculations

as a part of the PRA, including the heat and smoke migration and the --

MR. CHEN: Not -- not smoke migration.

MR. MICHELSON: Heat migration -- heat and smoke.

MR. CHEN: We'll talk about the heat -- if you have a fire in a room, how this fire will affect your safety equipment. That will be either calculate or like right now, we have alternative methodology, which will be a look-up table saying how far away your fire versus your target for say, safety systems; how it's going to impact this system. That will be able to address those in the procedures.

MR. CATTON: You don't include smoke?

MR. CHEN: Pardon?

MR. CATTON: You don't include smoke?

MR. CHEN: The impact of smoke is not because we -- we don't have -- we don't have a specific handle how to address smoke.

MR. CATTON: Well, I met a guy from Factory Mutual earlier this week, and heard some horror stories about smoke. The relative damage from the fire was one-tenth of the damage from the smoke. The damage from the smoke was bizarre, what it could do. In one case that he described there was a machine shop of some kind that was controlled with some sort of equipment. The actual problem occurred a couple of months later.

MR. CHEN: That -- that essentially, is what we are facing with certain problems we have -- we'll talk about somewhere in unknown stage -- the current state of art.

MR. CATTON: Do you have any research request letter to look into smoke transport and impact?

MR. FLACK: This is John Flack speaking. There is a generic -- generic issue that has been raised with regard to smoke propagation.

MR. CATTON: How are you going to deal with this in the IPEEE?

MR. FLACK: From the point of view of trying to resolve that issue, we're not. But we are -- we did put in the attempt that they are to think about it while they're doing their analysis, but we're not expecting that they're going to use sophisticated codes to analyze it.

MR. CATTON: I don't think you need sophisticated codes. I mean, I hope I didn't imply that.

MR. FLACK: Well, I don't need them, myself, but, nevertheless, we believe that the issue --

MR. CATTON: How about simplistic codes?

MR. FLACK: Well, there's a few out there.

MR. MICHELSON: How about any?

MR. CHEN: We have not talked about the code, we have talked about actual impact if you have smoke. The long-term impact.

MR. CATTON: Can you tell me how you get the impact without considering the smoke? How can you talk about impact?

MR. CHEN: That's why we have not specifically addressed in IPEEE, related to smoke migration. We talk the smoke hindrance on your detecting of the fire. That part we want the people to address, because that part can be addressed. But we cannot address, at this time, how the smoke will affect the long-term specifically; whether they will cause any kind of short in the circuit or any short in the cables or what other impact, we've not asked them to address at this moment.

MR. MICHELSON: Could I ask one question on your look-up tables? Apparently you've developed look-up tables on some kind of a calculational process that tells you what the thermal distribution is in the vicinity of a fire. Does that look-up table start with temperatures like 150 fahrenheit, or does this start with temperatures like 5, 600 fahrenheit?

MR. CHEN: The look-up table is still --

MR. MICHELSON: In other words, can I tell, from the that table the temperature at the floor level on the opposite side of the room in which the fire is located?

MR. CHEN: At this moment, the look-up table is in the development. That's not in this package.

MR. MICHELSON: Oh, I thought it existed, okay.

MR. CHEN: But the idea is starting from ambient temperature.

MR. MICHELSON: It should. Yes.

MR. CATTON: Is there any way we could get a preview of this NUMARC "FIVE" methodology? I there --

MR. CHEN: Well --

MR. CATTON: I may already have it.

MR. MICHELSON: I think you do.

MR. CATTON: I think I do.

MR. MICHELSON: It's going to be the subject of -- apparently of our meeting on the -- whenever.

MR. CATTON: I think I ask for it every time. I have several copies now.

I think you've got to address smoke somehow.

MR. CARROLL: Now, the third bullet talks about a data base to be submitted. This is a fire frequency data base?

MR. CHEN: Yes. The accumulation -- our data base -- so far we have NRC-developed data base, up to 85. It's by Sandia. NUMARC is taking the data base, expand it and added this up to 88 or later.

MR. CARROLL: You expect that database to be what?

MR. CHEN: More comprehensive.

MR. CARROLL: And it would probably predict more

frequent fires?

MR. CHEN: That's the part we want to review, because we want to know the database itself, whether there is encompassed all the fires or some have been screened out because there is certain justification to put on those fires.

MR. CARROLL: Do you believe the Sandia database as it exists today needs some screening, that there are many, many fires in that database that are so trivial that you can't even think of them in terms of causing a major fire?

MR. CHEN: I think to some extent it may be true. For instance, the construction fire, which may not be applicable to the operating plant. And those parts, if it's included in there, and it will be unlogical to take it out.

MR. MICHELSON: Why don't we move on, since we'll go back to all of this when we look at this "FIVE" methodology later on, in March or whenever?

MR. FARMER: Farmer, of the Staff. In response to Dr. Catton's comments on smoke, the Research Office is working with the German HDR program. They're conducting large-scale fire tests in a containment vessel over in Germany. And we expect to get from those tests a fair amount of information on the behavior of equipment with the smoke. So we do have access --

MR. CATTON: You are not going to get information on the behavior of equipment from smoke, you are going to get information on the propagation of smoke throughout a containment building from those tests. There's a difference.

MR. FARMER: Well, we intend to ask the Germans and discuss with them putting in a few items of electrical equipment to test directly cable tests that would come up later this year, or early in 1992.

MR. CATTON: I believe that you could already do at least zero with water kinds of calculations of smoke propagation with the tools you have. And it seems to me to wait to dot all the "Is" and cross all the "Ts" is a mistake with the IPEEE coming down the road now and with this NUMARC "FIVE" in front of you. You ought to bring to bear, they've done a lot of experiments at the HDR containment. They've already set off a number of fires in lower rooms to see where the smoke goes. They just finished cleaning the walls from the last one.

MR. FARMER: Yes, they ran one in November.

MR. CATTON: They've run some before November, too.

MR. FARMER: Yes. There's been a heavy emphasis in the tests that they've done on smoke migration, and collecting smoke on filters and trying to clean it from the

atmosphere so they would have escape routes for operators, but there has been less emphasis on what happens to equipment located in the vessel.

MR. CATTON: They are actually separate questions. The first question is the migration. I think you have enough data to do something. The second question is the impact on the equipment. If you can't address the first, I'm not sure what good the second does you.

MR. MICHELSON: I think we'll have to proceed to finish on time. We're going to get into this in great depth later.

MR. CATTON: This is the preview for NUMARC FIVE.

[Slide.]

MR. CHEN: In the high wind, flood and transportation, or other areas, we don't have, we did not make any major changes. A few questions have been raised more or less as a clarification, and they want to see why we feel a few things, why we should include it. And it's, the response is addressed in Appendix D. And this is basically related to fire, high wind, and flood.

MR. MICHELSON: Now, floods mean water coming to the building from beyond the building?

MR. CHEN: Basically, the flood we talk about in here is external.

MR. MICHELSON: But external means what? External

to the buildings, or external to the equipment?

MR. CHEN: External from the external source. It's from the buildings. If you talk about, if it's like rainfall.

MR. MICHELSON: Okay.

MR. CHEN: And all those floods.

MR. MICHELSON: Internal flooding, now, has always been the confusion. Sometimes you say it's already been covered.

MR. KING: That's pipe break kind of flooding. We're talking about flooding from --

MR. MICHELSON: But the pipe break flooding unfortunately was a rather limited spectrum of flooding potentials, too. You remember the whole problem of the nonqualified tank in a room. You didn't even look at the water; you looked at the structural impact of the tank under A-46, but you never looked at the water running across the room, at least it's not a regulatory requirement to look.

And now, when is that kind of flooding being considered?

MR. CHEN: I think under IPEEE we have a seismic-induced flood. That's covered in this area.

MR. MICHELSON: That's clearly covered in here?

MR. CHEN: Yes, that's covered in our seismic, fire, or say with a seismic and flood interaction aspect.

MR. MICHELSON: Okay.

MR. CHEN: But our guideline basically is based on the EPRI --

MR. MICHELSON: There are some interesting kinds of floodings that some sites can get into. Namely, the flooding from groundwater, when you shut the groundwater pumps off, like when you lose offsite power and so forth. Is that sort of flooding being looked at? This happened one time at Brown's Ferry, as the Staff well knows, in which the groundwater pumps were taken out of service. The first thing you know, they flooded the basement. And the groundwater is a very high level there, and if you shut the pumps off, and it starts rising, the head forces the water into the building.

Now, is that considered flooding? Is the IPEEE going to check for that sort of thing?

MR. CHEN: We are hoping some of those things were brought, would bring the utilities' attention. I think for instance, we talk about in a fire database, we talk about one spent type.

MR. SHAO: That should be covered.

MR. CHEN: Yes. Those are the kind of things, if you have that kind of potential, then you should think about it.

MR. MICHELSON: It's somehow, some general word

that says if you think you got any kind of a potential like that, you better check your power sources and your effects of earthquake and so forth, because those are non-seismic pumps as well.

MR. CATTON: Mr. Farmer, could you get me some information on that program at HDR?

MR. FARMER: Yes. We have several reports. I'd be glad to send copies.

MR. CATTON: Particularly something that would give me an overview of the plan.

MR. FARMER: I'm sorry?

MR. CATTON: An overview of what your objectives are and what you plan to get out of the tests.

MR. FARMER: All right.

MR. CATTON: Thank you.

MR. MICHELSON: One further question on the flooding. In the case of cooling-tower basins and so forth, is that the kind of flooding you're talking about on a landslide, if those should rupture during an earthquake?

MR. KING: Yes, that would be included under the flooding.

MR. MICHELSON: The licensee is supposed to look, and he first of all, I guess, just postulates a burst and makes sure nothing happens, or if it does, then he's got to go back and do some kind of an analysis and show it really

won't burst; is that what he does?

MR. KING: It is in the package.

MR. CHEN: That is in the package. That is more or less addressed through the guidance of the EPRI 6041 tank.

MR. MICHELSON: What do you do about all your non-qualified chemical tanks and so forth out in the yard containing chlorine and hydrogen gas and whatever? A lot of that is non-seismic. How is that brought into this analysis? It's not a safety-related piece of equipment, it's not a flood. It's a flood of gas, it's not a flood of water, which people usually think of.

MR. CHEN: I think basically, this kind of interaction type of problem, in the licensing stage, we have addressed that. We believe to a certain extent, those things have already been addressed.

MR. MICHELSON: I thought all these problems were already in the regulations. The problem was that you are going back now to make sure you really took care of it. That's what IPEEE was about, wasn't it, because there is a question of whether you've overlooked some of these.

MR. SHAO: Well, we look beyond design basis.

MR. MICHELSON: You're looking for vulnerabilities which aren't supposed to be there. They were supposed to have been analyzed.

MR. KERR: In this, you are also looking at higher earthquake potentials in the design basis.

MR. MICHELSON: To that basis, yes.

MR. KING: We are trying to look at beyond the design basis, and to that extent, a licensee would be expected to look at those kind of hazards.

MR. MICHELSON: Hopefully, you'll find all these others because it turns out that there was no design basis and that for those kind of earthquakes, they, indeed, do fail, and you look at the effect of failure. I'm just trying to figure out what you did with site equipment outside the buildings.

MR. KING: We would expect them to look at that even though it's non-safety-grade kind of equipment.

MR. MICHELSON: And even though it's not a flood and so forth?

MR. KING: Yes. I think that's covered under the catch-all of other external hazards that may be site specifically unique.

MR. MICHELSON: All right. Tom, do you have anything further?

MR. KING: No, that completes our presentation.

MR. MICHELSON: We're a little ahead of schedule, I believe. Eleven o'clock was the scheduled time. So I guess we can go to a committee discussion on this.

MR. WARD: Okay. Sounds good.

MR. MICHELSON: Do we want to record the committee discussion? I have no preference.

MR. WARD: I have no problem with that.

MR. MICHELSON: Okay. We'll go ahead and record it.

I think that, first of all, it's my understanding that Chet looked at the proposed documents and had no problem. Is that correct? I looked at the proposed documents and I have no problem with them. They seem to cover the appropriate caveats, what we've been most concerned about, at least what I was highlighting. So I wonder, have other members looked at the documents and do they have any problems with them?

MR. KERR: From the preliminary discussions, do you think that most of the licensees are likely to use a margins approach or the PRA approach in dealing with the seismic issue?

MR. CHEN: I think the idea, it depends on what they feel comfortable using. Given those people already sent in their response, a lot of them are using PRAs. But on the other hand, the methodology developed by EPRI, the margin methodology, is very advantageous for them to use because it's much easier for them to understand what's going on in their plant. So there is a trade-off on their part, I

think. We are thinking about maybe 50-50.

MR. SHAO: We think about 50.

MR. KERR: Thank you.

MR. WILKINS: I don't have a substantive point, but it does disturb me that the draft letter cites as authority from the Office of Management and Budget a clearance which expired in December of 1990.

MR. CHEN: Okay. Let me provide some clarification on that. That has been modified to April 30th. That's interim clearance, because we are negotiating for three years. We haven't reached that stage yet.

MR. WILKINS: Just make sure the letter shows April.

MR. CHEN: Yes.

MR. WILKINS: Thank you.

MR. MICHELSON: Other comments?

MR. WARD: Carl, there are a couple of points that were discussed here this morning, and this definition of vulnerability is one. It's one that seems to come up every time we talk about the IPEEE, and it's hasn't been resolved. Are you going to say anything about that in the letter?

MR. MICHELSON: If the committee wishes, of course, we will say something. It's a problem of specifying beauty -- it's hard to do.

[Laughter.]

MR. MICHELSON: But we can attempt to indicate. I think that's the staff's problem, is it's very difficult to provide a specification for this.

MR. KING: Yes. We chose not to do that. We chose to let the licensees define it.

MR. MICHELSON: Now, if the committee thinks that we should define vulnerability in some way --

MR. KERR: Carl, it isn't a question of what the committee thinks. The staff is going to have to define it when they do their reviews. They will make a de facto ad hoc definition that works, but at some point, it has to be defined.

I don't disagree with them that it's difficult, but if they're going to do the review that they say they are going to do, and if they are going to disagree, as they may well, with the conclusion reached by licensees, then they are going to have to have a working definition.

MR. MICHELSON: Comments?

MR. FLACK: This is John Flack. I'd like to just make a comment on that. We're not trying to define vulnerability in an absolute sense. I think it's impossible and I think it's inappropriate to define it in an absolute sense across all plants.

I think it's something that would come out of the review process. It's something that you have to look at the

entire PRA, what the IPE is telling you before you can determine whether you have a vulnerability or not. I don't think we can do that in an absolute sense.

MR. MICHELSON: It's like a beauty contest, then -- if you r a few, you can make a choice.

MR. KERR: I am not insisting that one do it in an absolute sense or a numerical sense or any other sense. I'm simply saying you're going to need a working definition, one that a reviewer can apply. Otherwise, it will be up to the individual judgment of the individual reviewer, and it seems to me that is somewhat capricious.

MR. MICHELSON: Other comments on that point?

MR. FLACK: Just one more comment. It will not be left up to any specific individual. There will be teams reviewing the IPEs. There will be contractors to support that team review. It would be done in that type of frame work. It's not to be determined by any specific individual.

MR. KERR: It doesn't make me feel any better that it's going to be done on an ad hoc basis by committee because that means it'll be done at the lowest common denominator probably. That's what usually happens, especially if nobody has really thought about it before hand. They sort of get together and say, Well, what's a vulnerability? Well, I know one when I see one.

MR. MICHELSON: Ernest, did you have a comment?

MR. WILKINS: I am not sure if this is meaningful, but am I correct in inferring that the licensee will furnish his own definition of vulnerability in his IPEE?

MR. KING: Yes. We have asked that he provide his definition of a vulnerability.

MR. MICHELSON: Did you ask that literally? I mean, you literally asked him to define it.

MR. KING: Yes.

MR. WILKINS: Now, then you could audit or at least you could examine their response in light of their own definition without having to invent your own definition for that purpose. Of course, that would mean that you might well be inconsistent between licensees.

MR. MICHELSON: I would think that that definition ought to come up front and be kind of discussed with the staff before they spend three, four years doing the work. That would seem logical.

MR. WILKINS: One might think that was prudent.

MR. MICHELSON: Yes. And that might be a valid suggestion. Maybe after you look at enough utility definitions, you can arrive at what appears to be acceptable to the staff, and then all utilities can use that definition.

MR. SHEWMON: Well, is there an owners group or an EPRI group that has been working on this or helping

coordinate? NUMARC.

MR. KING: NUMARC.

MR. SHAO: They have two working groups. One is a seismic working group; the other one is called Severe Accident Working Group. There are two groups working on it.

MR. SHEWMON: And they could come up with something that would perhaps reflect the safety goals of the Commission or some such thing, or do we know yet?

MR. SHAO: I don't think they have come up with anything yet. They may be working on it in the future, but not right now, no.

MR. CARROLL: That seems to me to be the key, Paul. It seems to me vulnerability has some relationship to the safety goals.

MR. MICHELSON: But neither the industry nor the staff has been willing to define it so far, I gather.

That would certainly be a valid suggestion.

MR. SHEWMON: The staff believes that the industry is going to blink first.

MR. MICHELSON: Yes.

MR. WARD: Does the staff see a connection with the safety goal here? I mean, do you plan to use the safety goal in reviewing the IPEEE?

MR. SHAO: For the seismic methodology, there is no quantity in numbers, so you cannot really use safety

goals. For PRA, maybe you can do that, but --

MR. WARD: You sound pretty tentative like you don't really want to or you don't think it's applicable?

MR. SHAO: For seismic margin, you cannot use safety goals.

MR. WARD: I understand that part.

MR. BECKNER: This is Bill Beckner. We said in the IPEEE documentation that we would, once this is all over and we get insights from all the plants, we would go back and make use of the safety goals for the whole to see if we've identified any vulnerabilities in our regulations that might cause plants not to meet the safety goal, but not as a criteria for the individual reviews.

That was stated, I think, pretty clearly in the original generic letter.

MR. WARD: Okay.

MR. CARROLL: You have come up with a definition of a vulnerability in regulation?

MR. BECKNER: It's called the Backfit Rule.

MR. MICHELSON: I don't think that's the case, but I don't want to spend time to argue that one. Is that your only definition? Is that what you think vulnerability means; that something that I have now apply the backfit rule to?

MR. KING: No. If the staff wants apply some

additional requirement on a plant, they're subject to the backfit rule.

MR. KERR: I am sorry, but if the staff determines that something makes a plant not appropriately safe, it does not have to apply the backfit rule.

MR. MICHELSON: It depends.

MR. KING: That's not true. The staff has to follow the backfit rule.

MR. KERR: Even if a plant is deemed not adequately safe to protect the public?

MR. KING: The backfit rule covers that possibility, unless you're talking compliance. If you're talking compliance, that's true, you do not have to use the backfit rule.

MR. KERR: Sure, I'm talking compliance; I'm talking about compliance.

MR. KING: That's something new, over and above -- no, compliance, that's true.

MR. WARD: I guess he's saying the backfit rule acknowledges the issue of adequate protection and it doesn't require the cost/benefit test.

MR. KING: That's right.

MR. KERR: That's all I'm saying. In the case where it is deemed that something does not provide adequate protection or makes you conclude that this plant has not

provided it, the backfit rule doesn't apply.

MR. WILKINS: You don't have to make a cost/benefit analysis.

MR. KING: Yes.

MR. WILKINS: But the statement that the backfit rule doesn't apply, isn't correct because that's in the backfit rule.

MR. WARD: That's my understanding, yes.

MR. KING: The backfit rule makes you make the case that you don't need cost/benefit.

MR. MICHELSON: We do need to prepare a letter, I think, with whatever views, if any, we have, just to keep the record on this clean. We have a copy of our previous letter on page 4 of Tab 2.

I would suppose, since Chet's not here, I will see to it that an introductory paragraph is prepared. Now, as to what else you need: I read through the letter. I find that our comments there still stand.

I think that it would be appropriate in our transmittal letter to say they still stand. Is that truly the case, or do they -- does any member have any problem with what was said as to whether it still stands, and do we have any additions and possibly this question of the definition of vulnerability could be an additional paragraph?

That would all be what I would envision for the letter.

MR. WILKINS: The final sentence of this letters says we'd like to have the opportunity to review such changes and provide our comments.

MR. MICHELSON: That's what we're doing now.

MR. WILKINS: It would be appropriate to comment on the changes if we think we have any comments.

MR. MICHELSON: If we have any comments on the changes, plus the -- you know, new things or anything else, yes. That's what we're doing now, so I think we need our followup letter, all right, and it's just a question of what we would like to see in it.

Bill, would you like to draft a paragraph dealing with the question of definition of vulnerability?

MR. KERR: I will attempt to.

MR. MICHELSON: I think that would be a useful paragraph. I kind of agree with your comment. Let's see what it looks like.

Would there be any other paragraphs needed?

MR. WARD: The other point that was discussed at some length here this morning is this issue of the two seismic hazard curves; whether it's meaningful to require use of both of them and the issue of whether conservatism is an appropriate approach.

MR. SHAO: By the way, the two seismic curves, there were no changes. We just give an alternate. They were the same before.

MR. MICHELSON: Maybe it's our increased understanding that's changing these things.

MR. SHAO: There were no changes.

MR. SHEWMON: I think that the point that Al was making was that there was not a criteria for a cutoff, but there should be one.

MR. MICHELSON: I think it's an appropriate paragraph to see, if we can get Hal to draft. See if you can get Hal to draft a paragraph then.

MR. WARD: Why don't you say something to him?

MR. MICHELSON: I think it would be useful to see what that paragraph would look like. Any others?

[No response.]

MR. MICHELSON: I was not intending to go back and retouch on anything that's already clear in our previous letter and still stands; for instance, fire is the same situation. There's nothing new, nothing changed. We don't disagree with what the staff's doing. They're coming up later to tell us. By July, we'll reach agreement on the FIVE program.

I wouldn't intend to mention fire since there's no change.

MR. MURPHY: Excuse me. This is Andy Murphy of the staff. I think on the discussion of the two hazard curves, we will take your points into consideration, and if you want change the words from talking about a conservative or non-conservative and simply go to a higher or lower curve, approach it, if you want to say absolutely in that sense, rather than its relative conservatism.

MR. MICHELSON: Well, we have to write our letter based on what's in front of us, of course, and what we've heard -- we will comment on this and you will already have recognized what the comments might be.

MR. MURPHY: That's what we're saying, recognize your comments on the use of the conservative.

MR. MICHELSON: Your reply will be, we've taken care of it and here's how:

MR. MURPHY: Yes, sir.

MR. MICHELSON: But we would put the paragraph in the letter.

MR. CARROLL: One external event that we didn't hear anything about this morning is the effect of lightening which is in the program. Charlie, have you looked at the NUREG that's referenced about lightening and are you happy that sufficient guidance is out there for utilities to evaluate it?

MR. WYLIE: I haven't really reviewed it.

MR. CARROLL: For the last couple of days, we've heard quite a bit about bad grounding and its impact on control and protection systems.

MR. WHITE: I'll do that.

MR. CARROLL: Okay, it's referenced in here.

MR. SHAO: By the way, there was no change in this area from the last.

MR. MICHELSON: One of the things we also, along that same line, we heard about the last couple of days was the fact that a number of plants are now going to digital control systems, some a little ways, some of them rather extensively. Of course, one always wonders if they had really analyzed the integration of the digital controls into the old pressure instruments they're still using and so forth, because the noise levels are now changed and the response is vastly changed.

You're now talking about microsecond response systems put in with the old relay -- the old contact chatter of the instrument. Have they done that sort of thing? I assume that's all integrated into these words, but I -- it depends on how you read them.

But they will have to do -- they can't depend upon all the evaluations in all cases. They've got to go back and reevaluate.

MR. KING: Yes. It is mentioned in the package

that they have done a PRA in the past and they have made changes to the plant that the IPE analysis should reflect today's plant.

MR. MICHELSON: You realize relay chatter is generally not included in PRAs as such.

MR. KING: That's right.

MR. MICHELSON: So it's got to be something -- can't use the PRA route to make that determination. It's got to be some -- whatever, but you think the generic letter makes it clearer that you do have to make sure that when you put these other systems in that you've re-examined from the head end of the process.

MR. SHAO: I think we think it's clear here.

MR. MICHELSON: Okay.

MR. WILKINS: Let me ask a naive question. I've read the description on page 3 of this generic letter that talks about identifying the external hazards and I understand the philosophy here.

You don't mention sabotage at all. Is that considered an external event?

MR. SHAO: No. That's not part of it anyway.

MR. WILKINS: I know it's not part of -- not here so it's definitely not part of it.

Is it covered anyplace else?

You don't care anymore?

You know the events in the last few weeks it seems to me have increased the probability -- I mean if they can fire mortars at 10 Downing Street, I don't know why they can't fire mortars at --

MR. MICHELSON: Oh, they can do better things than that.

MR. WILKINS: They probably can. Is this something that anybody is worrying about or needs to worry about?

MR. KING: Yes, people worry about it. It's not part of IPEEE anywhere but there is a division in NMSS that deals with the threat, the external threat from sabotage and periodically tries to keep up to date with the latest potential threats and deals with it through their channels but not through this channel.

MR. MICHELSON: It's specifically included by words though in this program, isn't it? Doesn't it say somewhere you do not include sabotage? Or does it?

MR. KING: I didn't see it in this paragraph on page 3 of the generic letter.

MR. MICHELSON: I was thinking I've read it somewhere --

MR. CARROLL: It has never been included in --

MR. CHEN: It has never been included in IPEEE but in our response, in the Appendix D, we have a section

specifically address that sabotage is not included in the IPEEE.

MR. KERR: There has been a recent request for rulemaking to change the NRC "defined threat."

MR. CARROLL: Which was denied -- and Mr. Bernero in denying it noted that the NRC is continually reviewing the threat environment associated with commercial nuclear facilities and then based on evaluation of the intelligence community and other relevant data.

The Staff has determined that there continues to be no credible threat of terrorist actions against any NRC-licensed facility that warrants implementation of contingency plans.

MR. MICHELSON: Recent?

That was February 23rd, 1990.

MR. WILKINS: When did we start bombing Kuwait? January 15th?

MR. MICHELSON: I think, gentlemen, that Charlie had planned on bringing this up as an added agenda item during our future agenda discussion in which we will talk about what we wanted to do, so I'd rather not spend any time for this subcommittee --

MR. CARROLL: We are just killing time 'til 11:00.

[Laughter.]

MR. WARD: I don't understand. Jay brought up a

thing about lightening and Charlie said you're going to take a look at it.

Where do we go from there? What happens?

MR. MICHELSON: You may have a letter, a paragraph in a letter, depending on what he decides, I assume --

MR. WARD: Oh, I see.

MR. MICHELSON: -- even if it's a caveat, which I think we need to put in here. If there are things you really think need to be looked at and haven't been discussed and don't appear here, then we need it in our letter.

Any other paragraphs we think ought to be added, at least at this time?

If not, then we'll all proceed on this basis. I expect to get at least two paragraphs from people and perhaps a third and I'll take care of the boilerplate and the rest of the letter.

I believe that's all, Mr. Chairman.

MR. WARD: All right, well, thank you very much, gentlemen.

MR. MICHELSON: Oh, excuse me. One more thing -- I'm sorry. I was handed a note here that says that Dr. Siess also wondered about the definition of vulnerability. That adds encouragement to your paragraph.

It's yours, Mr. Chairman.

MR. WARD: Let's just take a five minute break for

the meeting room to clear and then you're on at eleven o'clock, right?

[Brief recess.]

MR. WARD: For the next topic, Mr. Wylie will lead off.

MR. WYLIE: This portion of our meeting concerns the staff's plans to complete its review of the EPRI Advanced Light Water Reactor requirements documents and specifically what the staff intends to do with the rollup documents which were submitted September 7, 1990.

Tab 3 contains a very good status report and summary of the activities in this regard over the last several years.

Just for a moment, I'd like to refresh the memories of ourselves.

The original purpose of the EPRI Advanced Light Water Reactor requirements documents was to identify and define all of the features and requirements which the utilities wanted in the future advanced light water reactor plant designs and to identify and reach a position or agreement with the NRC on all regulatory policies and safety issues by way of the review of the documents and the issuance of the staff's SERs.

Thirteen chapters of the original version were developed and submitted between June '86 and October of '89.

The staff has issued SERs covering all except Chapters 10 and 11, I believe. However, they are remaining open items.

I believe that the original intent was that the original version of the documents were to be revised to reflect the final agreements and staff positions, much like a FSAR. However, it was -- it is my understanding that so many revisions had to be made that EPRI decided to issue what is known as the rollup documents, which were submitted September 7, 1990, to reflect the final agreements reached with the staff and the positions.

The rollup documents consist of Volume 1, which is the executive summary and policy, and Volume 2, consisting of 13 chapters covering the evolutionary advanced light water reactor plants, and Volume 3, 13 chapters covering the passive advanced light water reactor plants.

These rollup documents are somewhat different from the original versions. They expand the scope, and they do not reflect all of the staff positions or agreements which have been reached or in the SERs. And of course, there are a lot of open items yet.

Before we proceed -- well, we'll come back to this. I had first asked EPRI to be prepared to answer some questions. I believe they are prepared to wait until the staff makes their presentation, and then we'll ask those questions.

So, go ahead.

[Slide.]

MR. KENYON: My name is Tom Kenyon. I'm the NRC Project Manager on the EPRI requirements document for both the evolutionary and the passive plant.

MR. WYLIE: First of all, let me ask a question, Tom. Do you agree with what I said?

MR. KENYON: There's a few corrections I'd like to make, and I figure either I or Mr. Trotter from EPRI can make them as we go along.

[Slide.]

MR. KENYON: The purpose of my presentation is to discuss the status of the review of the requirements document, both the evolutionary and the passive. I'm going to discuss the review that's taken place to date.

We'll address the regulatory significance of the requirements document and then discuss the remaining work that has to be done and the review schedule. I intend to emphasize on some of the work that we expect will have to be done with interactions with the ACRS.

[Slide.]

MR. KENYON: The next few slides are nothing more than a chronology of what's taken place since the inception of the review back in '86.

Since I last met with the Committee, which was

sometime in July, a number of major occurrences have taken place.

EPRI has submitted the rollup document on Volume 2 of the evolutionary plant, as well as the original -- their original version of Volume 3.

It's my understanding and it's always been EPRI's intent to provide a rollup document that would reflect modifications that were agreed upon after we have performed our review.

The original plan with the rollup document was that it was going to be submitted after all the draft SERs and after the review of the original document was completed.

However, for a number of reasons, EPRI has submitted -- decided to submit the document based on the five draft SERs that have been issued on Chapter 1 through 5 and also including what they knew of what our concerns were on the other chapters.

So, the rollup document on the evolutionary plant does not reflect all the concerns that you've seen in the other six draft SERs that we just issued.

MR. MICHELSON: One of the problems I'm having, though, with your SERs is that they don't reflect what changes EPRI has made in the rollup document that had -- I don't know if they were negotiated or not. I have no way to know.

But they have significantly changed some areas, moved things around, and significantly added and sometimes moved them from one category to another and so forth. Has all this been negotiated with the staff?

MR. KENYON: I understand the concern. There's a couple of ways that EPRI and the staff have arranged to mitigate the problem.

First, EPRI has submitted a third document -- well, I shouldn't say a third -- a version of the evolutionary requirements document that shows us what changes were made. It will help the staff identify where things have been moved around.

MR. MICHELSON: Is that big book or something that's manageable that I could get a copy of?

MR. KENYON: No. It's a small box.

MR. MICHELSON: You mean it's a foot of paper.

MR. EL-ZEFTAWY: It's about an inch for each chapter. We've got 13 chapters.

MR. KENYON: It's a markup. It shows what was deleted and what was added.

MR. MICHELSON: When it's been deleted or added, was that after negotiation or before negotiation with the staff?

MR. KENYON: Well, for Chapters 1 through 5, I would say it was -- you know, these modifications were made

after they saw what our concerns were.

MR. MICHELSON: Okay. So, the rollup document reflects your views at least on Chapters 1 through 5?

MR. KENYON: Well, no. It reflects the views of EPRI, as they understood what our concerns were on the draft SER.

MR. MICHELSON: Okay. The rollup has been negotiated already on 1 through 5. So, I can believe that the staff is at least aware of the changes and doern't have a violent disagreement.

MR. KENYON: Well, we're going to be reviewing it to determine that. We haven't started the review of the rollup document in a great deal -- in a great amount of detail.

MR. MICHELSON: I thought the rollup was to represent some sort of a final consensus.

MR. WYLIE: Well, just like he said, Carl, it doesn't reflect that, and so, you plan to review those and comment on those?

MR. KENYON: I guess what I'm getting at is it should reflect what we've discussed and what EPRI understands to be the resolution to the problem. Until we review it, I'm not in a position to say that it does.

MR. MICHELSON: I see.

MR. KENYON: As you can see, in January we have

issued six more SERs, and that was based on the original document, not on the rollup document. There were a number of reasons for that. But the primary reason is, by the time EPRI submitted the rollup document, we were too far along in our review of those chapters in order to efficiently switch to the rollup document. So we decided to issue the draft SERs, get them out on the table, and begin our review of the rollup document.

MR. WYLIE: Let me ask, when you've issued [illegible] SERs and you've got the rollup documents, what are y[illegible] to review in the future?

Say you review Chapter 5 of the rollup document and you've got comments and open items there. What are you going to correct? The original document or the rollup document?

MR. KENYON: I assume it's going to be the rollup document. Perhaps John Trotter might want to address the mechanism EPRI intends to use to fix it.

MR. WYLIE: I am curious as to whether we should review the rollup documents or whether we should review the original documents.

MR. KENYON: We're going to review the rollup document to see how it reflects resolutions for Chapters 1 through 5. EPRI has provided us what I call a roadmap, telling us where in the rollup document they've addressed

our concern.

And so we're going to go back, take a look at the rollup document, and if we have a disagreement, of course, we'll get back to EPRI, we'll have appropriate meetings, and, if necessary, have documentation, you know, questions sent out, et cetera.

MR. WYLIE: Chapter 1, for example, in the evolutionary, the old version and the new one, the amount of information for certification no doubt will be changed, depending on what the Commission comes down on, on that decision. I would expect that to be changed in both cases.

MR. KENYON: Are you saying you're expecting the level of information in EPRI's document?

MR. WYLIE: The way it's defined, yes.

MR. KENYON: You have to remember that EPRI is not coming in for design certification.

MR. WYLIE: I understand that. But they're saying, though, this is a guide for the industry, saying this is the information required for certification, is in that document.

MR. KENYON: No, I don't think it's going to that point.

MR. WYLIE: Yes, I think it does, too.

MR. MICHELSON: Yes.

MR. KENYON: John Trotter would like to make a

comment.

MR. TROTTER: Yes. That was one of the questions that I was warned about is we did go back and look at, it's Attachment 2 to Section 11 to Chapter 1. And in the original issue, there was a list of category of engineering activities in Categories 1, 2, 3, and 4, 3 and 4 being site-specific I believe.

Category 1 was the engineering effort necessary for certification.

Category 2 was the engineering details, and our requirements were addressed toward two utility decision points.

The first decision point was the decision to buy. And that one, although it's not as clearly stated as perhaps it should be, a prerequisite for the decision to buy is a certification. The intent of that split in the list was to say the decision was just that, that the prereq. to buy was the certification. What goes in that certification, or what is necessary for that certification, our list was intended merely to reflect the status of that issue when we were writing that rollup. That was July, August of last year. So it reflects a negotiation process that's ongoing in the industry and being led by NUMARC.

Our requirement for completion is more strongly stated toward the completion of engineering before first

concrete. And that's the 90 percent of engineering, before first concrete.

So I wouldn't, we are not taking a position; we are reflecting our understanding of where that list, which always existed in our document, now reflects, beyond going to negotiation.

MR. MICHELSON: That list is going to move significantly; the distribution has been changed significantly. It exists, yes, the list did exist on that.

MR. TROTTER: Right.

MR. MICHELSON: But you just moved it, appeared to be moving it from the category of what you need for certification to what you need for detailed design.

MR. TROTTER: I think as people got closer to understanding the impacts and understanding the needs, yes, that list got changed. But we are not particularly devoting much effort to understanding where that goes.

MR. MICHELSON: Well, this all depends upon what we finally decide this is ever useful for.

MR. TROTTER: Absolutely.

MR. MICHELSON: That apparently we hear last instead of first. If I knew upfront what the Staff was going to do with this, I'd change a lot of my comments.

MR. WYLIE: Go ahead and proceed, and then we'll ask that question, what you're going to do with it.

MR. WARD: Charlie, could I ask a question?

MR. WYLIE: Sure.

MR. WARD: Tom, in this past month, you issued these SERs on Chapters 6 through several of them. Now, eventually you're going to issue SERs on those same chapters in the rollup document.

MR. KENYON: That's correct.

MR. WARD: All right. Are you going to refer to these January '91 SERs when you do that? Are the SERs you write months from now going to depend on these January '91 SERs on the original document?

MR. KENYON: Well, the draft SERs, the January SERs are identifying where we feel are the open issues. So we're going to be using that as the base. We're going to be using that as our talking point with EPRI. We intend to be meeting with EPRI over the next several months, and for that matter, with the committee, over the next several months, to talk about what the issues are, and the proposed resolutions.

I'm not sure of the mechanism EPRI intends to use, but EPRI will need to respond to these open issues, and, if necessary, modify the rollup document from that point, before we would write our final SER.

MR. WARD: Okay. So you're saying this is the same SER, that this is a draft based on the original

document. Some months from now, the final SER will be based on responses to this draft and also on what's in the rollup document.

MR. KENYON: That's correct.

MR. MICHELSON: Are you going to rewrite the SERs, though, so they make sense, so I can throw away the old draft document, use the final rollup, and that's self-contained? I don't need to go back? Unfortunately, I threw my old one out, because I was under the impression that when I got the new one, the old one was superceded, and it turned out it wasn't. But eventually it will be superceded; your SER will be based only on the final rollup document?

MR. KENYON: Oh, that's correct.

MR. MICHELSON: It's self-contained; I don't need to save the, don't have to have the old document?

MR. KENYON: The original version and the draft SERs are just an interim stage to get to the final.

MR. WYLIE: You might, if you're trying to use the draft SERs that you've got, in reviewing the open items, because they refer to the old document.

MR. KENYON: Well, that's true. We're going to be using that to identify where in the rollup document EPRI has made changes to answer the questions.

MR. WYLIE: Unless you're going to rewrite your draft SERs. You're not going to do that?

MR. KENYON: No. We intend to have only one more final SER, you know, one more SER on all the chapters.

MR. MICHELSON: Then I believe the answer to my question is I must keep both the draft EPRI document and the rollup document, because the words are, some places they've even moved the thing to another part of the book. I don't see how you do this, unless you have both parts in front of you, or rewrite it for the final rollup.

MR. KENYON: EPRI is providing us with two aides to help us see what the changes were in the roll-up document. Number one is the red-line version, the mark-up version of the requirements document, and then, number two, they're going to be providing us with the road map I mentioned earlier.

MR. CATTON: Where will the 90-016 items be addressed?

MR. KENYON: A lot of them have already been addressed in the Chapter 5 draft SER. Presumably, it would wind up either in Chapter 1 or Chapter 5.

MR. CATTON: Chapter 5.

MR. KENYON: Things like station blackout -- it depends on the subject. Things like station blackout would wind up in the electrical chapter, which is --

MR. CATTON: Well, in particular, I'm interested in the .01 square meters per megawatt thermal for the --

MR. KENYON: That would be in either Chapter 5 or Chapter 6.

MR. CATTON: Five or six. The reason I ask is that rumor has it that the recent experiments at Argonne, a 20 centimeter layer of molten materials didn't solidify very fast, and that .02 megawatts squared is 30 centimeters deep, which says that that area ought to be bigger by maybe a factor of two.

MR. KENYON: We intend to be reviewing it as part of our development of the final SER.

MR. CATTON: Okay.

MR. KENYON: It's my understanding -- correct me if I'm wrong, Jim -- that we intend to have a meeting to talk about the review results. Is that correct?

MR. SHEWMON: Ivan, is there water assumed to be down there when this stuff comes down?

MR. CATTON: That's not clear. I don't know. I think you have to plan on that maybe being dry and then getting water on top of . I don't know. But the Argonne experiment was a layer of molten materials that supposedly were prototypic. It put water on the top of it and it didn't cool very fast. Now, they're going to repeat those experiments. I just wanted these people to be aware that there could be a big headache out there for containment design.

MR. KENYON: I think that will be addressed as part of our review to the final. My understanding is there is a meeting, it's not necessarily an EPRI specific meeting, but there is a meeting to discuss the results of that. From that, we will --

MR. CATTON: Maybe EPRI could comment because EPRI is funding those.

MR. SHEWMON: And this is half of the course spread uniformly over the electrical area?

MR. CATTON: Well, I don't know where the 30 centimeter number came from, but that was in some of the discussions with EPRI and also in the Fauske & Associates report that they based the .02 on. That's where I got the 30 centimeters, roughly. Well, if 20 centimeters doesn't cool, then I think you have to come to the conclusion that .02 is sufficient by another direction, and they probably ought to start thinking about it.

MR. SHEWMON: I guess where I come from repeatedly is you are never going to get that stuff melting as hot as it does, pour it out on a cold surface to spread uniformly.

MR. CATTON: Well, I don't believe you're ever going to have to deal with all the core, either.

MR. SHEWMON: Well, so it ought to be half --

MR. CATTON: I'd like somebody to show me that.

MR. SHEWMON: -- and it ought to be some sort of a

cone, and you may get the same answer.

MR. CATTON: I would hate to see the process until the end when the final SER is being written to come grips with this question. They ought to be thinking about it now.

MR. WYLIE: Have the 90-016 issues been incorporated in the roll-up document? I don't think they have.

MR. TROTTER: This is John Trotter. Yes, we reflected the 90-016 issues in the roll-up to the degree that A) we understood how to implement them in a requirements level document, and B) to the extent that we agreed that they were the proper technical answers. There are some where we would like to continue the discussion, but I believe that's not more than one, I think, on the evolutionary plant.

MR. WYLIE: So far, the staff has not really reviewed that, I guess.

MR. KENYON: That's correct.

MR. CATTON: Well, the EPRI document, at least for this .02, has been available for some time.

MR. MICHELSON: Could I get one clarification? When I read the roll-up document, do I assume that there's no flag there that says that the NRC hasn't agreed or whatever? Do I interpret the roll-up document then to mean

that the NRC is aware of this position and hasn't indicated any disagreement? Is that how I read that?

I thought the roll-up was to roll up the SER responses and everything into a final document, and now I'm beginning to be uncertain as to whether that's -- I think it's just Revision 2 of the document or Revision 1, and there's another roll-up. The roll-up is later, because if you haven't rolled up the SERs in this thing, I don't know how to read it.

MR. CATTON: Maybe the roll-up was wishful thinking.

MR. MICHELSON: I think it's just another revision and that really, there is a roll-up coming after this document I have so far in front of me. Is that correct?

MR. TROTTER: Yes, I think that is substantially correct.

MR. MICHELSON: This isn't the roll-up that we used to talk about.

MR. TROTTER: Right. We got to a point where we had received many comments from many people, including the NRC. We wanted to keep both the requirements for the passive plants and the evolutionary plants in sync, and it was time to submit the requirements for the passive plant. So rather than have two sets out there that were out of sync, we submitted Rev 1 of the evolutionary plant and Rev 0

of the passive plants.

We will intend to submit -- you know, where negotiations result in necessary word changes to the evolutionary plant requirements, we will submit page changes.

MR. MICHELSON: Well, I had been reading it like it was the roll-up, and I thought I knew what the roll-up meant, and I said, Gee, this can't be the roll-up. The staff certainly hasn't agreed to some of the --

MR. WARD: For the passive plant you're talking about now?

MR. MICHELSON: No, in the evolutionary. Your comment was on the evolutionary, right?

MR. TROTTER: Sure.

MR. MICHELSON: So what they're saying is that we're looking at a new revision, but it's not the roll-up that we all envisioned as the final wrapping up of the disagreements and so forth. Okay. That helps me immensely.

MR. WYLIE: As Carl says, the format of it is different, too.

MR. MICHELSON: Yes.

MR. WARD: Some things have been moved around.

MR. MICHELSON: Well, they can do anything they want in the revision.

MR. WYLIE: I know, but if you're trying to

compare it --

MR. MICHELSON: You can't. Yes. It's difficult. Unfortunately, I threw out the one that they wrote the SER on because I thought this was the roll-up. I was misinformed. It really wasn't the roll-up.

MR. WYLIE: Please proceed.

[Slide.]

MR. KENYON: I've only provided this slide just to remind the committee of the number of interactions that we've had with the staff between the EPRI and the staff, and I didn't really intend to belabor the point.

[Slide.]

MR. KENYON: I have a second list of packages given to Med. It has a cover letter like that. All it does is it lists all of the open issues that are present in the draft SERs that we've issued to date.

A bean counting of those issues is my next slide. My main point is to point out there's about 186 open issues. Now, I want to point out that about 50 of those open issues are redundant and that they were identified in one chapter and perhaps identified in several different chapters. So what we're really looking at is roughly about 130 open issues.

MR. CARROLL: I guess I had a question in that regard. I almost fell out of my chair when I read your

comments on Chapter 13, where you're presuming to make things or insist that EPRI do things. Generator instrumentation, for example. What has this got to do with public health and safety and where does the NRC get the expertise to decide that fiber optics generator intern monitoring should be required or shouldn't be required?

MR. KENYON: Well, in Chapter 13, we noticed that we didn't have a lot of regulatory authority in that area, and I'll grant that.

MR. CARROLL: Not a lot or any?

MR. KENYON: What we tried to do in the draft SER is identify areas of suggestions. If you read the SERs, I think we tried to make it clear which areas were suggestions and which areas were things that we thought needed to be met.

MR. CARROLL: I didn't see that distinction in the language. It keeps saying this is an open item that must be satisfactorily addressed.

MR. KENYON: Jim, do you want to address that.

MR. WILSON: Jim Wilson, NRR. I think we identified this as an area that was -- there was no information requirements document, and without prejudging what EPRI might respond or the way they might respond, one response might be this is out of the scope of the requirements document and will be addressed at the design

specific stage where it was in some other fashion. But --

MR. CARROLL: But you are going to review whether somebody puts intern winding vibration monitoring in a generator? If so, why?

MR. KENYON: I guess I'd have to see how we stated the issue. I know that there were a number of items in there that we put in as recommendations.

MR. CARROLL: This is an open item that must be satisfactory addressed.

MR. KENYON: I can't answer that. Perhaps we can answer that when we discuss Chapter 13.

MR. CARROLL: I just picked one, but there's a whole bunch of stuff in here. It seems to me your only involvement historically in turbine generators has been turbine missiles.

MR. KENYON: That's probably a fair statement.

MR. CARROLL: And this thing just gets into all kinds of stuff that seem to me to be totally outside the purview of the NRC.

MR. KENYON: I guess --

MR. WILSON: One thing is this is a draft and it's points for discussions, and the final SER may be quite different in character from what the draft was. This is just something to get issues out to the staff and begin the dialogue.

MR. WYLIE: Yes, but why do you want to discuss it if it's not germane to your regulatory mission?

MR. KENYON: Well, I guess we thought it was appropriate, you know, to provide recommendations to a number of issues. Now, I'm afraid I don't have the right people to discuss the technical issues here. Perhaps the best thing to do is to put this off until we come to the Chapter 13 discussion.

MR. CARROLL: All right. You might forewarn them, though, that they better be ready to answer the question, What does this have to do with public health and safety?

MR. KENYON: To be quite honest, we had several discussions on what was required and what wasn't.

[Slide.]

MR. KENYON: This is a slide that I've used in the past regarding the conduct of the staff's review. Really, the main points here I wanted to present is that we tried to do the review of the requirements document of the different levels of information that they've given us.

A question was asked regarding how the level of detail issue affects the EPRI requirements document, and the way this is set up is EPRI has determined the level which they wanted to go into. We reviewed it to that level, and unless we recommended otherwise, we generally went to that level of information.

The other point that I wanted to present is that the requirements document, as I'm sure you are all aware, does not follow the standard review plan, and so it was kind of a difficult review. But because it didn't follow the standard review plan, we didn't look at this as a completeness review.

We asked EPRI and they have provided in their Appendix B to Chapter 1 in their roll-up document to -- they have provided -- identified areas of compliance with the Commission's regulations. We don't look at that as detailed enough to be able to come to the conclusion that -- if they say that they've met all the regulations, we have to review it to see if we agree with them. It is not that easy to determine whether or not -- given the level of detail, it's not that easy to determine that they've met these regulations. That's what's causing us to go back and look at the design certification applications.

MR. MICHELSON: I guess what you are saying is that whatever is said in the EPRI requirements document does not in any way bind you when it comes to reviewing a specific application, such as ABWR? Is that what you're saying?

MR. KENYON: We are not legally bound to that.

MR. MICHELSON: Well, that's the only thing that really counts, doesn't it, on finality? Part 52 talks about

finality, but it's a legal document. Now that's the finality I'm talking about.

MR. KENYON: Let me discuss that in the next slide. Maybe that will answer your question.

MR. WYLIE: Wait a minute, before you leave that one. I think that's a very important point. You say the staff assumed that all regulatory requirements would be met by a design that complied with the EPRI ALWR requirements document except where deviations are identified in the document by EPRI, where the staff identified essential incompatibility in EPRI proposed design requirements and the current regulatory requirements or where the staff identified a possible misinterpretation of regulatory requirements.

Now, all this depends on identifying something, right?

MR. KENYON: That's correct.

MR. WYLIE: And if you don't, the staff then assumes that the requirements are correct.

MR. KENYON: No. We're assuming that EPRI has complied with our requirements, and if we've missed it -- we're reviewing it to determine whether or not the requirements document conflicts with our regulations. If we haven't identified that it has and we haven't brought it out, we're working under the assumption that they comply

with our regulations. But if we do miss it, we expect to be able to pick it up in the design certification review of an actual design.

MR. MICHELSON: So, therefore, the EPRI requirements document doesn't really bind you in any way in terms of Part 52, that you do your Part 52 review, and that's where you make your final determinations as to whether you've met regulatory requirements?

MR. KENYON: That's correct.

MR. MICHELSON: Okay. So this is a for-information-only document, as I see it.

MR. KENYON: I'm sorry, what was that?

MR. MICHELSON: I say it's a for-information-only type document. In other words, you read it as nice, interesting guidance and so forth, but it isn't a binding document at all.

MR. CARROLL: The next page will tell you what they think it is.

MR. MICHELSON: Oh, okay. Go ahead, then.

MR. WARD: But on the other hand, the utilities are hoping that EPRI has settled some of these issues with the NRC.

MR. MICHELSON: Well, that was thought to be the goal.

[Slide.]

MR. KENYON: That is the goal, and that's the way we've treated it. First off, my first statement is that it has no legal regulatory status. That in some ways has always been a problem in doing the review of this document.

The next three items identify the way the staff sees the EPRI requirements document. It serves as a vehicle to get consistent resolution of a number of open issues. It's what I think EPRI calls their regulatory stabilization, where they're trying to get a consistent solution on EPRI and under the assumption that that will be reflected in all of our design certification reviews.

MR. MICHELSON: How do I know, in looking at the EPRI document, that the second bullet has been the process by which the statement was reached? In other words, how do I know that there's been a resolution between the staff and EPRI when I read this Revision 1 that I have, or let's say Revision 0 -- well, the roll-up document, whenever it comes?

MR. KENYON: It would be identified in the final SER when we complete our review.

MR. MICHELSON: If it's not identified in the SER as a problem that was resolved, then I assume it was resolved or I assume that it wasn't even discussed, or how do I know?

MR. KENYON: Well, we are assuming that if we have not identified any places of -- any other areas where

regulatory --

MR. MICHELSON: Okay. Having not identified it, then you're satisfied with the EPRI requirements document, even if you might not have even thought of it. Is that the type of finality it is, or is it -- I can understand that if the document clearly says the staff reviewed this item, this is a resolution, and if it's clearly stated, I have no problem. But a lot of what I read is never clear to me whether it's a one-sided statement or both parties have agreed to it.

MR. KENYON: I think the point is that we've tried -- the staff has reviewed the entire document, every review area of responsibility. Reviewers have looked at that document and they've identified where they have been able to or where EPRI conflicted with their regulations. If they didn't identify it, then we're working under the assumption that they are complying with our regulations.

Now, as I said before, even though an applicant for design certification comes in and says they complied with the EPRI requirements document, we're going to do our normal review of the application, and if we've missed something on EPRI, we'll identify it.

MR. MICHELSON: You are going to independently review it irrespective of the EPRI document, I think you're saying.

MR. KENYON: That's correct.

MR. MICHELSON: Okay. Then that's fine. Then it's meaningless.

MR. KENYON: On the path of plants, we see the EPRI document as being a method of identifying what the major issues are going to be with the design concepts for these passive designs.

In addition, as a kind of aside is that it identifies with the utilities' desire to have in their future designs.

To go on to the next three slides, it was not intended to demonstrate complete compliance with the Commission's regulations. Although they've made an attempt in their Appendix B to Chapter 1 to identify where they complied with our regulations, we still don't feel that there's enough detail in order to come to feel that we've done a completeness review of that -- to ensure that they've met all of our regulations.

MR. MICHELSON: Are those the optimization issues?

MR. KENYON: What, Appendix B?

MR. MICHELSON: Yes.

MR. KENYON: Well, I think optimization issues are identified in there. They also made a listing of all of our Commission's regulations, GDCs.

MR. MICHELSON: Maybe the optimization was in

Appendix A.

MR. TROTTER: The new Appendix B has three parts. The first part is a list of regulations applicable to LWRs, and in its righthand column, it'll say "co ply optimization." So it'll identity where it goes.

Later on in Appendix B is this set of optimization --

MR. MICHELSON: Those are very interesting. Everybody should read those. But I don't know if they were one-sided or whether that's a mutual agreement because it turns out that the staff hasn't even reviewed them yet.

MR. KENYON: We are still reviewing them.

MR. MICHELSON: But I assume they're the end product of a negotiation, but I'm not sure that the end product is even agreed to. I'm just not clear what I'm reading. But they are nice. They are very interesting, and some of them I wondered if the staff really did agree to. Those are key issues that the committee might be interested in looking at. These are the optimization issues, apparently in Appendix B, Chapter 1.

MR. TROTTER: Right. In the Revision 1, it's Appendix B to Chapter 1. It's the second part of Appendix B, I believe.

MR. MICHELSON: I think some of those are very interesting.

MR. WYLIE: Of the new document.

MR. MICHELSON: Of the new document, yes. I don't have the old one. I threw it out.

MR. WARD: Well, you're asking what standing they have, though?

MR. MICHELSON: Yes. Reading them, it sounded like they were all resolved.

MR. WARD: Yes.

MR. MICHELSON: But I said, Geez, I can't believe the staff decided it that way. But we'll see.

MR. WYLIE: I assume, then, that the staff will review those and --

MR. KENYON: The staff is intending to review the roll-up document like we did the original.

MR. WYLIE: Okay. And you will comment on those issues.

MR. KENYON: And we will issue a final SER on that. We'll talk about this later, but we will be meeting with the committee on the results of our final review, too.

To get back to another point that Dr. Michelson was talking about earlier, it's not intended to be used as the basis for supporting the design certification. It is one of those things that if they say that they comply with the EPRI requirements document, that's fine, but the staff is going to continue to do its review to ensure that it does

meet the regulations.

[Slide.]

MR. KENYON: The next slide is a further discussion of the regulatory status and partly explains why we're doing the review. The Commission has directed the staff to give the requirements document for the evolutionary plant equal priority with that of the ABWR and the System 80+ reviews.

As part of that same SRM that gave that direction, the Commission instructed the staff to compare future designs against the requirements document. So we will have an indication from the vendors as to whether or not they comply with the requirements document.

As far as the passive designs are concerned, the Commission instructed the staff to complete the review before submitting the LRB on passive designs to the ACRS. Now, development that occurred after that is the Commission, in a SRM, in a later SRM, said that LRBs for the passive designs were not going to be required. However, the staff is interpreting this directive in that the Commission still wants us to complete our review of the passive requirements document before significant review effort is put onto the actual passive designs.

Then on one last note, the Commission has indicated that its major technical and policy issues should

be raised in the context of the requirements document, and the staff sees that as its prime goal.

MR. WARD: So if I read the third bullet -- I mean, you've given, up above it says equal priority in the evolutionary designs for the requirements document and the submittals for design certification.

MR. KENYON: That's correct.

MR. WARD: For passive designs, you're giving higher priority or first priority to the requirements document.

MR. KENYON: That's correct.

MR. WARD: And that's how you're interpreting that? The Commission wants you to get everything settled with EPRI before you plunge into a real review of the submittals?

MR. KENYON: That's our current interpretation, yes.

MR. MICHELSON: Do you have a schedule yet --

MR. WYLIE: Next page.

MR. KENYON: Let's go on to the next page.

[Slide.]

MR. KENYON: The best I can give you right now is the short-term review schedule. I'll talk a little bit more about the future milestones in a minute. As you already know, we've issued eleven of the 14 draft SERs we intended

to issue. The draft SERs are review of Chapters 10 and 11, which is the I&C and the electrical systems, are expected to be completed by the end of this month and sent up to the Commission, and a review of Appendix A, which is -- a review on how to do PRA reviews is expected sometime in April.

We are focused right now on developing detailed requests for additional information on the passive requirements document, and we expect to be done with that some time in March.

We began our review when EPRI submitted the passive requirements document by looking at big ticket issues and trying to identify major issues, and we're in the process of sorting those out right now and preparing a policy paper to be sent up to the Commission.

Now we're trying to get into the nuts and bolts of the requirements document and get into a more detailed design review -- I'm sorry -- a more detailed review of the document.

MR. WYLIE: Do you plan to use the same procedure on the passive that you did on the evolutionary as far as the issuance of SERs per chapter?

MR. KENYON: That's correct.

The future milestones that I have listed are based on SECY-90-065, which was issued last year and provided a review schedule. It's currently under reevaluation, and we

expect this to slip, but we haven't determined how much yet, and when we find out, we will inform the committee.

MR. WYLIE: That draft SER on the passive, that's the final overall SER. Is that right?

MR. KENYON: I'm sorry?

MR. WYLIE: The passive draft SER, that's the final overall SER, right?

MR. KENYON: The passive draft SER would be based on the original version of the passive requirements document.

MR. WYLIE: Yes, but you are going to issue one per chapter and then a final overall, right? This is the final overall?

MR. KENYON: Well, we would issue one per chapter, and then we would issue one final overall that's a final.

MR. WYLIE: That's what this is, this schedule?

MR. KENYON: Right. Well, this was the schedule for completing our evolutionary requirements document review.

MR. WYLIE: Yes.

MR. KENYON: Okay. Obviously, we're not going to meet it --

MR. WYLIE: No, I was talking about the passive, though.

MR. KENYON: Okay. On the passive, they have

submitted the roll-up document -- I'm sorry -- on the passive, they have submitted the original version. We're going to review that and issue 14 draft SERs on the original, and then we're going to go back and review the passive final.

MR. WYLIE: Between now and July '91?

MR. KENYON: That was the original schedule, yes. Like I said before, I don't think we're going to meet it.

MR. MICHELSON: Refresh my memory. Your final SER is to be written before or after the roll-up document on the evolutionary?

MR. KENYON: It was supposed to be written after the roll-up document was completed.

MR. MICHELSON: After the roll-up document. But we haven't yet received the roll-up document. If I understood EPRI a little while ago, I received Revision 1 of the original document, but it's not purported to be the roll-up document.

MR. KENYON: I guess it's a question of semantics. EPRI considers it the roll-up document.

MR. MICHELSON: Well, it isn't semantics. It's a question of another revision coming along before your SER, I guess.

MR. KENYON: But they will be making additional changes to the document.

MR. MICHELSON: Yes. I have no problem there. I was just trying to determine, I will see another revision of the EPRI requirements for evolutionary plants before I see the final SER?

MR. KENYON: That's correct.

MR. MICHELSON: Okay.

MR. KENYON: By the way, there will be a roll-up document for the passive requirements, too.

MR. MICHELSON: Yes.

MR. KENYON: Our final SER would be based on that.

MR. WARD: So you showed us these three dates here, and those were from this last year's SECY.

MR. KENYON: That's correct.

MR. WARD: And there are new dates, and you don't have any --

MR. KENYON: Well, we haven't established the new dates yet.

MR. WARD: But they're obviously a lot later than these.

MR. KENYON: I expect they will be later. It's just that we haven't determined what they will be yet. Dr. Murley is meeting with EPRI today. He met with GE yesterday. I believe some of the topics will be with regard to these review schedules.

[Slide.]

MR. KENYON: Many of you may remember this diagram that we created back in early or mid 1990. It comes from SECY-90-065.

The reason I put this on the board is I wanted to show the committee what kind of interactions the staff thinks are necessary with the ACRS Committee. If you recall, this diagram was put together based on all the inputs and SRMs that we had received from the Commission. We sent it up to the Commission. This was in the form of SECY-90-065, and the Commission has endorsed it as a review process to follow.

The important things I wanted to identify was the ACRS has identified three basic review stages, as it were. The policy issues are identified on either the evolutionary or the passive requirements document, or, for that matter, during our reviews of the design certification reviews. We would identify them to the Commission, to the ACRS, and we would expect to work on a resolution of those issues such as we did in 90-016.

MR. MICHELSON: Aren't the optimization issues in that category?

MR. KENYON: They should be.

MR. MICHELSON: I don't recall --

MR. KENYON: I don't know which ones are.

MR. MICHELSON: -- ever seeing the first one yet.

That was why I was so surprised to read about all of them in the EPRI Revision 1. I don't think the ACRS has ever seen any of these optimization issues come through us. But I'll stand corrected if you can just go back and look, but I don't think we've been getting them. But I've been reading about them.

MR. TROTTER: In the original organization of the books, the optimization issues were appendices to a given chapter.

MR. MICHELSON: They were in the --

MR. TROTTER: So there were several optimization issues on Chapter 5.

MR. MICHELSON: But these are resolutions that I've been reading. They appear to be resolutions.

MR. TROTTER: I think that's where earlier our earlier discussion on "This is a revision" is more proper.

MR. MICHELSON: And they aren't really resolutions, but perhaps postulated resolutions?

MR. KENYON: They are EPRI proposed resolutions.

MR. TROTTER: It's where the utility group has proposed resolutions to these problems.

MR. MICHELSON: Okay. And the staff has yet to look at them.

MR. TROTTER: The staff has yet to endorse them.

MR. MICHELSON: Okay. So when the staff looks at

these optimization issues, then we'll start seeing them floating toward us. Is that it?

MR. KENYON: Well, I think it's fair to say that some of the optimization issues have already been addressed.

MR. MICHELSON: Well, is it fair to say the --

MR. KENYON: Not most of them.

MR. MICHELSON: -- ACRS ever saw any of them? Perhaps they have and I just didn't recognize it.

MR. KENYON: Well, they either showed up in the draft SERs or perhaps in SECY-90-016. I'm not sure which.

MR. MICHELSON: Well, I'm thinking beyond SECY-90-016. Those particular issues, yes, we've seen. We were intimately involved in them. But beyond that, I'm trying to find any of these other issues that are in that optimization set.

MR. KENYON: Well, as John said, John Trotter said, the optimization issues were identified in different chapters, primarily in Chapter 5, and they were addressed in those draft SERs.

MR. MICHELSON: well, somehow from your flow diagram, I got the impression that when an optimization issue came up, it was because it was a very important issue, it needed a lot of thought and resolution, and that we would see each of those individually, not drifting in through an SER where they are mentioned or something like that.

MR. SHEWMON: May I get into this for a minute?

MR. MICHELSON: Yes.

MR. SHEWMON: I'd be interested in a definition of an optimization issue. The only time I saw one had to do with hydrogen, and there, I got the impression that an optimization issue was one where the probability was low enough to be below ten to the minus five or something, and therefore you could use different criteria with regard to its resolution. It was imaginable, but still very improbable. Did I misunderstand that? Did that only apply to hydrogen, or what is the definition?

MR. TROTTER: Our most straightforward definition of optimization issue is one where we think there is an alternative to current regulation, and we would like to pursue that alternative to current regulation.

MR. CARROLL: Source term would be a good example.

MR. TROTTER: I think I can name them. Source term, source term hydrogen, OBE/SSE. No, I can't name them right now. But there are ten or eleven, I believe.

MR. SHEWMON: These are items where you want to find the optimum way to get them below some probability.

MR. TROTTER: It's ones where we feel that based on the plants described by the ALWR requirements that we think it's appropriate to have a change in the regulation or the guidance.

MR. MICHELSON: It's a change in regulation. That's pretty important.

MR. WYLIE: Okay. Let's proceed. We have to be through by twelve.

[Laughter.]"

MR. KENYON: As I said earlier, the ACRS was identified in three areas. One in policy issue discussions, one, they were identified to be involved after the draft SERs are issued, and they were also identified to be involved in the review of the final SER and the final roll-up requirements document.

As a result of that, the staff feels that there are a large number of meetings that will have to take place in order to complete a review of the requirements document. First, of course, there will be meetings put together, as we did in 90-016, to talk about resolution of any policy issues that are identified.

To give you an example of some that may be coming up, we expect to have three or four coming out of our reviews of Chapter 10 and 11 on I&C and electrical systems.

We're in the process, as I said earlier, trying to identify what we consider the major policy issues on the passive requirements document. We'll be putting together a SECY paper shortly and be sending that both to the Commission and to the ACRS.

The larger number of meetings that we expect to have are going to be meetings that will have to take -- that need to take place in order to just complete review of the requirements document.

We expect to be -- we just issued six draft SERs and we expect to issue the remaining three within the next several months. We will need to meet with the subcommittees a number of times to discuss these issues.

We already have one set up for February 12th, where we will meet with the subcommittee to talk about Chapters 6 and nine. Six is --

MR. MICHELSON: Are you referring now to the Volume II evolutionary?

MR. KENYON: Volume II is EPRI's designation of what they call the Evolutionary Requirements Document. Volume III is the 13 chapters set for the passive.

MR. MICHELSON: Okay.

MR. KENYON: So we expect to be meeting in the next several months to talk about the contents of the requirements document and then the results of the staff's review.

In addition to that, once EPRI addresses our concerns in all of our SERs, we'll be producing the final SER, and we will have to discuss all 13 chapters, plus the two appendices to discuss the final resolutions. Then we

have to go through the same process over again on the passive requirements document.

[Slide.]

MR. KENYON: In conclusion, I think the basic point I wanted to make was that there's a lot of work ahead of us for all of us to complete our review of the requirements document.

Are there any other questions?

MR. MICHELSON: Do you intend to -- you know, you are going to write these SERs and so forth. Are you going to write any kind of a letter transmitting or endorsing or whatever you do to the EPRI requirements document? Are you going to write a letter that says what the document is really good for in the regulatory sense, or how does one then know, after you write all these SERs, what your final conclusion is about the usefulness of the EPRI document and when it can be used in a regulatory arena?

MR. KENYON: I believe that was discussed in the draft SERs and you'll find it in the file. Our end product is a final SER talking about the final --

MR. MICHELSON: Of course, I haven't seen your final SER. I've seen the draft SERs, but I haven't seen the final yet. You won't approve the EPRI requirements document, I guess, since you've already said that it has a very limited usage, there's no finality to it. So what do

you do? Do you just say, This looks like a good document?

MR. KENYON: If there are any remaining open issues, we'll identify the remaining open issues that we're aware of and we'll -- we're going to review it to determine if it conflicts with our regulations, and that's it.

MR. MICHELSON: Okay. Now, when we come to ABWR, we don't even reference the EPRI requirements document, I guess.

MR. KENYON: Well, only in that GE and CE and Westinghouse will be providing an evaluation of where they comply or don't comply with the requirements document.

MR. MICHELSON: But are reviews of the ABWRs totally based on the ABWR submittal per se?

MR. KENYON: That's correct. That's a stand-alone document.

MR. WYLIE: Let's take the hypothetical case where one comes in and says, "Okay, we comply with the EPRI document." Then what would be the status with the staff on that?

MR. KENYON: It's additional information that gives us that warm feeling that they've complied with the regulations, but we're still going to review it to make sure that it does.

MR. MICHELSON: And if it doesn't for any reason, you're in no way bound by whatever you might have written in

a letter about the EPRI requirements document.

MR. KENYON: Well, if we identify areas that were missed, then obviously we will fix it in the actual design certification.

MR. MICHELSON: But I mean there's no binding agreement that if you did what the EPRI requirements document said, you're okay?

MR. KENYON: Not any legal binding agreement.

MR. MICHELSON: Yes.

MR. WYLIE: I'll ask Mr. Trotter if he has any comments he'd like to make.

MR. TROTTER: Earlier this week, there were a couple of questions asked, and since I'm in the overtime period here, I'll try to make it brief, one of which was on the utility use of the requirement, which is really what the document was written for, was for utilities.

A point that we would like to make is that the degree of use of the requirement depends to a degree on the quality of the regulatory review and how much of the Commission positions get reflected in their SER. I think that's important, that if the quality of the review and the quality of the SER is high, then we would expect the requirements document to be more useful.

It was designed to be part of a procurement spec. That was always its intention from the beginning. There

have been a couple of international cases where they have taken our requirements document and modified it for their conditions and, in fact, used it in bid specs.

The ideal case -- which I don't think we have any ideal, cases, but the passive plant is closer -- the ideal case is where the design follows the requirement in time so that the designer has the best possibility idea of what staff positions are on issues.

Now, I have to go along with what Tom said -- it's not a legally binding document. We don't have a role in 10 CFR.

The corollary to this question was, you know, What do I think the NRC believes the requirement document should be, and my first caveat is to most certainly say that I consciously avoid the business of telling other people how they should run their shop, and I think that's one of those questions.

However, having said that, I think there are several possible uses that the staff can make of their SER, and that includes closure or a clear statement of what are acceptable positions on issues, on specific issues, a clear identification.

Certainly, in the Commission SRM on a passive plant, they used the term the closure or resolution of open issues. I want to make sure that that maintains part of the

process, not just to identify issues but to close them as well.

There are a number of NRC positions which have not been updated in a long time. Adherence to, you know, codes and standards have moved along, and sometimes the NRC endorsement of that has not. We would think this would be one place to get the NRC to write in whatever form is appropriate, you know, their endorsement of new technology, new standards, and get that in the SER, in their SER. It's their document; they can write that.

MR. SHEWMON: Does your document call out those things that you think need to be updated or would profit from updating?

MR. TROTTER: We list in a couple of places the codes and standards which we believe are the current ones that a plant should be built to today, and they're listed with revision numbers. We did not consciously go back and say, Okay, this one has been NRC endorsed, this one has not been. But they are listed.

Overall, I think the advantage of using the requirements document SER as a method to standardize versus using the one-plant-at-a-time approach that we historically had, I think there are all the advantages of standardization that people have talked about. So addressing things at the requirement stage and making all the vendors aware of those

requirements has a tremendous impact on standardization.

MR. WYLIE: Mr. Kenyon thank you very much.

MR. CARROLL: There was one issue that came up earlier that maybe John might want to comment on. It was certainly news to me.

That is the so-called Phase III program, where, after these requirements have been reviewed and approved by the Commissioner, negotiated with the Commissioner, whatever, as I understood it, teams from EPRI will then go and visit the vendors who are designing these plants and do evaluations to establish that General Electric indeed meets all of the requirements, for example, that are in the requirements document with respect to digital reactor protection systems and feed that back to the Utility Steering Committee, which sort of puts them in a kind of an NRC or INPO or whoever role.

MR. TROTTER: I think it puts us more in the role of utility representative. In the old days, when somebody brought a plant, they quite often would have their own engineers go out and do that did-you-meet-my-bid-spec sort of work.

In this case, where much of the design is going to get finished before there is a purchase order, we are performing that function, certainly not substituting for any sort of regulatory review.

MR. CARROLL: I just thought it was an interesting thing that came up.

MR. WARD: Charlie, one point. The meeting next week on the 12th is to review the SERs for these new chapters and the old. Do you have any thoughts about whether the ACRS should be doing that now or not?

MR. WYLIE: Well, it would be helpful to see how they review the roll-up document when we have that meeting. We can review this, but it seems like to me we're going to have to review what comes out of the roll-up document reviews. Maybe we need to talk about that further.

MR. WARD: OKay. Before the end of this --

MR. MICHELSON: Which chapters are we going to cover?

MR. WARD: Six and nine.

MR. MICHELSON: Six and nine are the only ones I thought we really were going to cover in that meeting. The advantage of having that meeting, of course, is we can get a better appreciation for what the quality of the SERs are and so forth in case there's any feedback, or we can just wait until the SER on the roll-up comes through. Of course, by that time, we'll have the roll-up to read as well. The SER comes after the roll-ups, the final SER.

MR. WARD: We'll have the EPRI document.

MR. MICHELSON: Yes. If we're talking about

reviewing only the final SER, then we will certainly have gotten the real roll-up and be talking about one document again instead of two documents.

MR. WYLIE: Why don't we talk about this further?

MR. CARROLL: One additional comment for Tom. I did sort of skim Chapters 6 through 13, and you need a good proofreader. There are a lot of typos and misspellings, and it's not up to the normal NRC quality for these kind of things.

MR. CATTON: They haven't run it through Grammatical 4 in the spell-checker yet.

MR. CARROLL: I don't know what they haven't done, but I found quite a few problems.

MR. WARD: Okay. Let's break for lunch and come back at 1:10 p.m.

[Whereupon, the meeting recessed for lunch, to reconvene this same day at 1:10 p.m.]

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

[2:34 p.m.]

MR. KERR: By the powers vested in me by David Ward, if Paul doesn't show up, I'm supposed to start the meeting. So I am hereby starting the meeting.

MR. CARROLL: Are you going to turn it over to the subcommittee chairman?

MR. KERR: I'm going to turn it over to the subcommittee chairman to consider implementation of Regulatory Guide 1.97 and the material associated with this is in 5.1.

Those of you who have been around a long time will recall that this is a topic that has been discussed at considerable length even before TMI-2, but given original impetus by TMI-2.

We recently expressed some interest in learning about the current status of implementation of the regulatory guide, and the purpose of the meeting this afternoon is to hear as much of that information as the staff can provide us, and also to discuss a specific difference of opinion that exists now between the staff and the PWR Owners Group.

Without taking up any more time, because we really want to find out what's going on -- I'm not sure who is going to tell us.

MR. CATTON: Which tab was it?

MR. KERR: Five.

MR. WILKINS: Mr. Chairman, let me ask a question. I noticed there is reference to the existence of commercially available monitors. Now, that did not exist before, and I have a personal reason for asking who are the manufacturers.

MR. MARINOS: I will defer this to the individual that will give the formal presentation, if I may.

MR. WILKINS: Who are the manufacturers of commercially available equipment? I need to know because I may have a conflict of interest and I need to resolve it.

MR. JOYCE: What monitors?

MR. WILKINS: The ones that are talked about that BNW doesn't want to use and that you say they exist.

MR. JOYCE: I'm Joe Joyce with the Instrumentation and Control Systems Branch. If the question could be more specific, we could answer it.

MR. CARROLL: Tell who the vendor is that you're concerned about.

MR. JOYCE: Neutron flux. There were several variables, and I didn't know which one you were concerned with. General Electric and Gamma Metrics.

MR. WILKINS: Thank you. We won't be going into the details of neutron flux, anyway. Thank you.

MR. MARINOS: My name is Angelo Marinos. I am a

section chief in the Instrumentation and Control System Branch in the Division of System Technology in NRR.

As of last November of '90, I was assigned the technical oversight responsibility for the implementation of Regulatory Guide 1.9, and at the same time, of course, the individual that has been doing the review of this implementation, Barry Marcus, has been transferred to my section, where he, at the request of the committee, will give a status of this implementation of Regulation 1.97.

We did not have any specific guidance about technical implementation of specific items of the guide, but we will try to address any questions you have as we go along, and Barry will take over in our presentation.

Along with Barry, Joe Joyce is here with us, who had the previous technical oversight responsibility with the branch, and he's here to help us as Barry gives his presentation.

[Slide.]

MR. MARCUS: I am Barry Marcus of the Instrumentation and Control Systems Branch of NRR. Regulatory Guide 1.97, which is entitled "Instrumentation for Lightwater Cooled Nuclear Power Plants to Assess Plant and Environment Conditions During and After an Accident." It's also referred to as "Post Accident Monitoring Instrumentation," or "PAM Instrumentation."

[Slide.]

MR. MARCUS: As Mr. Marinos has just stated, we're prepared to discuss the status of implementation today. Reg Guide 1.97 provides an acceptable method of providing instrumentation to monitor a plant during and after an accident.

[Slide.]

MR. MARCUS: As a result of the accident at Three Mile Island, Revision 2 of Reg Guide 1.97 was issued in December, 1989. NUREG 0737, Supplement 1, provided requirements for safety parameter display systems, detailed control room design reviews, upgrading emergency operating procedures, emergency response facilities, and Regulatory Guide 197.

This document also required that licensees and applicants submit proposed schedules for implementation of Regulatory Guide 1.97. In May of 1985, the NRC issued confirmatory orders concerning those implementation schedules.

Reg Guide 1.97 consists of approximately 70 different variables that are a combination of different types and categories that are called out in the regulatory guide.

MR. KERR: Excuse me.

MR. MARCUS: Yes?

MR. KERR: Would you put that slide back on?

MR. MARCUS: Okay.

MR. KERR: So the confirmatory order was for licensees and applicants to implement schedules, and the schedules were schedules for what?

MR. MARCUS: These are the schedules for when the licensees planned to implement the regulatory guide.

MR. KERR: Now, since a regulatory guide is not a regulation, did the Commission require that all licensees conform to a regulatory guide?

MR. MARCUS: NUREG-0737, Supplement 1, which was issued by Generic Letter -- was it 87-23 -- I think that was the number -- required -- 82-33 -- excuse me -- okay -- required the licensees to tell how they planned on meeting the recommendations of the reg guide.

MR. KERR: But suppose they chose not to meet the recommendations of a reg guide. What?

MR. MARCUS: Joe, can you --

MR. JOYCE: Yes, I'll help with that. Going back to the first question about the schedules, back in '83, when NUREG-0737, Supplement 1, was issued, because there was more than one item in that particular NUREG and we did not have a handle on the living schedule at the time, and we told licensees and utilities to implement Reg Guide 1.97, but do not implement it in a vacuum, take into consideration the

other ingredients in the NUREG, such as control and design review, SPDS and the other items, and come back in to the staff and negotiate your dates with the project manager that will fit in the overall schedule and the scheme of things, at that time, once you submitted schedules to the individual project managers and they had been worked out and agreed upon, then at that time, the project manager would issue confirmatory orders on each plant.

Second question: --

MR. KERR: The first question really was how can you tell applicants to implement a regulatory guide since it is not a regulation, it's not a requirement.

MR. JOYCE: I'm sorry, how could you what?

MR. KERR: How did a regulatory guide become something that you could tell a licensee to implement since it isn't a regulation?

MR. JOYCE: That's true. It is not a regulation. All reg guides are just that, they are just guidance. At the time, like I said, that the NUREG went out and the generic letter, management decided that the best way to get this implemented was to go off and put confirmatory orders on each licensee that committed -- they've already made a commitment -- to do the implementation of 1.97.

MR. KERR: OKay. So you didn't tell them to implement it. They voluntarily said, We will implement it.

MR. JOYCE: That is correct.

MR. CATTON: And then you ordered them to?

MR. KERR: Ordered them to provide a schedule.

MR. JOYCE: The schedules. We sent confirmatory orders out on the schedule. Then came the review process, where we went into the exceptions and deviations that Barry will get into. As you know, well know, it's the prerogative of the user of a regulatory guide to take exceptions and deviations, and that he did, and what was what our review process was about.

MR. KERR: One of the reasons I ask this question is because in a document which was provided to us by our own staff, this is an SER, I guess, on the BWROG Licensing Topical Report, NEDO-31558, and one of the reasons given for rejecting this proposal by the applicants was that they don't meet the requirements of Reg Guide 1.97.

It seems to me that unless someone -- I mean, maybe all the owners' group committed to 1.97, committed to that, but unless they had, I didn't see that as a very strong reason for turning down the range required of the neutron monitors.

MR. JOYCE: You are correct with respect to the regulation. Reg guides are reg guides, and there's nothing more to be said about it. With respect to neutron flux monitoring, you are referring to the BWR owners group and

the one that is on appeal at the office director level?

MR. KERR: Yes.

MR. JOYCE: Okay. That particular issue is still under consideration by Dr. Murley, and we did not come down today to discuss the details of that, but we can give you some background as to what led up to --

MR. KERR: I was just trying to understand the basis on which that was a significant influence in your decision to reject the owners group.

MR. JOYCE: We rejected the owners group submittal on technical content, both of the reg guide and of their submittal, technical content being the criteria for a Category 1 variable with respect to environmental qualification of range and power supply.

MR. KERR: As I read it, the lack of range, they apparently proposed one percent and the reg guide requires ten to the minus six --

MR. JOYCE: To 100 percent.

MR. KERR: -- to 100 percent.

MR. JOYCE: Yes. That's correct.

MR. KERR: One of the reasons for rejecting it is that so-called reg guide requirement.

MR. JOYCE: That's correct. That was one of the reasons.

MR. KERR: Yes.

MR. JOYCE: Yes.

MR. KERR: Now, does that mean, then, that all the BWR owners group people had previously committed to 1.97?

MR. JOYCE: Does that mean what?

MR. KERR: Does that imply that all of the BWR owners group members previously committed to 1.97?

MR. JOYCE: What they previously committed to was to a schedule to implement Reg Guide 1.97. What has to take place after they have committed to the schedule was to go in and address the exceptions and deviations that each individual licensee took with respect to 1.97 variable by variable.

For example, Barry will probably mention about if a licensee came in and said that they conformed to Reg Guide 1.97 in its entirety, then in that case, there was not a staff SER. We did not do a review. It was the way the review process was set up when we started this review.

MR. KERR: Your discussion of the range of a neutron monitor didn't really give any technical justification, it seemed to me. It just simply said, We won't accept this because it doesn't conform to Reg Guide 1.97.

MR. JOYCE: And which one are you reading from? There was one where we had a technical discussion.

MR. KERR: I'm reading from the safety evaluation

report, BWR OG Licensing Topical Report, NEDO-31558.

MR. JOYCE: Okay. You're correct. The technical discussions are not in this one, and those technical discussions are in the package that Dr. Murley had that came from Reactor Systems Branch of why range and why EQ and why battery were rejected by the staff.

I guess once the decision is made with respect to the acceptability of the owners group proposal or the rejection of it, I think at that time it will be appropriate, if you'd like, for us to come back down and brief you on the technical content of that issue.

MR. KERR: Well, I was trying to understand -- I was getting mixed up between requirements and the regulatory guides, and I wanted to make sure I understood the current status of 1.97. It hasn't become a regulation.

MR. JOYCE: No. I wish it had, but it hasn't been. We've been wrestling with that one since 1983. But it stands as a reg guide, as any other reg guide, and it carries the same --

MR. KERR: Thank you. Please proceed, Mr. Marcus.

MR. MARCUS: A point of clarification on your question about licensees' commitments to meeting the reg guide. Not all licensees have committed to meet the reg guide on neutron flux. Some did. Some have not. I don't have a handle on the numbers.

[Slide.]

MR. MARCUS: As was stated before, the NUREG-0737 Supplement 1 required licensees and applicants to report on how they met the guide or planned to meet the guide. It also stated that deviations should be shown, along with justifications or alternatives.

If a licensee or applicant stated that it conformed to the guide, no further review was necessary. The review only looked at the exceptions and deviations taken to the guide.

[Slide.]

MR. MARCUS: The review approach was the same for operating reactors, operating license applicants, and construction permit applicants. We had a contractor help us in the review by issuing a technical evaluation report for each plant. An NRC review was not a prerequisite for implementation of the guide. The staff has issued SERs based on installed instruments and commitments for future installations.

[Slide.]

MR. MARCUS: A hundred and twenty units have been reviewed. This includes some plants where the review was complete and the plant was cancelled after that.

Reviews have been completed for 118 plants. In addition, we have issued 29 supplemental safety evaluation

reports. Work is continuing on eleven additional supplemental evaluation report requests.

[Slide.]

MR. MARCUS: Inspections have been performed in accordance with a temporary instructions. The regions are responsible for performing these inspections. NRR has assisted in the performance of a number of these inspections.

The inspections consist of an audit of Type A, Category 1 and selective Category 2 variables. Eighty-nine units have been inspected so far. Most have conformed to the temporary instruction, with only a few deviations found.

The current schedule is for all plants to be inspected by the end of Fiscal Year 1991.

MR. KERR: Excuse me. The inspections were in accordance with Temporary Instruction 2515/87. Does that mean it was promulgated in 1987?

MR. MARCUS: The temporary instruction was promulgated in '87 and it was revised in 1990. There were some minor revisions. Eighty-seven is when the first inspections took place.

MR. KERR: Is it still temporary?

MR. MARCUS: It still has the "Temporary Instruction" title.

MR. KERR: How long will it be temporary?

MR. CARROLL: Doesn't that mean an ad hoc?

MR. KERR: I don't know what it means.

MR. JOYCE: Joe Joyce, Instrumentation Branch. To my knowledge, it remains temporary for the life of it. It's a document that goes out in the region. It's called "Temporary Instruction." It may some day turn into a fixed document or a file or something, but to my knowledge --

MR. HANNON: Joe, I can help with that.

MR. JOYCE: Go ahead.

MR. HANNON: This is John Hannon, Project Director. The term "temporary instruction" is meant to indicate that it's a one-time-only. So as soon as it's been done at all the plants, it will effectively be deleted.

MR. LEWIS: Things could be worse. It could be 1887.

MR. MARCUS: Twenty-units have fully implemented the reg guide. Of those that are not implemented, 53 are related to generic issues. The next slide is the subject of the generic issues. Thirty-nine of those units not implemented are related to either generic issues and plant specific issues or plant specific issues only. In other words, if the generic issues were resolved, only 39 plants would not be fully implemented.

MR. WILKINS: Your count doesn't add up, does it?

MR. MARCUS: Well, it may be off by one or two.

MR. WILKINS: What was the total number?

MR. MARCUS: I came up with 114.

MR. WILKINS: This adds up to 114.

MR. MARCUS: Okay. Well, we have --

MR. WILKINS: It's not important.

MR. MARCUS: Well, we have reviewed some plants that were not -- construction were not finished or have closed down. That's why we did more reviews than there are active plants.

The BWR generic issue is post-accident monitoring and post-accident neutron flux monitoring. Reg Guide 1.97 recommends that this instrumentation meet the Category 1 criteria of Reg Guide 1.87.

Neutron flux monitoring instrumentation that met this criteria did not exist when the reg guide was issued, and it was an industry development item at that time. Until this instrumentation became available, the staff allowed operation on an interim basis with the existing instrumentation.

[Slide.]

MR. MARCUS: The owners group submitted a deviation request which was rejected based on environmental qualification, seismic qualification, range and power supply issues. The owners group has appealed the staff's position to the director of NRR. Dr. Murley is in the process of

reviewing this appeal. You know, if you desire further information, we can set up a time to come down after Dr. Murley rules on that.

MR. KERR: Okay. Thank you.

MR. CARROLL: Could you at least tell us what the controversy is?

MR. MARCUS: Joe?

MR. JOYCE: Joe Joyce, Instrumentation Branch. The controversy were the four bullets that Barry mentioned. The first one was with range. The regulatory guide requires that the range for neutron flux monitoring to be from ten to the minus six to 100 percent of full power. This particular piece of instrumentation should be environment qualified in accordance with 10 CFR 50.49. It should also be seismically qualified, and it should be tied to a Class 1E power supply.

Those were the three issues -- those were the four issues. I believe they decided they wanted just ten to the minus second to 100 percent. They were taking issue with the EQ because of present equipment. The drive motors and the cables were not environment qualified.

Class 1E power supply -- that was only an issue on some plants, not all. Seismic was an issue. I'm not sure how tough of an issue it was because early on in this review effort, when we went around to the regions and talked to each of the regions and all the utilities about the

implementation of Reg Guide 1.97, we stated that the instrumentation that was going into Reg Guide 1.97 with respect to seismic qualification only had to meet the seismic qualification program at the time of licensing. So there are a few BWRs that took issue with the seismic. I don't have the detail on them.

MR. KERR: Thank you.

MR. JOYCE: You're welcome.

[Slide.]

MR. MARCUS: The PWR generic issues deal with containment sump water temperature, accumulator tank level and pressure. The regulatory guide recommends that these instruments meet the Category 2 criteria of Reg Guide 1.97.

The majority of the plants took issue with the Category 2 classification for these variables. Since a majority of the plants raised this issue, the staff is reviewing it on a generic basis.

MR. KERR: What was the difficulty?

MR. MARCUS: Most of the installed instrumentation did not meet environmental qualification requirements, and some of them don't meet the power supply recommendations of the reg guide.

MR. JOYCE: Joe Joyce, Instrumentation. The only other point I can add to that was that there were some strong arguments that made sense to a lot of the staff

members that, particularly with respect to accumulator tank level and pressure, that they are passive systems, and there were some strong arguments that once the conditions are correct, they dumped what they had to do, and it was over, you know, within a matter of minutes, and what else did you want to know with respect to range and pressure?

MR. KERR: Thank you.

MR. MARCUS: That is the conclusion of --

MR. CARROLL: What is the answer to that question?

MR. JOYCE: The answer to that question, as I said, it was convincing enough for a lot of the staff members, and we said, Yes, why should we go off accepting a deviation on a plant-by-plant basis? The majority of these are asking for it. Let's do it generically.

The only thing that has to happen now is the staff has to get together, write up the position, write an SER on it, got to CRGR on it. It will be a relaxation, and part of the CRGR charter for relaxations are other interpretations of reg guides. So we'll probably put together something on this, I suspect, sometime in the near future. It's been on our list for at least a couple of years now.

MR. MARCUS: Since 1987, the SERs that have gone out on these two issues have basically stated that the staff is, you know, in the process of generically reviewing it. So the net result is the licensees did not have to do

anything. They just basically sit back and wait for the NRC to act on those issues.

MR. WILKINS: That's why they're not pushing you to get it finished.

MR. MARCUS: Actually, some of them are, surprisingly. That's the end of the prepared text.

MR. CARROLL: I remember a few years ago, when I last was involved with this reg guide, that there was a big problem with containment gamma monitoring and finding an environmentally qualified gamma monitor. Has that all gone away?

MR. MARCUS: I don't remember anything on that. Do you, Joe?

MR. JOYCE: I do not remember anything on a containment gamma monitoring. We have containment radiation. That's the one that was up on the dome. It was high level. Yes, that eventually became environmentally qualified. That is no longer an issue.

MR. CARROLL: And when this reg guide first came out, was it an ash issue?

MR. JOYCE: Range was a big factor in the EQ aspect because it was a lot -- temperature, etcetera was -- but that -- to my knowledge, we haven't seen too many deviations of that.

Surprisingly enough, when you look at the number

size plants, 120 plants and 70 variables, you generate a large matrix. So when you start looking at individual deviations -- and we've been keeping track. We have a pretty good track record and documentation of what plants took what deviations for what reasons. That's how we picked up on the accumulator tank level and pressure.

It may look like it was generic. We stopped doing that on a one-to-one basis and decided to handle it generically. The one that you mentioned, I do not recall it being a problem in the last four or five years.

MR. CARROLL: I guess people just went on and did it.

MR. JOYCE: Yes, similar to the neutron flux monitoring.

MR. KERR: In the course of accident management studies which are now underway, are the people who are doing that research looking at Reg Guide 1.97 or anything similar to see whether instrumentation that might be needed during an accident management strategy exists or will exist when 1.97 is implemented?

MR. MARCUS: Can you address that, Joe?

MR. JOYCE: Sure. I've talked to a number of people that were doing severe accidents, and we scanned 1.97 -- not scanned -- we looked at it, because when you look at 1.97, you know, it says it's for accident during and

following -- for instrumentation during and following an accident. There are some variables in it that really are severe accidents when you look at the temperatures and the pressures and the qualification of them. So we specifically looked at what variables already could probably meet perhaps what the severe accidents requirements are going to be.

The answer to your question is, yes, we have looked at some of it, but we certainly have not made any determination or conclusion that when we go off and the severe accident scenario is over with, that Reg Guide 1.97 in its entirety will already take care of those conditions. The answer is no to that because there are --

MR. KERR: I didn't mean whether it would take care of it, but rather to see whether changes in the requirement would be desirable as one looks in more detail at accident management strategies.

MR. JOYCE: I suspect that changes are going to have to take place in the Reg Guide 1.97 for the severe accident scenarios.

MR. KERR: Do you have any guess as to when some significant majority of the plants -- say 90 percent -- will have implemented 1.97?

MR. MARCUS: John?

MR. HANNON: John Hannon again, Project Director. I've only done a small sample. Of the plants that I talked

to -- again, it was a small sample -- about seven facilities -- most of them are already essentially complete. One of them has tied the wide range steam generator instrumentation to the change out of the steam generators, which is not scheduled for another five years. So there are some outliers on some of the variables that might go out in time if we're going to accept that kind of a schedule.

But from my small sample, I'd say that probably 90 percent of all the facilities are going to be done by the next refueling outage.

MR. JOYCE: I would probably have to concur with that, particularly with respect to -- when you saw the slide, we were going off and doing the inspections. When we do the inspections, we also look at the implementation with respect to all the other variables even though we take a small sample during that audit. As Barry pointed out, very few that we did an inspection to had deviations, and that included even with the schedules.

So, if I had to guess, it would be in the 90s by the --

MR. KERR: This inspection means that you go to the plant and look to make sure that the equipment actually exists?

MR. JOYCE: Yes, sir. What we do is there is probably three members. NRR was involved, probably did all

but one inspection at Region V, and we've had members of ICSB go out with all the other regions, with perhaps Region IV, but we've had them up to NRR with training sessions to share with them what we've reviewed on their plants and what the deviations were.

When we go out on these audits, there are probably generally three people, and we pick -- like Barry pointed out, we look at the Category 1 and the Type A variables, and some Category 2 that perhaps would be suspect dependent on our safety evaluation report.

We look at drawings, we do drawing reviews, we do walk-downs, we go into the control room. So we look at all the criteria with respect to the Category 1 variables. If you go in the reg guide and you look at the criteria, you can see what we're looking at.

So based on that sample, then there is a report, a region report on each one that is inspected.

MR. KERR: You previously had a written report from the plant, or you had no information until you go on the inspection trip?

MR. JOYCE: A prerequisite before inspection is a staff's SER.

MR. KERR: So you've had fairly complete information in order to write the SER?

MR. JOYCE: Yes, sir.

MR. KERR: What do you typically see on an inspection visit that you wouldn't get from a package of written information?

MR. JOYCE: Well, a lot of times what happens is when we go in and we start doing a review, we find out that these variables -- for range -- range may be one of the criteria. When we go into the control room, and perhaps you're supposed to see a temperature, the reg guide says have a temperature from 200 to 500 degrees, and you'll go into the control room and perhaps they'll be short under range even though they say they committed to the reg guide.

One of the weak links in the review process, if I may, was the review technique that was set up early on. We told all the licensees, utilities in the regions, We are only going to look at exceptions and deviations that you identified to the staff, okay? So whether the utility thought he had an exception or a deviation and called it out, then we reviewed it and found it acceptable or not acceptable.

So a lot of times what happens when we go out and we're doing this audit, we'll find something, and there will be an interpretation: Well, we didn't think that was a deviation, or, That's not an exception because our system does this, our system does that.

Also, during the drawing reviews, we find out

they're not necessarily -- we find that -- for Category 1 variables, it has to be single failure. Well, you find out that both these instruments are tied to the same power supply.

With respect to EQ, we do not do an EQ inspection. There is another arena and group that are doing EQ with respect to 50 49. What we do is ask, we say, Show us your master list. Identify on the list where this instrument is. If that instrument is on the list, then we go to the next subject. That's the extent we do for EQ, and the same with seismic.

So we do find things in that three- or four-day audit when we do inspection, and I guess we could send some sample TIs reports in, send them down to you if you'd like to see the type of things we're finding.

MR. KERR: I was just curious as to why an on-the-spot audit was necessary, but I guess if people don't understand the single failure criterion by now, it's necessary.

MR. MARCUS: Some plants where we have gone in and done an inspection, you know, they have come out extremely clean. In other plants, there are a lot of little things. You know, sometimes you find a big thing. It varies from utility to utility.

MR. KERR: Thank you. Are there further

questions?

MR. CARROLL: I am not sure these are the right folks to ask this of, but I keep looking at the status of TMI action items. It's published every few months, and I keep seeing a large number -- I guess I have done here 66 units don't have their control room design review complete. I guess that's the human factors people that are more involved in that.

MR. MARCUS: Yes, that is.

MR. CARROLL: Do you have some idea what the issue is?

MR. MARCUS: No, I do not have an idea on that.

MR. KERR: Are you satisfied with the speed with which implementation of this issue is occurring?

MR. MARCUS: Do you want to handle that, John?

MR. HANNON: I'll try, but I didn't hear the question.

MR. KERR: Are you satisfied with the speed with which this implementation proce s is going? It certainly existed before TMI-2 and was somewhat emphasized by TMI-2. I guess if we conclude that severe accidents are rare, it's not something that we need to push, but --

MR. HANNON: I think the answer to that is mixed. We have some good success stories and then some that we're still not happy with. The one particular case I mentioned a

while ago about postponing a wide range steam generator level until steam generator replacement, which may not occur for another five or six years, I think is pushing us out a little too far.

So we have some plants that we are going to be continuing the dialogue with to try to improve their schedule. I suspect that part of the inspection activity will address that. When we find issues that aren't being done on a reasonable schedule, that will be an issue for us to get involved with and try to get an improvement in the schedule.

MR. KERR: You mean you inspect before people finish the implementation?

MR. MANNON: If our inspection determines that there are open items at a particular plant that aren't being addressed on what we think is a reasonable schedule, then I would anticipate having discussions with that particular licensee.

MR. KERR: No, I guess I didn't word my question very well. I would have thought that you wouldn't go in and inspect until the plant decided they had completed their implementation.

MR. MARCUS: I can answer that one. We do perform inspections whether or not the implementation is complete. If there's an item that's found that is not completed during

the inspection that's noted in the inspection report, then it's an item open for reinspection after completion.

MR. WILKINS: There is no implication in that that it should have been completed.

MR. MARCUS: None. Sometimes it's an agreed upon schedule, and, you know, we have agreed with their schedule, and the inspection just came before that time.

MR. KERR: You have a certain number of inspectors that do this sort of thing, and they go out periodically sort of independently of how far along the utility is in the process?

MR. MARCUS: Yes. Let me point out one thing. When I stated that a number of plants were not fully implemented, not fully implemented means at least one variable was not implemented. You know, they could have 69 variables implemented and have one not implemented, and they're not fully implemented.

MR. KERR: So by the next refueling, 99.8 percent of all the plants will have implemented 1.97?

MR. MARCUS: I don't know if we'd put the percentage that high.

MR. KERR: Ninety-nine-point-five?

MR. HANNON: I don't think we have enough data right now to pin that down. As I said before, the very small sample that I took, I was satisfied that the majority

of our plants are moving towards complete resolution of this issue, and I estimate that the majority of them will be done within the next refueling outage. However, there are going to be some isolated cases where we're going to have to follow up because of, you know, delays in the schedule.

MR. KERR: I just wasn't sure what a majority was. Is it 51 percent?

MR. JOYCE: In the 90s.

MR. WILKINS: I was observing it can't be as high as 99 percent because that's one out of 100.

[Laughter.]

MR. HANNON: To make sure we're clear, though, what we've just talked about is excluding the generic issues that we're still working on.

MR. KERR: I understand that. And the staff has been working on one of those now for about two years.

MR. JOYCE: That is correct, with respect to the second one we talked about, the PWRs.

MR. KERR: That's a real tough one.

MR. JOYCE: No, that's a real easy one. It's just priority.

MR. KERR: Any further questions for Mr. Marcus or his colleagues?

[No response.]

MR. KERR: Well, we thank you. We probably will

want to get another progress report.

MR. WARD: Thank you. Thank you very much. That's the end of the record for the day.

[Whereupon, at 3:20 p.m., the meeting adjourned.]

REPORTER'S CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission

in the matter of:

NAME OF PROCEEDING: 370 ACRS Meeting

DOCKET NUMBER:

PLACE OF PROCEEDING: Bethesda, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

Marilynn Estep

Official Reporter
Ann Riley & Associates, Ltd.

BRIEFING TO ACRS FULL COMMITTEE

ON

INDIVIDUAL PLANT EXAMINATION FOR EXTERNAL EVENTS (IPEEE)

FEBRUARY 7, 1991

T. KING - RES (x23980)
L. SHAO - RES (x23800)
A. MURPHY-RES (x23860)
J. CHEN - RES (x23919)

PURPOSE OF BRIEFING

- TO SUMMARIZE THE STATUS OF THE STAFF'S PROPOSED FINAL IPEEE GENERIC LETTER AND GUIDANCE DOCUMENT.
- TO SUMMARIZE THE MAJOR COMMENTS RECEIVED AND CHANGES MADE TO THE DOCUMENT SINCE THE COMMENT PERIOD.
- TO REQUEST AN ACRS COMMENT LETTER ON THE STAFF'S PROPOSED FINAL IPEEE DOCUMENTS.

PURPOSE AND SCOPE OF IPEEE

- PURPOSE - TO HAVE LICENSEES:
  - DEVELOP AN APPRECIATION OF SEVERE ACCIDENT BEHAVIOR FOR THEIR PLANT(S).
  - UNDERSTAND THE MOST LIKELY SEVERE ACCIDENT SEQUENCES THAT COULD OCCUR AT THEIR PLANT(S) UNDER OPERATING CONDITIONS.
  - UNDERSTAND THE OVERALL LIKELIHOOD OF CORE DAMAGE AND RADIOACTIVE MATERIAL RELEASE AT THEIR PLANTS(S).
  - TO REDUCE THE OVERALL LIKELIHOOD OF CORE DAMAGE AND RADIOACTIVE MATERIAL RELEASE, WHERE APPROPRIATE.

PURPOSE AND SCOPE OF IPEEE (CON'T)

- SCOPE - LICENSEES ARE TO PERFORM A PLANT SPECIFIC SYSTEMATIC EXAMINATION TO IDENTIFY VULNERABILITIES TO SEVERE ACCIDENTS RESULTING FROM EXTERNAL EVENTS:
  - SEISMIC EVENTS
  - INTERNAL FIRES
  - HIGH WINDS, FLOODS, TRANSPORTATION AND NEARLY FACILITY HAZARDS
  - OTHER SITE UNIQUE HAZARDS

PROGRESS SINCE MAY 1990

- SECY-90-192, MAY 30, 1990 - SENT PROPOSED IPEEE GENERIC LETTER AND GUIDANCE DOCUMENT TO COMMISSION.

- SRM, JULY 17, 1990 - COMMISSION APPROVED ISSUING THE DOCUMENTS FOR COMMENT AND CONDUCTING A WORKSHOP. COMMISSION ALSO REQUESTED THAT THE FINAL DOCUMENTS BE SENT FOR THEIR REVIEW PRIOR TO ISSUANCE.

- WORKSHOP - SEPTEMBER 11-13, 1990 - APPROXIMATELY 250 ATTENDEES. VERBAL AND WRITTEN COMMENTS RECEIVED.

CURRENT STATUS AND SCHEDULE

- GENERIC LETTER AND GUIDANCE DOCUMENT (NUREG-1407) REVISED IN CONSIDERATION OF PUBLIC/INDUSTRY COMMENTS. SUMMARY OF AND RESPONSE TO COMMENTS INCLUDED IN APPENDIX D OF NUREG-1407.

- SCHEDULE:

  - TO EDO - LATE FEBRUARY
  - TO COMMISSION - EARLY MARCH
  - ISSUE AS FINAL - LATE MARCH
  - COMPLETE REVIEW OF NUMARC/EPRI FIRE METHODOLOGY - JULY 1991
  - LICENSEE PLANS SUBMITTED - 180 DAYS AFTER ISSUANCE OF GL
  - IPEEE SUBMITTALS DUE - 3 YEARS AFTER ISSUANCE OF GL

STAFF REVIEW OF IPEEE SUBMITTALS

- DETAILED STAFF REVIEW PLAN NOT YET DEVELOPED.
- EXPECT STAFF REVIEW TO BE SIMILAR TO THAT FOR INTERNAL EVENTS IPE:
  - SCREENING REVIEW - ALL SUBMITTALS
  - MORE INDEPTH REVIEW - SELECTED SUBMITTALS
- IF STAFF BELIEVES ADDITIONAL IMPROVEMENT IS WARRANTED BEYOND WHAT A LICENSEE HAS PROPOSED, STAFF WOULD USE THE BACKFIT RULE TO IMPLEMENT.

SUMMARY OF WORKSHOP

L. SHAO

IPEEE WORKSHOP

DATES: SEPTEMBER 10-13, 1990

PLACE: PITTSBURGH, PENNSYLVANIA

ATTENDANCE:

APPROXIMATELY 250 REGISTRANTS

UTILITY & UTILITY ORGANIZATIONS	50%
A/E & NSSS	10%
CONSULTANTS	25%
GOVERNMENT (STATE & FEDERAL)	15%

GENERAL COMMENTS

1. PERFORM A BACKFIT ANALYSIS BEFORE ISSUANCE OF THE GENERIC LETTER

   NOT REQUIRED

2. UNDERESTIMATED COST AND RESOURCE REQUIREMENT

   ESTIMATES BASED ON NUREG-1150 AND HATCH SEISMIC MARGINS EVALUATION (EXTRAPOLATED TO IPEEE SCOPE)

   SOME INDUSTRY ESTIMATES COMPARABLE WITH STAFF'S

3. EXTEND TIME FOR PERFORMING THE IPEEE

   CONSIDER EXTENSIONS ON A CASE-BY-CASE BASIS

4. EXTEND THE 60 DAY INITIAL RESPONSE TIME

   TIME EXTENDED TO 180 DAYS

FIRE

NO MAJOR COMMENTS EXCEPT REQUEST FOR NRC EXPEDITIOUS REVIEW OF FIRE VULNERABILITY EVALUATION METHODOLOGY

WIND, FLOOD & OTHERS

NO MAJOR COMMENTS

SEISMIC EVENTS

1. USE OF BOTH LLNL AND EPRI HAZARD CURVES

   STAFF PREFERS THAT BOTH CURVES ARE USED

   USE OF A SINGLE CURVE (THE MORE CONSERVATIVE ONE) IS ACCEPTABLE

2. FOCUSED SCOPE FOR RELAY CHATTER EVALUATION

SEISMIC

A. MURPHY

EXAMINATION METHODS FOR THE SEISMIC IPEEE

PROBABILISTIC RISK ASSESSMENT

SEISMIC MARGIN METHOD

NRC

EPRI

PRA APPROACH FOR SEISMIC IPEEE

THE FOLLOWING AREAS OF THE GENERIC LETTER OR GUIDANCE DOCUMENT WERE CHANGED:

USE OF BOTH LLNL AND EPRI SEISMIC HAZARD ESTIMATES

SCOPE OF THE RELAY CHATTER EVALUATION

SEISMIC HAZARD ESTIMATES

COMMENT — USE OF BOTH NRC/LLNL AND EPRI SEISMIC HAZARD CURVES IS UNWARRANTED AND TOO BURDENSOME

RESPONSE — OPTION OF USING A SINGLE (MORE CONSERVATIVE) SEISMIC HAZARD CURVE INTRODUCED

USE OF BOTH HAZARD ESTIMATES WOULD:

- HIGHLIGHT UNCERTAINTY IN BOTTOM LINE NUMBERS
- HIGHLIGHT ROBUST RESULTS, SUCH AS, DOMINANT COMPONENTS AND RELATIVE CONTRIBUTIONS

USE OF THE MORE CONSERVATIVE HAZARD ESTIMATE JUSTIFIED

- NO TECHNICAL BASIS TO SELECT ONE ESTIMATE OVER THE OTHER
- HIGHER ESTIMATE WILL CAPTURE ALL POTENTIAL SEQUENCES

RELAY CHATTER EVALUATION

COMMENTS 1. RELAY CHATTER REVIEW REQUIRES CONSIDERABLE RESOURCE EXPENDITURE

2. IDENTIFIED PROBLEMS WERE RECOVERABLE USING EXISTING PROCEDURES

RESPONSE RECOGNIZED RESOURCE ISSUE - A GRADED APPROACH ADOPTED TO REDUCE BURDEN FOR MOST PLANTS

FULL-SCOPE PLANTS WILL DO THOROUGH REVIEW TO PROVIDE ADDITIONAL CONFIDENCE THAT CONCLUSION IN COMMENT 2 IS GENERIC

SCOPE CONSISTENT WITH THE SITE'S SEISMIC MARGIN REVIEW LEVEL EARTHQUAKE CLASSIFICATION

SEISMIC MARGIN APPROACH FOR SEISMIC IPEEE

THE FOLLOWING AREAS OF THE GENERIC LETTER OR GUIDANCE DOCUMENT WERE CHANGED:

USE OF SEISMIC HAZARD AND SEISMIC DESIGN BASIS IN DETERMINING THE SCOPE OF THE REVIEW

SCOPE OF THE RELAY CHATTER EVALUATION (INTRODUCTION OF FOCUSED-SCOPE REVIEW PROPOSED BY NUMARC)

REVIEW LEVEL EARTHQUAKE

0.3G BIN WAS FURTHER DIVIDED INTO TWO CATEGORIES BASED ON THE SEISMIC DESIGN BASIS AND SEISMIC HAZARD ESTIMATES

FULL-SCOPE	0.3G
FOCUSED-SCOPE	0.3G (NEW)

PLANTS WITH HIGHER SEISMIC HAZARD AND LOWER SEISMIC DESIGN BASIS REQUIRE MORE DETAILED EVALUATION

PROCEDURE USED TO "SUBBIN" 0.3G PLANTS

ASSIGNMENT BASED ON SEISMIC DESIGN BASIS COUPLED WITH SEISMIC HAZARD ESTIMATE AND ENGINEERING JUDGEMENT

CRITERIA, INITIALLY PROPOSED BY NUMARC, IS SIMILAR TO THE WEIGHTED APPROACH USED BY THE STAFF FOR THE INITIAL PLANT BINNING

- DEVELOPED A COMPOSITE CONDITIONAL PROBABILITY OF EXCEEDING THE UNIFORM HAZARD SPECTRA AT 4 GROUND MOTION FREQUENCIES FOR EPRI, LLNL4, & LLNL5 CURVES AND FOR MEAN, MEDIAN, & 84%

SIX SITES CONSISTENTLY FELL INTO THE TOP GROUP (FULL-SCOPE)

RESOLUTION OF THE EASTERN U.S. SEISMICITY ISSUE IDENTIFIED EIGHT PLANTS AT FIVE SITES AS OUTLIERS

- THESE PLANTS SHOULD BE IN THE FULL-SCOPE BIN

- ADDED ARKANSAS NUCLEAR ONE, UNIT 1 TO THE FULL-SCOPE BIN

RELAY CHATTER EVALUATION

REDUCED SCOPE

USI A-46 PLANTS:	A-46 REVIEW
NON A-46 PLANTS:	NO ACTION

FOCUSED SCOPE

USI A-46 PLANTS:	A-46 REVIEW IF LOW SEISMIC RUGGEDNESS RELAYS ARE FOUND EXPAND SCOPE TO INCLUDE RELAYS OUTSIDE A-46 BUT IN IPEEE
NON A-46 PLANTS:	LOCATE AND EVALUATE LOW SEISMIC RUGGEDNESS RELAYS

FULL SCOPE AND 0.5G (INCLUDING WESTERN US SITES)

USI A-46 PLANTS:	FOLLOW A-46 PROCEDURES FOR A-46 REVIEW REVIEW IPEEE SYSTEMS, INCLUDING THOSE THAT ARE ALSO PART OF A-46 SCOPE AT THE ASSIGNED REVIEW LEVEL.
NON A-46 PLANTS:	RELAY REVIEW FOR ALL IPEEE SYSTEMS AT THE ASSIGNED REVIEW LEVEL

FIRES/HIGH WINDS - FLOODS

J. CHEN

FIRE EVALUATION

- PRA METHODOLOGY
  - o PROCEDURAL CLARIFICATIONS ONLY
- NUMARC/EPRI FIRE VULNERABILITY EVALUATION (FIVE) METHODOLOGY
  - o TO BE ADDRESSED SEPARATE FROM IPEEE GENERIC LETTER AND GUIDANCE DOCUMENT

- PROCEDURAL CLARIFICATIONS:

CABLE ROUTING VERIFICATION

DATABASE AVAILABILITY

SAFETY SYSTEM SEPARATION

TREATMENT OF TRANSIENT COMBUSTIBLES

FIRE SAFETY EXPERTS

TREATMENT OF CRITICAL AREAS WITH COMMON FIRE BARRIERS, PENETRATION SEALS

DAMAGING POTENTIAL OF FIRE SUPPRESSION AGENTS

SCHEDULE FOR STAFF REVIEW OF NUMARC/EPRI "FIVE" METHODOLOGY

- METHODOLOGY CURRENTLY UNDER REVIEW
- QUESTIONS TO NUMARC - 2/91
- DATA BASE TO BE SUBMITTED FOR REVIEW - 2/91
- REPORT FROM NUMARC ON DEMONSTRATION DUE - 3/91
- DRAFT STAFF POSITION - 4/91
- ACRS - 6/91
- CRGR - 6/91
- LETTER TO NUMARC - 7/91

HIGH WINDS, FLOODS, TRANSPORTATION AND NEARBY FACILITY HAZARDS

- NO MAJOR CHANGES

NRR STAFF PRESENTATION TO THE ACRS

SUBJECT: Status of Review of EPRI ALWR Requirements Document

DATE: February 7, 1991

PRESENTER: Thomas J. Kenyon

PRESENTER'S TITLE/BRANCH/DIV.: Project Manager
Standardization Project Directorate
Division of Advanced Reactors
and Special Projects
Office of Nuclear Reactor Regulation

PRESENTER'S NRC TEL. NO.: (301) 492-1120

- Introduction and Purpose
- Background/Chronology
- Results of Review
- Conduct of Review
- Regulatory Significance
- Review Process and Schedule
- Conclusions

PURPOSE

- To discuss status of review of EPRI ALWR Requirements Document for evolutionary and passive LWRs
- To discuss results of staff's review to date
- To discuss regulatory significance of Requirements Document
- To discuss remaining work on Requirements Document
- To discuss review schedule

CHRONOLOGY OF EPRI ALWR PROGRAM

Date	Type	Milestone
07/86 - 10/89	Evolutionary	Chapters 1 - 13 submitted by EPRI
09/87	Evolutionary	DSER on Chapter 1 issued by staff
02/88	Evolutionary	Revision to DSER on Chapter 1 issued by staff
02/88	Evolutionary	DSER on Chapter 2 issued by staff
03/88	Evolutionary	Interim position on ALWR Design Basis Tornado issued by staff
05/88	Evolutionary	DSER on Chapter 3 issued by staff
06/88	Evolutionary	DSER on Chapter 4 issued by staff
07/89	Evolutionary	SECY-89-228 forwarded DSER on Chapter 5 to Commission
01/90	Evolutionary	SECY-90-016 on ALWR policy issues forwarded to Commission
02/90	Evolutionary	DSER on Chapter 5 issued by staff
04/90	Evolutionary	ACRS letter to Commission providing Committee's views on issues in SECY-90-016
05/90	Passive	Preliminary views on passive designs identified by staff
06/90	Evolutionary	SRM issued regarding Commission guidance on issues in SECY-90-016
09/90	Evolutionary/ Passive	EPRI submits rollup of Volume II (evolutionary) and original Volume III (passive)
11/90	Passive	Additional views on passive designs identified by staff
01/91	Evolutionary	DSERs on Chapters 6, 7, 8, 9, 12, & 13 issued by staff

CHRONOLOGY OF ACRS MEETINGS ON EPRI ALWR PROGRAM

Date	Milestone	Meeting Subject
03/86	ACRS Subcommittee on Standardization of Nuclear Facilities	EPRI ALWR Program
06/86	ACRS Subcommittee on Standardization of Nuclear Facilities	EPRI ALWR Program
06/86	ACRS Full Committee	EPRI ALWR Program
10/87	ACRS Subcommittee on Standardization of Nuclear Facilities	Chapter 1
08/88	ACRS Subcommittee on Improved LWRs	Chapters 2, 3, 4, & 5
04/89	ACRS Subcommittee on Improved LWRs	EPRI ALWR Program (Chapters 1 - 13)
09/89	ACRS Full Committee	EPRI ALWR Program, including key outstanding issues
02/90	ACRS Full Committee	Issues in SECY-90-016
03/90	ACRS Full Committee	Issues in SECY-90-016
03/90	ACRS Joint Subcommittee on Extreme External Phenomena and Severe Accidents	Fire protection issues
04/90	ACRS Joint Subcommittee on Containment Systems and Structural Engineering	Containment Performance Criteria
04/90	ACRS Full Committee	Issues in SECY-90-016
07/90	ACRS Subcommittee on Improved LWRs	Chapters 1 - 5
07/90	ACRS Full Committee	Chapters 1 - 5
02/91	ACRS Full Committee	Status of EPRI Review
02/91	ACRS Subcommittee on Improved LWRs	Chapters 6 & 9

SUMMARY OF ISSUES

Chapter	Open	Confirmatory	Vendor/Utility-Specific
1	22	25	8
2	3	0	1
3	9	9	4
4	11	5	5
5	41	6	11
6	30	12	19
7	11	1	5
8	15	5	2
9	18	16	12
12	5	5	5
13	21	0	6
Total	186	84	78

EPRI ALWR Requirements Document

Volume I - Evolutionary and Passive

Volume II - Evolutionary

Volume III - Passive

Chapter 1 - Overall Requirements

Appendix A - PRA Key Assumptions and Groundrules

Appendix B - Licensing and Regulatory Requirements and Guidance

Chapter 2 - Power Generation Systems

Chapter 3 - Reactor Coolant System and Reactor Non-Safety Auxiliary Systems

Chapter 4 - Reactor Systems

Chapter 5 - Engineered Safety Systems

Chapter 6 - Building Design and Arrangement

Chapter 7 - Fueling and Refueling Systems

Chapter 8 - Plant Cooling Water Systems

Chapter 9 - Site Support Systems

Chapter 10 - Man-Machine Interface Systems

Chapter 11 - Electric Power Systems

Chapter 12 - Radioactive Waste Processing Systems

Chapter 13 - Main Turbine-Generator Systems

CONDUCT OF STAFF'S REVIEW

- As requested, the staff endeavored to review the EPRI ALWR Requirements Document at the various levels of detail presented.

- Standard review plan was used as guidance, but the level of detail did not permit a completeness review.

- Staff assumed that all current regulatory requirements would be met by a design that complied with the EPRI ALWR Requirements Document, except:

    - where deviations are identified in the document,
    - where the staff identified a potential incompatibility between EPRI-proposed design requirements and current regulatory requirements, or
    - where the staff identified a possible misinterpretation of regulatory requirements.

- EPRI has modified its Chapter 1 in the rollup to identify areas of compliance with the Commission's regulatory requirements.

REGULATORY STATUS

- Does not have legal or regulatory status.
- Serves as a vehicle to obtain consistent resolution of common operating plant problems, issues generically applicable to designs, severe accident issues, and certain USIs/GSIs.
- Serves as a vehicle to identify major concerns with LWR design concepts using passive safety systems early in the design process.
- Identifies what utilities desire in future designs
- Not intended to replace staff's review of future design-specific certification applications
- Not intended to demonstrate complete compliance with Commission's regulations, regulatory guidance, and policies
- Not intended to be used as basis for supporting design certification rule for design-specific application

REGULATORY STATUS
(CONTINUED)

- Commission has assigned review of evolutionary Requirements Document equal priority with that of ABWR and System 80+ (December 15, 1989 SRM).
- Commission has instructed staff to compare future designs against the Requirements Document (December 15, 1989 SRM).
- Commission has instructed staff to complete review of Volume III (passive) of Requirements Document prior to submitting the LRB on pas[illegible]esigns to the ACRS (December 15, 1989 SRM).
- Commission has stated that major technical and policy issues should be formally resolved in the context of the EPRI review on passive plants (June 22, 1990 SRM).

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(CONTINUED)

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- Commission has stated that major technical and policy issues should be formally resolved in the context of the EPRI review on passive plants (June 22, 1990 SRM).

REVIEW SCHEDULE

- Staff issued DSERs on Chapters 1-9, 12, and 13.

- DSERs on Chapters 10 & 11 to be forwarded to Commission in February 1991.

- DSER on Appendix A to Chapter 1 to be forwarded to Commission in April 1991.

- Detailed RAIs on passive Requirements Document to be issued by March 1991

- Future Review Milestones (SECY-90-065)

  - Evolutionary Final SER - May 1991*
  - Passive Draft SER - July 1991*
  - Passive Final SER - February 1992*

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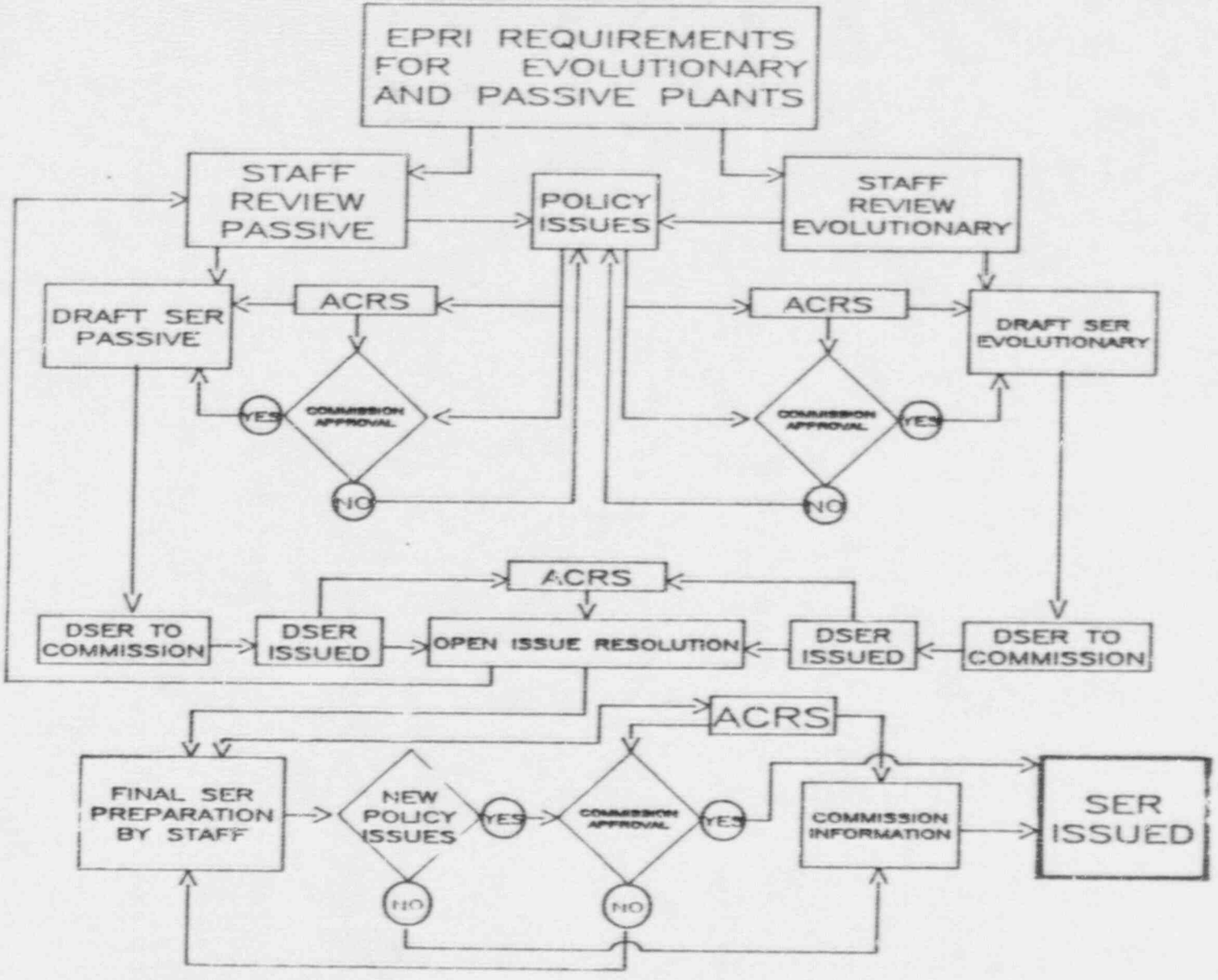
* Under reevaluation

EPRI REQUIREMENTS REVIEW



PLANNED MEETINGS WITH THE ACRS

- Meetings will be planned, as necessary, to discuss resolution of any policy issues identified during review.

- Meetings are planned between the ACRS, EPRI, and the staff to discuss:

Volume	Version	Staff Document	Chapters
Volume II (evolutionary)	original	DSER	6 - 13, App. A
Volume II (evolutionary)	rollup	SER	1 - 13, App. A & B
Volume III (passive)	original	DSER	1 - 13, App. A & B
Volume III (passive)	rollup	SER	1 - 13, App. A & B

CONCLUSIONS

- Significant work remains to be done by EPRI, ACRS, and the NRC to complete review of the Requirements Document.
- Staff's review of original version of evolutionary Requirements Document (Volume II) nearly complete.
- Staff's review of evolutionary rollup document (Volume II) and Volume III (passive) underway.
- Meetings with the ACRS to discuss review results will be set up, as appropriate.

Outstanding Issues

As a result of the NRC review of the ALWR Utility Requirements Document, a number of items discussed in the DSERs on Chapters 1 through 9, 12 and 13 remain outstanding. Because it has either not completed its review and reached a final position or it has reached a conclusion different from EPRI in these areas, the staff considers these issues to be open. These issues fall into one of four categories: (1) issues that require satisfactory resolution before the staff can complete its review of that particular chapter of the Requirements Document, (2) issues which are addressed in other related chapters of the Requirements Document, (3) confirmatory issues for which the staff will ensure followup of commitments in the Requirements Documents, and (4) issues that require satisfactory resolution in support of a vendor- or utility-specific application. The open items, with references to sections of the EPRI Requirements Document given in parentheses, are listed below:

The following is a list of issues obtained from the DSER on Chapter 1:

Issues To Be Resolved Before the Staff Can Complete Its Review of the Chapter

(1) EPRI ALWR Public Safety Goal (2.1.4.A.1, 10.0)
(2) 60-year life (2.1.4.B.1, 8.0)
(3) plant site parameters (2.3.C)
(4) station blackout classification (Table 3-2, Table 3-3)
(5) classification of certain types of events (Table 3-2, Table 3-3)
(6) seismic classification of seismic Category II items (4.3.B)
(7) damping values in Code Case N-411 (4.4.C, 4.6)
(8) vibratory loads with significant high frequency input/deviation from R.G. 1.92 (4.4.C, 4.6)
(9) seismic equipment qualification (4.4.C, 4.6)
(10) tornado effects/non-compliance with R.G. 1.76 (4.4.C, 4.6)
(11) OBE/SSE relationship (4.6, 4.9, 4.10)
(12) BWR safety relief valve loads (Appendix A)
(13) leak-before-break (Appendix A)
(14) In-plant hazards regarding remaining BWR suppression pool loads after demonstration of leak-before-break (Appendix A)
(15) decoupling SSE from LOCA (Appendix A)
(16) materials selection for reactor coolant pressure boundary piping/compliance with NUREG-0313 (5.3.A.1)
(17) construction program quality assurance (7.2.C.3)
(18) reference to IEEE P1023/D5 and EPRI-2360 for guidance regarding human factors engineering (8.2.b.4)
(19) meaning of NRC approval of EPRI ALWR Requirements Document (10.0)

Issues Addressed in Other Requirements Document Chapters

(1) coincident occurences (3.3.A.3)
(2) event frequency classifications (Table 3-1)
(3) protection of control room personnel against toxic and radioactive gases (8.3.A)

Confirmatory Issues

(1) Section XI of BPVC/ASME code (2.2)
(2) living PRA (2.2.F.3, 2.2.F.4)
(3) sabotage protection (2.2.F.7)
(4) internal flooding (2.2.F.7)
(5) initiating events (3.3.A.3)
(6) seismic ductility factors and ductility limits (4.3.B.2)
(7) seismic and dynamic qualification by experience (4.7.A)
(8) seismically qualified anchorage (4.7.A)
(9) structural codes and standards for structures, systems, and equipment (Table 4-1)
(10) hardness limits for martensitic stainless steel (5.3.A.2)
(11) use of Alloy 600 (5.3.A.3.b(1))
(12) allowance for carbon and low alloy steel corrosion (5.3.A.5)
(13) failure mechanisms (6.2.B.4)
(14) construction verification milestones (7.2.C.2)
(15) inspectability and provisions for inservice inspection (8.2.B)
(16) accoustical monitoring (8.2.B)
(17) preventative maintenance and inspections (8.2.C.2)
(18) use of life extension experience (8.2.C.3)
(19) personnel qualification requirements (8.2.C.4)
(20) operation problem areas (Table 8-2)
(21) quality assurance requirements (9.2.B)
(22) quality problems during design and construction (Table 9-1)
(23) updating Appendix B cross-reference table (10.0)
(24) cross-reference table of unresolved and generic safety issues (10.0)
(25) compliance with GDC-4 (10.0)

Vendor/Utility-Specific Issues

(1) performance capabilities - step and ramp power changes and inadvertant control insertion without reactor trip (Table 3-6)
(2) use of ANSI/ANS 51.1 and 52.1 versus R. G. 1.26 for quality group classification (4.3.A, 4.4.4)
(3) compliance with 10 CFR 50.55a (4.4)
(4) probabilistic approach to modifying existing loads and/or loading combinations (4.5)
(5) OBE/SSE relationship (4.6, 4.9, 4.10)
(6) conflicting codes and standards not approved by the NRC (Table 4-2)
(7) compatibility with NRC generic resolutions of unresolved and generic safety issues (10.0)
(8) list of principal design criteria (10.0)

The following is a list of issues obtained from the DSER on Chapter 2:

Issues To Be Resolved Before the Staff Can Complete Its Review of the Chapter

(1) classification of power generation system components (2.0)
(2) clarification of guidance regarding valving and piping materials (2.2.C)

Issues Addressed in Other Requirements Document Chapters

(1) functional requirements of instrumentation and controls (2.0)

Vendor/Utility-Specific Issues

(1) acceptability of turbine trip without reactor trip (3.2.A.1.b)

The following is a list of issues obtained from the DSER on Chapter 3:

Issues To Be Resolved Before the Staff Can Complete Its Review of the Chapter

(1) bolting degradation or failure (GSI-29) (2.0)
(2) reactor coolant pressure boundary leakage detection system (3.1.3.9, 3.1.3.10, 3.3.2.2, 3.3.4, 3.3.4.2)
(3) low-temperature overpressure protection (LTOP) (3.3.2.3)
(4) pressurizer relief tank system (3.3.2)
(5) automatic isolation of component cooling water to reactor coolant pumps (3.4.2.2.1)
(6) cooling of reactor coolant pump seal during station blackout (GSI-23) (3.4.2.2, 3.4.2.6, 3.4.2.11, 6.3.1)
(7) BWR main steamline isolation valve leakage control (GSI C-8) (5.3.3.9, 5.4.1.4, 5.4.1.5)

Issues Addressed in Other Requirements Document Chapters

(1) protection of non-critical components inside containment (2.2.1.1)
(2) functional and performance requirements for instrumentation and controls (2.3)

Confirmatory Issues

(1) protection of non-critical components inside containment (2.2.1.1)
(2) corrosion-resistant bolting (2.2.11, 4.4.1.1)
(3) overfrequency transient during loss of electical load (3.2.1.4.1)
(4) non-safety power supply design (3.2.1.4.2)
(5) power for pressurizer heaters (II.E.3.1) (3.4.3.4.3, 3.4.3.4.4)
(6) reactor coolant temperature instrumentation for cold leg (3.5.1.2)
(7) emergency feedwater actuation (4.2.3.4, 4.2.8.1)
(8) steam piping supports (4.3.2.4)
(9) contaminant limits for abrasives (4.4.1.1.3)
(10) eddy current inspection procedures (GSI-67.7.0) (4.4.1.4, 4.6.2)

Vendor/Utility-Specific Issues

(1) snubber requirements (2.4.4)
(2) PORV block valve electrical connections (II.G.1) (3.3.2.1)
(3) manual control of pressurizer heater sources (II.E.3.1) (3.4.3.4.3, 3.4.3.4.4)
(4) compliance of CVCS with SRP section 9.3.4 (6.0)

The following is a list of issues obtained from the DSER on Chapter 4:

Issues To Be Resolved Before the Staff Can Complete Its Review of the Chapter

(1) power oscilaations in BWRs (2.2.4)
(2) low-temperature overpressure protection (GSI-94) (2.0)
(3) protection of reactor pressure vessel from brittle fracture (thermocouples/materials surveillance program) (3.0)
(4) performance requirements for BWR core and fuel (thermal-hydraulic stability) (4.0)
(5) effect of natural circulation cooldown on reactor pressure vessel (GSI-79) (6.2)
(6) thermal-hydraulic characteristics of PWRs (7.2.1.?)
(7) positive moderator coefficient above 50% power (7.3.1.?.3)
(8) materials requirements for fuel assemblies, fuel rod cladding, and control rods (7.3.1.4)
(9) 60 year service life of control rod drive mechanisms (8.2)

Issues Addressed in Other Requirements Document Chapters

(1) functional and performance requirements for instrumentation and controls (2.0)
(2) scram pilot solenoid valves (5.3.5.3)

Confirmatory Issues

(1) low-temperature overpressure protection (2.3.1.7)
(2) percentage of copper in reactor pressure vessel forging (2.3.1.2)
(3) reactor pressure vessel surveillance program (2.3.1.8)
(4) fracture toughness specifications (2.3.1.8.1)
(5) irradiation dosage limits for the reactor pressure vessel internals (2.3.2.1.1)

Vendor/Utility-Specific Issues

(1) irradiation dosage limits for the reactor pressure vessel internals (2.3.2.1.1)
(2) fatique design margin for reactor pressure vessel (2.3.2.1.4)
(3) preconditioning of fuel for maneuvering (4.2.1.4.2)
(4) operation with reduced feedwater temperature (BWR thermal-hydraulic stability) (4.2.1.6.2)
(5) maneuvering capability/rate of power increase for hot startups of plant (7.2.1.4.2)

The following is a list of issues obtained from section 1.4 of the DSER on Chapter 5:

Issues To Be Resolved Before the Staff Can Complete Its Review of Chapter 5

(1) severe-accident containment performance criteria (2.1, D.3.4)
(2) metal-water reaction and hydrogen generation and control during a severe accident (2.3, 6.5.1, B.8, C.3, D.3.1)
(3) automatic standby liquid control system (4.3)
(4) effective distribution of boron injection (4.3)
(5) safety classification of containment spray system (4.4, 7.2)
(6) suppression-pool-bypass leakage (4.5, 7.2)
(7) suppression-pool temperature-monitoring system (4.6)
(8) operation of residual heat removal (RHR) system with reduced reactor coolant system inventory (Generic Letter 87-12) (5.2, B.5, D.2.2)
(9) safety depressurization and venting system (5.5, 6.6.5, B.10, D.3.3)
(10) use of remote manual valves on essential non-ESF lines (6.2)
(11) containment isolation provisions for IRWST connections (6.2)
(12) Type C leak testing (6.2)
(13) Type B testing of air-locks (6.3.2)
(14) Type C containment valve leak rate testing interval (6.3.3, C.1)
(15) interface requirements for fission product leakage control systems (6.4)
(16) control systems for radiolytically generated hydrogen (6.5.2, B.8, C.3)
(17) timing of igniter activation in the event of an accident (6.5.3, B.8, C.3)
(18) containment heat removal (6.6.3)
(19) functionability of fission product control systems during a severe accident (6.6.4)
(20) equipment survivability criteria for severe accidents (6.6.6, D.3.5)
(21) severe-accident management (6.6.8)
(22) dynamic effects of pipe breaks during severe accidents (7.2, 8.1))
(23) main steam isolation valve (MSIV) leakage rate (7.2)
(24) containment leak rate (8.1, 8.2, C.2.5, D.1.2)
(25) postaccident pH control (8.2, C.2.1)
(26) containment integrity check (8.2)
(27) high/low-pressure interface design (B.5, D.2.5)
(28) deletion of charcoal adsorbers (C.2.2, D.1.2)
(29) BWR suppression pool fission product scrubbing (C.2.3, D.1.2)
(30) timing of fission product releases into containment (C.2.4, D.1.2)

Issues Addressed in Other Requirements Document Chapters

(1) ALWR public safety goal (2.1, D.1.1)
(2) station blackout (2.2, B.9, D.2.3)
(3) fire protection (2.5, D.2.4)
(4) inservice testing of valves (3.1, D.4.1)
(5) anticipated transients without scram (3.4, 4.2, D.2.1)
(6) containment loading during severe accidents (6.6.1)
(7) cavity/pedestal-drywell configuration, debris coolability (6.6.2, D.3.2)
(8) containment atmosphere mixing (6.6.7)
(9) externally initiated severe accidents (6.6.9)
(10) protection against BWR containment reverse pressurization (7.1)
(11) fission product leakage control system (7.1)

Confirmatory Issues

(1) 10 CFR Part 50, Appendix J local leakage testing (3.1)
(2) low-temperature overpressure protection (LTOP)(5.2)
(3) automatic/manual initiation of feedwater flow (5.3)
(4) use of liquid in Type C containment leak rate testing (6.3.3)
(5) actuation of the containment spray system (B.2)
(6) low-temperature overpressure protection (B.10)

Vendor- or Utility-Specific Issues

(1) station blackout (2.2, B.9, D.2.3)
(2) inservice testing of valves (3.1, D.4.1)
(3) diesel generator start times (3.2)
(4) elimination of BWR core spray (4.1)
(5) safety injection system (SIS) design pressure (5.4)
(6) radiolytically generated hydrogen control system (6.5.2)
(7) analysis of oxygen generation during a severe accident (6.5.3)
(8) suppression pool design (7.3)
(9) emergency feedwater system design analysis (B.4)
(10) high/low-pressure interface design (B.5, D.2.5)
(11) pressure isolation valve testing (B.5, D.2.5)

The following is a list of issues obtained from section 1.4 of the DSER on Chapter 6:

Issues To Be Resolved Before the Staff Can Complete Its Review of Chapter 6

(1) human factors considerations (2.1 and 4.6.5)
(2) structural steel members' growth due to fire and design basis loss-of-coolant accident (2.1)
(3) inspections of potential structural degradation of safety-related structures (2.1)
(4) standard embedment depth (2.1)
(5) qualification of analytical techniques for structural and mechanical design (2.1)
(6) stiffness degradation of modular concrete structures (2.1)
(7) anchorage design and installation of safety-related tanks (2.1)
(8) steel containment corrosion, spent fuel pool leakage, and degradation of intake structures (2.1)
(9) reliability and structural strength of modularly constructed components (2.2 and 4.2.12)
(10) location of oil-filled transformers (2.3)
(11) computer codes for shielding design evaluation (2.4 and 4.2.8)
(12) use of American National Standards Institute/American Nuclear Society Standard 2.8-1981 to determine the maximum probable flood (3.3.1, 3.3.2, and B.1)
(13) design requirements for outdoor tanks containing liquid radioactive material (3.3.10)
(14) alternative seismic restraint devices (4.2.3)
(15) modification of the requirements for the design of instrument impulse lines (4.2.4)
(16) inservice inspection considerations (4.2.7)
(17) use of the containment air volume to dilute the containment hydrogen concentration to less than 13 percent as the sole means of postaccident combustible gas control (4.3.2)
(18) core debris coolability and cavity sizing criteria (4.3.2)
(19) movement of fuel (4.3.3)
(20) containment design leak rate of 0.5 percent per day (4.3.4)
(21) location of the control complex (4.6.5) (22) computer room, which is part of the "control room emergency zone," is not included in "control room envelope" (4.6.5)

Issues Addressed in Other Requirements Document Chapters

(1) design considerations for reduction of vulnerability to sabotage (2.1 and 2.3)
(2) fire protection requirements (2.3)
(3) HVAC systems design (4.2.5)
(4) containment systems (4.3.1)
(5) fuel handling and storage facility (4.6.2)
(6) radwaste facility (4.6.3)
(7) emergency onsite power supply facility (4.6.4)
(8) man-machine interface systems (4.6.5)

Confirmatory Issues

(1) design criteria for fire exits (2.3)
(2) fire barriers between the control room complex and peripheral rooms (2.3)
(3) clarification of the discussion of the general security requirements related to building design and arrangement (2.3)
(4) level of embedment for PWR containment building (3.3.2)
(5) alternative seismic restraints (4.2.3)
(6) vertical separation requirements for cable trays (4.2.6)
(7) compliance with Institute of Electrical and Electronics Engineers Standard 384 (4.2.6)
(8) use of lightweight conduit, fittings, and cable tray materials (4.2.6)
(9) assigning of aisles and corridors to the safety trains (4.2.6)
(10) use of American National Standards Institute (ANSI) Standard N101.4-1972 for coatings (4.2.10)
(11) addition of the commitment to meet ANSI Standard N101.4-1972 for qualification of coatings (4.3.2)
(12) design for probable maximum precipitation (B.1)

Vendor- or Utility-Specific Issues

(1) deviations from National Fire Protection Codes and Standards (2.3)
(2) qualification criteria for fire barriers (2.3)
(3) fire protection features in the heating, ventilation, and air conditioning design criteria (2.3)
(4) compliance with the requirements of Three Mile Island (TMI) Action Plan Item II.B.2 (2.3)
(5) details of shielding design (2.3, 2.4, and 4.2.8)
(6) effect of site-specific topography on standard overall site arrangement (3.1)
(7) flooding protection design requirements (3.3.1)
(8) description of airborne radioactive material sources (4.2.5)
(9) potential high-radiation areas, shielding, and exposure minimization measures (4.2.8 and 4.2.9)
(10) review of coatings against SRP Section 6.1.2 (4.2.4.10 and 4.3.2)
(11) containment access control (4.3.3 and 4.3.4)
(12) details of design of BWR reactor building (4.4.2)
(13) details of design of PWR auxiliary building (4.4.3)
(14) details of design of BWR turbine generator building (4.5.4)
(15) details of design of fuel handling and storage facility (4.6.2)
(16) details of design of radwaste facility (4.6.3)
(17) details of emergency onsite power supply facility (4.6.4)
(18) details of design of control complex (4.6.5)
(19) details of design of technical support center (4.6.6)

The following is a list of issues obtained from section 1.4 of the DSER on Chapter 7:

Issues To Be Resolved Before the Staff Can Complete Its Review of Chapter 7

(1) human factors considerations (2)
(2) radiological consequences of a fuel handling accident (3.2.2)
(3) storage of radioactive non-fuel components (3.2.3)
(4) criticality of new fuel in new fuel storage facility (5.0)
(5) radiological consequences of fuel cask drop accident (6.5)
(6) safety classification of the refueling platform assembly (7.1.2)
(7) high-radiation areas (7.2)
(8) segregation of fuel pool area used for fuel reconstitution (7.4)
(9) Generic Safety Issue 82 (Appendix B)

Issues Addressed in Other Requirements Document Chapters

(1) fuel pool cooling and cleanup system (4.2)
(2) fuel handling area heating and ventilation system (7.3)

Confirmatory Issues

(1) quality group classification of components for the new and spent fuel storage racks (3.2.1 and 5)

Vendor- or Utility-Specific Issues

(1) protection against tampering during refueling activities (3.2.4)
(2) design of the overhead bridge crane (6.1.2)
(3) design of the fuel handling system (7.1.2)
(4) high-radiation areas (7.2)
(5) reactor disassembly and servicing equipment for BWRs (7.5)

The following is a list of issues obtained from section 1.4 of the DSER on Chapter 8:

Issues To Be Resolved Before the Staff Can Complete Its Review of Chapter 8

(1) human factors considerations (3.1)
(2) probable maximum precipitation (3.1)
(3) justification for the reduction of surveillance testing and improved limiting conditions for operation (3.1)
(4) inservice testing of pumps and valves (3.2)
(5) division requirements for the component cooling water system of the nuclear steam supply system for BWRs (4.1)
(6) design of the reactor coolant pump seal cooling system (5.1)
(7) evaluation of postulated intake structure failure (5.1)
(8) evaluation of postulated electrical power supply failure for service water system (5.1)
(9) independence of decay heat removal cooling from fuel pool cooling and cleanup system (9)
(10) heat exchanger testing (3.1, B.1)
(11) biofouling in service water systems (3.1, 5.1, B.1)
(12) reliability of essential service water system (B.1)

Issues Addressed in Other Requirements Document Chapters

(1) probable maximum precipitation (3.1)
(2) instrumentation and control considerations for essential service water pump failures at multi-plant sites (Generic Safety Issue 130) (5.1)
(3) BWR suppression pool cooling, PWR postaccident containment heat removal systems (9)

Confirmatory Issues

(1) sabotage protection (3.2)
(2) effect of inadvertent actuation of non-safety-related equipment on safety-related components (3.2)
(3) flow indication for the component cooling water system (4.1)
(4) compliance with Federal Guideline on Dam Safety (7.1)
(5) maximum temperature for essential service water system (7.1)

Vendor- or Utility-Specific Issues

(1) pump minimum flow line or recirculation line design (3-1)
(2) availability of emergency power supply for the fuel pool cooling and cleanup system following a design-basis accident (9)

The following is a list of issues obtained from section 1.4 of the DSER on Chapter 9:

Issues To Be Resolved Before the Staff Can Complete Its Review of Chapter 9

(1) human factors considerations in the design of fire protection systems (2.2.5 and 3.4.11)
(2) independence of ventilation systems inside the containment (3.3.1)
(3) requirements for smoke-removal capability (3.3.1)
(4) sabotage considerations for the control room (5.1)
(5) effects of instrument air supply problems on safety-related equipment (Generic Letter 88-14) (7.1)
(6) design of air filtration systems (8.2.1)
(7) structural design of heating, ventilating, and air conditioning (HVAC) system (8.2.1)
(8) Charcoal filters in air filtration systems (8.2.1)
(9) control room capacity following design-basis accident (8.2.2)
(10) determination of airborne iodine concentration during an accident (Section III.D.3.3 of NUREG-0737) (9)

Issues Addressed in Other Requirements Document Chapters

(1) building structural and physical arrangement features that enhance fire protection (3.1)
(2) effect of fire protection features on electric power systems (3.1)
(3) radiation monitors (4.1)
(4) instrumentation and controls for environmental monitoring system (4.4.1)
(5) physical barrier requirements (5.1)
(6) protection against computer viruses (5.2.13)
(7) containment penetrations for compressed air and gas systems (7.1 and 7.2)
(8) charcoal filters for emergency filter units (8.2.1, 8.2.5, 8.2.6, 8.3.4, 8.4.2, 8.4.3 and 8.4.4)

Confirmatory Issues

(1) use of radiation- damage-resistant materials in high-radiation areas (2.2.4 and 8.2.1.3)
(2) control room cable fires (3.4.9)
(3) use of seismically sensitive relays in fire protection systems (3.4.13)
(4) design enhancements for sabotage protection (5.1)
(5) guidance designation of vital equipment (5.2.1)
(6) insider sabotage vulnerability analysis (5.2.2 and Appendix B)
(7) inaccessibility of cable and piping runs connecting two protected areas (5.2.4)
(8) installation of security door hardware (5.2.5)
(9) alarm assessment coverage of interior of intrusion detection system (5.2.7)
(10) use of hand-held radios in plant buildings (5.2.11)
(11) backup power for security lighting (5.2.12)
(12) use of duct wrap or other material for protecting ventilation system penetrations of fire barriers (8.2.1)
(13) operability of safety-related systems in areas with shared HVAC systems (8.2.1)

(14) bullet resistance of control room (8.2.2)
(15) resistance to penetration of an unalarmed grating (8.2.4)
(16) potential for insider sabotage (8.1)

Vendor- or Utility-Specific Issues

(1) fire protection review (3)
(2) fire hazard analysis (3.2.2)
(3) security hardware on fire doors (3.3.1)
(4) separation of redundant shutdown equipment in the containment (3.3.1)
(5) control room cable fires (3.4.9)
(6) security area devitalized during unit shutdown (5.1)
(7) operability of safety-related systems in areas with shared HVAC systems (8.2.1)
(8) criteria for design of HVAC duct work (8.2.1)
(9) HVAC design for PWR auxiliary building (8.2.5 and 8.4.4)
(10) HVAC design for miscellaneous areas (8.2.6)
(11) containment purging during normal operation (Branch Technical Position CSB 6-4, NUREG-0800) (8.4.2)
(12) design, equipment, and instrumentation for laboratories (9)

The following is a list of issues obtained from sect' - 1.4 of the DSER on Chapter 12:

Issues To Be Resolved Before the Staff Can Complete Its Revie[illegible] of Chapter 12

(1) fuel source term parameters (2.2.2)
(2) process and effluent radiological monitoring instrumentati[illegible]n and sampling systems (2.2.9)
(3) fire protection requirements (2.2.10, 3.3.6, 4.3, and 5.F)
(4) use of turbine seal steam (3.3.1)
(5) use of high-efficiency particulate air filters downstream of charcoal adsorbers (3.3.3)

Confirmatory Issues

(1) use of reasonably demonstrated technology to reduce population doses (2.2.1)
(2) transfer of gaseous radioactive wastes to plant vent through the heating, ventilating, and air conditioning systems (3.3.2)
(3) potentially explosive mixtures of hydrogen and oxygen (3.3.4)
(4) configuration of charcoal adsorber beds (3.3.5)
(5) shipping container design (5.5)

Vendor- or Utility-Specific Issues

(1) inputs and releases from the radioactive waste processing systems (2.2.1)
(2) use of demonstrated technology (2.2.1)
(3) estimate of personnel radiation exposure (2.2.4)
(4) potentially explosive mixtures of hydrogen and oxygen (3.3.4)
(5) shipping container design (5.5)

The following is a list of issues obtained from section 1.4 of the DSER on Chapter 13:

Issues To Be Resolved Before the Staff Can Complete Its Review of Chapter 13

(1) 60-year design life (2.2)
(2) foundation design for turbine-generator systems (2.3)
(3) seismic design of BWR main steam lines (3.1.1)
(4) dynamic seismic system analysis for seismic Category II BWR components or systems (3.1.1)
(5) seismic design of BWR turbine stop valves (3.1.1)
(6) inspection and quality assurance guidelines for turbine stop valves, turbine control valves, turbine bypass valves, and main steam leads (3.1.2)
(7) testing/inspection techniques for main turbine (3.1.2)
(8) turbine maintenance program (3.1.3)
(9) probability of turbine missile generation (3.1.4)
(10) post-machining inspection of one-piece rotor (3.1.5)
(11) performance requirement for turbine exhaust boot (3.1.7)
(12) nozzle block alignment (3.1.8)
(13) overspeed limit for governor (3.3)
(14) load shedding without turbine trip (3.3)
(15) screens for reheat stop or intercept valves (3.3)
(16) inservice inspection of main stop and control valves and reheat stop and intercept valves (3.3)
(17) extraction steam check valves (3.3)
(18) hydrogen seal oil leakage detection (4.5)
(19) generator instrumentation (4.8)

Issues Addressed in Other Requirements Document Chapters

(1) turbine/reactor interface instrumentation (3.5.3)
(2) voltage surge testing (3.5.6)

Confirmatory Issues

None

Vendor- or Utility-Specific Issues

(1) performance and safety requirements for main turbine (3.1.3)
(2) effect of other duty cycles on probability of turbine missiles (3.1.4)
(3) need for prototype-testing new or significantly changed designs (3.1.6, 4.1.1)
(4) bearing flow control orifices of the turbine lube oil system (3.2)
(5) oil collection of the turbine lube oil system (3.2)
(6) seal clearances of gland seal system (3.4)

EPRI ALWR Requirements Document

Volume I - Evolutionary and Passive

Volume II - Evolutionary

Volume III - Passive

REGULATORY GUIDE 1.97

INSTRUMENTATION FOR LIGHT-WATER-COOLED NUCLEAR POWER PLANTS TO ASSESS PLANT AND ENVIRONS CONDITIONS DURING AND AFTER AN ACCIDENT

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FEBRUARY 7, 1991

PRELIMINARY COMMENTS

- PRESENTATION IS FOR THE PURPOSE OF PROVIDING A REVIEW OF THE STATUS OF THE IMPLEMENTATION OF REGULATORY GUIDE 1.97

- REGULATORY GUIDE 1.97 PROVIDES AN ACCEPTABLE METHOD FOR COMPLYING WITH THE COMMISSION'S REGULATIONS TO PROVIDE INSTRUMENTATION TO MONITOR PLANT VARIABLES AND SYSTEMS DURING AND FOLLOWING AN ACCIDENT

R.G. 1.97 BACKGROUND

- REGULATORY GUIDE 1.97, REV. 2 ISSUED - DECEMBER, 1980

- NUREG-0737 SUPPLEMENT 1 (CLARIFICATION OF TMI ACTION PLAN REQUIREMENTS) AND GL 82-33 (REQUIREMENTS FOR EMERGENCY RESPONSE CAPABILITY) - JANUARY, 1983

  - REQUIRED LICENSEES AND APPLICANTS TO SUBMIT PROPOSED SCHEDULES FOR IMPLEMENTATION

- CONFIRMATORY ORDERS ISSUED FOR LICENSEES AND APPLICANTS TO IMPLEMENT SCHEDULES - MAY, 1985

- R.G. 1.97 CONSISTS OF 70 VARIABLES THAT ARE TYPES A, B, C, D, OR E AND CATEGORY 1, 2, OR 3

REVIEW APPROACH

- NUREG - 0737 SUPPLEMENT 1 REQUIRED LICENSEES AND APPLICANTS TO SUBMIT A REPORT DESCRIBING HOW THEY MEET THE GUIDANCE OF REGULATORY GUIDE 1.97

- DEVIATIONS FROM THE GUIDANCE IN REGULATORY GUIDE 1.97 SHOULD BE EXPLICITLY SHOWN, AND SUPPORTING JUSTIFICATION OR ALTERNATIVES SHOULD ALSO BE PRESENTED

- WHERE LICENSEES OR APPLICANTS EXPLICITLY STATED THAT AN INSTRUMENT SYSTEM CONFORMED TO THE PROVISIONS OF THE GUIDE NO FURTHER STAFF REVIEW WOULD BE NECESSARY

- REVIEW EFFORTS TREATED ONLY THE EXCEPTIONS AND DEVIATIONS FROM THE GUIDE IDENTIFIED BY THE LICENSEES OR APPLICANTS

REVIEW APPROACH (CONTINUED)

- GENERAL IMPLEMENTATION APPROACH WAS THE SAME FOR OPERATING REACTORS (OR), OPERATING LICENSE (OL) APPLICANTS, AND CONSTRUCTION PERMIT (CP) APPLICANTS

- A CONTRACTOR (EGG/INEL) ASSISTED IN THE REVIEW OF LICENSEES AND APPLICANTS IMPLEMENTATION OF REGULATORY GUIDE 1.97

- NRC REVIEW WAS NOT A PREREQUISITE FOR IMPLEMENTATION OF REGULATORY GUIDE 1.97

- NRC ISSUED SAFETY EVALUATION REPORTS (SER) BASED ON INSTALLED INSTRUMENTATION AND COMMITMENTS FOR FUTURE ACTIONS

SAFETY EVALUATION STATUS

- 120 UNITS HAVE BEEN REVIEWED
- REVIEWS COMPLETED FOR 118 UNITS
  - WATTS BAR 1 AND 2 CURRENTLY UNDER REVIEW
- 29 SUPPLEMENTAL SAFETY EVALUATION REPORTS ISSUED
- 11 REQUESTS FOR SUPPLEMENTAL SAFETY EVALUATION REPORTS BEING REVIEWED

INSPECTION STATUS

- INSPECTIONS IN ACCORDANCE WITH TEMPORARY INSTRUCTION 2515/87 BY THE REGIONS / NRR
  - INSPECTIONS CONSIST OF AN AUDIT OF TYPE A AND CATEGORY 1 VARIABLES
- 89 UNITS HAVE BEEN INSPECTED
  - MOST UNITS CONFORMED TO TI 2515/87 WITH FEW DEVIATIONS
- REMAINING UNITS ARE SCHEDULED TO BE INSPECTED DURING FY 1991
- IMPLEMENTATION STATUS
  - 22 UNITS FULLY IMPLEMENTED
    - 53 NOT IMPLEMENTED RELATED TO GENERIC ISSUES
    - 39 NOT IMPLEMENTED RELATED TO GENERIC ISSUES AND/OR PLANT SPECIFIC ISSUES

BWR GENERIC ISSUES

- POST-ACCIDENT NEUTRON FLUX MONITORING INSTRUMENTATION

  - REGULATORY GUIDE 1.97 RECOMMENDS THAT NEUTRON FLUX MONITORS MEET THE CATEGORY 1 CRITERIA

  - STAFF RECOGNIZED NEUTRON FLUX INSTRUMENTATION AS AN INDUSTRY DEVELOPMENT ITEM

  - WHEN INSTRUMENTATION BECAME AVAILABLE THE BWR OWNERS GROUP SUBMITTED A DEVIATION REQUEST WHICH WAS REVIEWED BY THE STAFF AND REJECTED

  - BWR OWNERS GROUP HAS APPEALED THE NRR STAFF POSITION TO DIRECTOR OF NRR

PWR GENERIC ISSUES

- CONTAINMENT SUMP WATER TEMPERATURE AND ACCUMULATOR TANK LEVEL AND PRESSURE

  - REGULATORY GUIDE 1.97 RECOMMENDS THAT CONTAINMENT SUMP WATER TEMPERATURE AND ACCUMULATOR TANK LEVEL AND PRESSURE INSTRUMENTATION MEET THE CATEGORY 2 CRITERIA

  - OVER HALF OF THE PWR PLANTS TOOK ISSUE WITH CATEGORY 2 CLASSIFICATION FOR THESE VARIABLES

  - NRR STAFF GENERICALLY REVIEWING THE ISSUE