ACRST-3016

ORIGINAL

OFFICIAL TRANSCRIPT OF PROCEEDINGS

NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

ACRS SUBCOMMITTEE

RELIABILITY AND PROBABILISTIC

RISK ASSESSMENT

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

NOVEMBER 13, 1997

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, taken on November 13, 1997, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript had not been reviewed corrected and edited and it may contain inaccuracies.

UNITED STATES NUCLEAR REGULATORY COMMISSION

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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ACRS SUBCOMMITTEE

RELIABILITY AND PROBABILISTIC RISK ASSESSMENT

U.S. Nuclear Regulatory Commission
Two White Flint North, Room 2B-3
11545 Rockville Pike
Rockville, MD 20852-2738

Thursday, November 13, 1997

The subcommittee met pursuant to notice at 8:30 a.m.

MEMBERS PRESENT:

GEORGE APOSTOLAKIS, Chairman, ACRS

MARIO H. FONTANA, Member, ACRS

ROBERT L. SEALE, Member, ACRS

THOMAS S. KRESS, Member, ACRS

RICHARD SHERRY, Senior Fellow, ACRS

STAFF AND PRESENTERS SEATED AT THE COMMISSION TABLE:

MICHAEL T. MARKLEY, Staff, ACRS

THOMAS KING, Staff

GARY HOLAHAN, Staff

GARETH PARRY, Staff

MARK CUNNINGHAM, Staff

JOSEPH MURPHY, RES

BIFF BRADLEY

PROCEEDINGS

[8:30 a.m.]

CHAIRMAN APOSTOLAKIS: Good morning. The meeting will now come to order.

This is the second day of the meeting of the ACRS Subcommittee on Reliability and Probabilistic Risk Assessment. I am George Apostolakis, chairman of the subcommittee.

ACRS members in attendance are Mario Fontana, Tom Kress, and Robert Seale.

ACRS Senior Fellow in attendance is Richard Sherry.

The purpose of this meeting is to continue review of the proposed final Standard Review Plan, Chapter 19, and associated Regulatory Guide DG-1061, general guidance for risk-informed performance based regulation and the use of uncertainty versus point values in the PRA-related decision-making process.

The subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full Committee.

Michael T. Markley is the cognizant ACRS Staff Engineer for this meeting.

The rules for participation in today's meeting

have been announced as part of the notice of this meeting previously published in the Federal Register on October 31st, 1997.

A transcript of the meeting has been kept and will be made available as stated in the Federal Register notice.

It is requested that speakers first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

We have received no written comments or requests for time to make oral statements from members of the public.

We will now proceed with the meeting, and I call upon Mr. Murphy to talk to us about performance-based regulation.

MR. MURPHY: Thank you.

Good morning.

CHAIRMAN APOSTOLAKIS: Good morning. I think it is a very thin package here.

MR. MURPHY: But I will --

CHAIRMAN APOSTOLAKIS: Take an hour.

MR. MURPHY: As much time as you want.

CHAIRMAN APOSTOLAKIS: Well, you have until 9:30.

MR. MURPHY: Okay. I remember the day I came down here with two viewgraphs and talked for an hour and a half -- hopefully this won't take that long.

What I am talking about is the Commission SRM that

came to the Staff some time ago, and asked us to consider performance-based initiatives that do not explicitly reference criteria derived from PRA insights and they said this shall not be excluded from consideration.

CHAIRMAN APOSTOLAKIS: Do you have the actual SRM somewhere?

MR. MURPHY: I have the words of it but I don't have the actual SRM with me.

DR. SEALE: Do you have the number?

MR. MURPHY: Anybody have the number? Use the mike.

MR. KADAMBI: This is Prasad Kadambi with the Office of Research. The SRM is the one associated with SECY 96-218 dated January 22nd, 1997.

CHAIRMAN APOSTOLAKIS: Is there a short paragraph there you can read?

MR. KADAMBI: Yes. I'll read the first paragraph from this SRM, which is entitled, "The Role of Performance-Based Regulation in the PRA Implementation Plan" -- "The Commission has approved Alternative 1 with respect to the role of performance-based regulation, but applications of performance-based approaches should not be limited to risk-informed initiatives. Thus, the Commission also approves elements of Alternative 3 as follows. Performance-based initiatives that do not explicitly

reference criteria derived from PRA insights should not be excluded from consideration. The Staff should include in the PRA Implementation Plan or in a separate plan how these performance-based initiatives will be phased into the overall regulatory improvement and oversight program. As part of the PRA Implementation Plan or its separate plan, the Staff should include its plan to solicit input from industry or develop on its own additional performance-based objectives which are not amenable to probabilistic risk analysis but could be ranked according to, for example, a relative hazards analysis and phase in these initiatives."

CHAIRMAN APOSTOLAKIS: So what are you talking about today? Non-PRA?

MR. MURPHY: For want of a better way and a shorthand way of explaining it, the non-risk informed performance-based regulation.

CHAIRMAN APOSTOLAKIS: So we have solved the issue of risk-informed performance criteria and now we are talking about non-risk informed? Is that --

MR. MURPHY: It is what do you do when you can't use risk analysis to give you the insights needed, or at least to give you the quantitative measures needed to use, as we have been discussing in your meetings.

CHAIRMAN APOSTOLAKIS: But are you also dealing with the issue of how does one determine performance

criteria using risk information?

MR. MURPHY: This is focusing on where you don't have risk information.

CHAIRMAN APOSTOLAKIS: Yes, I understand that, but I mean who is working on criteria when you have risk information? Is anybody working on that?

MR. MURPHY: I presume my colleagues will be doing risk-informed performance-based regulation but I'll let them speak for themselves.

CHAIRMAN APOSTOLAKIS: Well --

MR. KING: Repeat the question? We were having a sidebar conversation over here.

CHAIRMAN APOSTOLAKIS: Joe is doing what this SRM instructed him to do, namely address the issue of how does one determine performance criteria in cases where risk information cannot be used for some reason.

So the question is who is looking into the determination of these criteria when risk information can actually be used -- is it you?

MR. KING: Yes. I think that is what we are doing in DG-1061 where you have risk information and are using it to make changes to the current licensing basis -- how do you use performance monitoring to supplement and complement that decision.

CHAIRMAN APOSTOLAKIS: Well, but I think 1061

really says you should have some monitoring strategies but it doesn't really get into how one defines reasonable criteria, does it?

MR. KING: It leaves it up to the licensee to propose what is a reasonable monitoring strategy, what should be monitored, how frequent, what do you do with the information.

MR. MURPHY: So I think the general principles that you will hear for performance-based will apply both ways, but they will have to be tailored for the specific application.

CHAIRMAN APOSTOLAKIS: So that is my point. Who is developing those principles? I mean --

MR. MURPHY: Well, you will hear some of them from me.

CHAIRMAN APOSTOLAKIS: From you.

MR. MURPHY: But it is broader than just what I say, because they have to be tailored for a specific application.

DR. SEALE: Joe, I want to give you an opportunity to disillusion me. You say you are concerned with performance measures which do not follow directly from risk-informed insights.

MR. MURPHY: Yes.

DR. SEALE: But that doesn't mean -- or does that

mean that you are talking about things which because of other considerations which give you a qualitative feel for risk levels of concern, that you have identified those as being important and so you are talking about the performance measures for that sort of thing, or are you talking about things that you'd just like to have performance measures on even though their risk status is perhaps uncertain?

MR. MURPHY: I think the answer is yes.

DR. SEALE: To which one?

MR. MURPHY: Both.

Let me try to explain. There is a reason this paper is as late as it is in that there's been a lot of philosophical discussions on something that really is fairly simple in concept.

I want to start off with a basic premise which I would ask you to note, that our regulations are to a very large extent performance-based today.

If you pick up Part 50, Part 50 itself is mostly performance-based. If you pick up Appendix A to Part 50, the general design criteria, probably three-quarters of them are performance-based.

As you get further on into the appendices to Part 50, you pick up more prescription, but it is amazing when you sit back and look at it with an unjaundiced eye how much of our regulations are really performance based.

Now I brought a couple other viewgraphs with me that I wasn't going to show you, but I am going to put them on because they are either going to cloud this issue more or they are going to help, and I am not sure which. The reason I wasn't going to show them is because I was afraid of the first -- VIN diagrams.

Basically I have three schools of thought.

One is that we have a performance-based space in. Inside it there is an area that can by risk-informed, and there's two other spaces -- if I can get the paper apart.

One says performance basis is a subset of risk informed, and there is an argument in favor of this that says at the time the regulations were written, back in the '60s, we thought they were risk informed. Every action we have taken has been based on no undue risk to the health and safety of the public, and to that extent all our regulations at the time they were issued were risk informed. We just may not have had a very good idea what the risk was before we started doing risk analysis, which was when most of the regulations were written.

My own view of the life and the way this paper is, that we have a risk-informed space and we have a performance-based space, and they happen to intersect, and so in here I have risk-informed, performance-based regulation.

Now depending on how you use that first definition, I would say we probably want to be in the position that we evolve to this state, but right now I think we can have -- and then there is a space out here that is deterministic.

CHAIRMAN APOSTOLAKIS: What is performance?

MR. MURPHY: What?

CHAIRMAN APOSTOLAKIS: What is performance? What is the definition of performance?

MR. MURPHY: We'll get to that.

The static electricity is good today. The slides won't come apart.

Well, what we're trying to do in this paper is first consider those performance-based approaches that do not explicitly reference criteria from PRA and then plan how they may be phased into the regulatory structure and then solicit industry input. That's the overall goal of the presentation and the overall goal of this paper.

The paper, by the way, does not yet have office concurrence. It's just been circulated yesterday. We'd be glad to give the Committee a copy, but right now we don't have a consensus, and I will get you one as soon as I can, which I hope will be by the end of this week.

Now what's our approach? The approach is first to specify a safety objective -- I'm going to stand up so I can

see my own viewgraphs -- and what actions we'll take if the objective is not met.

Let me see if -- in my briefcase I have a hard copy of these things. I can do that sitting down.

Now once we set this basic safety objective, the licensee determines how the objective will be met. In setting the objective we require that there be some margin. In other words, you would not set an objective that took you right up to what you believe was the safety limit.

CHAIRMAN APOSTOLAKIS: Can you give us an example or two of safety objectives?

MR. MURPHY: The low-power shutdown, the spent-fuel pool may be a good example, although I know the rule is having its own share of troubles. The objective may be I don't want the spent-fuel pool to boil. Or the objective might be I don't want the level in the spent fuel to lower to the point where I have a shine dose equal to some radiation dose.

CHAIRMAN APOSTOLAKIS: And these are areas where you cannot do a PRA or --

MR. MURPHY: In some places they are, and in some places they're not.

CHAIRMAN APOSTOLAKIS: You cannot do them for what reason?

MR. MURPHY: Inadequacies in the PRA methodology.

I can come up with performance-based rules for security, for instance. I don't really handle sabotage or insider threat well in a PRA. Fitness-for-duty rules don't really fit we'll into a PRA, but I certainly can have a performance-based objective associated with them.

You know, the basic objective if I can put it bluntly is that I would prefer that, and our safety objective is that people who are spaced out or drugs or drunk on alcohol should not be operating nuclear powerplants. Now how do you come up with a performance-based objective to show that you meet that -- a performance-based program to show that you meet that objective? In some cases if you did enough PRA you could get there, but you may not have done it yet, and you still may want to go performance-based.

DR. SEALE: I guess external events are another general category where you can have that problem.

MR. MURPHY: Yes.

CHAIRMAN APOSTOLAKIS: No, but there you do have PRAs.

DR. SEALE: Some do.

CHAIRMAN APOSTOLAKIS: Seismic fire.

DR. SEALE: Some do.

CHAIRMAN APOSTOLAKIS: We're talking about areas where you cannot do it, not that you haven't done it.

MR. MURPHY: Well, I think that I'm talking about both. One is that I haven't done it, let's put it that way. In the PRAs that have been done there are sufficient uncertainties or I have eliminated something by assumption as I did the PRA so that I can't use the PRA model today. Now in some of these I may not be able to use it in the near future. In others I may be able to start a PRA today. But I can't answer it yet.

CHAIRMAN APOSTOLAKIS: It seems to me that if you actually can do a PRA, and you just haven't done it for some reason, then you should do the PRA.

MR. MURPHY: But you could go to performance-based regulation while you're doing it. I mean, the PRA based on past experience may take you two, three, four, five years, depending on how many you're doing, the level of depth of the PRA. To get that kind of insight may take a rather significant expenditure of resources.

CHAIRMAN APOSTOLAKIS: That's one side of the coin. The other side is that if you do this, you may be derailing the risk-informed initiative, because people might say well, gee, I'm doing this now, I'm fine, why do I need a PRA? And we don't want to do that, do we?

MR. MURPHY: No, as I say, I think we ought to evolve into where performance-based is part of risk-informed.

DR. KRESS: There are likely places where you'll never be able to treat well with the PRA and maybe ought to consider performance-based regulations as a permanent way to deal with them. For example, if you ever really got into organizational factors.

CHAIRMAN APOSTOLAKIS: Um-hum.

DR. KRESS: That's -- maybe that's never going to be amenable to PRA, and it seems like a likely choice.

CHAIRMAN APOSTOLAKIS: I disagree with that --

DR. KRESS: Well, we'll just --

CHAIRMAN APOSTOLAKIS: But there may be --

DR. KRESS: There may be areas.

CHAIRMAN APOSTOLAKIS: There may be areas.

MR. MURPHY: Yes, I hate to say never on almost anything --

DR. KRESS: Yes, I agree.

MR. MURPHY: But practically speaking, there's areas that I just plain can't do very well or I can't do at all yet. Other areas I can do but I know that they have major deficiencies in the method, so that when I calculate a PRA answer I have to do it with the full recognition that there are things that I can't handle with it.

A QA is another example of something that is very difficult to model in a PRA. I have a concept in my own mind of how you might be able to do something, but absent

data to prove what's sitting around in the back of my head, that's a very conjectural kind of thing.

DR. KRESS: You'd have to have a lot of data for any model that relates QA to actual improvement in viability.

CHAIRMAN APOSTOLAKIS: I think the most challenging problem is when you have some risk information but it's not complete and you do want to have performance criteria that, you know, utilize risk information as much as you can, but then you have to supplement those by criteria that do not use risk information. And I think that's the challenge. So you are really doing the extreme case where there is no risk information at all -- for PRA, let's put it that way, PRA.

DR. SEALE: There's no quantitative result.

CHAIRMAN APOSTOLAKIS: Quantitative result.

No, if you can do the PRA, though, I don't know, I'm not too sympathetic with that. I mean, I think we've gone out of our way to accommodate people who haven't done this, haven't done that. Well, I don't know, it can take another 30 years to finally say now you do it. I mean, this technology didn't start yesterday.

DR. KRESS: Well, I must say I'm very sympathetic to that view, but I also believe there are going to be some things we have to regulate that just are never going to be

very well treated by the PRA.

CHAIRMAN APOSTOLAKIS: If they cannot be treated well, I understand that.

DR. KRESS: Yes, and that's what I'm -- I'm just going to take his -- what he says and apply it to that proportion of the regulations. But I agree with you, if you can do a PRA, it just hasn't been done, why --

DR. FONTANA: There's basically two different -- you're talking about really two different things here, because you can use a PRA to determine prescriptive regulations if you wanted to. Performance-based doesn't have to be linked with PRA logically. It just makes a lot of sense to do it that way.

CHAIRMAN APOSTOLAKIS: No, I agree that it does not have to. I'm just trying to understand under what conditions we develop what. So if we cannot do it, yes, I agree, then, you know, that's something we have to deal with.

MR. MURPHY: Well, I'm kind of jumping ahead to another slide. Let me put that up and then come back to the one that was just on. This is what I consider the attributes of performance-based. And the one is that I set in a objective criteria. Now I can set that criteria using risk insights, for instance.

DR. KRESS: You can make judgments, say this is

likely more risky than this one, even though I don't have any numbers.

MR. MURPHY: Yes.

DR. KRESS: Or PRA.

MR. MURPHY: Or I may not believe the numbers. I may look in and I'll take something that may be controversial and I'll say there are things missing from fire-risk analysis. So I don't really believe the bottom-line number. But I learn a lot from looking at an analysis. Doing the analysis is worthwhile, even though I may not believe the bottom-line numbers. It's the logical pattern of doing it and the fact that the integrated look at the whole system from a fire standpoint gives me a lot of information. It's qualitative information, but I've gained a lot from that kind of thing. So that kind of risk insights I can use to help set my objective criteria even though I don't believe bottom-line numbers.

CHAIRMAN APOSTOLAKIS: But the point, Joe, is that the bottom-line number will never help you set criteria. It's always the insights that you just mentioned that will. So whether you believe the number or not is actually irrelevant. I mean, if I tell you yes, this is the result and it's a distribution log normal from 5 to 100, how does that help? It doesn't help you at all, even if you believe it.

DR. KRESS: I would almost call that risk-informed if --

CHAIRMAN APOSTOLAKIS: Yes. I think what you just mentioned, you know, the insights, doing it, developing the scenarios and all that, that's really what will help you do the -- develop the criteria. So the credibility of the final number really is an irrelevant --

MR. MURPHY: I agree with that, and that's why I said at the beginning that much of what I'm saying, even though it's developed to the nonquantitative PRA kind of stuff coming in, is applicable across the board, because you can say this risk insights and as I'm using it I'm thinking in terms of qualitative insights, but you get quantitative insights as well.

CHAIRMAN APOSTOLAKIS: I would be --

MR. MURPHY: Depending on how much you believe the analysis itself.

CHAIRMAN APOSTOLAKIS: The thing that bothers me with the four items you have there is that again they can be used by people and say, you know, there are four possibilities. I pick one. If you could prioritize them and show some preference and say look, I really would like to have the risk insights. If I can't have those, maybe a hazard analysis would be the next best thing. Then I think that would be a much more realistic way to approach the

problem.

DR. SEALE: This sounds like the PRA implementation or let's say 1061s integrated assessment or integrated decision making process where you don't have a quantitative PRA result as an input to that integrated decision making process. I mean, that's basically what you're talking about here, I guess. I mean, everything else that's there --

CHAIRMAN APOSTOLAKIS: The integrated decision making.

DR. SEALE: Yes.

CHAIRMAN APOSTOLAKIS: Yes.

DR. SEALE: Yes. It's just that process where you've got to know value for the PRA input.

CHAIRMAN APOSTOLAKIS: But I still think some statement to the effect that certain things are preferred over others would go a long way. We had the question yesterday from Commissioner Diaz, how do you make people who are skeptical, you know, realize that they have to use this.

DR. SEALE: Sure.

CHAIRMAN APOSTOLAKIS: And I repeat, this is 22 years after the reactor safety study was published in final form. So I don't think we can say, you know, they need more time to understand it, because I don't think it's so profound.

MR. MURPHY: Well, you know, I agree with you, as you know, 100 percent. I was drafted to work for four months on risk analysis in 1972, and I've been dabbling in it ever since. The --

DR. SEALE: That's because you were so good at it, Joe.

MR. MURPHY: Well, either that or it took a long time, you know.

CHAIRMAN APOSTOLAKIS: In 1972, you know, the state of the art was not --

MR. MURPHY: It was kind of nil.

CHAIRMAN APOSTOLAKIS: See, that's why --

MR. MURPHY: But, you know, recognize that when I go forward with this, I'm starting with a basic premise. I'm answering a Commission question that says what do you do when you're not amenable to PRA? And I'm taking that to mean quantitative PRA, but the -- even, as you know, if I do a PRA and I don't even quantify it, I just get cut sets. I've got a lot of valuable information.

CHAIRMAN APOSTOLAKIS: Unless you are overwhelmed. If I give you a thousand cut sets, I don't know what you can do with them if I don't prioritize them using probabilities, right? If I give you five --

MR. MURPHY: I have to use some judgment as how I look at them. You know, I -- in general I can say singles

are worse than doubles are worse than triples. And then I look at it in terms of common-cause factors, the things that may influence it. All this without ever quantifying them all.

CHAIRMAN APOSTOLAKIS: So you're quantifying in your mind, in essence.

MR. MURPHY: In a very rough way, yes.

CHAIRMAN APOSTOLAKIS: In a rough way

MR. MURPHY: Of course.

CHAIRMAN APOSTOLAKIS: My skepticism has to do with the fact that I don't -- I suspect there is nobody who is thinking about this thing at a higher level, the highest possible level, if you were given a task and obviously you have to respond to that. But this is not the highest level.

DR. SEALE: Well, let me ask you this, though, or perhaps we could ask the Staff. Are you thinking in terms of a hierarchy of inputs in the integrated decision making process?

CHAIRMAN APOSTOLAKIS: I am thinking of performance-based regulation. Just as we had Mr. Holahan and Mr. King think about risk-informed regulation, I would like somebody to be responsible for that.

Now, Joe, may very well be that man, but he was asked to do something very specific when PRA is not available, and that bothers me, because I would like him to

think about the overall problem and then tell me, maybe in a hierarchical fashion, for some problems, when you do have this information, this is what you do. For other problems, when you don't have anything like that, this is what you do. And in between, there is another spectrum of things you can do.

And I am not sure that there is somebody senior enough now at the agency who is doing this kind of thinking. If there is, then my problem goes away.

MR. MURPHY: I think the overall development that we went into in this, which is pretty simple, as I said, it covers both the risk-informed -- you make -- I guess the easiest thing to say is you make a decision on the basis of all the information that is available to you. If you have risk information available, certainly you use it.

If you have risk information available and you believe that there are some portions of it that are faulty, but there is still good integrated information there, you use it.

You make a judgement on the validity of every piece of information before you. It may be risk insights, it may come from hazards, or just an analysis of the hazards. It may come from your performance monitoring.

Historically, you look at the tracking of a system or a train with time and you see it degrading, and that

tells you some useful information. If maybe you have done deterministic analysis.

It can be at a very general level. Remember back in 1976, it is, after we published WASH-1400, we came to the conclusion that, gee, we were making a mistake, auxiliary feedwater systems really should be safety graded. They weren't up until then.

And so there was a crash effort that Mr. Cunningham in the back of the room, and a couple of others did, to try to quantify the reliability of aux. feedwater systems for the -- every PWR in the country.

And that led to new requirements on the plants. Now, they weren't based on a PRA, per se. They were based on analyzing one system based on insights that were given from one PRA. But they were important insights and we did the right thing.

So that you take -- you know, I don't see us discarding any information, but we use what we have. Now, I don't going forward in this manner in any way suggests that we are diminishing our push towards risk-informed, performance-based regulation.

As I said, you know, we want to go to the risk-informed. But right now, in some areas, we are not there yet. We either haven't done the studies, even though they can be done, or we can't -- just plain can't do them

yet.

Anyhow, the attributes that I see for performance-based regulation are that we have a measurable parameter. Now, that is either directly measurable or indirectly. And I guess the easiest way to say what indirectly means is that a relatively simple calculation can give you, can be used to generate something.

You have objective criteria to assess the performance. You are measuring something and you have an objective criteria to judge against it. That criteria is chosen from the information you have available to you.

You give the licensee flexibility. Once you have stated the objectives, the licensee has the flexibility to tell you how he is going to meet that objective.

CHAIRMAN APOSTOLAKIS: So who states the objective, the licensee or you?

MR. MURPHY: No, we state the objective. They state how they are going to meet the objective.

CHAIRMAN APOSTOLAKIS: And the objective has to be fairly high level, I suppose.

MR. MURPHY: The objective has to be at a fairly high level, but you have to consider a lot of things as to how you set it.

In other words, one of the considerations, for instance, is defense in-depth. It is very easy to set a

criteria for a system. But even though you haven't done a quantitative analysis of it, you don't want to give a big chunk of probability space away. So you may have to set your objective at a train performance rather than a system performance in some cases, for instance. Because you are trying to preserve this concept of defense in-depth.

You know, in an auxiliary feedwater system, it is important that you have both electrical and turbine-driven pumps. You may not want to give that away and set a performance standard for the aux. feedwater system. You may want to set a performance standard for the electric-driven portion and for the performance, and another one for the turbine-driven portion.

Once the licensee chooses, however, at that point, that becomes fixed. And what I am suggesting here is that be fixed in a licensee -- in a control document. Depending on the importance, that could mean something like the FSAR. It could mean a license condition, such that, once chosen, it can only be changed with care. Perhaps that has to be something like a 50.59 process. Perhaps if we really consider it important, it has to meet something like a license amendment.

So the concept is basically the NRC sets a safety objective. A reasonable high level, but recognizing the importance of defense in-depth and multiple trains, single

failure criterion and that sort of thing.

Once you set that general objective, the licensee picks how they are going to meet it. They choose the parameter they want to meet. Or we may choose it either, if we feel strong enough. We could choose the parameter, or we could leave that open so that they could choose it.

Once that parameter is set, however, and they tell you how they are going to meet it, then, at that point, that becomes a fixed parameter from a licensing standpoint.

CHAIRMAN APOSTOLAKIS: Well, it seems to me that it would be nice to have a set of criteria or guidelines, or principles that will give advice to the people who set these criteria. Because the way you described it, now it is pretty open-ended.

MR. MURPHY: Well, --

CHAIRMAN APOSTOLAKIS: I mean I can choose to apply defense in-depth and go to a very low level, or I can choose to do something else. And that -- I mean in the hands of an experienced, rational person, that's fine. But, you know, it --

MR. MURPHY: Well, I hope we are. No, what my thought is, you see, as I say, I require a margin, and then to explain. Yes, we are giving the licensee flexibility, but we are also preparing regulatory guides, standard review plans to identify what that means for a specific

application. What kind of depth, level of depth do yo need to go into? And then that is the purpose of the reg. guides. Is to accomplish just what you said.

And then once the licensee determines how they are going to meet it, that determination is approved by the staff. Then it gets locked in to a control document. And tne degree to which it is locked in depends on the document -- on the importance of the issue and how you are going to grade it.

This could be fleshed out more, but I think it really needs to be fleshed out on a case by case basis almost.

Now, the implementation of the process -- well, let me talk about the implications side first. As I said, provided we can develop objective criteria, based on any analysis that we have done, which may be PRA-based, it may not be, we may come up with a qualitative safety objective. We also may feel something is strong enough that we will pick a very fixed objective. In other words, the temperature of the spent fuel pool shall not exceed 125 degrees fahrenheit. Now, that's a safety objective. So is a safety objective saying it won't boil.

We channeled the inspection process, and I think this is fairly well addressed in a paper that was sent to the Commission about a month ago by NRR on inspecting for

performance and performance-based inspections. I don't know whether the committee discussed that or not, but it is an interesting paper.

The inspection focus should be on the oversight of the performance monitoring process and the effectiveness of the corrective actions that are taken if you start approaching or exceeding one of those performance limits. And, as I said, in some cases at least, my guess is that defense-in-depth considerations may lead us to setting performance standards at the train level more than at the system level.

Even though I don't have a quantitative analysis, I can look at, in a number of things, and say, you know, a know a train is worth somewhere between 5 times 10 to the minus and 10 to minus 1, and that element of probability space, I don't want to give up. And so I may want to set my standards at a different level.

CHAIRMAN APOSTOLAKIS: I am trying to understand now how one can -- is facing, how can you face the problem of setting performance criteria for trains without a PRA? I mean, can you give me an example of that?

MR. MURPHY: Well, you know, if you look at the general design criteria, they were written in 1969 before anybody developed PRA, and three-quarters of them are performance-based.

CHAIRMAN APOSTOLAKIS: Right. But you are doing it now. You are doing it now. So --

MR. MURPHY: Where I have PRA information, I certainly use it. Where I haven't done a PRA on a specific plant, or I find there is something significantly wrong with the PRA on the specific plant, with the IPE in the specific plant, that I don't want to believe it, but I have this whole bunch of insights that have come from the IPE program, and from all the other PRA's that have been done.

Certainly, I use it. I don't discard information in making safety decisions. I use the whole panoply of information available to me.

CHAIRMAN APOSTOLAKIS: Yeah. But, I mean when I asked you about examples, for examples, you told me fitness for duty and exotic things like that, for which there is no PRA. Now the discussion is on trains. It seems to me that is Level 1 PRA. That's different.

MR. MURPHY: Yeah. Yeah. I am a systems engineer and I get down to the level and maybe I should stay higher. But the fact is that -- all I am suggesting is, not that in every case will I need to go the train level, but in some cases I might.

If I get to fire protection systems and some things that I am not confident of the PRA, then I may be using more qualitative insights.

Fitness for duty. I have to start looking at, you know, their performance data might draw what I say. I have taken so many samples over the years in the nuclear industry, and I have an idea as to what my success rate has been.

Now, I can have some sort of trending information that says I will judge the effectiveness of your fitness for duty program depending on whether you increase detection rate. Now, I have to worry about other things in that, too. You know, am I getting -- how good is my program? You know, are things slipping through?

But I used the entire basis for the program. But instead of specifying exactly how I may do something, I can set an overall target.

I'll leave the details of the program to you, but once you pick those details, I will lock it into a licensee controlled document so you can't change it without giving serious thought to it.

Now that doesn't mean you can't change -- you, the licensee, can't change it. You can change it under a 50.59 type process is what I would imagine, so the licensee still has the flexibility. The licensee still can make the changes but they are reasoned changes.

Finally, the question that the Commission asked us is how do we implement it?

Well, what we are trying to do to the extent possible is to piggyback onto DSI-13. I believe the committee was briefed on DSI-13 at the last meeting by John Craig.

This is the direction-setting issue on interactions with industry. As part of that process, as part of the public law just passed a couple years ago, we are required to raise questions with our stakeholders if our regulations can be better represented by consensus standards that have been developed by presumably one of the professional societies.

This will require that we will have frequent interactions with stakeholders to solicit from them questions of what issues are amenable to the use of consensus standards.

What I had hoped to do with this is to minimize resource commitments. It would be to use those kinds of meetings that will be going on under the DSI-13 rubric to ask the additional question as to are there any regulations out there that should be made performance-based and solicit the input from the industry, from the public in one case.

Now if for some reason the plans for DSI-13 don't fit the kind of schedule we want to make here, obviously we can separate those two but the real thing is to solicit industry suggestions for candidate regulations that might be

converted to a more performance-based scheme.

We would encourage petitions. We published a Reg Guide -- I guess it is about a year and a half ago now -- our Reg Guide 10.12 that provided information as to what information should be submitted with a petition under 10 CFR 2.802 to get us to change the regulations and identify the kind of information that would help speed the process through.

We would continue as we did for the last several years through our marginal to safety program to encourage petitions on that type case, in that kind of a situation.

We'd evaluate the need for pilot studies. Perhaps they are needed, perhaps they aren't -- perhaps the pilots that are already going on in many different areas would be helpful, some PRA-based, some weakly PRA-based. You know, do you need something or can you gain?

As you say, when you are looking for performance-based standards, a performance-based standard that is based on risk information is better than one that isn't, in my view, but the performance-based aspect of it you may be able to gain insights from looking at the other.

Finally, we are committing to report to the Commission on what we are doing by the end of fiscal '98.

CHAIRMAN APOSTOLAKIS: Is the ACRS getting

involved at some point in this? Are we writing a letter?

MR. MURPHY: I don't know.

CHAIRMAN APOSTOLAKIS: Do you have any plans to solicit a letter or --

MR. MURPHY: I think it probably would be wise for us to request your review.

CHAIRMAN APOSTOLAKIS: When?

MR. MURPHY: I would hope to be able to have the letter to you --

CHAIRMAN APOSTOLAKIS: The letter?

MR. MURPHY: What?

CHAIRMAN APOSTOLAKIS: The letter -- are you writing a letter as well -- or the report?

MR. MURPHY: No, no, we are writing a report to the Commission in response to the SRM.

I hope we have that Commission paper available -- I think we can make it available to the committee if things go well in the internal review process early next week.

Now at that point I guess that would mean -- I don't know when your next meeting is after December but --

CHAIRMAN APOSTOLAKIS: So we will have a chance to comment on what you are doing well before you finalize anything?

MR. MURPHY: Well, I hope to send the letter forward soon. It is due to the EDO within a week.

CHAIRMAN APOSTOLAKIS: How about this report to Commission by end of 1998? That's different.

MR. MURPHY: Well, certainly you would have full opportunity to comment on that.

DR. SEALE: Joe, have you --

MR. MURPHY: But it is something that says basically what I said to you today was what our current Commission paper says.

I would plan to send that forward to the EDO almost immediately and we could use the committee comments to influence how we develop the report that is due at the end of '98.

CHAIRMAN APOSTOLAKIS: Well, could we put it on the agenda for December? That is two weeks.

DR. SEALE: No. The agenda for December looks like -- it's full.

MR. MARKLEY: February would be the soonest next date.

CHAIRMAN APOSTOLAKIS: That doesn't help him very much.

DR. SEALE: Joe, could I ask you a question?

MR. MURPHY: Sure.

DR. SEALE: You have here I'll say a sketch of a plan to use -- a technique that can be used to identify I guess performance-based regulation candidates in absent a

PRA.

It is a sketch of the use of something you could use to do that.

What do you put in here to protect against abuse? This is almost kind of a hunting license for things that -- you know, I could see where if a person has a hobby-horse in the current regulatory process and he wants to legitimatize that interest, and there is no support for that necessarily in a present PRA, I could see you trying to go through this process in order to cover that particular item with a performance-based approach where there may not be the full -- a real legitimate reason to include it in that part of your VIN diagram.

MR. MURPHY: Well, I have the same concern.

DR. SEALE: Have you thought about how you would go about it?

MR. MURPHY: Yes. I think in the Reg Guide that I mentioned it asked for a complete technical analysis of the issue. Clearly this would have to be reviewed by the Staff in some depth.

It would have to have a safety evaluation to approve it.

The process for changing a regulation is an involved process. You know, it involves seeking public comments and putting things out for comment, considerable

deliberation with you guys, and to be honest with you, I guess the answer to your question is that that is what the NRC Staff is for, is to keep something like that from coming through the system -- to look for those that make sense, to try to implement them, and to stop those that don't.

DR. SEALE: Well, I think a few words that specifically address that might be --

MR. MURPHY: That is a good suggestion --

DR. SEALE: But I would recommend again that you look at this integrated decision-making process and ask yourself how close is that to what you are talking about absent a PRA.

CHAIRMAN APOSTOLAKIS: Well, I would like to have an opportunity to comment in writing as soon as I can because frankly I am cool to the whole project. There is a good chance it will derail the risk-informed initiatives so I don't like that.

I may be wrong but -- so I don't know when we can have an opportunity to write something to somebody.

MR. MARKLEY: We can't schedule any briefings for the December meeting. However, if we have the draft paper, you could do a review and possibly recommend a future meeting at the December meeting, something like that.

CHAIRMAN APOSTOLAKIS: Recommend to the full committee?

MR. MARKLEY: Yes.

CHAIRMAN APOSTOLAKIS: Well, I guess the earliest is February.

MR. MARKLEY: Yes.

DR. SEALE: Yes.

CHAIRMAN APOSTOLAKIS: Now you say there is a good chance your letter will go up in a couple of weeks? Is that --

MR. MURPHY: I hope it's a lot faster than that but it depends on -- it is very basic principles but they are very philosophical in nature, which means a lot of people want to comment on it, so it's taken a long time to write it and even though it is only a few pages long, but my goal is -- I'll put it this way. The due date to the EDO is next Monday. Whether I am going to make that or not, I don't know.

DR. FONTANA: But then you have got a whole year practically after that. That is mostly taken up with reviews with industry and all that kind of stuff.

MR. MURPHY: Yes. It is sitting down with industry, soliciting their ideas, encouraging them that if they want to do something -- I still think they are the ones that know where this may do the most benefit for them.

I would encourage them to submit a petition -- and we have tried to make that as crystal clear as to how to do

that as we can, and then we would review the petition as we do any rulemaking petition and try to apply these general principles to it.

DR. FONTANA: But that occurs after the report goes to Commission at the end of fiscal '98.

MR. MURPHY: No, it could happen parallel to that.

DR. FONTANA: Okay.

MR. MURPHY: In other words, what the report at the end of fiscal '98 is to say we met with the industry, this is what they suggested, this is what they have done or this is what they haven't done.

If the answer is they have shown no interest whatsoever in this, then it may die on the vine if the answer is that they have proposed a whole bunch of things and we are now characterizing them and prioritizing them and basically it is a status report of where we are at the end of the fiscal year.

This gives us nine months to gather information to try to put it together to flesh this out more.

DR. FONTANA: Well, I respectfully don't agree with George on this. I think there's a lot of benefits to this that shouldn't be held hostage to requiring everybody to do a PRA. Of course long-term is that it should be risk-informed as quantitatively as possible. Of course, there's always something you can't do.

CHAIRMAN APOSTOLAKIS: I didn't say that we have to have a PRA. I would like the approach to be different. That's all I'm saying. But maybe the emphasis.

DR. FONTANA: Yes.

DR. SEALE: There are a lot of things like the fitness-for-duty thing and those kinds of things where there has been criticism that there's not anything being done in those areas, and this is one way to begin to address some of those -- I shouldn't call them side issues, but things that are not pretty high on the screen right now.

CHAIRMAN APOSTOLAKIS: Would the committee know enough about what you are doing if we had say a presentation, an hour an a half from you and your people in February, or do we need a subcommittee meeting? Because this is an extremely important subject, and I really want to understand where the Agency's going with that. What do you think?

MR. MURPHY: I suspect in its conceptual stages I'm not going to be able to give you much more in a month than I could give you -- than I gave you today.

CHAIRMAN APOSTOLAKIS: Okay. So maybe an hour, and hour-and-a-half with the full committee.

MR. MURPHY: Yes.

CHAIRMAN APOSTOLAKIS: In February.

DR. SEALE: Yes, that sounds reasonable.

CHAIRMAN APOSTOLAKIS: Would be sufficient.

DR. SEALE: Yes.

MR. MURPHY: We'll be a little further along in our thought.

CHAIRMAN APOSTOLAKIS: Yes.

MR. MURPHY: I value your input, and I certainly don't want to do anything to derail the risk-in[illegible] work that's going on, and if --

CHAIRMAN APOSTOLAKIS: I think, you know --

MR. MURPHY: Your suggestions are very valuable.

CHAIRMAN APOSTOLAKIS: You know, I have reservations. I think it's best to air them earlier rather than later, so you have that input.

MR. MURPHY: Yes.

CHAIRMAN APOSTOLAKIS: Okay. Well, any other questions?

Thank you, Joe. We'll take a break now. We'll come back at 9:45.

[Recess.]

CHAIRMAN APOSTOLAKIS: Now we're going back to 1061, right? And the policy issues. And we're back to Mr. King, Cunningham, and Parry. Where is Holahan? He is not coming?

MR. KING: He's probably still getting a cup of coffee. He'll be here.

CHAIRMAN APOSTOLAKIS: Oh, okay.

MR. KING: We're going to pick up where we left off yesterday in going through the changes to 1061, and we had gotten up to discussing PRA quality and scope, and that's where we'll pick it up.

MR. CUNNINGHAM: As we were discussing yesterday, we've added a section into the document that talks about the quality and scope of the PRA that would be needed. Before we had more of a kind of a vague reference to NUREG 1602 and to talk about this, and given that we've kind of removed 1602 from the process right now, we wanted to go back and put something in.

I think that there are a couple of key points in terms of the scope and the quality of the PRA, and our first two are on these bullets on the slide, the first two bullets on this slide. One is that we want the plant -- the PRA to realistically reflect the as-built and as-operated practices in the plant. So it gets at this issue of a need for a living PRA that we talked about a little bit yesterday.

The second key piece is that we try and reinforce the point that the scope and quality of the PRA required of the PRA depends on the application, and that there's not a single standard for the PRA for all applications. There may be kind of a base standard above which -- minimum standard, if you will, but there's no single standard for any

application.

Another point we made in this section is that the acceptance guidelines deal with all operating modes and all initiating events, but it's not necessary that we have a PRA for all of these modes, again reinforcing the point that this can be done quantitatively and -- or qualitatively as well.

CHAIRMAN APOSTOLAKIS: Which section is this, Mark, in the actual report?

MR. CUNNINGHAM: It's section 2.4.2.1.

CHAIRMAN APOSTOLAKIS: 2.4.2.1.

MR. CUNNINGHAM: Page 12.

CHAIRMAN APOSTOLAKIS: Yes. So again this is where Dr. Powers may raise questions regarding the credibility of the models and the availability of all the information they might need.

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: Do we have anything else after that? It says here that all plant operating modes and initiating events should be addressed. However, it is not necessary to have a PRA that treats all of these modes. For every application I guess is what you mean, but if you don't need that.

MR. CUNNINGHAM: Yes, that's right. So one say to deal with the concerns about shutdown might be that proposed

CLB changes that deal with parts of the plant that are not related to shutdown operations in one way or another might be a wiser course of action, if you will.

CHAIRMAN APOSTOLAKIS: You want to change that word "can" to "may"? May be sufficient? What do you think? It's the second sub-bullet, qualitative treatment of missing modes and -- yes.

MR. CUNNINGHAM: I guess so; yes.

CHAIRMAN APOSTOLAKIS: It's okay?

MR. CUNNINGHAM: Okay.

CHAIRMAN APOSTOLAKIS: It's also in the text, page 13.

MR. CUNNINGHAM: Okay.

CHAIRMAN APOSTOLAKIS: There must be, though, I don't know if it's a good idea, but the message should be clear that if one chooses to give you qualitative arguments he will not have as easy a time as, you know, trying to quantify things. We don't want people to start waving their arms and say, gee, you say here I can do qualitative, so I will do qualitative here. I don't think that this is so, and I think this is so. Somehow we have to discourage that. Is it going to be a practical matter when they're going to have a hell of a time getting anything out of you if they try to do that?

MR. CUNNINGHAM: I'm not sure I want to discourage

them.

CHAIRMAN APOSTOLAKIS: If it can be done quantitatively, yes, I think we should discourage them.

MR. CUNNINGHAM: But remember our objective is not more quantitative analysis. Our objective is good safety decisions.

CHAIRMAN APOSTOLAKIS: Yes.

MR. CUNNINGHAM: And if you can make a good safety decision with qualitative information, and that's more efficient, why require more?

CHAIRMAN APOSTOLAKIS: That's true. That's true. If you can do that.

MR. CUNNINGHAM: So I would think that perhaps you ought to apply the same standard, not encouraging more or less quantitative analysis but the demonstration that whatever analysis, quantitative or qualitative, is appropriate to the decision that's being made it seems to me is independent of how the analysis was done.

CHAIRMAN APOSTOLAKIS: I think, yes, this will evolve from actual practice. That's okay.

MR. CUNNINGHAM: The last point that we have in this section is the issue of peer review and certification processes and things like that. Again we're encouraging the use of peer review of the PRA to help give the staff more confidence of the quality of it, and that certification

programs and some cross-comparison studies could be a support to this overall review. It doesn't replace necessarily a peer review or that type of thing, but it could be of benefit to acknowledge the types of efforts that have been going on in the industry.

CHAIRMAN APOSTOLAKIS: Is anybody going to tell us at some point what the inadequacies of modeling are? I mean, we have a list of those somewhere?

MR. CUNNINGHAM: I'm not sure I understand what the inadequacies --

CHAIRMAN APOSTOLAKIS: We have a number of people now who are very experienced doing PRAs and arguing with their peers and so on, and some of them of course are at national laboratories who work for NUMARK. Others have been in private industry. There is a whole body of knowledge there regarding models, how good they are, what questions frequently arise.

Do we have a report somewhere where the insights these people have gained are there? For example, you know, I mentioned once that we really don't have many model uncertainties in Level 1 PRA and I got the answer no, that's not true, it's because we're not asking the right questions. And there are a lot of questions about success criteria, but it seems that we just accept them. These kinds of insights, you know, it would be nice to have a document, a NUREG or

something where something like that would be listed, in an appropriate way, of course, so it -- an evaluation of the methodology.

Because it seems to me that these standards and these peer reviews, they probably will have to address minimum requirements. I don't think we're ready to say yes, this is what a PRA should look like, because then you are inhibiting progress in some sense. But if you say yes, it's unacceptable not to do common-cause failure analysis, much to my surprise several IP's did crazy things with that, as you guys know.

I mean, we choose to do it this way for these components or will only do it for these components. What is that? I mean, you have to do it. Now choosing the actual model may be a different story, but you have to do it. Choosing not to do an uncertainty analysis, you know, why? I mean -- so on.

So minimum requirements make sense to me, but setting up standards is, I don't know, I'll have to understand the subject more. But I think it would be useful to everyone, including the peer review panels, to have a document from well-recognized experts where the limitations of models -- in fact there was an interesting paper published a few years ago by three people from PLG --

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: And what was it, strengths and limitations of PSA.

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: So, you know, maybe we need an update about it, or maybe we need a broader group of people doing something like that. Because obviously they represented a certain point of view.

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: You are familiar with it, Gary?

MR. CUNNINGHAM: Yes. It's one of those things where the PLG people have touched on this. To some degree it was touched on in the IP insights report.

CHAIRMAN APOSTOLAKIS: Um-hum.

MR. CUNNINGHAM: Where they talked about at least some of the issues.

CHAIRMAN APOSTOLAKIS: Yes. Yes.

MR. CUNNINGHAM: Some of the work that's being done by CSNI touches on pieces of issues, if you will.

CHAIRMAN APOSTOLAKIS: Pieces of issues, yes.

MR. CUNNINGHAM: CSNI has a group now looking at the issue of where are we in the state of the art in fire PRA, for example.

CHAIRMAN APOSTOLAKIS: Yes.

MR. CUNNINGHAM: But it -- I'll have to think

about something.

CHAIRMAN APOSTOLAKIS: That would be a useful thing to have. We also have to think about the best way of doing it. Maybe it's not worth having a NUREG. Maybe just having somebody write a paper.

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: That will be reviewed extensively by the peers.

MR. HOLAHAN: I don't think it lends itself to being in this reg guide.

CHAIRMAN APOSTOLAKIS: Oh, no. No. No, but peer reviews, you know, I've participated in a lot of peer reviews, and I know there are peer reviews and peer reviews. So just by having a peer review doesn't mean much to me. There are some peers that are better than other peers. Or they're given different charge than other groups, you know.

MR. CUNNINGHAM: As I said when I started this slide, I said that we put this into the document because we had had, in a sense, a reference to new Reg. 1602 was our method of dealing with this issue of quality and scope. 1602 was probably far beyond what we needed to talk about.

This is a cut, at least, of what we see here at some of the issues. We are kind of, you know, hoping that we can get some feedback from the committee, that are there other issues with respect to quality and scope that we ought

to touch upon in 1061? I think, this may not be -- I don't think we are completely comfortable yet that this is a sufficient set of issues to talk about in 1061.

CHAIRMAN APOSTOLAKIS: I find that the potential problem here is, as I said yesterday, you are using the baseline CDF and LERF, plus the changes, to make a decision. So if people raise a question regarding our ability as a community to estimate the baseline numbers, what do we do?

The criteria, the QHO's themselves, CDF and so on, are supposed to be numbers that are applicable to all modes, all considerable failure modes, except sabotage and so on.

So -- you were about to say something.

MR. PARRY: Yeah. I think it is an overstatement on Dr. Powers' part to say that we don't have the techniques to do this assessment of the total core damage frequency, for example, I think we do, and they have been done. You can argue about whether they have been done very well, or whether some parts of them, conservatively, you know, compare to the others. But I think we are not totally in ignorance of these other areas.

So -- but the real problem is that, I think, to do -- well, he had a two part comment, actually. One of them was that we don't have the techniques, and the second part was that the staff doesn't have the experience to review those, even if they were presented with them.

And I think the experience in the industry with the missing parts of the analysis is not that great. That is certainly true. But it is wrong to say that the techniques don't exist.

CHAIRMAN APOSTOLAKIS: Well, speaking of shutdown and low power, I mean we have had the two studies that Sandia and Brookhaven have done.

MR. PARRY: And there have been several industry one that have been done, too.

CHAIRMAN APOSTOLAKIS: Yeah. Those were, though, limited in scope. Is that correct?

MR. PARRY: Yes.

MR. CUNNINGHAM: No.

CHAIRMAN APOSTOLAKIS: Your studies.

MR. CUNNINGHAM: The two PRA's we did for shutdown operations, there was a screening analysis of all the operating, plant operating states that are associated with shutdown operations. Coming down in power and going back up. So at a screening level, it was covered, the waterfront, if you will. In terms of initiators, it included fire and seismic and things like that as well. So it wasn't -- I wouldn't call those limited scope analyses.

CHAIRMAN APOSTOLAKIS: But they are detailed analyses.

MR. CUNNINGHAM: Detailed analysis for one plant

operating state that just -- for each one that seemed to jump out as the most significant. So if there is a limitation, and certainly Dr. Powers has made this point before, there was certainly a limitation that we didn't do extensive PRA studies on each of the operating states.

DR. SEALE: And I believe at our last meeting we found that there was some -- or we heard that there was some reason to question whether or not the screening had been fully successful in identifying the reported sequences, or failing to identify significant sequences.

MR. CUNNINGHAM: It must have been a meeting I missed, so I am not sure. But, clearly, it is a screening and that is what it was.

DR. SEALE: Yeah.

CHAIRMAN APOSTOLAKIS: Now, the industry has done a more complete job, right? I don't know.

MR. PARRY: Not as a whole, certainly.

CHAIRMAN APOSTOLAKIS: Seabrook, the Seabrook folks have done low power and PRA.

MR. PARRY: Right.

CHAIRMAN APOSTOLAKIS: Is that, have they done more than Brookhaven and Sandia?

MR. CUNNINGHAM: I would guess it would not be more. It's has been a while since I have thought about the Seabrook study, but I wouldn't characterize it as

substantially more or substantially less than what was done by the staff studies.

MR. HOLAHAN: You also can recall that the three NEI pilot plants, San Onofre, Arkansas and South Texas, are committed to doing shutdown, full scope PRA's. Okay. External, internal, external and including shutdown.

CHAIRMAN APOSTOLAKIS: Is this a new development now?

MR. HOLAHAN: Yes.

MR. KING: Well, no, we talked about it. It's the NEI initiative where they are going to do the full scope PRA.

CHAIRMAN APOSTOLAKIS: But that will be everything, all balls and everything.

MR. KING: That's almost -- now, they are all, all of those are PWR's. We have been hoping they would throw a BWR in there but --

CHAIRMAN APOSTOLAKIS: In fact, speaking of that, are we going to discuss this at some time, you know, what the staff is expecting to get out of this initiative? I mean I understand they expect you to bless it in some sense. They are not going to go ahead unless they have some sort of blessing.

MR. KING: They are concerned that it going to take quite, you know, a significant effort on their part --

CHAIRMAN APOSTOLAKIS: Sure.

MR. KING: -- to do these three full scope PRA's. They would like some assurance that what comes out the other end has a reasonable chance of leading to some burden reduction. So what they have proposed is three pilot proposals where they are taking what they consider relatively simple changes as examples of the kinds of things that are going to come out of this study, and they want to submit them as pilots to us. And they want to use that to get a warm feeling that we are willing to process those kind of ventures in a reasonable time frame with a reasonable effort on their part.

And they say, given that, then they are willing to go ahead and invest the rest of the money for the full scope PRA. And we are negotiating now the schedules and scope of those pilots, as well as the criteria they are going to use for the full scope activity.

But, yeah, if you would like to be briefed on this, we could arrange a briefing.

CHAIRMAN APOSTOLAKIS: What do you think about --we are talking about the Bob Christie, the so-called Bob Christie initiative. They are negotiating what the staff would be willing to accept or see.

MR. KING: Our next meeting with them is on November 24th. It is a public meeting. If you can't wait

for your own subcommittee, you are welcome to attend that.

CHAIRMAN APOSTOLAKIS: No, I won't here though.

MR. KING: You won't be here.

CHAIRMAN APOSTOLAKIS: Maybe, I don't know, Mike, can you go?

MR. MARKLEY: Yeah. What date was it again?

MR. KING: November 24th. It's a Monday, it is going to be in the afternoon, starting at 1:00. It's somewhere -- it's here at headquarters, I don't remember the room number.

MR. CUNNINGHAM: So, if you we like, we will just inform Mike.

CHAIRMAN APOSTOLAKIS: Yeah. Yeah.

MR. PARRY: George, to get back though to this full scope issue, remember that part of the -- with the modification to the acceptance guidelines, that, in a sense, removes the need to at least assess the baseline on the full scope.

CHAIRMAN APOSTOLAKIS: What modification is that?

MR. PARRY: The modification of having that very small region below 10 to the minus 6.

CHAIRMAN APOSTOLAKIS: Yeah.

MR. PARRY: Well, a lot of applications could be in that region.

CHAIRMAN APOSTOLAKIS: But even there, you need to

know that they are below 10 to the minus 3, I hope. You used to have it open-ended, but you really didn't mean that.

MR. PARRY: That's true. But whether -- whether one needs to do a formal assessment to do that.

MR. HOLAHAN: I don't think that is an issue for individual license amendments, any more than it is -- I mean we have process 1,000 license amendments a year, okay. We think we have an idea that the plants we are dealing with are not 10 to the minus 3 on a day to day basis. We don't stop at every license amendment and ask them, by the way, are you still below 10 to the minus 3?

And I don't think necessarily that we are going to do that, you know, for these applications either.

CHAIRMAN APOSTOLAKIS: To recapitulate. The answer is, first of all, that you don't agree with him that the situation is so bleak, right, that we do have information?

MR. PARRY: We do have information, right.

CHAIRMAN APOSTOLAKIS: And the second, is there a second part to the answer?

MR. HOLAHAN: I have a second part of the answer. I don't agree with him on the bleakness, which I think, really, you could assess in terms, not of impossibility, but as a level of uncertainty you have left after you do the analysis.

And it seems to me that I -- even recognizing that there are things that were not analyzed and there can be large uncertainties in some areas, I don't think that changes what you want to do.

It seems to me that what you want to do is still make, you know, an integrated decision with the best risk insights you can bring to that decision. Whether it is very limited information or, you know, complete quantification with very small uncertainties. It seems to be me it doesn't -- in some ways Dr. Powers is suggesting that his concerns about what we know and what we don't know will derail the process, and I don't see that at all.

It seems to me that our objectives are not -- not, you know, the gold-plated PRA. Our objectives are to make the best decisions you can, with the best information you have got.

And, you know, to the extent that there is limited information in some areas, well, that influences your decisions, but it doesn't, to me, it doesn't stop you from using risk analysis or risk insights.

DR. KRESS: It may be you even identify places where you need to do more work.

MR. HOLAHAN: Yeah.

DR. KRESS: More research to advance this thing.

MR. HOLAHAN: I mean it seems to me the

alternative is worse.

DR. KRESS: Yeah, not doing any.

DR. SEALE: This is a candidate -- or these are candidates for the inevitable upgrade of the quality as experience is accumulated. That is really what he has done here.

MR. KING: And, if you recall, the Commission has charged the Office of Research and given us resources to do more detailed risk studies on low power and shutdown.

DR. SEALE: Sure. Sure.

MR. KING: They recognize the fact that this is an area that has got less information than we would like to have.

MR. HOLAHAN: It can't be worse than what we have been doing before. All right. And so I think his note is, in my view, too pessimistic, in that, sure, there are lots of limitations to what we know, but the objective is to take what you know, recognize what you don't know, and make the best decisions you can. And I think we are putting in place a process to do that.

DR. SEALE: Clearly, you don't want to be too timid in this process.

MR. HOLAHAN: No. If you are too -- well, you know, whether you act or don't act, whether you make a conservative decision or use the numbers, every decision has

consequences. Even the decision not to act has consequences.

DR. SEALE: That's is correct.

CHAIRMAN APOSTOLAKIS: That is a statement that can be debated for a long time. But let's not do that.

[Laughter.]

MR. CUNNINGHAM: If I could come back a moment to the point that we were talking about a little bit earlier on kind of where are we in terms of strengths, weaknesses and PRA's and shutdown being one issue there.

I should mention that a couple of weeks ago, the Office -- another thing that the Office of Research has been asked to do is to expand our international cooperation in PRA research. And a couple of weeks ago, there was a meeting where, kind of a kick-off meeting. We had 15 or 16 countries represented. One of the things we did there was discuss what people perceived to be the big issues in terms of future PRA research. In a sense, what are the weaknesses of current PRA?

And the topics that came up, I am trying to recall now, shutdown was one of them. Fire, risk analysis, human reliability, including --

MR. HOLAHAN: Digital I&C.

MR. CUNNINGHAM: Yeah. HRA, including management and organization influences.

CHAIRMAN APOSTOLAKIS: They have been saying that for 15 years.

MR. CUNNINGHAM: Yes. Yes. And digital and software reliability and risk issues were the biggies.

As a next step in this program, we have committed that we would try to get the researchers together involved in shutdown and digital systems risk and fire risk. No, I am sorry, not fire -- management and organizational factors risk. To try to understand better at the researcher level, what are the details of the issues and how can be collaborate more, internationally, in help to quit just talking about it and do something about some of these things. So for what that is worth.

The issues that came up in this meeting, from a variety of countries, seemed to be the same issues that we have been talking about here, in terms of HRA, and shutdown and fire, and that sort of thing. For what this is worth.

CHAIRMAN APOSTOLAKIS: Okay

MR. CUNNINGHAM: And --

CHAIRMAN APOSTOLAKIS: Yeah, let's move on.

MR. CUNNINGHAM: Okay. We have tried to go back and look at what -- and better define what we meant by management attention, or increased management attention in the Reg. Guide.

We had kind of a long list of items in the first

draft, in the draft for comment. We tried to consolidate them and to make it a little more clear in the present version that you have, and, basically, it comes down to the bullets that are on Slide 21.

We are looking at, first of all, the issue of cumulative impact. And what, in risk management, what -- we are evaluating -- in evaluating certain CLB changes now, what has the licensee been doing in terms of risk management in the past? Is the first -- first of the proposed CLB changes? Is it one of many involving -- involving increases? Is it a -- it is a more balance type of thing. That sort of thing would be brought to consideration of management. Again, it is -- that would apply for CDF and for LERF.

The bullet that we had before that remains is the impact of proposed changes on the complexity of the issue, the burden -- operational complexity, I'm sorry. The burden on the operating staff of the plant, and overall practices in the plant. We have discussed before that we didn't want to have programmatic, tradeoffs between hardware and programmatic types of parts of the plant and practices.

Then, finally, other plant-specific factors, including the siting. Recent inspection findings, performance indicators and LER's from the plant.

This is the place where we had talked yesterday

about including in here information from a Level 3 PRA. That it could be part of siting factors, if you will, or something. That this could be a place to consider, if it is a high population site versus a low population site, or the impact of population and weather together in terms of looking at Level 3 PRA. So this could be a place where we could add something here too deal with that issue.

DR. KRESS: Now, when we go deeper into the darkness of this gray area of increased management attention, which of those is it that varies? Is it the last two bullets?

MR. CUNNINGHAM: Yeah. Perhaps the one that varies the most is the last one.

DR. KRESS: The last one.

MR. CUNNINGHAM: Yes. As they get closer to the bright lines, and the dark areas, then --

MR. KING: And there is another one that is not shown here that we are still kicking around, and that has to do with the closer you get to the decision guidelines, maybe the more you ought to think about what is the benefit that is being accrued by this change. Sort of a cost benefit or regulatory analysis guideline kind of consideration.

It is not stated in here at this point, but we are kicking that one around, as well as something that would come into play as you get into the grayer and grayer areas.

CHAIRMAN APOSTOLAKIS: Incidentally, we are done with the bright lines? Yeah, I don't see any.

Coming back to you. What is negligible -- what is small and so on? It is the numbers that you had in that previous viewgraph that we surveyed? Can we spend five minutes to make sure that everybody understands that? Because I am not sure that we actually addressed that.

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: For example, I got the comment yesterday from Dr. Miller that he would like the very small, the line that defines the very small region to be three or four times 10 to the minus 6. So --

MR. CUNNINGHAM: I am trying to go back and find it.

CHAIRMAN APOSTOLAKIS: Yeah, you have the transparencies here?

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: Okay.

MR. CUNNINGHAM: I just have to find them.

MR. HOLAHAN: It was number 13.

MR. CUNNINGHAM: It is over here.

Number 15.

CHAIRMAN APOSTOLAKIS: Yes. Now you are talking in the text someplace about -- I think, first of all, the shading perhaps should not be --

DR. SEALE: The deltas don't line up.

CHAIRMAN APOSTOLAKIS: The other way --

MR. CUNNINGHAM: Trying to do it backwards.

CHAIRMAN APOSTOLAKIS: That's it. There you go. Move it to the right a little bit. That's it -- that's it.

DR. KRESS: So Region II is all --

CHAIRMAN APOSTOLAKIS: What I call negligible --

MR. HOLAHAN: It obviously takes a coordinated team to make these decisions.

[Laughter.]

DR. SEALE: Integrated decision-making.

CHAIRMAN APOSTOLAKIS: With advice --

DR. KRESS: Did Dr. Miller have any technical basis wanting to move the thing to 3 times --

CHAIRMAN APOSTOLAKIS: No, that is a policy issue. He thinks it is too small.

DR. KRESS: I know. Certainly could be a technical basis having to do with being able to predict it or something like that. There could be a technical basis.

CHAIRMAN APOSTOLAKIS: Well, one argument that can be advanced is that you can have a CDF, say, of 10 to the minus 5, and by changing it to one point -- two 10 to the minus 5, you don't really change much depending on the return you have.

DR. KRESS: I don't call that a good technical

basis myself, but I think he, as best I recall, was concerned about if you apply this region, say, to certain outage times that you get very short times to be consistent.

CHAIRMAN APOSTOLAKIS: I don't know.

DR. KRESS: For things that are normally granted -- you get such a short time it is not consistent with what we do now, or something like that, but I don't recall -- do you remember why he wanted that --

CHAIRMAN APOSTOLAKIS: No. As he was leaving he told me he thinks it's too small, 10 to the minus 6, that's all. That's all he told me, so I assumed -- that is why I gave you this argument -- that if you are already 10 to the minus 5, you know, 1.2 versus 1 really -- I mean it's not the technical argument but it is a numerical argument.

The technical argument is that you really don't have models that allow you to make a distinction between 1.2 and --

MR. HOLAHAN: That is the point I agree with.

DR. KRESS: That's the point I agree with.

CHAIRMAN APOSTOLAKIS: On the other hand though, let me finish the argument, it seems when we put this together with gray areas, it says there's NRC Staff scrutiny, but perhaps we meant more than that. I still don't like bright lines even if they are buried in a gray area.

I think the gray area should indicate also that 10 to the minus 6 really we don't mean 10 to the minus 6. We mean something somewhere there.

Now you guys had a figure some time ago where you actually made those lines fuzzy.

MR. KING: Yes.

CHAIRMAN APOSTOLAKIS: And that will probably be more accurate than this.

MR. PARRY: It's pretty difficult to see it.

CHAIRMAN APOSTOLAKIS: I think people though should realize that these are really not bright lines, so the gray includes that. It's not just a scrutiny.

MR. PARRY: Right.

MR. MARKLEY: Actually, I liked Gary's focus on it being regions for decision-making rather than focusing on the lines.

CHAIRMAN APOSTOLAKIS: Yes, but what does that mean? I mean if the lines define the regions --

DR. KRESS: That is not a very big conceptual step, it seems to me, like to look at a line and say it represents a fuzzy thing.

CHAIRMAN APOSTOLAKIS: It is not a conceptual step, Tom, until you realize that there are people are scared and when they see two times 10 to the minus 6 they say that's above the line, I reject it.

DR. KRESS: Tell them not to.

CHAIRMAN APOSTOLAKIS: If I find them in the cafeteria, I will.

[Laughter.]

MR. HOLAHAN: I don't think it matters how broad a brush we use. You'll notice that the first time we showed the 10 to the minus 4 line, at least one owners' group came back in to show us that all their plants had been just recently reanalyzed and rethought and they were all below 10 to the minus 4.

DR. KRESS: Gee whiz.

DR. SEALE: Could I ask a question about another caveat that you laid on us here the other day, and that was something to the effect that you didn't want to introduce another dominant sequence.

MR. HOLAHAN: Yes.

DR. SEALE: Now let's suppose you had a CDF of 10 to the minus 5, and someone came in with a request for a Region II change with all that Region II implies --

MR. HOLAHAN: Oh, you ought not to imply that we can't function with a fuzzy curve.

DR. SEALE: No, no. My point is that in the limit there was a Region II request for a 10 to the minus 5 addition.

Now clearly that is a major sequence that has been

added, a dominant sequence.

MR. HOLAHAN: Yes.

DR. SEALE: And you wouldn't do that?

MR HOLAHAN: Well -- it is at the limit of what we might do.

DR. SEALE: Okay. Okay -- so that really is what defines the fuzziness of the fuzz is that --

MR. HOLAHAN: Yes.

CHAIRMAN APOSTOLAKIS: That is why they have scrutiny.

DR. SEALE: I just wanted to reconfirm that you were reading from the same page.

MR. HOLAHAN: I think so.

CHAIRMAN APOSTOLAKIS: Can you point to me where in the text you make it clear that 10 to the minus 5 is not 10 to the minus 5? I remember seeing it someplace but I want to read it again.

MR. HOLAHAN: While they're looking can I go back and try to answer the question about how we picked the 10 to the minus 5 and 10 to the minus 6?

DR. KRESS: Yes.

MR. HOLAHAN: I don't think of them as percentages. To me if the absolute steps are meaningful, I think for the current generation of nuclear power plants, another 10 to the minus 5 is an important change, so whether

the plant is at 10 to the minus 7 or whether it is at five times 10 to the minus 4 --

CHAIRMAN APOSTOLAKIS: So Mr. Holahan does not subscribe to the view that the PRA numbers can only be used in a relative sense and I think that is a great thing.

You think that absolute numbers mean something. I fully agree with you.

MR. HOLAHAN: Yes. When they become a certain size, I think they do.

CHAIRMAN APOSTOLAKIS: Yes.

MR. HOLAHAN: And likewise I think 10 to the minus 6 doesn't rise to that level -- 10 to the minus 6 you are talking about they are sufficiently small that they are in most cases either not dominant sequences or you are talking about a relatively small change to a dominant sequence.

MR. PARRY: Of changes spread over several sequences even, so --

CHAIRMAN APOSTOLAKIS: I fully agree with what you are saying. I think this is the way these numbers should be --

DR. FONTANA: I agree with the approach and I agree with what you are saying, but your identification of 10 to the minus 5 is a major change.

It doesn't necessarily mean that you have full confidence in the bottom number.

You know that 10 to the minus 5 is similar to other 10 to the minus 5s which are major changes.

MR. HOLAHAN: Yes.

DR. FONTANA: But remember we didn't call them, we don't say 10 to the minus 5 are major changes. We said that they are -- in fact, we called them small, but they are just at the upper limit of small.

DR. SEALE: They are at the level of becoming a dominant sequence in a 10 to the minus 4 --

DR. FONTANA: In any plant.

DR. KRESS: Now if you 10 to the minus 6 changes, you suddenly have a 10 to the minus 5 change, are we going to require them to track the changes in Region III?

MR. HOLAHAN: Yes. Well, I think we have some -- they will be tracked. Whether we will require licensees to track them or whether we will simply keep our own database I think is a discussion we are having.

DR. KRESS: You will be notified on any changes.

MR. HOLAHAN: Well, remember -- no, what we are talking about it if it has 10 to the minus 5 changes, we are talking about things that we have approved, right? You know, the current regulation and the 50.59 and all that don't allow licensees effectively to make risk increases on their own, so all we have to do is keep track of things that we have approved. Not so hard to do.

Now you could argue that --

DR. KRESS: Now we are going to change 50.59, right?

MR. HOLAHAN: Well, if we change 50.59, and we say that the level that we pick is sufficiently small, then I am not all that worried about accumulating a hundred 10 to the minus 7s.

DR. KRESS: I wouldn't worry about that either.

MR. PARRY: George, the section you are looking for, if you are interested, is on page 16.

CHAIRMAN APOSTOLAKIS: Okay.

MR. PARRY: It's the first paragraph under comparisons with acceptance guidelines.

CHAIRMAN APOSTOLAKIS: Okay. 16?

MR. PARRY: Page 16, the last paragraph on page 16.

MR. KING: Last paragraph --

CHAIRMAN APOSTOLAKIS: Oh.

So, where exactly do you have it? What?

MR. PARRY: Well, read the whole of the first paragraph there.

CHAIRMAN APOSTOLAKIS: Oh, an indication?

MR. PARRY: Um-hum.

CHAIRMAN APOSTOLAKIS: Yes. Approximate values. Okay. So if I go back to page 14 then, the last bullet,

applications which result in increases to CDF above 10 to the minus 5 per reactor year would not normally be considered. Was that too absolute?

MR. HOLAHAN: Well, I don't think so.

DR. SEALE: It's not a "may," it's a "would."

MR. HOLAHAN: Yes. In terms of regulatory language I think it's more flexible than one normally sees

CHAIRMAN APOSTOLAKIS: And the 10 to the minus 5 again is to be interpreted according to page 16.

MR. HOLAHAN: Right.

CHAIRMAN APOSTOLAKIS: An indication.

MR. PARRY: And again, stressing that it's not just numerical, the results that you're using but --

CHAIRMAN APOSTOLAKIS: As long as people understand these things. I don't think there's any problem. Yes, would not know. So when you train the staff, you should spend some time on this, that these numbers are really fuzzy numbers. But don't use fuzzy set theory now.

MR. PARRY: We try not to.

CHAIRMAN APOSTOLAKIS: So are we happy with the figure? Everybody's happy?

DR. FONTANA: Yes. Sure.

CHAIRMAN APOSTOLAKIS: The combined figure, I hope.

DR. FONTANA: As long as it has the lines on it.

CHAIRMAN APOSTOLAKIS: Huh?

DR. FONTANA: As long as it has the lines on it.

[Laughter.]

CHAIRMAN APOSTOLAKIS: All right. You come from the old school, too.

DR. FONTANA: I would use fuzzy dots, but that's a different thing.

DR. KRESS: It'd be a lot better if you didn't have that gray stuff on there.

CHAIRMAN APOSTOLAKIS: Now there is a clear change there in the gray area when we cross 10 to the minus 3. Is that something that you guys will leave there? I mean, that's a criterion, really. We're talking about a criterion.

MR. HOLAHAN: Well, I have a different way of drawing it. You just stop drawing the curve.

CHAIRMAN APOSTOLAKIS: Stop drawing.

MR. HOLAHAN: Yes.

DR. KRESS: Yes, the curve -- it was incomplete.

MR. HOLAHAN: Yes, it becomes undefined territory.

DR. SEALE: Terra incognita.

CHAIRMAN APOSTOLAKIS: So it's not unacceptable, it's undefined?

MR. HOLAHAN: Both.

CHAIRMAN APOSTOLAKIS: So you would not have that

dark region at all?

MR. HOLAHAN: Right.

CHAIRMAN APOSTOLAKIS: The very dark.

MR. HOLAHAN: Right. Well, not this part of it. I don't see any reason to --

CHAIRMAN APOSTOLAKIS: I think there is a message there. Look at how it becomes very dark.

MR. HOLAHAN: I don't think the industry has any misconceptions about running their plants above 10 to the minus 3.

CHAIRMAN APOSTOLAKIS: That's correct. In fact, I would make it a little darker to the left.

[Laughter.]

DR. KRESS: How can you make it absolutely black? That's what they need over there.

CHAIRMAN APOSTOLAKIS: There is a command that says 100 percent.

DR. KRESS: 100 percent reliable. No light reflected whatsoever.

CHAIRMAN APOSTOLAKIS: The greatest difficultly here was making sure that the transition was smooth. That was the problem.

Okay -- but you wouldn't do the same thing at 10 to the minus 5, I hope.

MR. HOLAHAN: No, that's different. I think

that's different.

CHAIRMAN APOSTOLAKIS: Okay. So the only thing you're dropping is what we call there unacceptable, the very dark part that says --

MR. HOLOHAN: This part. Well, I think this region still exists.

CHAIRMAN APOSTOLAKIS: The region will be there?

DR. SEALE: Yes, it's the stuff to the right of 10 to the minus 3.

CHAIRMAN APOSTOLAKIS: Oh, okay, to the right of 10 to the minus 3. Okay.

MR. HOLAHAN: Just draw the curve.

CHAIRMAN APOSTOLAKIS: Okay.

MR. HOLAHAN: -- about like so.

CHAIRMAN APOSTOLAKIS: Any other changes you would make? You will drop the region below 10 to the minus 7, I suppose? You don't need that.

MR. KING: Yeah, we don't need to show that. It might be worth putting a footnote on the table saying that these -- the numerical values are approximate values.

CHAIRMAN APOSTOLAKIS: I like that. That would go a long way toward making me happy.

MR. KING: So it's right there all in one place.

CHAIRMAN APOSTOLAKIS: I really like that. Yes. That's a great idea. And I'm not sure you need this bar

that says NRC staff scrutiny. I mean, darker and lighter.

MR. HOLAHAN: Otherwise you haven't defined what the gray is.

CHAIRMAN APOSTOLAKIS: You can leave it there if you want, but try to reverse the order. The less should be on the left.

MR. HOLOHAN: That's a good idea.

CHAIRMAN APOSTOLAKIS: We were unable to do that.

DR. FONTANA: Just cut it and turn it around and glue it on.

[Laughter.]

CHAIRMAN APOSTOLAKIS: That's a --

DR. FONTANA: They told me I was --

CHAIRMAN APOSTOLAKIS: That's why they want an advisory committee. We really give good advice.

DR. KRESS: Now if you had a plant that would come in and had a CDF of 10 to the minus 4, and you automated a delta CDF change of 10 to the minus 6, he's right on that 3-point corner there.

MR. HOLAHAN: Yes.

DR. KRESS: It's either Region II, Region III, or is unacceptable.

MR. KING: We have a lot of flexibility.

[Laughter.]

CHAIRMAN APOSTOLAKIS: He's going to get in a lot

of trouble.

MR. HOLAHAN: It has an emissivity of .9.

CHAIRMAN APOSTOLAKIS: So, going once -- you have to realize, gentlemen, this is a historic moment. It we say this is it, this is it. Is this it?

MR. HOLAHAN: This rev zero.

DR. KRESS: I don't think.

CHAIRMAN APOSTOLAKIS: You're not going to surprise us in December with a different figure, so tell us what changes you're going to make. I want to start drafting the letter before that.

DR. KRESS: You know, except for minor adjustments of the lines, which I can see no technical basis for it, I can't see any way the --

CHAIRMAN APOSTOLAKIS: I don't see -- I mean, if you make it clear, especially if you put -- follow Tom's suggestion and have a little note there, which copies essentially what you have in the text, that the numerical guidelines are approximate values and give an indication, something to that effect, I don't think we should be talking about whether it should be 2 10 to the minus 6 or 10 to the minus 6. And that's the idea of the gray actually, also. But, you know, there is a certain continuity there, and life gets harder as you move up or to the right. That's really the message.

MR. KING: Recognize the numbers are in the policy paper going up to the Commission, that 10 to the minus 6 is part of the policy recommendation that's going up, and we have the words in as to why we chose that.

CHAIRMAN APOSTOLAKIS: And 10 to the minus 6 is a sharp number there? Is a crisp number?

MR. KING: I'd check the words in the paper to make sure it says --

CHAIRMAN APOSTOLAKIS: To make sure it isn't.

DR. SEALE: Is it 1.0 times 10 to the minus 6 or 10 to the minus 6. That's --

MR. KING: I think it's 10 to the minus 6.

MR. HOLAHAN: We removed the 1.0's a long time ago.

DR. SEALE: Good.

MR. HOLAHAN: Right. In the context of not surprising you, just recognize this is our current thinking. We have four office directors, four levels of management, and one other committee to consult with

CHAIRMAN APOSTOLAKIS: Well, if there is any significant change, maybe you should let us know quickly, before the December meeting.

MR. KING: Well, we should know. At the December meeting. The policy paper should be up there, which will have the concurrence right on up through the EDO.

MR. HOLAHAN: But it won't have the delicacies of shades of gray of what the figure looks like.

MR. KING: No, no, the figure's not in the policy paper.

CHAIRMAN APOSTOLAKIS: So 10 to the minus 3 is the absolute upper bound?

DR. SEALE: Yep.

DR. KRESS: I'm happy with that.

CHAIRMAN APOSTOLAKIS: You would shut down a plant that shows higher than 10 to the minus 3?

DR. KRESS: No.

CHAIRMAN APOSTOLAKIS: No?

DR. KRESS: Not under the context of what we're doing now, but I -- maybe later on I would.

CHAIRMAN APOSTOLAKIS: No, no, no. You get an IPE that says --

MR. HOLAHAN: Wait, wait. Let's answer the different questions in a different context. What this says is that the staff wouldn't entertain license amendments.

DR. KRESS: That's right.

MR. HOLAHAN: Okay. And one of the reasons we wouldn't entertain license amendments is because I think we have other business to do with that licensee. Now whether that business was shutting them down immediately or seeing whether they're meeting the regulations or whatever else is

going on I think is not answered by the darkness of this curve.

CHAIRMAN APOSTOLAKIS: No, it's not, it's not. I know. But that was a separate question.

MR. MARKLEY: I think this jumps into the category of speed-limit stuff. You start defining it that way, then they'll start looking at the other lines as limits the same way.

CHAIRMAN APOSTOLAKIS: But that's my point. I mean, at some point you switch to speed limit and you draw the line and you say enough is enough. No more fuzziness. I really don't want to see any plans with core damage frequency greater than 10 to the minus 3.

MP. HOLAHAN: Recognize that that is -- in my mind that's a one-sided limit. It doesn't say that 9 times 10 to the minus 4 is perfectly acceptable.

CHAIRMAN APOSTOLAKIS: It is not. It is not.

MR. PARRY: It is a limit of tolerance rather than the speed limit.

CHAIRMAN APOSTOLAKIS: Right. Okay. So as long as we all understand this. Okay.

MR. KING: Thank you.

CHAIRMAN APOSTOLAKIS: So we're back to 22 now?

MR. KING: Twenty-two.

CHAIRMAN APOSTOLAKIS: No, we are not there. We

are --

MR. CUNNINGHAM: Here we are.

CHAIRMAN APOSTOLAKIS: I'm sorry. I thought it was --

MR. CUNNINGHAM: We are on 22.

CHAIRMAN APOSTOLAKIS: Huh?

MR. CUNNINGHAM: We are on 22.

CHAIRMAN APOSTOLAKIS: Yeah, we will be there, too. Given enough time.

MR. CUNNINGHAM: We tried to go back in the document and clarify what we were talking about in the context of performance monitoring. We had comments about what is the relationship of this performance monitoring process with the maintenance rule performance monitoring? What are we trying to accomplish here? This type of thing.

So the text in the document as it is now, basically, is as laid out in this Slide 22. The goal of the performance monitoring here is that, to ensure that no adverse safety degradation occurs because of the change that is being -- that is approved, if you will.

DR. KRESS: What do you mean by adverse safety degradation?

MR. CUNNINGHAM: I'm sorry, I didn't --

DR. KRESS: I'm sorry. I am just not sure I know what you mean by adverse safety degradation. A safety risk?

MR. CUNNINGHAM: In a sense, it goes on, and if you look in the sub-bullet there that we are talking about, that we have -- get to the point of having an unacceptable number of, an increase in the number of failures of pieces of equipment, is what we were thinking about in terms of that, numbers.

DR. KRESS: Okay. You have further defined in that sub-bullet.

MR. CUNNINGHAM: Yes, that's right. And this performance monitoring is particularly of concern in cases where we are allowing changes, for example, in grade and QA, where a number, a large number of components in the plant are having a change made to them, to relax, in this case, QA.

The concern is there is something that, while no -- you know, an increase in the failure rate, or the number of failures of an individual component in there is probably not going to make much difference to risk, the concern is that, collectively, we may be doing something that is going to have a significantly larger number of failures across the board. And that is what we are trying to protect again, the potential for common cause ad that sort of thing.

And, again, talking about it in terms of the implementation of it, that if we are more certain about the types of changes that are occurring and the impact on these,

that we -- we may have a broader implementation. But where we are not so sure of what the impact of the changes are going to be, it may be appropriate to have a slower, more slow implementation, or have an initial smaller set of components that would be permitted to be changed, and then allow that to expand over time or something like that.

Go on and go on to Slide 23. Continue on performance monitoring. You expect the program, the performance monitoring program, should be monitored commensurate with the safety significance, or safety importance. That we would expect that the monitoring for low LSSC's would be less, could be less rigorous. I am not saying that right. Monitoring for low LSSC's would be less rigorous or less intensive than for the those of the HSSC's.

And, again, we would expect that you would want to have timely feedback and that your performance measures would be set up so that you were detecting unacceptable performance before you can really comprising plant safety.

DR. FONTANA: As I remember, there were at least three approaches for identifying the safety significance. Do you endorse any particular one? You know, like the fossil vessel and the risk importance and some other one.

MR. CUNNINGHAM: I don't know that we have a specific. There is not a universal endorsement, if you will, of one or the other. They all come into play and are

used in different ways. Risk achievement and risk reduction are complementing each other as opposed to being alternative measures.

CHAIRMAN APOSTOLAKIS: Don't they usually use two of them?

MR. CUNNINGHAM: Yeah. Usually, use --

CHAIRMAN APOSTOLAKIS: Fossil vessel plus risk achievement.

MR. CUNNINGHAM: Yes, some sort of a risk achievement.

CHAIRMAN APOSTOLAKIS: Because they measure different things.

MR. CUNNINGHAM: They measure, right.

DR. FONTANA: In other words, they do it, and if it looks good to you, it is okay. That's fine.

CHAIRMAN APOSTOLAKIS: Now, all this information is Section 2.5, page 19?

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: There are bullets here on 1, 2, 3, 4, 5. Can you tell me where these bullets are?

Okay. They are not really in a bullet form. They are 1, 2,, 3, 4 in the text.

DR. SEALE: Page 20.

CHAIRMAN APOSTOLAKIS: Page 20, very top.

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: Okay. So this is as a result of public comments?

MR. CUNNINGHAM: Yes.

CHAIRMAN APOSTOLAKIS: That you are doing this?

MR. CUNNINGHAM: Yes, that's right. Just --

CHAIRMAN APOSTOLAKIS: Are there any public comments that you decided not to respond to, in the sense that you are not changing the guide, that have some significance?

MR. CUNNINGHAM: There was a comment that we not use 10 to the minus 4, have an acceptance guideline of 10 to minus 4 and not differentiate.

CHAIRMAN APOSTOLAKIS: For core damage frequency?

MR. CUNNINGHAM: For core damage frequency.

CHAIRMAN APOSTOLAKIS: Right.

MR. CUNNINGHAM: But we just let it kind of be independent as Gary was saying yesterday, we have kind of compromised on that, and some very small increases would be permitted.

Are there others that are --

MR. KING: Changing, that they don't like the CLB definition. We didn't accept that comment.

CHAIRMAN APOSTOLAKIS: Change what?

MR. KING: The definition of current licensing basis. People said they didn't like it, but we haven't

accepted that comment or made any change.

You could probably go through, find a number where there was a comment, but we chose not to make a change.

MR. CUNNINGHAM: Slide 24 goes, discusses performance monitoring in a little more detail, or continues it. Again, we want to make the point explicit in the document that it is monitoring that is being performed as part of the maintenance rule implementation, can be used under some circumstances.

That was a point of contention in the draft. They were saying, you know, do we have to have a monitoring program here and a maintenance rule implementation? I said, no, under certain circumstances, you can use the maintenance rule implementation, performance monitoring program to handle this as well.

And, again, related to that is that you want to have provisions for specific cause determination and trending of failures and that sort of thing, and to have corrective action.

DR. SEALE: I understand that there is an effort underway to perhaps modify the maintenance rule to bring it up, bring it back, or to -- to take care of discrepancies, if you will.

I assume that you put a notch of the people that are doing that, to suggest to them that they also talk about

reciprocity, if you will, on the monitoring process.

It seems to me the other way to go is to say that the maintenance rule monitoring should be -- well, I am saying compatibility between the two processes.

MR. HOLAHAN: Yes. And if you look at the options offered to the Commission, there is a spectrum of possibilities. I think there were three. One of them was do nothing. But both of the other two options would more closely link the maintenance rule to our risk-informed framework, one further than the other.

And I think it is fair to say, from Commission or Commissioner questions, so far, the Commission is thinking about perhaps something in between those options. But something definitely in the direction of more tightly coupling with risk-informed initiatives here.

CHAIRMAN APOSTOLAKIS: How about a break?

DR. SEALE: All right.

[Recess.]

CHAIRMAN APOSTOLAKIS: Okay. Back in session. So we are on 25?

MR. CUNNINGHAM: Yes. The rest of the slides that we have in this package discuss documentation, and even though it covers a number of slides what we have done in the document is reduce the amount of documentation that would be submitted as part of the proposed CLB change.

CHAIRMAN APOSTOLAKIS: That's fine.

MR. CUNNINGHAM: Okay --

DR. SEALE: I have a question. Yesterday, we were earlier talking about what constitutes the current licensing basis, and I found this footnote that is on page 3 of 1061, and there are some differences from some earlier drafts of 1062 and the other things that we saw.

Is this footnote going to be common to everything?

MR. CUNNINGHAM: Yes. Yes.

DR. SEALE: I have one other question. It says here it includes the regulations contained in, among other things, Part 50 and Part 54 in that listing, and then in the rest of the footnote on the next page it say it also includes the plant-specific design basis information in 10 CFR 50.2 as documented in the most recent safety analysis report, as required by 1050.71.

That is kind of redundant, isn't it? I mean if it has 50 -- if it is 50 then it's 50, I would assume, in its entirety.

MR. KING: No, I understand your point. We just took this right out of Part 54.

MR. HOLAHAN: No, I think in fact it is a restriction. What it says is the FSAR, the total FSAR, has lots of stuff in it, okay? The portion of the FSAR which relates to the design basis of the plant are those things

defined by 10 CFR 50.2.

I think it is a subset of the FSAR.

DR. SEALE: And 50.71.

MR. HOLAHAN: 71 is just -- or 71(e) I think is what it means is just the update requirement.

MR. MARKLEY: But isn't the point here also that those continuing words in that footnote are parts of things that are considered current licensing basis under Part 54 but are not specifically defined in Part 50.2?

MR. CUNNINGHAM: That is correct. There is no similar definition in Part 50.

MR. MARKLEY: Right.

MR. CUNNINGHAM: So we are using the Part 54 definition.

DR. SEALE: No wonder we need lawyers.

MR. CUNNINGHAM: The remainder of the slides were just what we would have and it's smaller than what we requested before. No questions on that?

CHAIRMAN APOSTOLAKIS: One of the things that we have not done is we haven't looked at the SRP, so --

DR. FONTANA: I did.

CHAIRMAN APOSTOLAKIS: We just got it.

DR. FONTANA: Must have read an old one then.

CHAIRMAN APOSTOLAKIS: What, you read 1602? You finished early.

DR. FONTANA: So I can go home.

[Laughter.]

CHAIRMAN APOSTOLAKIS: Well, is there anything in the SRP that is inconsistent with what the Guide has?

DR. KRESS: Of course not.

CHAIRMAN APOSTOLAKIS: Okay. Well, one of the things we have to do with you is what you will do at the December meeting, right?

How much time do we have for this?

MR. MARKLEY: About an hour and a half -- it's 8:35 -- to 10 o'clock.

CHAIRMAN APOSTOLAKIS: Do we need an hour and a half? Do the members present feel that we need an hour and a half?

Do you think that we need an hour and a half?

DR. KRESS: Yes --

CHAIRMAN APOSTOLAKIS: You don't care. Yes?

DR. KRESS: Dana will be there. He hasn't heard this.

MR. HOLAHAN: His note may be the only controversial element.

CHAIRMAN APOSTOLAKIS: That's probably true.

MR. HOLAHAN: At the December meeting.

CHAIRMAN APOSTOLAKIS: Is it possible that we get a response before the meeting?

MR. HOLAHAN: A response to his note?

CHAIRMAN APOSTOLAKIS: Yes.

DR. KRESS: I personally don't think we ought to ask for a response to the note other than verbal.

CHAIRMAN APOSTOLAKIS: Okay. Well, there is a transcript of course that he can read.

DR. KRESS: I don't think these guys ought to write down --

CHAIRMAN APOSTOLAKIS: No --

DR. KRESS: Every time we get an internal note like that, I don't think --

CHAIRMAN APOSTOLAKIS: Well, the thing is that I would like to start on our way to resolution before the actual meeting.

DR. KRESS: I think this may be a case of there is no resolution. They just explain their position and response and then Dana votes the way he wants to vote on letters or whatever we write.

CHAIRMAN APOSTOLAKIS: Certainly, well -- and as I say, there is a transcript of today's meeting where the gentlemen already have expressed a reaction.

DR. KRESS: I think it would be good if they are prepared to talk directly to Dana and let him interact and question and their answers will be useful.

CHAIRMAN APOSTOLAKIS: Directly? You mean what?

Before the meeting?

DR. KRESS: No, during the meeting.

CHAIRMAN APOSTOLAKIS: Oh, during the meeting.

DR. KRESS: At the meeting. That's why I am saying we will probably need an hour and a half.

CHAIRMAN APOSTOLAKIS: No, but I would like him also to have an idea what their thoughts are, and he will because he can look at the transcript, so there is no need for a written response.

Okay, period -- so we have an hour and a half. I guess you can go over a reduced version of this?

MR. HOLAHAN: Yes.

CHAIRMAN APOSTOLAKIS: With whatever changes you make.

Are you going to change the name to combined change requests or you haven't decided yet?

MR. KING: I think that sounded pretty good. We'll talk about it.

CHAIRMAN APOSTOLAKIS: CCRs. Maybe it would be a good idea to have a viewgraph with comments to which you decided not to respond, like you gave me a few examples.

DR. SEALE: Yes, okay.

CHAIRMAN APOSTOLAKIS: I think we definitely need to have something on the Standard Review Plan because we haven't covered it at all, so whatever you give us to

enlighten us on that, that will help.

I'm sure there will be a discussion on the figure that you come up with if it survives.

MR. KING: We will present the combined figure.

CHAIRMAN APOSTOLAKIS: Yes, but you have several reviews to go through, as Gary said, so I don't know if -- is it a serious kind of situation if any one of those reviewers says no?

MR. HOLAHAN: Yes. It was last time.

DR. KRESS: Is it likely that Region III will disappear --

CHAIRMAN APOSTOLAKIS: Last time? Who derailed it last time?

MR. HOLAHAN: Well, it was the shape of the curve and the acceptance guidelines I think were influenced by both CRGR, the committee, and by the office directors.

Well, in my opinion, some for better and some for not quite as good, but I mean they had influence.

DR. KRESS: Let me ask it another way. Is there a lot of expressed concern about Region III?

MR. HOLAHAN: Tom King and I had discussed their being, conceptually being the Region III with both at the EDO level and at the Chairman level, but we haven't covered everyone.

MR. KING: No, but at those levels I didn't hear

any serious reservations.

CHAIRMAN APOSTOLAKIS: About?

MR. KING: About Region III, the concept of Region III.

Yes.

CHAIRMAN APOSTOLAKIS: Oh, you need something like that. I mean you really need something like that.

DR. KRESS: Yes, we think so.

CHAIRMAN APOSTOLAKIS: Okay, so you will summarize today's presentation. When you say agreement, do you mean with the comments or with us, because we agreed on everything and disagreement with the comments like we already said that. We discussed the figure. We'll discuss Dana's points and Chapter 19. That's it as far as I can tell.

DR. KRESS: One reason I think they need to discuss Dana's points is when the committee, if and when they write a report, that will be a big debating area between us.

CHAIRMAN APOSTOLAKIS: Which one?

DR. KRESS: Dana's concerns.

CHAIRMAN APOSTOLAKIS: Oh, yes.

DR. KRESS: So we will need to be able to have a good understanding among the full committee of what your response is.

CHAIRMAN APOSTOLAKIS: Now we are supposed to write, I think the Planning Committee decided, two letters to respond separately to the SRM on uncertainty. Is that what you decided?

DR. SEALE: Well, I think that was the thought we had during our meeting and I think our discussions yesterday sort of reinforced the idea that we keep the focus on our letters.

CHAIRMAN APOSTOLAKIS: But what they are doing is combining the two, right? You are not planning to do something separate on the use of point values, are you?

MR. KING: That is correct. We're not.

CHAIRMAN APOSTOLAKIS: So we are using 1061 then as a response to that question from the Commission?

DR. KRESS: I think that would be an appropriate --

MR. KING: And that is what we are doing.

CHAIRMAN APOSTOLAKIS: Okay, so in the hour and a half you gentlemen could address that question too and maybe point to the committee where in 1061 you feel you have been responsive to that particular request, particular SRM, right?

DR. KRESS: They did this pretty well in our meeting that you missed. They might want to dig out those old slides because they actually addressed it pretty well

then.

CHAIRMAN APOSTOLAKIS: Do I have those slides? I think I do. Okay. That's it. I can't think of anything else.

What I propose is that we go around the table and you give me your input, points to be considered when a draft letter is put together.

DR. SEALE: I have one typo to mention, okay. In your standard review plan, which we are not going to go into in a lot of detail here, but in it, the footnote that defines the licensing basis is not the same as it is in the Reg. -- draft Reg. Guide, and they are within three days of each other in terms -- no, one day of each other in terms of the date on the front.

So I am not going to ask you how you are going to reconcile it. I am just to say that is something that would it would probably we a good idea to straighten out.

We don't need more definitions of licensing basis.

CHAIRMAN APOSTOLAKIS: Now, during the discussion, so we will have these gentlemen present, okay.

DR. KRESS: Sure. If they want to stay.

CHAIRMAN APOSTOLAKIS: So clarification needed. Any problem?

Do you want to stay? Wold you like to stay?

DR. SEALE: Sure.

CHAIRMAN APOSTOLAKIS: You don't have to stay.

MR. HOLAHAN: In a risk-averse environment, I think we ought to stay.

[Laughter.]

CHAIRMAN APOSTOLAKIS: This is more than 10 to the minus 5.

Okay. Who wants to go first? Rick, do you want to go first? This is not for the letter. Just give me your opinion, your judgments.

If you don't want to go --

MR. SHERRY: No. Just a coupl' of things. One is I think that it is probably a good idea to combine your response in one letter since the response on the uncertainty is so integrated with what is in 1061, I think.

CHAIRMAN APOSTOLAKIS: Well, we have two members of the Planning and Procedures Committee here.

DR. SEALE: We could be argued with.

DR. KRESS: I think that we would probably come down on two separate responses. Because with two separate -- we have got a specific SRM.

CHAIRMAN APOSTOLAKIS: Two specific SRM's, okay. So that is one point.

MR. SHERRY: And I guess my only other comments are with regard to something that is not specific to what is being done now for the regulatory guides. But the future

work to be done on a re-look at the safety goals. Because I think there are some significant considerations which should be acknowledged with regard to derivation of the criteria. You know, we have been talking about it.

CHAIRMAN APOSTOLAKIS: Wait a minute now. That is a separate issue. Isn't it a separate SRM on elevating CDF?

MR. SHERRY: But I am talking more generally.

CHAIRMAN APOSTOLAKIS: Yeah. And they said that that will be more general than just elevating the CDF. But that is not part of the two letters we are writing now.

DR. SEALE: No.

MR. SHERRY: No, it is not.

DR. SEALE: But it is something we discussed.

CHAIRMAN APOSTOLAKIS: Go ahead.

MR. SHERRY: No, I was just saying that it must be recognized that there is a possibility that the acceptance guidelines for LERF may possibly be impacted by that activity. Okay. And somewhere that, it might be a good idea to acknowledge that in 1061.

For example, if a decision is made to include consideration of population density, societal risk, land contamination, or whatever, within the safety goals, that might impact the acceptance guidelines for LERF.

DR. KRESS: I have thought about that some, too, Rick. In fact, that was one of my expressed concerns. And

it seems to me like the best way to treat that societal risk type of thing would be to incorporate it in some sort of siting criteria, and separate this from the siting. Take care of that with your siting criteria and keep this stuff the way you got it.

Because you are really going to foul this thing up when you try to get a LERF that incorporates societal risk more than it does now. You are going to get LERF's that vary all over the place. Or you are going to have one that is so badly --

DR. SEALE: Skewed.

DR. KRESS: Skewed to be bounding that it is not very useful to a lot of them.

So my recommendation is look to see if you can't hide that other part in the siting criteria and finesse the issue. But that is just one thought.

MR. HOLAHAN: That is an interesting thought. Because I have been somewhat concerned, when we talk about drawing QHO's or other similar measures into the regulatory process, that you are drawing in information that, in many cases, neither the NRC, nor the licensee, has control over.

DR. KRESS: Has any control over, or any way to change or do anything about. That is my concern also.

CHAIRMAN APOSTOLAKIS: Based on what I know now, I would be very reluctant to start this revision with the high

level goals and think about land contamination and societal risk. I don't think that is a pressing need for the agency.

DR. KRESS: I think -- I think those are reasonable things to deal with in high level goals, but I would deal with them in my siting.

DR. SEALE: Yeah.

CHAIRMAN APOSTOLAKIS: You will deal with what?

DR. KRESS: Within my siting criteria.

DR. SEALE: Siting criteria.

DR. KRESS: And I would still separate design from siting.

CHAIRMAN APOSTOLAKIS: Okay. Rick.

MR. HOLAHAN: Just, can I --

CHAIRMAN APOSTOLAKIS: Yeah.

MR. HOLAHAN: Just complete that thought a little bit. That is, there has always been some controversy over what is the role of policy statements anyway. Our legal staff has never really liked them. They like either, if you want something done, you put it in the regulation, and if you don't care whether it is done, you don't say anything about it.

Policy statements are sort of --

DR. SEALE: In between.

MR. HOLAHAN: In between philosophical things. Something has happened between the time of most, between all

the policy statements' writing and the current, and that is that Congress wrote a law which basically said agencies have to have things like strategic plans. And the strategic plan is a sort of philosophical, non-regulation, sort of like a policy statement. And when you read it, it has, at least in shorthand form, a lot of things that look like policy statements.

And you might ask, in the long run, whether your policy statements are not just explanations and elaborations of your strategic plan. And they are not, you know, meant to last a lifetime, but they are, you know, they are Volume 3, 4, 5 and 6 explaining what your strategic plan is.

So, you know, I think there are a lot of things to think about in the policy statement area.

CHAIRMAN APOSTOLAKIS: Okay. Rick, any more, anything else?

MR. SHERRY: No.

CHAIRMAN APOSTOLAKIS: No.

DR. SEALE: Well, I didn't -- I hadn't thought so eloquently, or perceptively, I guess, as some of the other people had on this issue. But I had written down the words ballast versus baggage. In trying to characterize that wish list or -- I don't know whether it was a wish list or a bad dream that you guys had put up there that had things like land contamination and so forth on it. And I think we have

to be very careful about what we would integrate into any kind of revisitation on the safety goals.

And, as I say, I had ballast versus baggage, and that kind of characterizes the way I felt about it.

The only other comment I would make is that I endorse the idea of having a very open discussion of Dana's issues at the meeting. My own feeling though is that he has articulated goals that need to be -- that we would hopefully meet in the maturation of risk-informed regulation. But I don't think he has made the case for a call for inaction on the process. I think he is just trying to -- I hope he is trying to steer us in the direction we ought to be going.

Other than that, I think what you have done so far is a tour de force. It is an extraordinary effort. It is clear that everybody has been very thoughtful, and at the same time, wiling to think large rather than small, and I congratulate you.

CHAIRMAN APOSTOLAKIS: Mike, do you want to say anything?

MR. MARKLEY: I just want to mention, looking at two letters here, it seems to me that the letter on the SRP and Reg Guide could be a fairly simple letter in terms of is it okay to go forward or not go forward and then any comments you might have on the policy issues so then considering that you might want to look a little more

closely at that draft policy paper before the meeting if you are going to separate out an uncertainty, which is one of those policy issues that might be the foundation for spinning it off to the other letter.

CHAIRMAN APOSTOLAKIS: Okay. Mario.

DR. FONTANA: Again, like Bob I think you guys have done a tremendous job on this thing.

There are some things that, some comments.

I'm still a little -- not real happy about Appendix B to do Level 2 so that don't forget about issuing the NUREG report that drives what that is all about.

The question of raising CDF to a fundamental goal, my opinion and I think I am in the minority, is not to do it.

I think the way you are using it is just the right way of doing it because a fundamental goal should be to protect the health and safety of the public and the CDF is one way of demonstrating you have got defense-in-depth, so it is extremely useful, but I don't think you have to go through this other stuff -- but that is an opinion.

I don't really understand why plant design is separated from siting. Does that also apply to advanced plants?

MR. KING: Of course. It was prompted by advanced plants --

DR. FONTANA: Because one would think if you'd come up with a bulletproof plant you ought to be able to put it on a different site.

MR. KING: No --

DR. FONTANA: Just logically.

MR. KING: -- the idea was we didn't want urban siting regardless of the plant design.

DR. SEALE: Ravenswood is a no-no --

DR. FONTANA: Well, I am not going to go that far.

MR. HOLAHAN: Well, it is an element of defense-in-depth.

DR. FONTANA: It is.

MR. HOLAHAN: No matter how good the plant is.

DR. FONTANA: Principally to put more of it into the design --

MR. HOLAHAN: Yes. I recently visited the Ravenswood site, just to see what it was like, and you wouldn't want to put a plant there. I wouldn't want to put a plant there.

DR. FONTANA: Is there a steam plant on there now?

MR. HOLAHAN: No, actually, it is a maintenance yard about large enough to put a power plant on --

DR. FONTANA: It's good for it.

In reading the Standard Review Plan it looks like a real good job and it gives a lot of guidance. but on the

other hand, it leaves -- as it has to -- it leaves a lot of judgment, it leaves a lot of leeway to the reviewer, which leads to the next question.

What kind of training are these reviewers going to get in PRA? I know you guys are not going to do it directly. You don't have to answer that, but it is something to be concerned with.

MR. HOLAHAN: Well, I can give you that, the 30 second version.

There are three major courses going on. One is sort of a two-hour introductory lecture that we have been doing and I think one was done yesterday so probably about 400 of the NRR Staff have been lectured on what is risk-informed regulation and what are your responsibilities.

Then there is a two and a half day PRA for technical managers course, which all NRR managers should take. I think all of them are scheduled for this year or it might run a little bit beyond that. That is ongoing.

Then there is a course for technical reviewers, which is a revised version of what used to be called fundamentals of PRA or a title like that.

There's basically a commitment over the next two years, something like that, to have all of NRR's technical staff take that, which is about a four or four and a half day course.

Then there's an additional course specifically set up for inspectors -- resident inspectors, regional inspectors, and the few headquarters inspectors -- which is actually a two-week course. That is a little bit further behind, but the intent is to get at least one resident inspector at each site covered within about the next year, and then in a year after that pick up the second inspector on each site and the regional office inspectors.

So I would say within two years most all the technical staff in the reactor area will have been touched by this one way or another.

DR. FONTANA: Okay. Sounds good.

Have you given much thought on how this would spill over into license renewal yet?

MR. HOLAHAN: I hadn't but like all other technical aspects of the licensing basis, I think it just carries on.

DR. FONTANA: It will occur.

MR. HOLAHAN: Yes.

DR. FONTANA: That's all I have.

CHAIRMAN APOSTOLAKIS: Tom?

DR. KRESS: First, I want to say I am real pleased with this effort. I view this as probably one of the most important things that the agency has done in a long time and I am very pleased with it.

I think you guys have done a great job and I see it as a standard for how to do risk-informed regulation, not just this specific application but when we get around to doing risk-informed throughout the whole body of what we do, it's the standard of how to do it, so it's real important stuff to me.

Early on I had three concerns.

One of them was the societal risk concern, which I think is an important one, but I already expressed how I think that should be dealt with.

The other two were -- I was concerned early-on that a plant with a very low CDF automatically meets the LERF and this could compromise things having to do with containment and mitigation.

I think you dealt with that very well with your integrated decision process and defense-in-depth requirements, so I no longer have a concern there.

The other one that I had a concern with was performance monitoring. It seemed to me like there was a disconnect between the way that performance monitoring was established and the risk-informed process itself.

It seemed to me like one needs to fold that back in and say let's look -- let's make a risk-informed or risk-based performance monitoring process.

I didn't really see the risk basis for it. We

fall back on the old process of how to do performance monitoring.

CHAIRMAN APOSTOLAKIS: Which is why I objected to Murphy's presentation this morning.

DR. KRESS: Yes, I had a little bit of problem with that that still exists, but it is not enough of a problem that I want to make any issue of it.

CHAIRMAN APOSTOLAKIS: So 1061 as it is now has that problem but --

DR. KRESS: Yes, but I am not going to be that concerned with it.

CHAIRMAN APOSTOLAKIS: Okay.

DR. KRESS: Because I don't want to do anything to derail the process.

CHAIRMAN APOSTOLAKIS: I'll check it. Anything else?

DR. KRESS: No, that was it.

CHAIRMAN APOSTOLAKIS: Well, so if we were to draft a series of conclusions and recommendations I guess the first conclusion would be this Guide, assuming that the guys do everything that we discussed, is the Regulatory Guide and the associated Standard Review Plan chapter are ready for adoption by the agency. Right?

DR. KRESS: That would be right, yes.

CHAIRMAN APOSTOLAKIS: Do we need to repeat the

excellent effort and all that? Maybe in passing but not in the conclusions -- in the discussion.

DR. KRESS: Your suggesting word changes earlier on yesterday were pretty good also. I think they are going to incorporate them.

CHAIRMAN APOSTOLAKIS: So I can't think of any other conclusion or recommendation We're just blessing it.

DR. SEALE: Yes.

DR. KRESS: I pretty much agree with that.

CHAIRMAN APOSTOLAKIS: And I don't see intensive discussion and we can say the responses have been reasonable.

DR. KRESS: To the public --

CHAIRMAN APOSTOLAKIS: I didn't expect you guys to come up with Region III. I was very impressed by that.

DR. KRESS: Yes, that was a good move.

CHAIRMAN APOSTOLAKIS: But maybe we should put that in the letter?

[Laughter.]

DR. KRESS: I was real happy to see that Region III.

CHAIRMAN APOSTOLAKIS: I was happy too.

DR. SEALE: We may want to take some credit by way of just noting that the way in which this thing evolved with the discussions between Staff and ourselves and so forth

seemed to be --

CHAIRMAN APOSTOLAKIS: I can't hear you.

DR. SEALE: I'm sorry -- seemed to be a particularly efficient way or at least effective way. It may not have been efficient with your time, and we certainly appreciate your tolerance in putting up with us, but I think in general it was an effective way of getting from where we were to where we are, and we may want to make that comment.

CHAIRMAN APOSTOLAKIS: Okay, so this is going to be a very short letter.

MR. HOLAHAN: Can I make a suggestion?

CHAIRMAN APOSTOLAKIS: Yes.

MR. HOLAHAN: This is a suggestion of what I think you should do, not necessarily because I think it is good for me.

CHAIRMAN APOSTOLAKIS: Yes.

MR. HOLAHAN: Like a lot of good efforts, somebody ought to be monitoring whether they are really achieving what was intended and I think maybe it is good for us to have someone watching, because I think the subcommittee ought to take some role as to seeing in practice whether all these principles and good ideas are really working out, and you might want to take on some sort of role of looking at -- even if it is not the pilots -- just in the normal process.

CHAIRMAN APOSTOLAKIS: Oh, we will.

MR. HOLAHAN: -- within a year or so, are we really achieving all these good ideas we have laid out.

DR. SEALE: Volunteering is so dangerous.

CHAIRMAN APOSTOLAKIS: Well, this is not for the letter. This is just something to do here.

MR. HOLAHAN: It could be. It could be.

CHAIRMAN APOSTOLAKIS: Oh, yes -- we will -- that is how we finish the letters. Do we have the benefit of any documents in this case?

DR. FONTANA: I would like to get rid of that.

CHAIRMAN APOSTOLAKIS: What?

DR. FONTANA: Anyway, the last sentence should be more than the boilerplate is I think what he is saying. Normally we have a boilerplate sentence we want to keep up with this. We may want to elaborate something.

CHAIRMAN APOSTOLAKIS: Yes, we'll do it. Oh, yes. In fact, I will go back to our first letter where we had several suggestions and say that maybe this -- like urging the Commission to encourage the industry to come back with major studies --

DR. KRESS: Oh, yes.

CHAIRMAN APOSTOLAKIS: -- and maybe this thing that you guys are negotiating now is one of them, right? -- and see whether we want to say that we'd like to monitor progress on these fronts.

By the way, what did you decide to do about bibliography, or you haven't?

MR. CUNNINGHAM: I think we will look at having a more complete set of references or -- in a bibliography or something like that.

CHAIRMAN APOSTOLAKIS: That's a good idea.

Well, how about a second letter? The second letter is not going to be so easy. I'm not sure we have an answer that will satisfy the Chairman, frankly.

DR. KRESS: On values versus uncertainty?

CHAIRMAN APOSTOLAKIS: Yes.

DR. KRESS: Well, these guys had a pretty good story.

CHAIRMAN APOSTOLAKIS: What story's that?

DR. KRESS: You didn't hear it?

CHAIRMAN APOSTOLAKIS: Huh?

DR. KRESS: You didn't hear it. You've got to go back to the transcripts and --

CHAIRMAN APOSTOLAKIS: I heard it. I heard it. And I still ask myself what story is that. If I were the Chairman would I find that satisfactory? I don't know. Maybe we ought to spend a little more time at the presentation next time.

DR. KRESS: On that particular issue.

CHAIRMAN APOSTOLAKIS: That really bothers me.

DR. KRESS: You guys may want to repeat some of what you said at --

CHAIRMAN APOSTOLAKIS: And we had -- remember at one of the subcommittee meetings in June we had a list of questions and issues. I don't know that we have addressed all of them.

Okay. Anything else?

[No response.]

This is then the closure of this subcommittee meeting. Thank you gentlemen very much.

[Whereupon, at 11:36 a.m., the meeting was concluded.]

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: ACRS SUBCOMMITTEE
RELIABILITY AND PROBABILISTIC
RISK ASSESSMENT

DOCKET NUMBER:

PLACE OF PROCEEDING: ROCKVILLE, MD

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.

Jon Hundley

Official Reporter

Ann Riley & Associates, Ltd.

United States
Nuclear Regulatory Commission

Proposed Modifications to DG-1061 and SRP Chapter 19 in Response to Public Comment and Pilot Plant Experiences

Thomas King, Mark Cunningham
Office of Nuclear Regulatory Research

Gary Holahan, Gareth Parry, Michael Cheok
Office of Nuclear Reactor Regulation

Presentation to Advisory Committee on Reactor Safeguards
Subcommittee on Reliability and Probabilistic Risk Assessment

November 12, 1997

Overview

- Summary of public comments on DG-1061 and SRP Chapter 19
- Summary of planned changes
- Discussion of specific changes
  - Policy and other issues
  - ACRS issues of June 12, 1997

Summary of Public Comments on DG-1061 and SRP Chapter 19

- PRA Standards
- Acceptance Guidelines
- Integrated Decision Making
- Licensing Issues
- Licensee Burden
- Staff Review Process
- Implementation Issues

Summary of Public Comments (Cont.)

Acceptance Guidelines

- Use of the 10^{-4}/RY benchmark on CDF
- Process for treatment of very small risk increases
- Allowance for very small increases in risk
- Treatment of uncertainties
- Guidelines for temporary changes
- Specific guidelines for shutdown operations
- Guidelines for use of level 3 analysis

Integrated Decision Making

- Reconsider use of absolute quantitative criteria
  - core damage frequency
  - large early release frequency
  - conditional core damage probability (TS)
- Provide better definition of the roles of defense-in-depth and safety margins
- Provide better definition of increased management attention
- Provide guidance on bundling of changes
- Provide more guidance on use of qualitative and quantitative evaluations

Summary of Public Comments (Cont.)

Licensing Issues

- Definition of CLB too broad; limit scope to regulations, orders, license conditions, exemptions and Technical Specifications

- Guidance for conducting evaluations per 10CFR 50.59,(i.e., does NRC have to review all risk-informed changes to CLB?)

Summary of Public Comments (Cont.)

Licensee Burden

- PRA quality; guidance implies only state-of-the-art PRA is acceptable
  - level of detail
  - scope
  - QA
  - Peer review (particularly in comparison with traditional analyses)

- Overlap with maintenance requirements (categorizing SSCs, performance monitoring, configuration risk management)

- Monitoring and corrective action
  - more focused guidance needed; too much expected
  - monitoring of SSCs of low safety significance

- Excessive documentation requirements

Summary of Public Comments (Cont.)

Staff Review Process

- **Inconsistency among reviewers**
- **Common interpretations of guidance by NRR and Regional offices**
- **Bringing complex issues to closure**

Implementation Issues

- **Tracking of cumulative changes to risk**
  - **What is purpose?**
  - **additional guidance needed**

- **Limited scope (of application) submittals**
  - **e.g., only address IST requirements for selected set of pumps and valves**

- **Need for a defacto "living PSA"**

Summary of Planned Changes

- Principles
- Acceptance Guidelines
- Bundling
- PRA Quality and Scope
- Management Attention
- Performance Monitoring
- Documentation
- Appendix B - NUREG/CR report

Specific Changes - Principles

1. **The proposed change meets the current regulations. This principle applies unless the proposed change is explicitly related to a requested exemption or rule change (i.e., a 50.12 "specific exemption" or a 2.802 "petition for rulemaking").**

2. **Defense-in-depth is maintained.**

3. **Sufficient safety margins are maintained.**

4. ***Proposed increases in core damage frequency and risk are small and are consistent with the intent of the Commission's Safety Goal Policy Statement.***

5. **Performance-based implementation and monitoring strategies are proposed that address uncertainties in analysis models and data and provide for timely feedback and corrective action.**

Specific Changes - Acceptance Guidelines

ACCEPTANCE GUIDELINES FOR CDF

- If the application can be shown to result in a decrease in CDF, or is CDF-neutral, the change will be considered to have satisfied the relevant principle of risk-informed regulation with respect to CDF.

- When the calculated increase in CDF is very small, which is taken as being less than 1E-06/reactor year, the change will be considered, regardless of whether there is an assessment of the total CDF. The technical review will address the scope, quality, and robustness of the analysis of the change, including consideration and quantification of uncertainties.

- When the calculated increase in CDF is in the range of 1E-06 to 1E-05/reactor year, applications will be considered only if it can be reasonably shown that the total CDF is less than 1E-04/reactor year, subject to an NRC technical and management review. The technical review will address the scope, quality, and robustness of the analysis of both the change and the baseline CDF, including consideration and quantification of uncertainties.

- Applications which result in increases to CDF above 1E-05/reactor year would not normally be considered.

Specific Changes - Acceptance Guidelines

ACCEPTANCE GUIDELINES FOR LERF

- If the application can be shown to result in a decrease in LERF, or is LERF-neutral, the change will be considered to have satisfied the relevant principle of risk-informed regulation with respect to LERF.

- When the calculated increase in LERF is very small, which is taken as being less than 1E-07/reactor year, the change will be considered, regardless of whether there is an assessment of the total LERF. The technical review will address the scope, quality, and robustness of the analysis of the change, including consideration and quantification of uncertainties.

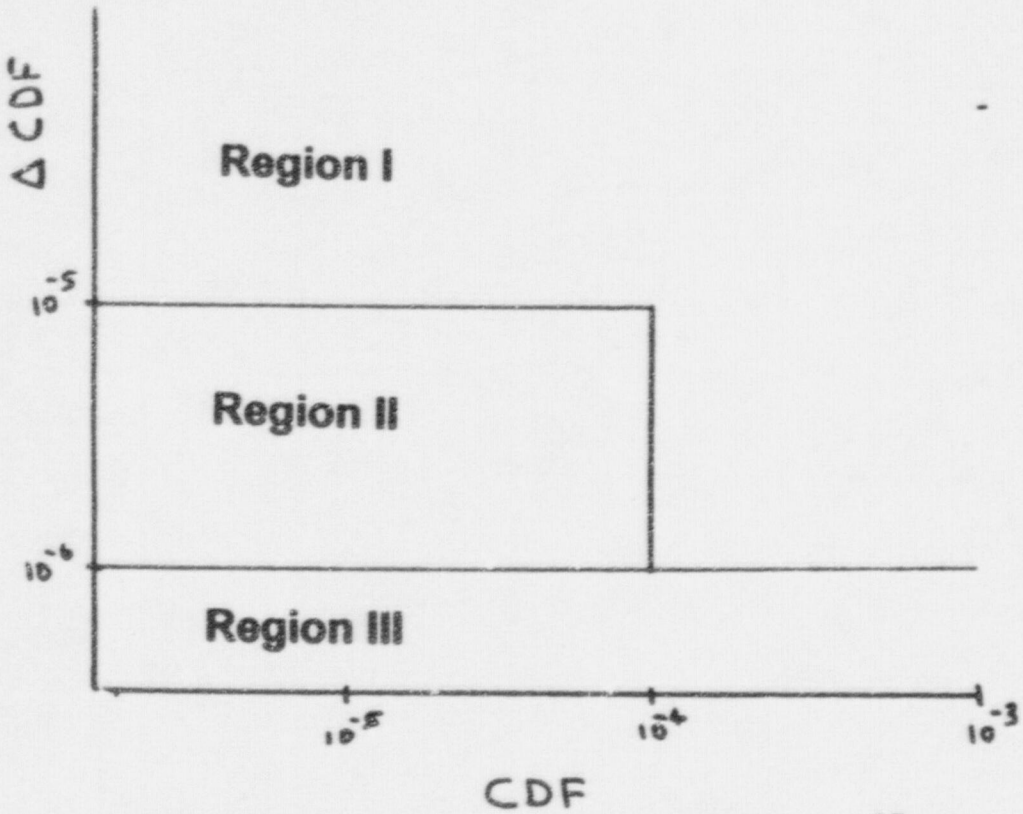
- When the calculated increase in LERF is in the range of 1E-07 to 1E-06/reactor year, applications will be considered only if it can be reasonably shown that the total CDF is less than 1E-05/reactor year, subject to an NRC technical and management review. The technical review will address the scope, quality, and robustness of the analysis of both the change and the baseline LERF, including consideration and quantification of uncertainties.

- Applications which result in increases to LERF above 1E-06/reactor year would not normally be considered.

Specific Changes - Acceptance Guidelines

Concept of Very Small Changes

- Region I
  - no changes allowed
- Region II
  - Management attention
  - full uncertainty analysis
  - track cumulative impacts
- Region III
  - very small changes
  - not tied to baseline CDF
  - uncert analysis only on Δ CDF
  - track cumulative impacts



COMPARISON OF PRA RESULTS WITH ACCEPTANCE GUIDELINES

- The focus of the comparison is to assess whether principle 4 has been met, namely that "increases in core damage frequency and risk are small and are consistent with the intent of the Commision's Safety Goal Policy Statement".

- It is not sufficient to simply compare the values calculated from a PRA with the guidelines; both the contributors and how the results could be impacted by uncertainties in the analysis should be understood,

- Uncertainties to be addressed:

  - parameter uncertainties
  - model uncertainties
  - completeness uncertainties

- Scope of uncertainty analysis required is a function of the role the quantitative results play in the decision, and on the significance of the calculated change.

Specific Changes - Acceptance Guidelines

COMPARISON WITH ACCEPTANCE GUIDELINES (Cont'd)

- When comparing quantitative PRA results with the guidelines, mean values should be used. Mean values capture the uncertainty in the parameter values to some extent, are compatible with traditional decision-making practices, and are appropriate given the origin of the values used in the acceptance guidelines.

- The requirement to use mean values does not imply that a detailed propagation of uncertainties is always necessary; in many cases it will be possible to show that a point estimate is an acceptable approximation to the mean value, using qualitative arguments about the contributors to the assessment.

- Unquantified uncertainties such as those arising from model uncertainties and questions of completeness must be addressed, even, and perhaps especially when, the changes in risk metrics are in the region of the acceptance guidelines where only the change is requires to be evaluated.

COMPARISON WITH ACCEPTANCE GUIDELINES (Cont'd)

- In addressing model uncertainties, the focus should be on those that most strongly impact the application. For small increase in risk, and relatively minor changes, the number of issue to address will be small. For cases for which increases lie in the intermediate range, such that the baseline risk metrics are to be evaluated, the number of issues will be correspondingly larger.

- Model uncertainties may be addressed by appropriate sensitivity studies to assess the impact of alternate assumptions or approximations, by demonstration that the assumptions adopted in the analysis are bounding, or by qualitative arguments.

- Alternate assumptions or models for key issues should be reasonable in that there is some precedent for their use, and that they have a reasonable basis given the state-of-knowledge in the industry.

COMPARISON WITH ACCEPTANCE GUIDELINES (Cont'd)

- When the analysis is not full scope, it is necessary to address the impact of those risk contributors (initiating events, modes of operation) not modeled.

- This may be done by bounding analyses, by a qualitative argument that the contribution from the missing analyses does not impact the decision, or, if necessary, by supplementing the analyses with detailed analyses.

- One acceptable alternative is to design the change to the CLB such that the missing risk contributors are not impacted by the change, or that the assessment of the change would not require a particular modeling issue to be addressed.

Specific Changes - Bundling of Changes

- Changes that make up a MCR will normally be related to one another, for example by affecting
  - the same single system or activity,
  - the same safety function or the same accident sequence or group of sequences, or
  - the same type (e.g., changes in TS allowed outage time).
- Does not preclude unrelated changes being accepted

Specific Changes - Bundling of Changes

- **Relationship among individual changes and how it has been modeled in the risk assessment should be addressed.**

- **Licensees should evaluate the *overall impact* of the changes in a MCR against the safety principles and qualitative acceptance guidelines in Section 2.1 and the quantitative acceptance guidelines in Section 2.4.2.2**

- **Staff will consider the acceptability of the individual changes in its review of the MCR; but will focus primarily on the overall impact of the MCR on safety at the plant.**

Specific Changes - PRA Quality and Scope

- The PRA performed should realistically reflect the actual design, construction, and operational practices.
- The scope and quality required of the PRA is commensurate with the application for which it is intended and on the role the PRA results play in the integrated decision process.
- Acceptance guidelines require that all plant operating modes and initiating events be addressed.
  - Not necessary to have a PRA that treats all these modes and initiating events.
  - Qualitative treatment of missing modes and initiators can be sufficient in many cases.
- Adequacy of modeling could be assessed by a peer review of the PRA. Industry PRA certification programs and PRA cross-comparison studies could support this review process.

Specific Changes - Management Attention

- Issues addressed by management will include:
  - The cumulative impact of previous changes and the trend in CDF (the licensee's risk management approach);
  - The cumulative impact of previous changes and the trend in LERF (the licensee's risk management approach);
  - The impact of the proposed change on operational complexity, burden on the operating staff, and overall safety practices; and
  - Plant-specific performance and other factors, including, for example, siting factors, inspection findings, performance indicators, and operational events.

Specific Changes - Performance Monitoring

- Primary goal is to ensure that no adverse safety degradation occurs because of the changes to the CLB.
  - principal concern - possibility that the aggregate impact of changes which affect a large class of SSCs could lead to an unacceptable increase in the number of failures due to unanticipated degradation, including possible increases in common cause mechanisms
- Decisions concerning implementation of changes should be made in light of the uncertainty associated with the results of the traditional and probabilistic engineering evaluations.
  - Broad implementation within a limited time period may be justified when uncertainty is shown to be low
  - slower, phased approach to implementation when uncertainty in evaluation findings is higher and where programmatic changes are being made which potentially impact SSCs across a wide spectrum of the plant

Specific Changes - Performance Monitoring

- Program should be structured such that:
  - SSCs are monitored commensurate with their safety importance, i.e., monitoring for SSCs categorized as low safety significant may be less rigorous than that for SSCs of high safety significance;
  - feedback of information and corrective actions are accomplished in a timely manner; and
  - degradation in SSC performance is detected and corrected before plant safety can be compromised.

Specific Changes - Performance Monitoring

- Integrate or coordination of monitoring for risk-informed changes with existing programs for monitoring equipment performance and other operating experience on their site and throughout the industry.
  - monitoring performed as part of Maintenance Rule implementation can be used in cases where SSCs affected by the application are also covered under the Maintenance Rule and if the Maintenance Rule criteria are compatible with the application of interest
- Important that provisions for specific cause determination, trending of degradation and failures and corrective actions be included.
- Monitoring program should identify any corrective actions to preclude recurrence of unacceptable failures or degraded performance below expectations.

Specific Changes - Submittal Documentation

Information expected to be submitted:

- A description of how the proposed change will impact the CLB
- A description of the components and systems affected by the change, the types of changes proposed, the reason for the changes, and results and insights from an analysis of available data on equipment performance
- A reevaluation of the licensing basis accident analysis and the provisions of 10 CFR Parts 20 and 100, if appropriate
- An evaluation of the impact of the change in licensing bases on the breadth or depth of defense-in-depth attributes of the plant
- Identification of how and where the proposed change will be documented as part of the plants licensing basis (e.g., FSAR, TS, licensing conditions). This should include proposed changes and/or enhancements to the regulatory controls for high risk-significant SSCs which an not subject to any requirements, or where the requirements are not commensurate with the SSCs risk-significance.

Specific Changes - Submittal Documentation

Licensee should also identify:

- **Those key assumptions in the PRA that impact the application and commitments made to support the application**
- **SSCs for which requirements should be increased**

Submitted information summarizing the risk assessment methods used:

- **A description of risk assessment methods used**
- **The key modeling assumptions necessary to support the analysis or that impact the application**
- **The event trees and fault trees as necessary to support the analysis of the CLB change**
- **A list of operator actions modeled in the PRA that impact the application and their error probabilities**

Specific Changes - Submittal Documentation

Submitted information summarizing the results of the risk assessment should include:

- The effects of the change on the dominant sequences (sequences that contribute more than 5 percent to the risk) in order to show that the CLB change does not create risk outliers and does not exacerbate existing risk outliers.
- An estimate of total plant CDF (including a qualitative or quantitative assessment of uncertainty) before and after implementing the proposed CLB change
- An estimate of the total plant LERF (including a qualitative or quantitative assessment of the uncertainty) before and after implementing the proposed CLB change, and a summary description of the methodology used to calculate this LERF
- Analyses that show that the conclusions regarding the impact of the CLB change on plant risk will not vary significantly under a different set of plausible assumptions.
- A description of the licensee process to ensure PRA quality and a discussion as to why the PRA is of sufficient quality to support the current application

Specific Changes - Submittal Documentation

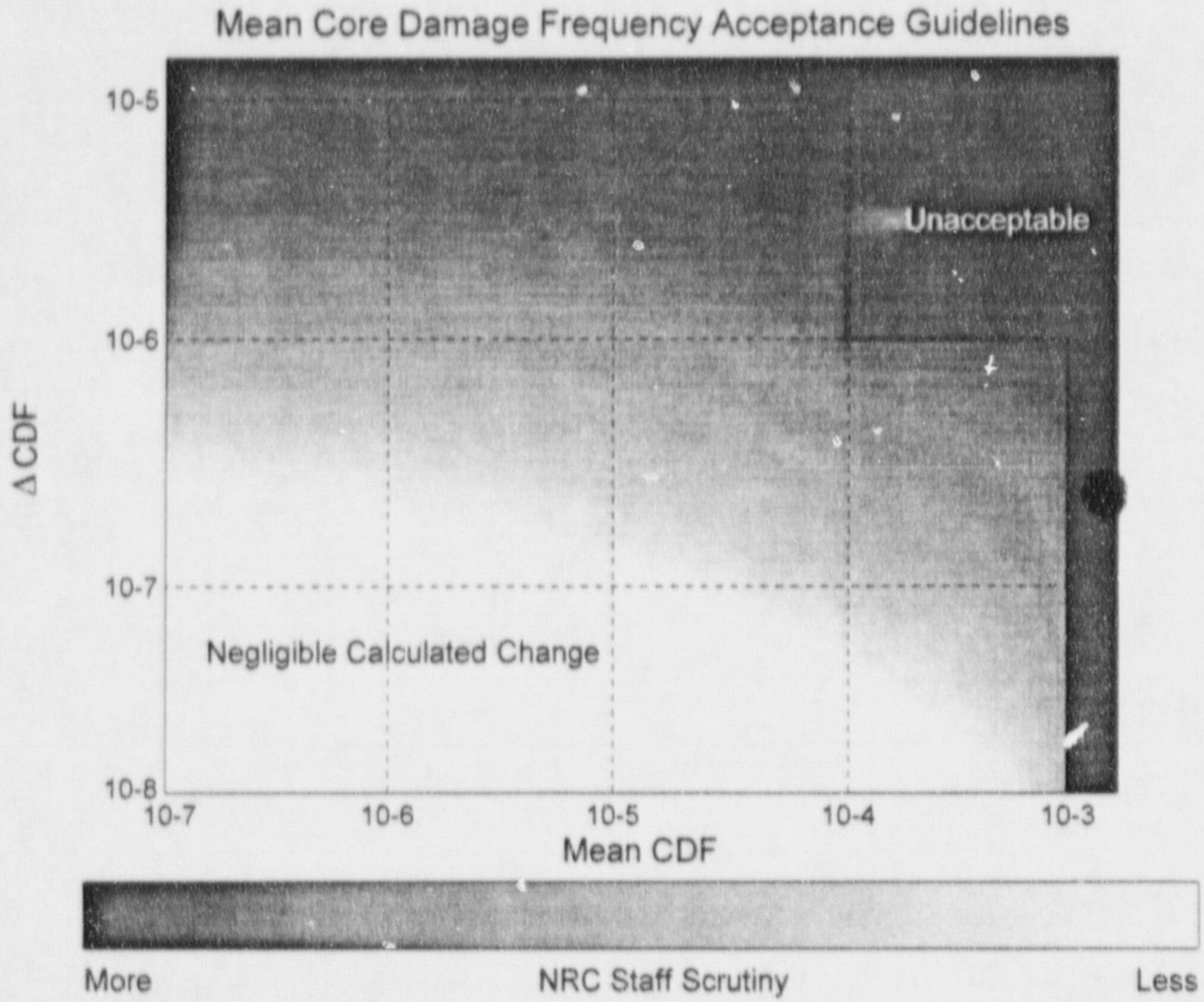
Cumulative risk documentation should include:

- the calculated change in risk for each application (CDF and LERF) and the plant elements (SSCs, procedures, etc) affected by each change
- qualitative arguments were used to justify the change (if any) and the plant elements affected by these arguments
- compensatory measures or other commitments used to help justify the change (if any) and the plant elements affected
- a summary of the results from the monitoring programs (where applicable) and a discussion on how these results have been factored into the PRA or into the current application

Specific Changes - Submittal Documentation

Performance Monitoring Documentation

- **Description and rationale for the implementation and performance monitoring strategy for the proposed CLB change.**


Mean Core Damage Frequency Acceptance Guidelines
10-5
10-6
10-7
10-8
ΔCDF
Unacceptable
Negligible Calculated Change
10-7
10-6
10-5
10-4
10-3
Mean CDF
More
NRC Staff Scrutiny
Less

January 22, 1997

MEMORANDUM TO: Hugh L. Thompson, Jr.
Acting Executive Director for Operations

Karen D. Cyr
General Counsel

FROM: John C. Hoyle, Secretary /s/

SUBJECT: STAFF REQUIREMENTS - SECY-96-218 - QUARTERLY STATUS UPDATE FOR THE PROBABILISTIC RISK ASSESSMENT (PRA) IMPLEMENTATION PLAN, INCLUDING A DISCUSSION OF FOUR EMERGING POLICY ISSUES ASSOCIATED WITH RISK-INFORMED PERFORMANCE-BASED REGULATION

The Role of Performance Based Regulation in the PRA Implementation Plan

The Commission has approved Alternative 1 with respect to the role of performance-based regulation but applications of performance-based approaches should not be limited to risk-informed initiatives. Thus, the Commission also approves elements of Alternative 3 as follows: Performance-based initiatives that do not explicitly reference criteria derived from PRA insights should not be excluded from consideration. The staff should include in the PRA implementation plan, or in a separate plan, how these performance-based initiatives will be phased into the overall regulatory improvement and oversight program. As part of the PRA implementation plan, or its separate plan, the staff should include its plan to solicit input from industry on (or develop on its own) additional performance-based objectives which are not amenable to probabilistic risk analysis, but could be ranked according to, for example, a relative hazards analysis, and phase in these initiatives.

(EDO) (SECY Suspense: 8/29/97)

The staff should provide the Commission a summary discussion on how performance monitoring is being addressed in current PRA Pilot Applications and, where appropriate, other planned performance-based approaches. The staff should address the technical question concerning how the implementation and monitoring aspects of performance based regulations (Attachment 3, Item IV) are considered in these planned performance-based approaches. For the maintenance rule implementation activities, address how these issues are considered within the context of the inspection process and inspection program. These items should be addressed in the March 1997 quarterly update and in the next Commission briefing on the PRA implementation plan.

(EDO) (SECY Suspense: 3/31/97)

The words "intolerable outcome" in the fourth key element are too vague and require further definition. For example, the words could be revised to read "failure to meet a performance criterion will not result in violation of a Safety Limit" or some other specific terminology.

(EDO) (SECY Suspense: 8/29/97)

Plant-Specific Application of Safety Goals

The Commission has tentatively approved Alternative 1 with respect to plant-specific application of safety goals and/or subsidiary objectives, but prior to issuance of the final guidance, the staff should explore the legal ramifications of the use of numerical guidelines for plant specific regulatory decisions and prepare a legal analysis of the issues for the Commission. As part of this analysis, the staff should consider situations where updates or changes to licensees' PRAs (such as the underlying assumptions) result in changes to PRA results, which would cause a previously approved action to become unacceptable. The analysis should also include a discussion of the type of regulatory decisions that might be subject to litigation, an identification of the problems that such litigation might pose for the staff, and an estimate of the level of staff resources and technical support that likely would be required to address the issues in such litigation.

(OGC) (SECY Suspense: 6/30/97)

Risk Neutral vs. Increases in Risk

The Commission has approved Alternative 1 which would allow for small increases in risk under certain conditions, for proposed changes to a plant's licensing basis. The legal analysis requested above should address the legal ramifications and prospects for litigation in making this change. In addition, the

terms "small" and "under certain conditions" require more precise definition. The staff should provide a sound rationale for judging small increases and provide for explicit consideration of uncertainties. Criteria for judging small increases in risk

should be considered in the context of maintaining reasonable assurance that there is no undue risk to public health and safety. The staff should establish procedures to monitor the cumulative changes in risk for a given nuclear facility as the result of license amendments that are conducive to quantitative risk assessments. The staff should develop a methodology for assessing changes in risk that uses statistical concepts and gives considerations to uncertainties.

(OGC/EDO) (SECY Suspense: 8/29/97)

The staff should, in its development of risk-informed guidance and review of applications regarding risk-informed initiatives evaluate all safety impacts of proposed changes in an integrated manner including the use of risk insights to identify areas where requirements should be increased or improvements could/should be implemented. In this regard, the staff should encourage licensees to use risk assessments for purposes of improvement that may require additional activity or effort on their part, as well as relaxation, in order to realize the full benefit of risk assessments.

The staff should also verify licensee activity in this regard, as appropriate.

(EDO) (SECY Suspense: 8/29/97)

Implementation of Changes to Risk-Informed IST and ISI Requirements

The Commission has approved Alternative 2 allowing the staff to use the acceptable alternative provision of 10 CFR 50.55a(a)(3)(i) to approve the pilot plants' applications provided appropriate findings can be made. Where the findings necessary to approve the alternative cannot be made, then the use of exemptions should be considered. The staff should work closely with ASME and with the Code consensus process so as to expedite changes to the Code involving ISI and IST.

cc: Chairman Jackson
Commissioner Rogers
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
OGC
OCA
OIG
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)

PERFORMANCE-BASED

REGULATION

Joseph Murphy, Director
Division of Regulatory Applications

November 13, 1997

Presentation to Sub-Committee on Reliability and Probabilistic Risk Assessment

OBJECTIVE

- CONSIDER PERFORMANCE-BASED APPROACHES THAT DO NOT EXPLICITLY REFERENCE CRITERIA FROM PRA
- PLAN HOW THESE MAY BE PHASED INTO REGULATORY IMPROVEMENT AND OVERSIGHT PROGRAM
- SOLICIT INDUSTRY INPUT

APPROACH

- SPECIFY SAFETY OBJECTIVE AND ACTIONS IF OBJECTIVE IS NOT MET
- LICENSEE DETERMINES HOW OBJECTIVE WILL BE MET
- MARGIN REQUIRED
- REGULATORY GUIDES TO SUPPORT QUALITATIVE CRITERIA
- LICENSEE DETERMINATION INCORPORATED IN CONTROLLED DOCUMENT

ATTRIBUTES

- MEASURABLE PARAMETERS
- OBJECTIVE CRITERIA TO ASSESS PERFORMANCE
  - RISK INSIGHTS
  - HAZARDS ANALYSIS
  - PERFORMANCE MONITORING
  - DETERMINISTIC ANALYSES
- LICENSEE FLEXIBILITY
- CLEARLY DEFINED OBJECTIVES
- INSPECTABLE AND ENFORCEABLE

IMPLICATIONS

- SAFETY OBJECTIVE MAY BE QUALITATIVE PROVIDED OBJECTIVE CRITERIA (NOT NECESSARILY PRA-BASED) CAN BE DEVELOPED

- INSPECTION FOCUS ON OVERSIGHT OF PERFORMANCE MONITORING PROCESS AND EFFECTIVENESS OF CORRECTIVE ACTIONS

- DEFENSE-IN-DEPTH CONSIDERATIONS MAY LEAD TO TRAIN-LEVEL PERFORMANCE MONITORING

IMPLEMENTATION

- TIED TO IMPLEMENTATION OF DSI 13
- SOLICIT INDUSTRY SUGGESTIONS FOR CANDIDATE REGULATIONS (OR REGULATORY GUIDANCE) THAT MIGHT BE CONVERTED
- ENCOURAGE PETITIONS [E.G. REGULATORY GUIDE 10.12 ON 10 CFR 2.802]
- EVALUATE NEED FOR PILOT STUDIES
- REPORT TO COMMISSION BY END FY98