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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

495th MEETING

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FRIDAY,

SEPTEMBER 13, 2002

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The Subcommittee met at 8:30 a.m. in Room T2B3, Two White Flint North, Rockville, Maryland, George E. Apostolakis, Chairman, presiding.

ACRS MEMBERS PRESENT:

GEORGE APOSTOLAKIS	Chairman
MARIO V. BONACA	Vice-Chairman
F. PETER FORD	Member
THOMAS S. KRESS	Member-at-Large
GRAHAM LEITCH	Member
DANA A. POWERS	Member
VICTOR H. RANSOM	Member
STEPHEN L. ROSEN	Member
WILLIAM J. SHACK	Member
JOHN D. SIEBER	Member
GRAHAM B. WALLIS	Member

NRC STAFF PRESENT:

SAM DURAISWAMY	Designated Federal Official
MARK CUNNINGHMAN	NRR
ERASMIA LOIS	NRR
HUSSEIN NOURBAKSH	ACRS Senior Fellow
NATHAN SIU	NRR
MAGGALEANA WESTON	Staff Engineer

C-O-N-T-E-N-T-S

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

(8:30 a.m.)

CHAIRMAN APOSTOLAKIS: The meeting will now come to the order. This is the second day of the 495th Meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the Committee will consider the following. Proposed 10 CFR 50.69 Risk-Informed Categorization and Treatment of Structure Systems and Components for Nuclear Power Reactors, Draft Regulatory Guide DG-1121, and NEI 00-04, Draft Regulatory Guide DG-1120 and Standard Review Plan Section associated with NRC Cold Reviews, future ACRS activities, report of the Planning and Procedure Subcommittee, reconciliation of ACRS comments and recommendations, and proposed ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mr. Sam Duraiswamy is Designated Federal Official for the initial portion of the meeting. We have received no written comments or requests for time to make oral segments from members of the public regarding today's sessions.

A transcript of a portion of the meeting is being kept, and it is requested that the speakers

use one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

Are there any issues that members would like to raise? Hearing none, I give the floor to Mr. Reed.

MR. REED: Thank you, Mr. Chairman. I'm Tim Reed from Division of Regulatory Improvement Programs at NRR. I have along with me Chris Grimes and Donny Harrison, also from NRR, to help out in today's presentation.

Going first to the objective of today's presentation to the Full Committee, it's obviously to brief you on the proposed rule making package that the Chairman has already discussed, and to gain the Committee's agreement to move forward and publish the proposed rule making package for stakeholder feedback and comment.

We're not asking -- in fact, I'm sure the Committee is aware, we're not asking for your concurrence on all the technical issues. In fact, the technical issues have not all been resolved. As you see, our comments are there on the draft guide and on the NEI guidance document. Some issues remain to be resolved, but we do feel that moving forward right now

and getting stakeholder feedback, and allowing stakeholders to see the actual proposed rule language, the full supporting Statement of Considerations, which are significant. Having all that information, and be able to comment on all of it would be very valuable in moving this thing forward, and trying to get to a final rule, so that's what we're asking from the Committee.

CHAIRMAN APOSTOLAKIS: So the technical issues that you raise, hopefully will be resolved during this period?

MR. REED: Exactly. We're going to continue, and Chris will talk about this in the next steps at the end, but we're going to continue working with the industry, and resolving the implementation issues in the guidance.

CHAIRMAN APOSTOLAKIS: But you would like comments from us on some of these issues?

MR. REED: Absolutely. A little background to give everybody a baseline this morning. I think everybody is aware of all this, so I'll just go through it pretty quickly.

We last met with the Subcommittee in February, and the Full Committee in early March, and that focused principally on the categorization

guidance. And in fact, at that time it was Draft Revision B of NEI 00-04. The Committee is all, I think, aware of the three major SECY papers, and this effort started back in December of 1998 with 98-300, and that outlined the options for risk-informing the regulations. Option II is, of course, why we're here today. That's risk-informing special trigger requirements.

In 99-256, we put together the rule making plan and an NPR. We followed that rule making plan. We put together proposed rule. That's why we're here today, proposed 69. SECY -00-194 was a response to the NPR comments, and it also had some additional language in there on the actual framework. We've tried to remain true to those words.

Since that time, a lot of the effort then went into -- for the following year really into the South Texas exemption. We were able to -- the staff was able to issue that exemption in August of 2001. It was a proof of concept. It proved the fact you can risk-inform special treatment requirements. Of course, that was done by exemption, not by rule. But those lessons have been valuable in putting together proposed 50.69.

We've had numerous stakeholder

interactions through the last three years. I just note three workshops. We briefed the Commission twice, and we've actually issued the draft rule language now on three occasions, and most recently back August 2nd, it appeared on our external web, so just a little background.

CHAIRMAN APOSTOLAKIS: You just said there have been numerous interactions. And apparently, there are still significant technical issues. Why do we believe that during the public commentary period, these will be resolved, if they have not been resolved already?

MR. REED: I think that the biggest piece -- first of all, you're talking draft language and the previous interactions in that proposed rule language. When we get a proposed rule language, it goes through the concurrence process. It puts a lot more pressure on upper management and everybody to really focus, and really decide where its positions really are on each of the pieces of the language, and the supporting statement considerations. And you get legal, you know, legal feedback too, and that's very important. So the Statement of Considerations for these rules are significant. I mean, they've very large, and I think that's very valuable for people out there to

understand what we really mean with these rules.

In addition to having the guidance, I think they need to understand the language. And that's been a problem. I think, you know, to some extent stakeholders have been somewhat blind. They've seen the language but they really don't have the underlying SOC for the language, and I think that would be a big benefit for stakeholders to provide good feedback.

MR. GRIMES: Dr. Apostolakis, I think -- you know, I'd like to add to Tim's description, and point out that there have been a lot of interactions, but the give and take on the dialogue up until this point has been largely shooting at a moving target. There have been a lot of trials to characterize both the features and attributes of the process, and also the regulatory framework that it would work within.

By publishing a proposed rule, it gets all the stakeholders to focus on a baseline to work from. And so that's why we feel this is a ripe opportunity to take four year's worth of dialogue, and to try and baseline it to move forward to resolve the public comments and the issues concerning implementation.

CHAIRMAN APOSTOLAKIS: How long is the public comment period, 60 days, or 75?

MR. REED: Seventy-five days.

CHAIRMAN APOSTOLAKIS: Seventy-five.

MR. REED: Okay. Next I want to go through the proposed rule language, at a pretty high level and pretty quickly, and I'm doing that for the sake of time so that we can get to the technical implementation issues, which I think are of most interest to this Committee.

Really quickly, before we go into the language, just to remind everybody here, the Committee and everybody else here, Option II, now proposed 56, about risk-informing special treatment requires. It's not about changing design-basis functional requirements. In fact, the entire framework is designed to maintain design-basis function requirements. I think we all too often forget that. We're really talking about risk-informing assurance. If you want to risk-inform technical or design-basis functional requirements, that's Option III. So just a little bit of a reminder to everybody.

Now getting into the proposed rule language, the overall structure of the rule is basically the same, although you'll see some format changes from what you were familiar with in the last draft rule you looked at. There's still -- Paragraph

A still goes through the definitions of RISC-1, 2, 3 and 4, and it's done before. This is the same. We've now added a safety significant function definition. That's new, but that language is supposed to be entirely consistent with the philosophy of Reg. Guide 1.174, and it's defined as, "A safety significant function is a function whose loss or degradation could have a significant adverse affect on defense in depth safety margins or risk", and that language is used in the rule. And now we're basically using that to tie the rule a little more tightly together.

Paragraph B now does a little more than what it did in the past. Last time we saw it, it was basically there to identify who could really adopt it. And those, of course, are the same people, the reactor licensees, either current licensees or applicants. And that's both Part 54 licensees, renew licensees, current or Part 50 licensees, current licensees, as well as, you know, traditional Part 50 applicants, or Part 52 applicants, so basically light-water reactor licensees.

MEMBER ROSEN: But only light-water reactor.

MR. REED: Right. Exactly, because we're using CDF and LERF. Exactly.

MEMBER ROSEN: But that raises the question that -- the implication of saying that is that non-light-water reactor licensees are presumably advanced plants, will not have special treatment requirements. Is that so?

MR. REED: Well, we would have to design, I think, the regulation with that -- those kinds of designs in mind. In other words, when we talk about -- when you're looking at the bottom line, for example, and this rule is, you know, risk cannot be no more than small change. We measure with CDF and LERF, you know, large early release and CDF, that means something for light-water reactors. I think we'd have to look at those designs in detail, and then try to develop the rule. I'll let the PRA experts talk about that, but that's principally where we're coming from.

MEMBER ROSEN: So it's an implementation difficulty. It's not a philosophical difficulty.

MR. REED: It's not a philosophical difficulty.

MEMBER ROSEN: It seems to me that one could use this process doing non-light-water reactors also.

MR. REED: You could, I think. But we'd have to --

MEMBER ROSEN: You could apply special treatment requirements, whatever they are, to the things that are --

MR. REED: Well, we would have to develop those from the start with that in mind, I think. And we haven't.

MEMBER KRESS: And if you were using that it would be small increase to the risk, instead of small increase in CDF and LERF.

MR. REED: Yeah. You could do that, and then we'd have to develop all the --

CHAIRMAN APOSTOLAKIS: So if you do nothing else, we will then impose the safety-related, non-safety-related categorization to advanced reactors, as well? Let me put it a different way. For advanced reactors or future reactors, would you still need the RISC-1, 2, 3 and 4, or you may go on with your safety significance --

MR. REED: Okay. To implement this process, unfortunately, you've got to go first to the safety-related/non-safety-related world.

CHAIRMAN APOSTOLAKIS: Even for future reactors.

MR. REED: Yeah. You'd have to put it into safety-related/non-safety related terms first,

and then map that into I, II, III and IV. You could do that all up front though, on paper, and procure it initially - okay - as RISC-3 at the facility at the site. Okay? But you still have to map it in. You've got to do the -- remember, we're maintaining the design-basis, so you've got to go out there and do the design-basis the old way, including all the Chapter 15 stuff and everything. Okay? That's the way this thing was designed, unfortunately, because it's taken the current set of regulations, and trying to map them into it.

MR. GRIMES: This is Chris Grimes. I'd like to -- Tim describes is as "unfortunately." Actually, I think it's a fortunate thing, that we're now looking at, you know, what are the technical needs in order to go through and look at our rules and regulations relative to non-light-water reactor technologies, and the Part 52 licensing process. And I think that we're going to have -- there's going to be a meeting later this month, where the Office of Research is going to explore some of the technical needs in that area. And that will give us an opportunity to reflect back on, in rule making space in terms of what are the order and priorities for looking at improving the rules to deal with non-light-

water reactor technology.

CHAIRMAN APOSTOLAKIS: One last comment on this. There are significant requirements of the quality of the PRA and the proposed use. And I wonder how one would handle that in a future reactor?

MR. REED: I think there's going to be a lot of issues that we have to look at, and that would just be the start.

MEMBER ROSEN: But there's no fundamental opposition in the staff to applying a process like this to non-light-water reactors. It's just an implementation difficulty, because of CDF and LERF that define specific ways for the current versions. It may need to be defined in a different way, for a different type of reactor.

MR. REED: Yeah. Continuing on then now, up in the front, in the Paragraph B, we now list the so-called special treatment requirements now in the front, for which 50.69 is an alternative to, so we've moved those up in the front. And now we have submittal requirements up in the front, so this kind of -- the way this works now, it identifies the licensees who may do it, what this is an alternative to, and then how you implement it. Here's how you do the submittal, so that makes a little more sense.

It's more consistent with other regulations, so that's the format changes there. And those requirements are pretty much the way they've been in the past, so I don't think there's too many surprises there.

Moving on then, you make, of course, your submittal, and what you are doing, you measure your submittal against Paragraph C. That's the next section, the categorization requirements, we're going to review and approve their submittal, and see whether, in fact, it meets those Paragraph C requirements.

Those requirements again, as already noted by the Chairman, we have a lot of PRA requirements, and there's requirements on the categorization process, requirement to have an IDP or expert panel, and I have listed some of the highlights. I won't go into a lot details here, because this is going to be hit pretty significantly by Donny a little later on, and I think that's probably the best place for the Committee to spend its time. But those requirements are pretty much the way they've been in the --

MEMBER KRESS: Well, what are you going to do about shutdown and low power modes, since nobody really knows how to do them?

MR. HARRISON: Yeah. We'll get to that

when we get to the other part of the process.

MEMBER ROSEN: Okay.

MR. REED: The next Paragraph is D, and again, this remains the treatment paragraph that you categorized in the bins 1-4. You apply the treatment. These treatment requirements are pretty much the way they've been before. A little bit of a change here. RISC-1 and 2, of course, maintaining all the special treatment requirements on them, with an additional requirement that says, you know, take a look at your treatment applied to these really for the area beyond design-basis assumptions occurring in your categorization process, and make sure that, you know, the performance you're assuming there is consistent with the treatment. That's what that requirement is there for.

And then, of course, RISC-3 treatment where there's been a lot of focus over the last couple of years is basically we're trying to put in the minimum level of requirements to maintain with sufficient confidence RISC-3 capability performance, safety-related functions under design-basis conditions. We think we've achieved that.

You'll see a little bit less detail there than we had before. We think we've had a little bit

more robustness in the categorization requirements, so we've tried to remove a little more detail. But all the previous versions, including this one, have that overriding requirement to maintain RISC-3 design-basis capability, and that's still there.

Paragraph E then is the feedback and process adjustment paragraph, and that's really -- the requirements there are to maintain this process valid over time, so as you change the plant, as you change procedures, as you change your operating practices, as you gain information from outside the plant through industry, as well as performance data from the plant itself, that all has to come back into the PRA in the categorization process. And Paragraph E explicitly requires that, and makes you build that back into the process to maintain it valid over time.

We were more implicit with these requirements than previous versions. Now I think you see it spelled out pretty explicitly, so the rule is a little more clear in that respect.

Then F and G are pretty much now the way they were in the past, you know, with the pieces that were moved up front, but these are the program documentation requirements, requirements to document the decisions on categorization process, requirements

to update your FCR as you implement this process, reporting requirements. Those are reporting requirements, in addition to 72 and 73, if you have an event or degradation that would have caused a RISC-1 or RISC-2 SE not to be able to perform a safety saving function, and it's not otherwise reportable under 50.72 and 73, then we have a reporting requirement now in 50.69. And that's the same as in previous -- that's a pretty high level, pretty quick go-through of the rule, but I think -- as I said before, I think it's probably more important to get to the technical issues. And then I think all these issues with the rule can be discussed with the technical issues also, at the same time.

As a way of kind of introducing the technical discussions that will follow, I've got a slide here that just basically is a way of getting all the issues into one of three bins. As you are well aware, in the last three years there's been a tug-of-war in trying to put proposed 50.69 together. We've been trying to drive this thing to have robust requirements in the rule, so that if somebody who implements the regulation will, in effect, have a categorization process that bins SSCs in 1, 2, 3 and 4 with high confidence. High confidence that's either

safety significant, or high confidence that it's low. And once you have high confidence, then we feel comfortable with applying the treatment requirements that we've delineated in the proposed rule.

And as you're well aware, we have the rule requirements. We've been working with NEI through numerous -- three different drafts, and we'll continue to work with them on the implementation guidance. And if you see in the package, we have some comments on their most recent Draft Revision C that we need to continue working on, so that's where the categorization requirements are. And we continue to work and make sure they're robust.

At the same time now on the other side we're trying to be risk-informed, to keep our focus on what's important, so we're making sure the treatment in boxes 1 and 2 are sufficient to maintain the process as valid. Okay? At the same time, a RISC-3, we're trying to have the minimum amount of requirements to maintain design-basis functionality in RISC-3, but no more than what's necessary to do that. And that's been the other difficulty we've been having. And we think proposed 50.69 does that - okay - but that's certainly been a challenge, and you've seen through all the different gyrations we've come

through. That's been a big effort.

And in another area, there's a kind of -- I like to think of us a tie between categorization and treatment. And in fact, my view is the bottom line. The bottom line on 05.69 is when you implement it, there should be no more than a small increase in risk. Okay? And we do that. We spell it out explicitly in the rule, I think in C-1.4, that basically you have to show with small changes in CDF and LERF. And we say what small changes are in the SNC and it's Reg. Guide 1.174 type criteria. But you have to show that there's no more than a small change in risk, and that comes down to sensitivity studies that you run. If it's in the PRA, or if it's not in the PRA, as being an evaluation using other models. And then the basis for those assumptions, and I think that's really a lot of where this Committee, and the technical interactions with industry are going to focus. That's been a very, very big technical issue, and I think it will continue to be as we try to resolve the remaining issues.

That's by way of trying to introduce the next two speakers up here. And I have -- I think Adrian from NEI, at least as I understand the agenda, would be next to discuss Draft Revision C of NEI-00-

04. And then following that, Donny Harrison to discuss our comments and issues associated with that. But that's all I have for right now. The next slide you have, Next Steps, Chris will get that at the end of everybody's presentation, but I can close right now. I think I'm still pretty much on schedule, and have any questions on this aspect of the presentation.

CHAIRMAN APOSTOLAKIS: Move on.

MR. PIETRANGELO: George, before Adrian goes through our changes, I just wanted to make a couple of introductory comments.

MEMBER ROSEN: Identify yourself, Tony.

MR. PIETRANGELO: This is Tony Pietrangelo from NEI. We've been working on the development of this document now for about a year or two. From our perspective, we're way ahead of the game from normally where we are associated with a rule making. In fact, the regulatory guide -- this categorization guideline was developed in advance of the draft ruling, which has been put out for public comment over the last year.

Typically, we wait to finalize the ruling, which then we go out and develop the guideline or regulatory guidance on how to implement the rule. We've still got at least a year or so to go before we

anticipate a final rule on this. And, therefore, we have at least another year to work on this guideline, so what you see today, and what Adrian is going to go over is the latest set of changes based on the feedback from our pilots.

Obviously, there's going to be additional changes as we get comments from this Committee, comments from our own membership, comments from other stakeholders, so this is a work in progress. Our intent is to get full NRC endorsement and a regulatory guide of this guideline, such that the ability to implement 50.69 will be stable, will be predictable, and will be beneficial to all parties, so with that, I'll have Adrian go through the changes we've made, and then maybe we can come back to some of these other questions.

MR. HAMMER: Good morning. My name is Adrian Hammer from NEI. I'm one of the Project Managers that works with Tony Pietrangelo and Steve Floyd on risk-informed regulation.

I thought as we start, it would be worthwhile just going back and looking at where we started and where we've been, and where we're going. And the project really started in 1999, firing off the Commission's SRM on SECY-98-300, and the initial

drafts Rev. A, were based on the early regulatory interactions. And we put something together, and then during those interactions as they went on, the concept of pilot projects and pilot plants was raised. And we then moved forward and produced Rev. B in 2001, based on the initial feedback we got from the NRC, and input as the pilot plants folk prepared to move forward and test the guideline.

They've done that now, and Rev. C really incorporates some of the pilot plant lessons learned. It really turned and looked at the guideline, what we had in Rev. B, and said how can we improve on it in two areas. One, so that it would be more attractive to people to move forward. And two, to incorporate what they learned. And it also incorporated a series of observations that the NRC made as they witnessed the IDP interactions.

CHAIRMAN APOSTOLAKIS: What are the pilot plants?

MR. HAMMER: The pilot plants are Surrey, Wolf Creek, Palo Verdis, and Quad Cities.

CHAIRMAN APOSTOLAKIS: Now you didn't mention at all the South Texas project.

MR. HAMMER: Well, they were approved for concept. They were way ahead, and really the four

pilot plants were coming along behind them, learning from it as they went forward, and seeing how they could, perhaps, improve on the South Texas plant.

CHAIRMAN APOSTOLAKIS: To what extent are you basing this on the South Texas experience?

MR. HAMMER: I wouldn't say it's based totally on it, but it takes insights and input, and methodologies that South Texas used. And then we had a general discussion, and throughout the development process, when we sort of were going round and round in circles on certain topics we said well, what did South Texas do? And that provided a stabilizing influence to the discussions and the development of the guideline.

MR. PIETRANGELO: We should mention that South Texas is also represented on the task force, helped in develop the NEI 00-04 guidance.

MR. HAMMER: And we see the guideline development will continue through the rule making process, taking insights and input from the rule making activities.

The actual changes in Rev. C, when we started off we really went through 00-04, a component by component evaluation. And what the pilot plants recommended is that we change that emphasis, and

really build on what we'd done in previous risk-informed activities, take insights from what South Texas did, and really try and, I guess, make the process more efficient, but still come out with the right answer. And also, take into account some of the comments that the staff had by saying well, you're not looking at -- the PRA doesn't look at all components. And we tried to change the methodology so what we had to do, actually expand the scope and do look at all components, so it's somewhat more conservative.

CHAIRMAN APOSTOLAKIS: But which way did you change it? You're not looking at the component by component, so which --

MR. HAMMER: No, we've gone to a functional basis.

CHAIRMAN APOSTOLAKIS: Functional basis.

MR. HAMMER: Yes. And I'll get to -- the next slide actually speaks to that. Following discussions with the NRC earlier this year, we moved the guideline to more of a categorization guideline, and the treatment will be moved. Rev. B had something like 60 pages on categorization, and 30 pages on treatment. We're going to take the treatment out, and move it into a supplemental industry guidance document. We're going to expand the treatment basis,

especially in the area of EQ seismic, and how to apply the various code cases. And it's really to provide some consistency in the application and treatment to RISC-3 throughout the industry.

We've refined the change control process to take into account we're now looking at the beyond design basis functions, and we've looked at the periodic review, and we've tried to improve on that. We may have to change that, and I'll get to that point in a minute or two. And taking input from both the IDPs and from South Texas activities, and this Committee, we believe we've improved the guidance as regards to the IDP, what they're to do, and what they're not to do.

Some of the specific changes, and I think this talks to what you're speaking to, George, is it really builds on the previous risk-informed activities, and the way we've adjusted the guideline is that we go ahead and we identify using the PRA, and operate and experience, identify the safety significant functions. We then identify the flow path that supports those safety significant functions, and then we map the SSCs to those flow paths. And then all the way through that, we then go back and verify the functions, have we missed anything, so the PRA is

used as a checking mechanism. Have we missed any safety significant functions? Did the PRA give us any insights that would make the function safety significant? And did the PRA actually identify any components, or specific components that we've missed?

That is a much more conservative approach than we had in Rev. B. And there is an option in there to do additional detailed engineering because, for example, if you have a flow path that supports a safety significant function, the vent and drain valves would be considered safety significant, and so we would say you would then do an additional engineering evaluation to say why you believe those vent and drain valves, perhaps, are not safety significant. Document that, justify it, and then run that back through the process, see what impact that would have on the overall approach.

We think it's more encompassing, and a number of licensees believe that they can get, if you like, 80 percent of the benefit just by doing the course approach, and then the rest, and certainly for some plants, they would need to go down and do the additional engineering evaluations, documenting them, and then run them, see how it changes the SSC categorization, and then provide the basis for the

change to the IDP.

CHAIRMAN APOSTOLAKIS: Now it's not very clear to me what the role of the safety functions, safety significant functions is. Is this guidance to the IDP, because when I do the categorization using the Fassell-Vasley in raw measures, I apply those to SSCs, don't I - not to functions?

MR. HAMMER: You apply those to SSCs, and that's part of the check that I said, having identified the functions, and then map the SSCs to the functions. You then check that off against the PRA, the Fassell-Vasley --

CHAIRMAN APOSTOLAKIS: The ultimate decision of whether it's safety significant or not depends on what? I mean, it's stated somewhere that, you know, the function may be safety significant, but you can have, you know, ten different ways of achieving that function. So how does that come into the picture? I mean, as to what --

MR. HAMMER: Well, the aim is that if you choose a pathway, and you say this is the way I'm going to select the pathway, and you map the SSCs to those functions, and then you go back and you see what the results of the PRA gave you. And you say well, there's a group of SSCs in there that would be safety

significant that you haven't identified. You would bring those in and say these are safety significant, and then either make an argument why they're not, or just assume that they are; and present results to the IDP.

CHAIRMAN APOSTOLAKIS: And why is that different from going to the PRA and just doing the Fassell-Vasley, and saying this component is safety significant or not? It's not clear to me, in other words, what the intermediate step of the safety significant function does. Is it just to organize your thinking, and do a more comprehensive analysis?

MR. PIETRANGELO: You still do -- I mean, the functional importance is still based on the importance measure of the SSCs that are modeled in the PRA.

CHAIRMAN APOSTOLAKIS: No, I thought that was determined a different way.

MR. PIETRANGELO: Well, in addition to other insights you get from the rest of the things we do in the categorization guideline. Once the safety significant functions are identified, as Adrian said, then you do a fairly conservative broad-brush. Everything associated with that function is now considered high safety significant.

MR. PERRY: George, can I -- this is Garreth Perry from the Staff. I think our interpretation of the way it's set up, is that first of all, you do the component importance based on the SSCs. And then --

CHAIRMAN APOSTOLAKIS: You mean on the --

MR. PERRY: Just on the PRA model, right. Using Fassell-Vasley in raw.

CHAIRMAN APOSTOLAKIS: Yeah. Yeah.

MR. PERRY: Then you look at the functions that those SSCs support. Those functions are then ranked according to the importance of the SSCs.

CHAIRMAN APOSTOLAKIS: Well, that's a very different process from what I just heard.

MR. PERRY: No, but I think then the next step is that if the function is now given a certain importance, then every component in that -- that supports that function is also given that same importance. So what this process is doing is capturing all those things that are not modeled explicitly in the PRA.

CHAIRMAN APOSTOLAKIS: I just don't see how you could do that. I mean, let's say you do the Fassell-Vasley in raw, and you find that 15 components that support one function are of high safety

significance, and 23 are of low safety significance. How do you determine the safety significance of the function?

MR. PERRY: By the highest safety significance of any component.

CHAIRMAN APOSTOLAKIS: So even if one SSC safety significant function is --

MR. PERRY: Yes.

CHAIRMAN APOSTOLAKIS: And then you turn around and say everything supporting the function is safety significant?

MR. PERRY: That's right. That's what Adrian was saying.

CHAIRMAN APOSTOLAKIS: How can you get anything in RISC-3 if you do that? I mean, we discussed this with South Texas four years ago, that the function may be significant, but if you have 100 ways of achieving it, why is everything under safety significant? I think --

MR. HAMMER: That's the course screen, and that's what some of the pilots did. And they found they did have equipment going into RISC-3. Then if you're in the situation that you've just described, George, you then do additional engineering evaluation to look at the SSCs in the flow path, and see if you

can justify why -- are they really safety significant, or is there some reason that you can make why they're not safety significant? You document that, and then you run that back through the process.

CHAIRMAN APOSTOLAKIS: Now you say it's a course categorization, but you have already done the Fassell-Vasley in raw, which is not a trivial thing to do.

MR. HAMMER: But only on the components that are in the PRA.

CHAIRMAN APOSTOLAKIS: So are we addressing now the other group?

MR. HAMMER: That's right. And this method is attempting to -- one of the major comments that we had from the staff, and I believe this Committee, is how do we bring in all the other components?

CHAIRMAN APOSTOLAKIS: So again, if I have 15 that are safety significant, 23 that are not. I declare the function as safety significant, but I can still argue that 23 are of low safety significance, because the Fassell-Vasley wrote them to be low, and I also include defense in depth arguments and so on. But then I go to the components that are not in the PRA and support this function. Automatically they are

safety significant, unless I give additional arguments.

MR. PIETRANGELO: That's correct.

MR. PERRY: I think the word --

CHAIRMAN APOSTOLAKIS: Well, why don't you say that in the document?

DR. BONACA: Well, I have one question. I understand. That is good. Still you have, right now, a Category-1 list of the plant. Okay? Through this process you will not include some of those elements. Are you going to do a verification of the process also for the remaining ones in the Category-1 list? See what I'm trying to say, right now, for example, South Texas had like 40,000 known PRA model components on the list. My understanding that for which one of them they went through a process. It was either -- if it wasn't in the PRA they went through the deterministic process one by one, so at the end of the process, all of them went through.

Through this approach, you are not going that way. You are going through identifying functionality, and so on and so forth, so you miss a number of those Category-1. Are you just going to exclude it automatically just because it did not -- or are you going to make a verification of each one of

the --

MR. PIETRANGELO: I think what happens is when the function is identified as safety significant, as Adrian said, you broad-brush that entire train that supports that function.

DR. BONACA: I understand that.

MR. PIETRANGELO: Yeah. I think that'll capture the components that you're referring to. If it's a safety related system, if they start in Category-1, then all those SSCs are probably safety related already. I think the -- yeah, the minor difference, as Garreth said, was everything else that supports the function, it's everything else kind of associated with that train that is the function. Then you go -- and this is optional. Then you can go through an engineering evaluation to determine does it really support the function or not?

DR. BONACA: But I think you have to --

CHAIRMAN APOSTOLAKIS: But to what extent?

MR. PIETRANGELO: Well, you can do that, but it's really more of a direct tie.

DR. BONACA: But it seems to me at the end you'll have to do just for the heck of going from one list to the next, a verification that each one of the items that you had in the original list has gone

through the process.

MR. HAMMER: Or at least have some -- say there's five items here that haven't gone through the process, and they're in the system. Where did they end up?

DR. BONACA: Or at least, I mean -- I'm not saying that they're going --

MEMBER SHACK: The default is always they remain where they are until you demonstrate the move.

CHAIRMAN APOSTOLAKIS: But they may not be in the safety related category already, so I don't know -- I mean, South Texas found that 600 or so components had to actually be elevated to RISC-2. So I wonder how -- it's not clear to me how this process captures that. It probably does.

DR. BONACA: It probably does, but that worries me less than simply that -- the completeness, but I think you have a good point, Bill. I mean, if something doesn't go through that process there, it remains. So probably you want to go a step further just for convenience, to verify you can element those too.

MEMBER ROSEN: I think we're talking about pathways to the same end result. I don't think we end up in a different place using the South Texas process,

or this process.

MR. PIETRANGELO: No. I think --

MEMBER ROSEN: And I'm still curious as to why you go through all of this. Why make it so different? I don't see the benefit of changing. You know, it was much more straightforward, for me, at South Texas.

MR. HAMMER: I think the pilots felt that if they were to stick with the process that was described in Rev. B, that the resources associated with that, they believed, were higher than this approach. And it was one of how can we make this approach more efficient, and build on what we've done before so the likes of the IDP would better understand it? Because it really builds on what we did in the other risk-informed categorization activities.

CHAIRMAN APOSTOLAKIS: But would you say though, that the first three or four questions that were explicitly stated in the South Texas approach to the panel, in fact did that? They identified the safety significant paths. I mean, this is really what you're --

MR. HAMMER: Yes, that's right.

CHAIRMAN APOSTOLAKIS: Because when they have to decide what is the safety significant

function, essentially you will go through the same kinds of questions, won't you? So it's not --

MEMBER ROSEN: Maintenance rule questions I think is what George is referring to.

MR. HAMMER: Yeah. That's right.

CHAIRMAN APOSTOLAKIS: It's not really different. Right?

MR. PIETRANGELO: Well, the difference is that South Texas did it component by component across the board. This starts with the components importances --

CHAIRMAN APOSTOLAKIS: And goes up.

MR. PIETRANGELO: Goes to the functional level, broad-brushes it.

CHAIRMAN APOSTOLAKIS: And then goes down.

MR. PIETRANGELO: People can stop there, feel like they captured everything they needed to, or they can go to the next level as South Texas did in their case, to further categorize. So it's a little bit more streamlined, less tedious approach. I think if you go the full approach that we're talking about, you're going to end up doing all the same things as in South Texas.

CHAIRMAN APOSTOLAKIS: Now I wonder, do you remember off-hand where this is described in NEI

00-04? And why I missed it.

MR. PIETRANGELO: There's a chart in there. That is the functional chart.

MR. HAMMER: .Figure 2-1 is a general overview.

CHAIRMAN APOSTOLAKIS: Figure 2-1? I guess it's on there, but I'm looking at it with a different eye now. Oh, yeah. You have it there. Okay. So you go to the right there, component safety significance, and then engineering categorization of functions. I see. That makes more sense.

MR. HAMMER: Okay. One of the other areas that we've tried to improve the guidance on is the change control processes. And if you look at these -- and what we focused on is the post implementation activities. And what we're talking here is if you look at 50.59, 50.59 has the initial screen dealing with the design-basis functions. And when you go into risk-informed space, and you go through Option 2 in the categorization process, some of the functions are what we consider to be beyond design-basis. And so somehow you need to capture those, and we've attempted to do that in the guideline.

We've also attempted, at the request of the pilot plants, to provide guidance on what action

should be taken should the SSCs change categorization once you finish the 50.69 categorization activity, and perhaps you've changed the treatment.

One of the comments we've received back when folk have really had time to digest and think about the guideline is, perhaps some of the material that we put in here as regards what action we take is more akin to treatment, and we need to look at that, along with the periodic review to make sure the guideline is consistent, and we're talking about categorization activities. But I do think we need to put something in the document to give some indication of how we're going to treat equipment that was non-safety related, went to 2, and then came back. Or was safety related, went to 3, and then for some reason or another something changes, and you now feel it should be back as safety --

MEMBER ROSEN: That's very important, Adrian, because as people look at better and better PRAs, you know, trying to come into conformance with the standards or responding to peer review comments, and do better PRAs, if they have gone ahead and done categorization with their less good PRAs, and then make changes to the PRAs to improve them, they may end up with quite a few of these changes. And what we

call them at South Texas, what we're calling them South Texas if that happens, and that has happened at South Texas, could we call them critical changes if the changes take something that we put in low, and move it back to high? In other words, cross it back over, so that it would change the treatment. That doesn't happen very often, we hope, but if it does it can be, you know, it can be confounded. So it's very important what you do with that second bullet.

MR. HAMMER: Right.

MEMBER ROSEN: Because it will happen.

MR. HAMMER: So we do have some guidance in there. We also proposed and this -- as regards to controlling the categorization process itself, we would use the commitment management guidelines, NEI 99-04, which really need to be amended to reflect some of the activities that we're doing in Option 2.

We've developed a draft change to that document. It's with the industry now, and we hope to forward it to the staff in the near future. But we recognize that is an open item, and an open issue.

As regards the guidance on action to be taken, we did produce in the guideline a small matrix of how to observe changes to the PRA, and whether or not it should at least be their starting point for

considering whether or not you need to change the categorization of the SSC, following the 50.69 categorization process.

Other changes, we made some changes to the periodic review, and which we believe are consistent with the ASME PRA standard. We went around the board a couple of times on this one. We started off I think in Rev. 8 with a set period of time, the ASME PRA standard. Then didn't have a specific period of time, had some criteria listed. And what we tried to do is just reference the ASME PRA standard when you do a periodic review, and that then leads to what's the impact of that? If you have to change the PRA, what's the impact on the categorization?

We have based on inputs from the pilots and the observations from the pilot activities, and the comments made, provided additional guidance for the IDP, both in the area of training and familiarization on how to deal with risk information, how to deal with the defense in depth. And we've also taken an action to expand the description in the guideline on defense in depth, to put some words to the diagrams, or more words to the diagrams and figures, to better explain how to interpret that defense in depth diagram. And really to give an

overall concept of what the IDP is meant to do. And I think it's important here to recognize that in Rev. B, the IDP was more -- we envisioned the IDP to be more of a working level panel. And what's come out of the pilot activities is we believe the IDP is more of an oversight and review function, with subsidiary groups underneath doing the work. And then they present the results, and the justification of those results to the IDP. So the IDP is the final arbitrator of what's safety significant and what's not, but that is somewhat of a change to where we've been before.

MEMBER KRESS: Could you elaborate a little on what defense in depth guidance you've given?

MR. HAMMER: We have a - let me see if I can find it - a chart in there.

MEMBER KRESS: Figure 6.1.

MR. HAMMER: Figure 6.1.

MEMBER KRESS: Yeah. Would you explain that chart a little to me? Now apparently, you've taken the list of design-basis events that are generally dealt with, and you predetermined what their frequency range is. And so, you're looking at design-basis accidents and you're asking, I have an SSC that by the other process, I've already classified as low

safety significance. It means it has a small affect on CDF in this case. And then you're going to say now have I maintained the defense in depth philosophy?

MR. HAMMER: .Right.

MEMBER KRESS: So you're going to look to see if that SSC has to be called upon in one of these DPAs or what?

MR. HAMMER: It has to be -- not necessarily has to be called upon, but at the end of the day, do you still have two diverse trains, or one train plus a system with redundancy available to address those activities.

MEMBER KRESS: Yeah, I understand. I'm thinking SSC that you've classified as low safety significant.

MR. HAMMER: Right.

MEMBER KRESS: Where do I put it on this chart, first?

MR. HAMMER: Well, this was really coming at it from the functional aspect.

MR. PIETRANGELO: Well, it's the same thing. Its function is to mitigate one of those.

MEMBER KRESS: Okay. You make a judgment, or if you look at its reason for --

MR. PIETRANGELO: Typically, it's formally

credited in the safety analysis.

MEMBER KRESS: Okay. It's formally credited in the safety analysis for it to deal with that.

MR. PIETRANGELO: That's correct.

MEMBER KRESS: That wasn't clear to me. So you -- it may be there to credit several of these. You pick the one with the high -- the lowest frequency?

MR. PIETRANGELO: You look at all of them.

MEMBER KRESS: Look at all of them.

MR. PIETRANGELO: Yeah. Where it's credited you look at -- for any of those events, you'd look at all those scenarios.

MEMBER KRESS: But it's not necessary to look at all of them, because you pick the one that's lowest frequency --

MR. PIETRANGELO: You'll end up doing that. That's correct.

MEMBER KRESS: Yeah. Okay. So if it happens to be there for loss of off-site power, plus some other things, but the loss of off-site power is the highest frequency DBA it's dealing with, then you say that SSC should have one train, and another system with redundancy. Now are we dealing with systems or

components there, because it looks like it's all systems to me.

MR. HAMMER: Well, it's system of functions.

MEMBER KRESS: Okay. So if that system is for that frequency of DBA, then it -- then you're saying that defense in depth is maintained if there's one train, and one system with redundancy.

MR. HAMMER: If they're still -- after the categorization you still have one train with redundancy.

MEMBER KRESS: Yeah. It's already classified as low safety significant by the other process.

MR. HAMMER: Yeah.

MEMBER KRESS: So this say now -- now if it doesn't have that, you're going to rethink the classification?

MR. PIETRANGELO: Right.

MR. HAMMER: That's right. You're going to go back and either send it back to the working level group, and say what -- you're either going to keep it at safety significant, or you're going to send it back to say do more work if this is to be considered to be low, and come back to us with why it

is low.

DR. BONACA: These are really the items of RISC-3 have been determined to be low safety significant. And now you run them through this filter here to verify. And those frequency design-basis are the ones from the FSAR.

MR. HAMMER: Right.

CHAIRMAN APOSTOLAKIS: Is it fair to say that this chart and the accompanying arguments compliment the CDF LERF-based categorization? A criticism that has been raised is that we haven't put all the components there just to prevent core damage. There are other reasons too. And focusing on CDF and LERF, you may be missing some other things that, you know, some other function that the component is supposed to perform to prevent minor releases. Is this the answer to that?

MR. HAMMER: Not the total answer.

CHAIRMAN APOSTOLAKIS: Well, what is the additional answer?

MR. HAMMER: The additional answer is, is that there are some -- in the IDP and elsewhere, there are things like the IDP needs, or has the categorization consider such things as late containment failure.

CHAIRMAN APOSTOLAKIS: Which is again beyond design-basis. Isn't it?

MR. HAMMER: Right.

CHAIRMAN APOSTOLAKIS: So for the less severe consequences, this is it.

MR. HAMMER: Right.

CHAIRMAN APOSTOLAKIS: For the beyond design-basis accidents, because the importance measures focus on CDF and LERF, we have an additional defense in depth requirement that looks at late containment.

MR. HAMMER: The IDP or the working level group --

CHAIRMAN APOSTOLAKIS: Which is the defense in depth basis.

MR. HAMMER: Yeah.

MEMBER ROSEN: But ultimately, it's the IDP's responsibility to assure that's taken into account at some level.

MR. HAMMER: That's right.

CHAIRMAN APOSTOLAKIS: Yeah, but that's all given to the IDP. Correct?

MR. HAMMER: Right.

MEMBER ROSEN: What they've done here is moved more towards -- with this change, moved more

towards the way the South Texas process has always worked, with the expert panel being the final arbiter of all changes, all kinds of risk-informed changes in South Texas, categorization changes which are done by a working group, risk-informed ISI changes which are done by different working groups, maybe four, five, six different working groups.

MEMBER WALLIS: Really there's at third axis, which is the consequences. And just looking at this, I'm a little concerned that LOCAs are somehow all of low safety significance. They're actually much more significant consequences than just a reactor --

MEMBER KRESS: Yeah. This seems to say --

MEMBER WALLIS: There's a third axis which is sort of the significance of an event, which isn't shown here. And by lumping LOCAs with reactor trip ups of condenser, you make it look as if nothing associated with LOCAs is ever significant. That can't be true.

DR. BONACA: If I understand this table, the first two columns are purely to deal with existing commitments. They are the SFAR, the accident analysis, et cetera. And to the right -- so they exist the way they are. I mean -- and the consequences are really listed in the SFAR. You know

what they are. They're documented. And here, what you're attempting to do, is to see what kind of requirements should you impose based on the number of redundancies supporting the functions. Okay?

But the question I have is two things. One is, I understand Reg. Guide 1.121 is asking that you consider all initiators, and not only the one listed in this table. Right?

CHAIRMAN APOSTOLAKIS: Yeah, they have a common element.

MR. HARRISON: Yeah, that's correct. This is from the staff. WE're saying since it's a risk-informed process, you need to look at the spectrum of initiators, including like loss of service water, loss of component cooling water. And the design-basis event column needs to be plant-specific, so if your plant has a higher initiator and frequency and it moves it in the category, then you need --

DR. BONACA: I understand the question, but I'm saying that this was put in place to deal with existing commitments in the FSAR - okay - that may be categorized RISC-3, and therefore, you're saying well, let's go run it through this process here now. Now you're including, for example, transient from the PRA that may not be in the FSAR, so why are you doing

that? Wouldn't the previous process already address those functions, the PRA based? Okay. I'm trying to understand that.

MR. HARRISON: Yeah. If you want to hold off that question until we --

DR. BONACA: That's fine.

MR. HARRISON: Because this is a bullet on one of my graphs, as well.

MR. HAMMER: I think this discussion has emphasized the point that we need to explain this chart better, and we've recognized that. We had a meeting with the staff in July, and we had a lot of discussion on this. And we've agreed to expand the discussion in the guideline associated with this, so it's easier to understand.

DR. BONACA: I understand. So the issue will be discussed later on. I have just -- one second issue I have is, my interest clearly is in a guidance that will result in applicants that do this process being consistent in implementation, so at some point to describe how the consistency is going to be achieved. Because I understand, you know, there is an expert panel there that is going to do that, but if the end of the process is that the expert panel would end up with, you know, 40,000 components because they

interpret the process in one way, and another one 2,000 because they interpret it in a different way, then there is no consistency, so you'll address that at some point.

MR. PIETRANGELO: We can address it now if you want.

DR. BONACA: Yes.

MR. KELLY: Yeah. This is Glenn Kelly with the staff. I just wanted to go back one second to the defense in depth matrix. And I think one point that it's important to be clear about is that this matrix is designed specifically to deal with the potential for core damage. It does not deal with, for example, any additional areas and safeguards. It doesn't deal with areas such as you might have tanks that are holding radioactive liquid or effluent or whatever, and any changes in treatment for them.

This is only -- the way this defense in depth matrix is set up, it only deals really with that aspect, like Chapter 25 analysis area in the FSAR. It does not deal with other areas of the plant, necessarily, so I think that should be understood when you look at this.

CHAIRMAN APOSTOLAKIS: Well, what you just said means that you're really not going to get that

information from this that is not already in the PRA. Is that correct?

MEMBER KRESS: This almost says to me though, that defense in depth concept is -- for higher frequency events, you want the function to be more reliable.

MR. PIETRANGELO: Yeah, that's it.

MEMBER KRESS: Well, is the consequences implicit in here in the fact that you've already determined that the potential function is of low safety significance?

MR. PIETRANGELO: Yeah. In the Chapter 15 analysis, I mean there is no --

MEMBER KRESS: Yeah, that's --

DR. BONACA: Oh, no, no. But the point of the function there is purely the one of defense in depth, which means a layer of intermediate safeguards to prevent any -- that's why I asked the question about consistency. I want to make sure -- I would like to make sure that by the time you have a filtering process - okay - you will maintain an accepted level of defense in depth, whatever is going to be negotiated. And not that somebody eliminates the functions in between through this process, and others will maintain them. Not eliminate them. I'm

saying undermine because of the treatment. There has to be some understanding of how you're defining that, otherwise it is not a logical inconsistency between saying that you maintain your functional requirements, and then you don't support them. I mean, it just --

MR. PIETRANGELO: No, we're not doing that at all.

CHAIRMAN APOSTOLAKIS: Just to make it clear in my mind, the first conclusion and recommendation of our letter of March 19, 2002 says, "The criteria used by the IDP for categorizing SSCs should be made explicit, and should include consideration of risk metrics of supplement CDF and LERF, such as late containment failure and inadvertent release of radioactive material." I understand late containment failure is handled somewhere else. Is the inadvertent release of radioactive material handled by this, or there is more that should be done? That's what is not clear in my mind, because we just heard that this is still Chapter 15 oriented, but that's not where all inadvertent releases are handled. This is core damage oriented. Correct? So this is not sufficient to address this concern.

DR. BONACA: We haven't heard --

CHAIRMAN APOSTOLAKIS: No, but this -- if

you look at just this figure, it's still core damage oriented.

MR. HAMMER: And the basis behind that was unless you have a core damage event, you won't get to an accident, you won't get to a release. And there's points being made about tanks and other mechanisms for getting off-site releases, and we still need to address that. That issue has come up, and we need to develop some guidance about whether or not we're going to look at those systems that could cause that such a release.

CHAIRMAN APOSTOLAKIS: But as far as you're concerned, this statement of inadvertent release of radioactive material is handled by this. That's what you just said.

MR. HAMMER: That's right.

CHAIRMAN APOSTOLAKIS: Okay. I'm just trying to understand where people are coming from.

MEMBER LEITCH: Can I talk about a specific example here for just a minute, to make sure I understand. I'm having trouble with the level of abstraction, I guess, in some of the discussion. Take a BWR where the indication of LOCA is high dry-well pressure, and low reactor pressure, so you've got switches that sense high dry-well pressure and low

reactor pressure, which scram the reactor. And typically, there's four sets of switches cranked up in a two out of four budgic arrangement. So I come down this chart to LOCA, and then I say well, I've got a completely redundant train of switches, so therefore, none of the switches are -- or I should say the switches are then of -- an individual switch is of low safety significance. Is that the correct interpretation of what I'm seeing here?

MR. HAMMER: Not each individual switch will be of low safety significance. And in fact, when you described what you said, those four switches, and you say there is redundancy there, but you're going to have to have something in there that's safety significant.

MEMBER LEITCH: Not as a -- I don't know if I understand the answer.

MR. HARRISON: If I can jump in just for a second. This is Donny Harrison again from the staff. I think one of the things to remember again is that this is at the system functional level, so you're not down at the SSC individual component to component. This is saying it's the system function. If those four relays are all in one system providing one function, that's one system. That's not four, so

you'd have to say do I have a diverse automatic system in addition to that, to be able to achieve defense in depth.

CHAIRMAN APOSTOLAKIS: And then you would go later back to the fact that you have falsehoods, and see where --

MR. HARRISON: That would be the optional step in their process. And at that point, you'd have to have --

CHAIRMAN APOSTOLAKIS: This is the course level.

MR. HARRISON: Right. This is the course level at the -- you'd have the option later to come back at the SSC level and say I've got four. Can I argue why I still have defense in depth met by lowering those. And again, when we get to our comments, we have some additional comments we had on the matrix, and just to clarify it.

MEMBER LEITCH: I'm still not sure I understand. To say a redundant automatic system to, in this case, to scram the reactor. And let's say yo have that, not these switches but some other totally different automatic system to scram the reactor, then these switches would be of low safety significance?

MR. HAMMER: There's a function to be

performed, and if they're in one system - okay - that's one function. You need to have something else out there to do the same activity, before you can even think about lowering the safety significance.

MEMBER WALLIS: What's in your box there? What does it mean to be --

MR. HAMMER: It means that if you've said that -- if the panel came up -- if the working level people come up and say it's a below safety significance, and you run it through here, and you actually find yourself in the lower right-hand box, then that's okay for that --

MEMBER WALLIS: I'm just saying having them all in the redundant automatic system in the event of a LOCA is of low safety significance.

MR. HAMMER: No, if it's been determined to be low.

MEMBER WALLIS: Then it's okay?

MR. PIETRANGELO: That's one redundant automatic system in addition to the function you're looking at.

MEMBER WALLIS: But it still seems perverse. Unless I'm misunderstanding it completely. Just because it's infrequent doesn't mean you say you don't worry about it.

MR. HAMMER: No, what it's saying is that if you've reached a determination that it's low, you're confirming that it's low. If you've come in and said that it's high, and you don't then come down here and say well, it's in that bottom right-hand box, so I can make it low. So you're going through the process to start with, and then you say when I come down here, if I've said it's low, do I still have these things available? Okay. Well, we need to do a better job explaining this, and we'll come back to the Committee.

MEMBER WALLIS: I'm sure the staff is on top of all of that.

MR. HAMMER: That's right.

MEMBER LEITCH: This is a test.

MEMBER ROSEN: Checking to see whether defense in depth has been maintained after the categorization has been done.

MR. HAMMER: That's right.

MEMBER LEITCH: That's the point that --

MEMBER ROSEN: This is what -- South Texas doesn't use a matrix. They rely on the IDPs with an expertise to say okay, now that we've made the categorization, does anybody here have a problem with it? And we believe it, and then people talk about

things like late containment failure, or what happens during outages with the containment door open or, you know, a whole bunch of other considerations. But we don't use a structured approach via this. We just rely on the experience and judgment of the panel.

CHAIRMAN APOSTOLAKIS: But being guidance, does this provide a structured approach for --

MEMBER ROSEN: Yeah. So there's nothing wrong with providing a structured approach. In fact, it's a better thing, but it's hard to explain. I don't think they've done a good job on that.

MR. HAMMER: We haven't done a good job both here or in the document. That's what we need to expand on, and then we can come back and chat to you and the staff at a later date.

MEMBER WALLIS: Well, I'm concerned about the philosophy being correct, let alone the chart. Well, I'm probably being stupid.

MEMBER SHACK: Well, I think the answer is they have to meet that function. You know, the question is how many ways do they have to meet it? And what they're saying is for something that's a very low frequency, they have to meet it but they don't have to be able to meet it --

MEMBER WALLIS: Well, I'm saying that's

not right. I mean, the frequency is not the only --

MEMBER KRESS: Something of high risk they have to meet it.

MEMBER ROSEN: Remember what risk is. Risk is frequency times --

MEMBER WALLIS: Frequency can't be the only variable.

MEMBER ROSEN: So it can't be the only variable.

MEMBER WALLIS: You've got to have consequence on another axis, or in --

MEMBER KRESS: Well, that's why I asked if the predetermination that that system has a low contribution to the CDF, already incorporates that dimension. I don't know that it does yet, but it could.

MEMBER WALLIS: Yeah, but it has a low contribution because of its low frequency.

MEMBER KRESS: Yeah. What bothers me is there's no concept of uncertainty in here, where defense in depth, to some extent in a rationalist view is there to accommodate uncertainty in your determination. Now if, for example, I had a system whose raw or Fassell-Valsey fell in the range where it would be low safety significant by the criteria you

have, but suppose that determination or that raw is very, very uncertain. And it could very well be for LOCAs, and the those other low frequency things, the more uncertain these things are.

MR. PIETRANGELO: I think the uncertainty goes up as you go down the column.

MEMBER KRESS: Yeah, so I would say well, I'm so uncertain in this determination, I may want more defense in depth. And this seems inverted to me. It seems like it's going the other way. You know, I want more defense in depth for the things that are highly uncertain, which is the very low frequency things. Yeah, somewhere in there I'm a little confused.

CHAIRMAN APOSTOLAKIS: I think it's really not the uncertainty of the individual contribution. It's the uncertainty that is induced in the overall risk evaluation. And I think the understanding here is that as you go down the contribution to the core damage frequency also goes down. So even though you may be uncertain, you are not affecting the core damage frequency. But that's not proven, because an individual contributor in a typical example is the seismic contribution in some plants, can be extremely uncertain, but the whole distribution is located on

the low axis, so you really don't care, because it doesn't affect the overall risk evaluation. There is no incentive there to reduce the risk, the uncertainty, because it's low anyway.

MEMBER WALLIS: Sorry, George. Low frequency events are inherently uncertain. You have an event that happens every day. You get so much experience that you know what happens.

CHAIRMAN APOSTOLAKIS: That's right. No, I think Tom has a good point, but let's not forget the absolute value of risk, as well. Not just the uncertainty in the contributor. That's what I'm saying.

Now to strengthen Tom's point, actually, you know, the core damage frequency really is determined by those low events at the bottom. So if you are very uncertain about those, then you are uncertain about the CDF itself.

One related question. The columns there, three diverse trains, or one plus one and so on, is that something new that is developed from this guide, or you took it from somewhere else?

MR. HAMMER: We developed it from what we've done in the oversight process. And we took that and then brought it over here as --

CHAIRMAN APOSTOLAKIS: The tables that they give to the inspectors.

MR. HAMMER: Yes. And what we tried to do was to say well, having categorized them, does this confirm that we've got the right categorization?

CHAIRMAN APOSTOLAKIS: So your last row there, in fact, does include -- oh, you say design-basis. Can you also put another row that says beyond design-basis, because these are the PRA events? And say something about defense in depth there?

MR. HAMMER: Okay.

CHAIRMAN APOSTOLAKIS: Because isn't one of the issues, you know, what is the guidance? Anyway, I think we're covering a lot of the issues that the NRC staff is going to raise later, which is good.

MR. HAMMER: Okay. Moving on. We thought it would be worthwhile saying something about the supplemental guidance that we're developing. And initially, we thought we would put the technical basis and the rationale for the categorization process, to really give an explanation of how we got to where we did in the document once it's finalized.

We're probably going to move quite a bit of the technical basis for categorization back into

the main document, but we're still going to have a rationale for the categorization. The document itself has a series of bulletized principles, and we've got about a paragraph or two, or three in some cases, description of what those principles are to help better explain them, and that's what we're going to put in there.

The treatment I've spoken of before is really an expansion of what we had in Rev. B. It's going to go into a lot more detail about EQ, seismic and the application of cold cases. It's going to provide examples. We're also going to rely heavily on the pilots to give us some examples, in addition to the ones that we already had in Rev. B.

The change control process is meant to provide additional explanation for the industry on why they're considering beyond design-basis functions, and how to go about doing that, so it's additional guidance.

MEMBER ROSEN: Is that change control for treatment, or change control for categorization?

MR. HAMMER: It's both. And then periodic review. And really what we look at all of these is kind of a bridging document. What we found in the past is that people have taken guidance documents, and

then owners' groups have gone off and developed sort of some topicals to help their people bridge between the guidance document and developing specific procedures, and so we're trying to do all that in this supplemental guidance document.

MEMBER ROSEN: Is that -- would you call that transition guidance, or guidance from where the plant is today, that wants to go and use this process, how to go about it?

MR. HAMMER: Yes.

MEMBER ROSEN: How to make that transition?

MR. HAMMER: To help them through that transition process.

MR. PIETRANGELO: And I think this piece that Adrian just talked about addresses the point you raised on Monday. RISC-3 SSCs are -- it's not that they're not important. They're relatively less important than the RISC-1. And given that this is a fairly significant initiative, we still think there's a need to develop the treatment guidance for this because it's the first time out doing it. And in particular, in the areas that aren't that amenable to, or aren't amenable at all to more of a performance-based approach to determine whether the functions can

still be performed, so that's why you see the seismic and EQ highlighted here.

And that gives us some assurance that whoever picks this up in the industry has some consistent industry guidance with which to do the treatment.

CHAIRMAN APOSTOLAKIS: Okay. Let's --

MR. HAMMER: There's one more. Just to let you know where we're going in the future. We're not finished with the guideline. Obviously, we just had a discussion on defense in depth which we need to expand on. We will have probably an additional appendix or statement in the guidelines dealing with the technical basis, and that will include the discussion on uncertainties.

As Tony told you on Monday, we're preparing some material dealing with uncertainties. It's still not ripe for sort of public discussion at the moment. We're still not comfortable with it. We'll probably move forward and talk about propagating uncertainties in the document, but we will address it along the lines that we spoke of back in March.

CHAIRMAN APOSTOLAKIS: You said uncertainties with the right parameter. You mean also model. This is really the issue.

MR. HAMMER: We're focusing on parameter uncertainties. As regards model uncertainties, we still have to discuss that internally where we're going with that.

CHAIRMAN APOSTOLAKIS: All right. That I think you should discuss, because that's what the issue is really.

MEMBER ROSEN: Well, George, I think you're ahead of us. I think just getting a good hard, clear discussion of parameter uncertainty, and how to treat it if you're going to do this process will be a step forward. Both in the analysis and the categorization as well as what the expert panel does with the parameter uncertainty --

CHAIRMAN APOSTOLAKIS: But the people on the staff that will determine the treatment don't care what uncertainties you handle. And I think what they really care about is the models. They don't --

MEMBER ROSEN: Well, but I'm saying you've got to start with something easier. Start with and define what to do with parameter uncertainties, and then go ahead and --

CHAIRMAN APOSTOLAKIS: And extremely important to the part of the NEI 00-04, the section where they talk about the sensitivities, the

sensitivity analysis. Because, you know, these are not the controlling uncertainties but, of course, you have to do those first. I don't disagree with that.

MEMBER ROSEN: All I'm saying is that's within the current state-of-the-art. What we're talking about here is industry guidance that hasn't applied the state-of-the-art and how to use it, and all the process.

CHAIRMAN APOSTOLAKIS: But the panel has to worry about --

MEMBER ROSEN: Oh, right.

CHAIRMAN APOSTOLAKIS: I'm not asking them to actually model model uncertainties. I know that's very difficult, but say something, especially in the context of the sensitivity studies, but I think we're going to come back to that.

Anyway, that's fine. Good. Anything else?

MR. HAMMER: The other three bullets is we'll just take whatever input we get from the rule making process in directions on the draft guideline, and any discussions on 99-04.

CHAIRMAN APOSTOLAKIS: Okay. Great.

MR. PIETRANGELO: Before we leave, I'll admit I jumped ahead and looked at some of the

comments that staff has in the draft reg. guide, and these have been discussed at length over the past several months. Mainly, they have to do with the one I'm going to pick on now, is the sensitivity study that's done after functions have been categorized. What's the basis for your factor of -- in your sensitivity study for the failure rate of the low safety significant SSCs? What's your technical basis for that? And I even see, "The reg. guide will recommend an industry-sponsored development of methods to determine appropriate characterization factor." Okay.

CHAIRMAN APOSTOLAKIS: Oh, you have not seen the draft guide?

MEMBER ROSEN: No.

CHAIRMAN APOSTOLAKIS: Oh, okay.

MEMBER ROSEN: We're not going to do a research project to determine what the impact of changes in treatment are. No one knows how to do that. I don't think anybody on this Committee knows how to do that. I don't think the staff knows how to do that, and I don't think the industry knows how to do that.

The real basis for the number that's selected - okay - is that you have to be able to

discern a difference in the performance of the equipment that's low. If you see by a factor of two or three your number of failures of your low safety significant SSCs coming into your corrective action program, Houston, we have a problem. All right? That's going to be apparent, so that factor has to be high enough in that bounding sensitivity study for you to be able to discern it, and do something about it. That's the real technical basis for it.

Now do we expect to see performance degrade to the point we're assuming in the bounding sensitivity study? No. Can we determine the risk impact and delta CDF and delta LERF due to changes in treatment? No. We can't do that up front. We do the sensitivity study.

We will use the 1.174 criteria to look at -- and actually, it's kind of a bastardization of the treatment. I mean, usually you use the 1.174 criteria for actual changes that you are making, not for bounding analysis that one does on a sensitivity study, so it's a little bit of a dilemma for us there. But, you know, no one knows what technically -- unless, you know, if the Office of Research wants to go out and figure what the changes in treatment are going to have on the performance of SSCs, you know,

but we are not planning on a research program to go try to discern this. I think that's too much to ask for Option 2.

CHAIRMAN APOSTOLAKIS: What you're saying is that this final sensitivity that calculates delta CDF and delta LERF is not the sole basis for the decision. One has to bear in mind the fact that there will be a monitoring program that is a corrective action program.

MEMBER ROSEN: Exactly. We tried to separate in our discussions with staff. There's categorization - all right. And this sensitivity study, the real purpose of it is to demonstrate the robustness of that categorization. The treatment requirements that are in the rule, there's enough meat there to be able to discern the performance, and that the functions are still being maintained. All right? But we can't demonstrate through some quantitative analysis that there may be some degradation due to treatment that's going to be small, or within the bounds of the sensitivity study. We don't know how to do that.

All right. We will pick a factor whose basis is you could be able to discern the difference in performance. I mean, we've had that discussion

with staff. I still see the same comment in here. I continue to be puzzled by it, and I just wanted to leave you with that thought before we get down from here.

CHAIRMAN APOSTOLAKIS: Okay.

MR. PIETRANGELO: Thank you.

CHAIRMAN APOSTOLAKIS: Thank you, gentlemen. So what do we have now? We have another hour to go? Do the members want to break for five minutes? Okay. Why don't we take not log normal, meeting in eight minutes. And that will show you the value of model uncertainties now.

(Off the record 10:05:26 a.m.)

CHAIRMAN APOSTOLAKIS: Okay. We're back in session. The staff will now talk to us about Draft Guide 1121. Okay.

MR. HARRISON: Thank you. This is Donny Harrison with the PRA Branch in NRR. And as the Chairman just mentioned, I'm going to go over basically the comments that the staff provided on Draft Guide 1121, even though I don't believe NEI has gotten the draft guide, I don't think anyone has gotten that outside the Committee here. They have received our comments, and they would be reflected as the same, so just to make that clear to the Committee.

CHAIRMAN APOSTOLAKIS: Now when you publish this, you will publish also the draft guide. Right?

MR. HARRISON: Right, that's the intent.

CHAIRMAN APOSTOLAKIS: Both together.

MR. HARRISON: I think the question there is what format the draft guide needs. Can it have an attachment with comments, or do the comments need to be incorporated as staff positions, so that's just a legal question.

CHAIRMAN APOSTOLAKIS: Uh-huh.

MR. HARRISON: This slide just gives a little background of where we're at. We received the latest draft of NEI 00-04 at the end of June. As NEI has mentioned, they've made numerous changes in their approach. They've focused strictly on the categorization. They've removed the treatment. They've incorporated the system functional categorization in the process, as opposed to doing individual SSCs.

We met with them July 10th. We provided them comments a couple of weeks ago, provided comments at the meeting with them in July, but formally provided them to them a couple of weeks ago. We expect that NEI is going to address those comments,

and our expectation is to go through the process, work with NEI, and at the end of the process endorse NEI 00-02 after they've addressed those comments with the staff.

What I've got is I'm going to put up four of the key comments that we made on NEI 00-04 that are listed as comments in the materials you got. The first one is on PRA quality. The staff made a comment in the draft guide that it's desirable for licensees to use a broad scope PRA that would cover internal and external events, that would cover full power shutdown conditions to meet the intent of 10 CFR 50.69.

We're aware that most plants don't have that, so it's a desire, it's not a requirement. At the same time, we plan to use the draft guide that's under development on endorsing the ASME and the NEI 00-02 on PRA technical adequacy for the internal events at full power.

For other modes and for simplified and non-PRA approaches that might be used in categorization, they will still have to have some quality that would represent the as-built as operated plant, and they would have to demonstrate that that's going to result in what I call a conservative categorization process, if you use something other

than a PRA.

As part of that, we've also recommended that the industry develop some guidance on the expectations for the type of quality, the attributes of quality for external and shutdown PRAs, and on the non-PRA analysis that might be used for Option 2.

MEMBER ROSEN: Now let me see if I understand. Would it be acceptable to try to get Option 2 without a PRA at all?

MR. HARRISON: Well, with a -- you still have to have internal events full power PRA as a minimum.

MEMBER ROSEN: And then the next thing this Committee will ask about is, and how good is your internal events PRA? Has it been peer reviewed? And if so, what are the facts and observations.

MR. HARRISON: Right. And that's all part of our requirement, that you would have to have a good quality PRA. The NEI 00-04 refers to a grade 3 PRA.

MEMBER ROSEN: Okay. So this non-PRA approach doesn't apply to the internal events.

MR. HARRISON: No. This is strictly talking -- when I say non-PRA, I really am meaning, to be honest with you, the NUMARC 91-06 approach to shutdown, shutdown and risk management. When I talk

about simplified, in my terminology, that's more of a seismic margins or a FIVE analysis, that mixture. That's really what I'm talking about. How do you address those when you've got the internal PRA at full power. What do you do with shutdown and all these other things?

MR. HARRISON: The second key topic that we had was -- the staff sees this as a very important step, is to show that after you're through a process, that NEI 00-04 refers to it as a risk sensitivity study. It's basically to show that after you've done the categorization, that the results still show that there's an acceptably small increase in risk. And what they do is they're going to adjust the factor of the RISC-3 components by some amount, and the run it through their PRA and see what the results are, and ensure that the delta CDF/delta LERF are small.

I would just say at this point, I think Tony from NEI is over-reading our comment, and for a good reason. I mean, in the past I think we've stated it stronger than it is now. The basis for that factor that you use for the RISC-3 SSCs in that risk sensitivity study, you have to come up with the factor that you're going to use, and there's a couple of different ways you can do it.

One way would be to go out and do some type of engineering evaluation of the treatment affects, and come up with a basis for the factor for treatment. And the alternative is to rely on your feedback and corrective action programs, that they would detect and correct any failures prior to reaching whatever that factor is. So if you use a factor of 3 for your low safety significant components, you've got to then come into the staff, and at least justify that your feedback and corrective action programs are going to be adequate enough that the failures will be detectable, and you will find them before you will have that type of degradation in performance, so that's an alternative. I think that's an alternative NEI has proposed, and the staff is willing to listen to them on.

MEMBER ROSEN: I don't understand why it's an alternative. Reliance on feedback and corrective action programs is something that you're going to do, period.

MR. HARRISON: You're going to do it at some level.

MEMBER ROSEN: Everybody has a corrective action program, and everybody looks at the results, so that's there. The real question is whether you're

going to do a sensitivity study? And the answer is, you really have to. Now the only question is how much are you going to increase the failure rates by?

MR. HARRISON: Right.

MEMBER ROSEN: So to get right down to brass tacks here, you know, South Texas used 10. And if somebody wants to use more or less, they need to say why.

Now one of the things that occurs to me is you could do it parametrically. You know, do a sensitivity study for, you know, two, four, six, eight, ten, whatever, and see if there's any in the curve, and come off of that with some intelligent engineering discussion.

CHAIRMAN APOSTOLAKIS: I think this requirement could be stated a little differently in your DG-1121 to make it explicit that you are not really asking for a technical justification of the factor itself. But the way I understand it, what you want is a justification as to why by doing this, and doing other things, as well, the appropriate level of safety is maintained. So that may include arguments like the ones Mr. Pietrangelo gave us earlier, you know, that we will have a monitoring program, and we'll see this and that. Because if it appears that

you are asking for a justification of the factor itself, you are really asking for something that is extremely difficult to justify.

MR. HARRISON: Right. And the way that the words are conveyed there, it's really to say that if someone wants to spend the time and effort and go do that, they can. If they want to justify it, they can. And what we're looking for is a justification, but that's got to be --

CHAIRMAN APOSTOLAKIS: Yeah, but I'm saying the words have to make that very clear.

MR. HARRISON: Right. We're not forcing the --

CHAIRMAN APOSTOLAKIS: That it's the actions that are important, not just the individual number.

MEMBER KRESS: This concept that Steve just mentioned, seems to me like needs some consideration. For example, you could vary the change in reliability until you find a value which you would say if you get this kind of change, a factor -- this factor change in the reliability of these things, then it's risk significant. So that's the level I want to be sure that I don't hit. And then you could say, all right, how am I going to be sure that I don't

hit that level? And then you could fall back on feedback and things like that and say, there must be a basis and approach. You must look at the reliability -- you must monitor the reliability of these things I change, and give me some assurance over time that they haven't even approached this level that's now risk significant.

It seems to me like that's the way to handle that sort of thing. And it doesn't require you to -- the way you determine the actual change in reliability is by monitoring it over time.

MR. HARRISON: The one thing -- that would be something that I think the staff probably ought to think about. And at the same time, just to be aware in doing this risk sensitivity study, that it's moving the reliability of all RISC-3 components simultaneously. And so then the argument, I think, that the industry could make is that through our corrective action feedback process, you're not going to see a massive move of all components. But then again, you're relying on your corrective action program to maintain that you don't get a collective group moving, because of some type of change in treatment. But no, I appreciate that. I think that's something that we'll take back and think about.

CHAIRMAN APOSTOLAKIS: Now you are not stating anything about the actual categorization process. Is this a good place to make some comments on that?

MR. HARRISON: On the categorization process itself?

CHAIRMAN APOSTOLAKIS: Yeah.

MR. HARRISON: Sure.

CHAIRMAN APOSTOLAKIS: There is a discussion of how one should get Fassell-Valsey in raw, in NEI 00-04. And there is a comment when raw is calculated, that the common cause event should be excluded. Now in your draft guide, you object to that, and you say no, it should be handled somehow.

MR. HARRISON: Right.

CHAIRMAN APOSTOLAKIS: What's not clear to me is whether you are asking them to treat the common cause failure term as a basic event in the PRA, or when you're dealing with a particular SSC, and you say this is down, to go back to the PRA and modify it, including the common cause term to see what the new CDF and LERF are. And if you don't make it clear what you really want.

MR. HARRISON: Yeah. And maybe it's the intent of that comment if it's in the section I'm

believing -- you're probably in that system engineering or component safety significance assessment.

CHAIRMAN APOSTOLAKIS: The risk sensitivity study, I suppose. That's where the --

MR. HARRISON: Well, no. At that point, you're doing the wrong Fassell-Valsey --

CHAIRMAN APOSTOLAKIS: Oh, the component safety significance assessment?

MR. HARRISON: It's over here.

CHAIRMAN APOSTOLAKIS: Yeah.

MR. HARRISON: And what that's doing is you're still at the safety system functional level, so you're at the system level, not at the component level. So we're saying when you're doing that course mapping, and you're figuring out the Fassell-Valsey raw importance of the components, and then you're applying that to say is the system function high that that analysis needs to include the raw for the SSC for the individual components.

CHAIRMAN APOSTOLAKIS: Right. But then at some point, I can go down to the component level when I develop my technical argument now why I should put it in RISC-3.

MR. HARRISON: Right. Then it --

CHAIRMAN APOSTOLAKIS: And it's not clear to me how the common cause failure term is going to be handled there.

MR. HARRISON: Okay.

CHAIRMAN APOSTOLAKIS: Are you still going to treat it as a basic event? For the function yeah, I think it's important. But for the component, it's not clear to me, and I don't think that the argument that raw for common cause events is an unrealistic parameter since it reflects the relative increase in CDF that would exist if a common cause failure condition existed for an entire year. I don't think that argument is a good one, because that's the definition of raw. I mean, if you don't like it, use another measure, because raw -- it's equally unrealistic to assume that the safety related component will be out for a year. And yet, raw says you do it. And also, the lack of realism probably is reflected on the factor of 2 that is the cut-off point. Suggested say - I'm not going to use this term because it's unrealistic, does no good to me.

MEMBER ROSEN: I bring in the argument that we had yesterday about human reliability, that latent errors could, in fact, keep a component out for a year. You think it's in, but it's not.

CHAIRMAN APOSTOLAKIS: That's right. And you don't know.

MEMBER ROSEN: You don't know.

CHAIRMAN APOSTOLAKIS: Exactly. So I think this issue of CCF which we have been discussing now for at least two years is still not resolved, how one would handle that.

MR. HARRISON: Yeah. I think we've resolved it at the system level. We haven't resolved it maybe at the risk sensitivity study level.

CHAIRMAN APOSTOLAKIS: Yeah. And then we have the issue of the sensitivity studies. For example, Table 5-2 of the NEI document, where it says, you know, "Increase all human error basic events to their 95th percentile, decrease them to the 5th, decrease all component common cause events, increase", and this and that. And again, it's not clear. If I do all this, do I take the most conservative result from all these sensitivity studies and declare this is now the basis for the categorization?

MR. HARRISON: That's the staff's position - right - at this time.

CHAIRMAN APOSTOLAKIS: And then if that is the case, it seems to me we should, as a community really scrutinize these sensitivity studies, because

I have the feeling at least that there is a considerable element of arbitrariness there. And especially when it says "increase human error basic events to their 95th percentile value". Well, this distribution probably comes from a particular model, and we know -- we have seen evidence that if one uses another model, the whole distribution is somewhere else. So to say that I rely on one model, and I'm just going from the mean or the median to the 95th percentile, I don't think that we are covering the real uncertainty here.

So if the case is that we will really rely on the maximum, or the most conservative result from these sensitivity studies, then we should take each one of them and ask ourselves whether they make sense. And I've always been a critic of the sensitivity studies, because I think they are pretty arbitrary. And that's why we do a full probability distribution propagation, you know, to get the mean value, and so on and so on, and then have a qualitative evaluation of what, perhaps, has been left out.

For Level 1 PRA the issue of model uncertainty is not that significant. There are little places, except for human error. But when you go to Level 2, because LERF also have to be evaluated.

Right?

MR. HARRISON: Right.

CHAIRMAN APOSTOLAKIS: Then I know that, for example, the state of knowledge dependence of distributions might be important there, like in the interfacing system LOCA. You know, you have broad distributions for the failure of these valves. If you ignore this dependence, this correlation, you may get a mean value that is not really correct. And I don't see any discussion of that. There is a distinction between how you handle the uncertainty in the CDF and LERF.

MR. HARRISON: And I think on the sensitivity studies that those are to address, to some degree, but the uncertainties that we have with the modeling and -- but you are right. You run a different HRA method, you can get a different number and a different distribution.

CHAIRMAN APOSTOLAKIS: Or a different common cause failure maybe. What I would like to see, since this is such an important table, is some discussion, some justification again, as to why these sensitivity studies provide an envelope that is reasonable. And I don't understand why, for example, I should set all maintenance and availability terms to

zero. What insight does that give me? Maintenance unavailability to zero, so that means they're available all the time.

MR. HARRISON: Right.

CHAIRMAN APOSTOLAKIS: What do I gain from that?

MR. HARRISON: That's only a case if it's masking the -- if your maintenance unavailabilities are masking the results.

CHAIRMAN APOSTOLAKIS: And then what -- how does it help me with CDF? What do I learn from that? Isn't that an optimistic thing to do, to say that the unavailability is zero?

MR. HARRISON: I'm not sure exactly how that would be --

CHAIRMAN APOSTOLAKIS: How does that contribute to the envelope?

MR. PERRY: I don't think that's necessarily an optimistic thing to do. I think for some systems, for example, the unavailable in the PRA could be quite high, so by taking it out, you might be masking the failures of those components, for example. I think that it's just --

CHAIRMAN APOSTOLAKIS: But it is conservative. I mean, if you're masking, that means

it's pretty high. If you take it out, then you're doing something that's --

MR. PERRY: No. You're masking the importance of the failures by having conservative values for the unavailabilities. I think all these tests are basically to try to see whether certain of the parameters, which you know are subject to significant uncertainty, like common cause failures, human reliability and unavailabilities could be masking the significance of component failures. That's all it's intended to do, I think.

CHAIRMAN APOSTOLAKIS: In other words, you're saying because a term is very high, I may not appreciate other possible failure modes.

MR. KELLY: Other possible failure modes. Yeah.

MEMBER ROSEN: But then you listen to Garreth, and you say -- he tells you the purpose of doing these sensitivity studies, to try and uncover masked affects. But then the staff turns around and says the astonishing thing, that you use the sensitivities to determine the categorization. This the worst --

CHAIRMAN APOSTOLAKIS: The maximum.

MEMBER ROSEN: The maximum from your

sensitivity studies to determine the categorization. That's astonishing, and unworkable.

CHAIRMAN APOSTOLAKIS: And that's why I really want to see a scrutiny of this table, and what is the basis for this request.

MR. PERRY: I don't understand why it's unworkable.

CHAIRMAN APOSTOLAKIS: Because there's an arbitrary element here, and you're saying well, I do the PRA. I do my best to reflect my realistic state of knowledge, and now you're telling me you make some decisions using some extremes that are fairly arbitrary. I mean, all the failure rates have to be increased to their 95th percentile value.

MR. PERRY: No, that's not in there.

CHAIRMAN APOSTOLAKIS: Well --

MR. PERRY: It's not in there.

CHAIRMAN APOSTOLAKIS: Or human error.

MR. PERRY: Human error is specifically pulled out because it does have the possibility of masking things. Now whether the 95th percentile is the correct thing, or whether we should have some more global thing that spans over all models, I'm not sure. I mean, we take your comment, and that's an issue we can look at.

CHAIRMAN APOSTOLAKIS: Okay. Some type of argument, in other words. Don't just throw the table there and say, you know -- and take the maximum.

MR. PERRY: And while I'm talking, can I address your issue on the interfacing systems LOCA issue and the state of knowledge correlation?

CHAIRMAN APOSTOLAKIS: Yeah.

MR. PERRY: I think you'll find actually that that is discussed, that whole issue is discussed in the statement of considerations. I think where it would come in particularly would be in the calculation of delta LERF, delta CDF.

CHAIRMAN APOSTOLAKIS: Yeah.

MR. PERRY: So it's not forgotten. We go back to Reg. Guide 1.174 where it's also addressed.

CHAIRMAN APOSTOLAKIS: But my point is, I have the impression that a lot of the stuff that's written here is really driven by CDF considerations, because I agree that if you use some reasonable point values in your Level 1 PRA, and especially if you're conservative in your categorization, you're probably doing a pretty good job. But in the LERF area, I'm not sure. I'm not sure whether you can do that, or you should actually go to some distribution.

Now finishing the thought, I thought the

whole point of not doing uncertainty analysis, and doing sensitivities is that people feel it's a burden to get all these distributions and propagate them. But then the next paragraph says that, you know, get these distributions even from generic sources. So the burden is there. In other words, all we're eliminating now is the computer work of propagating the distributions.

MR. PERRY: But remember where in the process you're at though. You're at the process of using importance analyses here. Okay. Nobody is saying that you shouldn't do an uncertainty analysis when you're doing the delta CDF, delta LERF calculation. That's where the parametric uncertainties would be evaluated.

CHAIRMAN APOSTOLAKIS: But when I calculate the Fassell-Valsey in raw, shouldn't I be using mean values? That's really my point. And especially --

MR. PERRY: And probably you are, because most people are. But I'm not sure that in calculating Fassell-Valsey in raw, you get -- you can take into account things like the state of knowledge correlation, for example.

CHAIRMAN APOSTOLAKIS: I need the baseline

LERF in order to calculate raw, and I need to do the change.

MR. PERRY: Right.

CHAIRMAN APOSTOLAKIS: And what I'm saying is that theoretically, one should take the distributions propagated and use the mean value and do that.

MR. PERRY: Right.

CHAIRMAN APOSTOLAKIS: The only step that this leaves out now is this propagation, and I don't see that that -- because you still have to have the distributions to get the 95th percentiles, so the burden is there.

MR. PERRY: But remember, propagating uncertainty to get importance measures is very difficult, as you know.

CHAIRMAN APOSTOLAKIS: Well, I don't want the uncertainty in importance measures.

MR. PERRY: Okay.

CHAIRMAN APOSTOLAKIS: I just want the --

MR. PERRY: But that's what the sensitivity studies are aimed at. And this Table 5.2 is to do with the categorization using importance analysis.

CHAIRMAN APOSTOLAKIS: Right. But the

values I put in the measures have to be mean values, and it's not clear to me that they would be mean values. That's what I'm saying, especially for LERF. Are we going to have another opportunity to meet again at the Subcommittee level on this? All right. Because this is too detailed for a full Committee meeting.

MR. PERRY: Yes.

CHAIRMAN APOSTOLAKIS: Okay. Now one other point here. As I collect data, a lot of these distributions become narrow, so the 95th percentile will leave no difference from the median at some point, and I don't know how that would affect the sensitivity study.

One other comment comes here from the integrated Fassell-Valsey importance integrated risk achievement work.

MR. PERRY: What page are you on?

CHAIRMAN APOSTOLAKIS: Page 32, which I didn't see any comment in the guide, draft guide on these things.

MR. HARRISON: Well, the guidance we gave in the draft guide, or the position we gave was that because of the different methods, and because of say if you're doing a seismic PRA, the level, the degree of uncertainty in that analysis --

CHAIRMAN APOSTOLAKIS: Is different.

MR. HARRISON: -- is much different than say internal event or a fire PRA even, and so that it would be --

CHAIRMAN APOSTOLAKIS: You should go --

MR. HARRISON: -- inappropriate to use an integral assessment of it all.

CHAIRMAN APOSTOLAKIS: So you're not really approving Section 5.5.

MR. HARRISON: Right. We're saying basically that if the seismic analysis shows it's high, and that if you were to do this integral, that the system would be -- system function would be low. It's still high.

CHAIRMAN APOSTOLAKIS: Okay.

MR. HARRISON: And what you need to do in that case is go do maybe better seismic PRA analysis if you want to narrow that down.

CHAIRMAN APOSTOLAKIS: So that's something that you have to settle with NEI, how to do that.

MR. HARRISON: Right.

CHAIRMAN APOSTOLAKIS: Okay. Let's go on. If there's anything else, I'll bring it up later.

MR. HARRISON: Okay. As part of the delta CDF and delta LERF, going back to slide four of the

package, the second bullet there is just dealing with the -- if you're using a simplified or a non-PRA approach, you have to demonstrate that it's not going to have a significant impact on risk. You can't just do the delta CDF for internal events, and show it's small.

CHAIRMAN APOSTOLAKIS: Yeah. This is another point now. The sensitivity studies in Statement 5.2 is repeated as 5.3 with some changes, and 5.4 for fire and seismic analysis.

MR. HARRISON: Right. Now that's not the risk sensitivity study, and I would almost champion that we use a different term.

CHAIRMAN APOSTOLAKIS: It says, "Sensitivity studies for fire PRA."

MR. HARRISON: Right. But those are again on the categorization part of the process. The risk sensitivity state that we're talking about is actually Chapter 8.

CHAIRMAN APOSTOLAKIS: I understand. The categorization. The comment about model uncertainty that they made earlier, I think here is worse. The model uncertainty is a big issue. There are assumptions that are made in the fire PRA and especially when you're doing bounding analysis, and

the seismic PRA, that to say that, you know, take the human error and go to the 5th or 95th percentile doesn't really mean much.

MR. HARRISON: Right. On the topic of uncertainty what our comment has been is to basically go back and read Reg. Guide 1.174, Section 2.5.

CHAIRMAN APOSTOLAKIS: I noticed that, and that was very nice, because that's what we said in our last letter too.

MR. HARRISON: Right.

CHAIRMAN APOSTOLAKIS: So that was really -- I was very pleased to see that.

MR. PERRY: George, can I just add a comment here?

CHAIRMAN APOSTOLAKIS: Yeah.

MR. PERRY: I think the -- what you're looking for is in the other category at the bottom of that table basically. You're talking about the modeling uncertainties. There would be any applicable sensitivity studies identified in the characterization of PRA adequacy. That's where you'd capture the model uncertainties and issues like that.

CHAIRMAN APOSTOLAKIS: Where do you capture them?

MR. PERRY: It's in the last bullet on

each of those tables.

CHAIRMAN APOSTOLAKIS: Any applicable sensitivity studies?

MR. PERRY: Yeah, because that comes from a review of --

CHAIRMAN APOSTOLAKIS: I think we need an elaboration on that.

MR. HARRISON: Yeah. Again, we made a comment on that.

CHAIRMAN APOSTOLAKIS: Huh?

MR. HARRISON: We made a comment on that saying that as part of your technical adequacy determination that you performed sensitivity studies to show that an issue was not -- or that a topic was not an issue, that that then becomes part of that additional sensitivity study.

CHAIRMAN APOSTOLAKIS: But, you know, speaking again of convenience and efficiency here, I really don't think that propagating parametric uncertainty is a big problem. And yet, people make it a big problem. If you tell people to do this last bullet, any applicable sensitivity study, and then you say go read 1.174, essentially you're telling them don't do it, because 1.174 has a fairly high level discussion of the various uncertainties. It talks

about incompleteness. It talks about model uncertainty.

I don't know how an average engineer can sit down and actually do something about them without further guidance, so it seems to me there is a lot of guidance here on things that may not be that important. And things that are important will either be ignored completely, or there will be a major obstacle to the implementation.

MR. PERRY: George, this is Garreth Perry again.

CHAIRMAN APOSTOLAKIS: I know who you are.

MR. PERRY: But I think the -- we're still confusing things between this table, which has to do with the use of the initial categorization using importance measures, and the Chapter 8 which has to do with the delta CDF, which is really where Reg. Guide 1.174 comes into play, I think. This has to do with, for example, if in performing the PRA, the peer review has come up with a specific assumption that was driving the results, then this is where this comment on the sensitivity study would come into play. You would investigate that to see if it had an impact on the initial categorization of the components. I mean, you might revisit that same assumption again when you

were doing the delta CDF but this is -- you know, try and separate the problem of the initial categorization with the final demonstration that the risk is small.

CHAIRMAN APOSTOLAKIS: But, you know, in the categorization process, I think you are telling them that they have to go and read 1.174, so I don't know what the guide can do with that. I remember there was -- it's not clear that you have to worry about these things only when you calculate delta CDF and delta LERF.

For example, Section 2 of the NEI document talks of -- the title is, "Overview of categorization process." And Section 3.2 is, "Use of PRA Information." And then your comment on Section 3.2 -- oh, no, you make it clear. When assessing the increase. Yeah. I still think though that in the categorization process, one has to worry about these things.

Anyway, when you revisit the tables and the sensitivity studies, I think there should be a better justification of these.

MR. HARRISON: Okay. And the final bullet here is just that we recommend that the process that's used to come up with the factor, if it includes some type of analysis and evaluation, or if it includes

reliance on the feedback and corrective action program, that that needs to be elaborated or developed further by the industry, so that there's a consistent approach, if you will, to how we do the determination of what factor to use in that calculation that's performed for delta CDF.

The next slide just has a main topic also. The first one is on the defense in depth consideration. I think we saw the chart before, and our comment basically was that there needed to be more guidance. I think if you had two or three engineers in the room, you get four or five different answers of how to interpret the chart, and that just needs to be elaborated, and clarified.

And just -- I know, Mario, you had asked a question earlier on the chart on the design-basis event where we had made the comment that it should include other initiators that aren't in the design-basis, such as loss of service water, loss of component cooling water. And I guess, part of the staff's comment fell into two categories on that. One is, these design-basis events have been put in a different initiator event frequency category. That's got to be plant-specific. The second part of that was this is a risk-informed process, and so we would

expect you to at least address defense in depth for other initiators, such as loss of service water. And you would still want to consider defense in depth for those conditions.

That may actually end up with a higher initiating event frequency than say the LOCAs or some of the lower events, so it's more of, if you will, making sure that defense in depth is addressed in a risk-informed manner, as well.

DR. BONACA: The reason why I asked that question, I thought that that process already had taken place before through the PRA categorization. And this is just a filter that you come through to review the existing commitments of your FSAR, and to see what kind of level of defense in depth you want to maintain for those. That's why I --

MR. HARRISON: And that may be true. Again, this is a confirmation step, if you will, because it says it's confirming a low.

DR. BONACA: That's the way I understood. In that case I was wondering, you know, are you referring to other initiators from the PRA? I mean, those are dealt with.

MR. HARRISON: Well, you could have something come out low because of its reliability, and

it may be a single point, a single system that's doing that. You would still want to say do I have defense in depth for that initiator, so just trying to expand our thought to make sure that we don't say well, this is design-basis, so we ignored, you know, everything.

DR. BONACA: But if you do that then, you know, the concern that Dr. Kress has pressed before will be --

MR. HARRISON: The consequence element of it.

DR. BONACA: Right.

MR. HARRISON: And we'll take that back from this, as well. And the last bullet that we had here was the fact that the staff has looked at NEI 00-04, and at this time, the staff's position has been to -- if it's determined to be safety significant for any reason in the process, then it should be safety significant, and it shouldn't be downgraded by the IDP, because that's either -- that significance is determined either because of the base PRA results, or it's based on some of the sensitivity studies that are addressing modeling uncertainty at least on some level, or it's because you're using a conservative model.

There was a comment in NEI00-04 that says

well, if it shows up because it has a high failure probability, then the IDP ought to look at that and maybe, you know, think about lowering it. And that's not an appropriate approach.

CHAIRMAN APOSTOLAKIS: Or they could send it back to re-evaluation.

MR. HARRISON: That's the issue. If the IDP has an issue that they don't believe the results, or they believe the results are overly conservative, they ought to be telling the technical team that's putting it together to go back, consider what they, redo the model, come back through the process, and have it be more of a process, not have it be an ad hoc change committee.

CHAIRMAN APOSTOLAKIS: Right.

MR. HARRISON: So that was the focus, and that's why we -- again, if you do a seismic margins analysis, and you're getting very conservative results from that, then it's not appropriate for the IDP to say well, we know these are conservative. Let's change them all. What's more appropriate is for them to say hey, these are more conservative than they need to be. Maybe we need to think about doing something else like a seismic PRA, or at that point, that allows you to do more.

CHAIRMAN APOSTOLAKIS: Okay.

MR. HARRISON: So those were the key -- what I thought were the key topics that we brought forward in the draft guide. I think I want to put up another slide, and this is just to address a concept that I just want to put across. The bottom of the curve is -- in this case for this application it's the capability to identify components as RISC-3, low safety significant. And again, this is concept. The curve is an arbitrarily drawn curve. It may go other ways, but for those plants that are -- this is just a recognition that those plants that are using a limited scope PRA. They're relying on margins analysis, simplified approaches or non-PRA approaches, they can come in through this process and they will get some benefit. They will be able to move some things to RISC-3. Okay? But if they were to go to the other end of the extreme and provide a full scope PRA, do the full analysis for internal and external events for shutdown and full power. Then the staff's view is that their potential benefit, their potential capability to identify things as RISC-3 would be much higher. You'd see a greater benefit for the licensee, and that's just a concept that I want to express.

MR. GRIMES: This is Chris Grimes. I'd

like to add that when we talked to the Committee last, I think when we were describing our coherence efforts, we indicated we've got some language challenges. The term "full scope PRA", you know, has certain meaning to certain people. And for this purpose, this rule really represents the first opportunity to make a substantial change in a regulatory program in a risk-informed and performance-based way. But we also recognize that we want all sources of risk addressed because of that.

Now that can be a full scope PRA, or as we discussed with the Committee on Monday, that can be PRAs in combination with addressing other sources of risk using reasonable techniques. And so we want to develop further some characterizations or some terms that are going to make that distinction.

MR. HARRISON: And this is just a summary. Again, we've made numerous comments on NEI 00-04. It's made numerous changes itself. We expect NEI to address those. WE're going to continue to work with NEI in addressing those comments, clarifying our intent. We'll take back the comments we've received here today. And the goal is that at the end of this process is to be able to endorse an NEI document that can be endorsed with few, if any, exceptions, that we

can come to a common ground on them. That's all I have.

CHAIRMAN APOSTOLAKIS: The request now is for us to write a letter on whether we agree that -- okay.

MR. HARRISON: The request is, as I mentioned, this is really the first significant rule change that the staff has developed in an effort to achieve a risk-informed and performance-based regulatory program.

The staff published draft rule language back in August that included some specific treatment requirements for RISC-3 components. And in the course of developing the proposed rule to deliver to the Commission, we concluded that that approach wouldn't achieve the Commission's expectations for risk-informed regulatory program improvement. Therefore, we've provided to you a rule making package that provides high level treatment requirements for RISC-3 components, and request public comment on this matter because there are still many among the staff who believe that fundamental treatment requirements for RISC-3 are needed to maintain safety.

We do not have all the concurrences in this rule making package yet. There are going to be

some additional conforming changes to the Statements of Consideration, in order to satisfy our general counsel, and perhaps other office's approval of this package.

We are working to complete all the changes in the package in order to achieve concurrence so that we can fulfill our commitment to deliver a proposed rule to the Commission by the end of September. Actually, that's a revised commitment. They originally hoped to get it in July, and because of the developmental work on the guidance documents, and we missed an opportunity. We couldn't come to the ACRS in August, so we committed to provide it to them in September.

We recognize that there are still many questions, as you've just discussed, relative to implementation, but we believe that those details can be better addressed in the context of resolving public comments on our proposed rule, that would integrate the resolution of all of these details about how to implement such a rule.

Consistent with this approach we would intend to continue an open dialogue with NEI and other stakeholders to resolve comments on the guidance documents, the associated regulatory guide that would

implement this proposed rule. And on that basis, we are requesting that the Committee endorse the concept of this rule, so that we can move forward to publish it for public comment, and start a more meaningful dialogue on the details.

CHAIRMAN APOSTOLAKIS: Okay.

MR. HARRISON: That completes the staff's presentation, and we'd be pleased to answer any other questions you might have.

CHAIRMAN APOSTOLAKIS: Do any other members have any other questions? Members of the public? Okay. Thank you very much, and we'll break until five minutes after eleven.

(On the record 11:07:44 a.m.)

CHAIRMAN APOSTOLAKIS: We're back in session. The next item on the agenda is Draft Regulatory Guide DG-1120 and Standard Review Plan Section associated with NRC Code Reviews. Professor Wallis is a cognizant member.

MEMBER WALLIS: The Standard Review Plan and Reg. Guide that we're going to go through today, we first saw in 1998. They were issued in response to Lessons Learned, and to comments that the ACRS have made in this review of 8600, and those two sources recommended that there should be an effort by the

staff to specify what should be in the thermal hydraulic codes.

We reviewed both of these documents in 1998, and we said that the SRP is in pretty good shape, but we need to see changes in the reg. guide. And in response to that, the staff took to heart our comments and made significant changes in the reg. guide, which in the year 2000 we reviewed again, and we said both of these documents are now in good shape. Put it out for public comment.

It went out for public comment, and the significant public comment was from industry, the gist of it was that yes, these are good things, but when we only make small changes in codes, maybe we don't need to go through the whole process, so give us some way of having this burden proportional to the need. And the staff responded to that reasonable request, and they added a section to the reg. guide, which we reviewed as a Subcommittee, I forget when. Fairly recently. July 17th. And our impression at the time was that the review plan had not been changed, so we focused on the changes to the reg. guide which were in response to the comments. Essentially in the reg. guide is Section 5. Section 5 has been added, and we had some comments. And then the staff has responded

to the comments of the Subcommittee in a way which I hope this Committee will find acceptable.

In preparing for this meeting, I was surprised to find that the SRP which we thought had not been changed, has been changed -- maybe just why and how will become clear, by lifting the changes to the reg. guide, and simply incorporating them in the SRPs. Exactly the same words now appear in Section 6 of the SRP, as appear in Section 5 of the reg. guide, which was a surprise to me because I thought we were only reviewing the reg. guide because it had been changed. And actually, the SRP has been changed in essentially the same way. And I'm sure this can all be sorted out, and so I'm looking forward to Norm to help us do that. I don't want to take any more of you time, Norm. Norman Lauben, please lead us through the reg. guide.

I might add that we're really looking forward to these getting out there for use, because we have to review codes. And both the applicants and the staff, and the ACRS will find these documents useful when we do them in reviewing codes, preparation of codes in the case of applicants. It would be very timely to have these documents actually issued in the final form. While you take you time, Norm, I keep

talking. Watch out.

MR. LAUBEN: I think, first of all - am I coming through now? Okay. All right. Jack, did you want to say a few words before I say a few words?

MR. ROSENTHAL: Okay. My name is Jack Rosenthal, and I'm the Branch Chief of the Safety Margins and Systems Analysis Branch of the Office of Research.

Norm and I, and a fellow named Len Ward went up to the Yankee Atomic in 1996 to do that review. And it's six years later, and at this point we think everyone would be better served to get the documents out on the street. In looking over the material, we believe that we have been responsive to the Subcommittee, in terms of their comments.

The guide describes a method for building an evaluation model, and let me remind you, this is for transients and accidents, really non-LOCA. And some of the transients are, by their very nature, far simpler.

I think that the sections I'm doing, phenomena identification, and scaling, and code assessment, et cetera, are straightforward and reasonably non-controversial. The section on a graded approach would be more controversial. And also, how

we approach quantification of uncertainties was an issue to us, and also an issue to the Subcommittee. So although Norm's presentation covers the broad scale span of the development of the reg. guide, the plan is that he'll go quickly through the non-controversial aspects, and then that will give us more time for discussion of the more important aspects.

MEMBER WALLIS: Jack, you already said something strange to me. You said that this guide is aimed at transients which are not LOCA, and yet the SRP and the guide makes quite a few references to LOCA, right on the first page, (reading.) So I don't understand this business of LOCA being somehow different. These codes are going to be used for LOCAs and for other transients, all transients. What is this backing off of -- these codes and the LOCAs are referred to in these documents as if they were a use of the code, as well. And that, I think, was our understanding.

MR. ROSENTHAL: Let's see.

MEMBER WALLIS: The word "LOCA" appears on quite a few of these pages, so it must be relevant.

MR. ROSENTHAL: It does. And I don't -- I think -- let's see. How should we approach this whole thing?

MEMBER WALLIS: Maybe you should make your presentation.

MR. LAUBEN: Well, I'm not sure I want to make it.

MEMBER WALLIS: But you have to.

MR. LAUBEN: I have to. I'd almost say that it's -- a lot of it is just -- let me go through it quickly, and I will get to that. Okay? This was DG -- okay. This used to be DG-1096. It's now DG-1120.

The difference between 1096 and 1120 is the graded approach. That's really the only -- that's the principal difference. I think the outline is obvious background. Many of you are familiar with the contents of DG-1096, the contents of 1120. I think I said what the difference was, and then we'll do a status and summary.

In terms of the background and need, let me just say something about there were really two Maine Yankee investigations. One was the LOCA investigation which was conducted by NRR to address an allegation, and it was -- the allegation had to do with LOCA message. What Jack referred to was the ISAT that Chairman Jackson set up, and which we were to go up there and look at everything except LOCA. However,

that's not to say that the reg. guide isn't applicable to all events in Chapter 15. Indeed, it is applicable to all events in Chapter 15. However, if it weren't for the ISAT part, and the part that looked at non-LOCA things, I'm not so sure that we would need this reg. guide for LOCA, because LOCA is addressed in reg. guide 1.157. It's addressed in the conservative method in Appendix K. And if we were to make changes to update Reg. Guide 1.157, we could do that in the context of LOCA only.

However, there are certain features about this new draft guide, especially including the idea of the hierarchical message that we discuss in terms of co-development and assessment, which is principally a response to your concerns, Graham, about how -- do you have the right things in the code that you're using for the particular application? So in that sense, the reg. guide, yes, it's not just to address transients. However, the first response which was to the ISAT, was indeed to make sure that transients and other non-LOCA accidents are being addressed, as well.

And, in fact, when we were at Maine Yankee, we spent a lot of time on steamline break, which is an accident. We spent also a fair amount of time on non-accidents, but the AOO, Anticipated

Operational Occurrences which are by their definition less benign, unless other failures occur.

MEMBER WALLIS: But clearly, the time you want your code to be really good is when it matters.

MR. LAUBEN: When it matters. So the point about that is that for benign AOOs which are design-basis AOOs, not the risk part where additional failures occur beyond -- you know, that may start out with these anticipated transients, but then with the further failures they become risk significant events. That's not what we're talking about.

MEMBER WALLIS: Could I add another need here?

MR. LAUBEN: Sure.

MEMBER WALLIS: In my introduction I said that these were introduced in response to Maine Yankee Lessons Learned.

MR. LAUBEN: Yes.

MEMBER WALLIS: Also, to concern to the ACRS.

MR. LAUBEN: Yes.

MEMBER WALLIS: And the ACRS saw a need to tighten up and make clear the requirements for these codes.

MR. LAUBEN: Okay.

MEMBER WALLIS: And I see your documents as being quite responsive to our concerns.

MR. LAUBEN: Right. Now the difficulty probably comes in when we start to think of something like a degraded approach, which was a response to industry's concerns. And I think this is a new concept, and probably it's not as easy for us all to deal with. But let me just say then that in terms of what we looked at at Maine Yankee, the things that were more difficult were the non-LOCA accidents, steamline breaks and things like that.

What we decided was, because the industry very much doesn't want to have their plants compromised or threatened because of simple events, they do a pretty good job when it comes to these non-threatening events. They spent a lot of time on it because due to normal operations or simple transients, they don't want to see their plant compromised. That's an economic reason, as much as a safety reason, and that's understandable. So they spent a lot of time. It may be with tools that we don't think are very modern all the time, but I think they do a pretty credible job, and they were anxious to show us how they handled these things. But we then, on the other hand, had to respond to did they do as good a job, or

as, you know, a sufficient job on the non-LOCA events. And NRR, as part of their investigation, looked at how do they do when it comes to LOCA events?

And these are the -- the accidents have more severe consequences. The accidents also turn out to be more complex, and so it wasn't surprising that we would have spent more time on the accidents, in terms of our concerns.

MEMBER WALLIS: You can presumably use it for lots of cases, such as beyond design-basis.

MR. LAUBEN: Okay. All right. And that -- but usually for beyond design-basis, it means you have to have something more than the simple design-basis codes that you are using for the non-threatening events, for the simple events. In other words, the fact that you may have a loss of feed water, it becomes more significance if you have a loss of feed water, and then something else. And that requires a more sophisticated code than just the loss of feed water.

MEMBER WALLIS: Why does it require more sophisticated codes?

MR. LAUBEN: Because you now encounter phenomenology that goes beyond the design-basis. If the design-basis shows a simple transient that's not

threatening to the fuel, non-threatening to the vessel, doesn't cause two phase flow to occur, then it -- it is because when they calculate the transient with their design-basis codes, without the additional failures, the transient is simple.

MEMBER WALLIS: Well, Norm, I think that the principles are laid out in the standard review plan.

MR. LAUBEN: Yes.

MEMBER WALLIS: The principles are rigorous basic equations, and then saying what your assumptions are and all those things, apply to any of these codes. Would you agree to that? It doesn't really matter what the application is. You still have to do a reasonable job of deriving, explaining and using the code. Maybe for some applications you need to add things.

MR. LAUBEN: Yes.

MEMBER WALLIS: But the principles that you've laid out in these documents still apply.

MR. LAUBEN: Okay. Yes. That's especially true if you're going to change any one of the five categories that we listed in Section 5 of the revised reg. guide. That is correct. But in general, just -- okay. Just because a set of analytical tools

is old, doesn't necessarily mean that it can't address what it is attempting to address. And I'm saying that for simple transients that are non-threatening, even though we say oh, my God, this is 40 years old. This must be terrible by definition, that's not necessarily the case. If it can address the simple cases, then it's okay. Okay.

MEMBER LEITCH: Dr. Bonaca, I think I need to declare a conflict of interest at this point. I was an office of Maine Yankee at the time this ISAT team was investigating up there. And although I was not deeply involved with this particular part of the process, I think I should recuse myself from this discussion.

MEMBER WALLIS: Well, as the Subcommittee -- I'm a little perplexed by you, because really ISAT had very little to do with these reg. guides. There's no reference to Maine Yankee itself in any of the documentation. We're talking generalities about codes.

MEMBER RANSOM: You don't really have a conflict.

PARTICIPANT: Yeah, I don't think -- well, that's okay.

MEMBER WALLIS: Okay. Let's move on. But

I'm surprised. There's nothing about Maine Yankee.

MR. LAUBEN: I think you've seen the contents of DG-1096. We've discussed it here. I don't think I need to go through slides 5 and 6.

I think that it's important, just to go over the principles of the -- remember, Chapter 15 talks about the specific transients, as well. Chapter 15 describes the specific transients, and what they -- you know, there's many subchapters in Chapter 15 that address transient classes, and what is expected in terms of figures of merit, which related to the general design criteria and stuff like that. That's for the specific things. But this is a new -- this is related to the new Subchapter 15.0.2, which says we think you ought to formalize your thought process in terms of how you address transient and accident methods that are required to do the transients that are listed in Chapter 15.

So the first thing is to determine requirements of the evaluation model. And by the way, there seemed to be some confusion about evaluation models in the comments that I saw. My feeling here, my intent here always been that evaluation models should be as defined in the reg. guide, not what somebody's common usage may be of the term. And that

definition in the reg. guide comes straight from 50.46. This is not a new idea. The ideal of evaluation model in 1988 was that it was exactly as we've talked about in the reg. guide. This is not -- before 1988, because of the only kind of things that used the concept of evaluation model was LOCA analysis with Appendix K. There seemed to be a merging of those concepts.

Well, in 1988 when the rule was changed for LOCA, the concept was generalized there to mean both the conservative method described in Appendix K, and the realistic method required, or the realistic option that was described in the revised rule.

MEMBER WALLIS: Really, any computer code or something put together to evaluate a transient.

MR. LAUBEN: Or set of computer codes, or set of procedures.

MEMBER WALLIS: It's a generic term.

MR. LAUBEN: It's a generic term and that's what we certainly meant here. If there was some confusion about the way people use that term, you know, I --

MEMBER WALLIS: There isn't a confusion any more.

MR. LAUBEN: I hope not. Okay. All

right. So then it -- the idea in the first principle is that you should do something, including an importance determination of what's important in the transient, and then develop an evaluation model that meets the requirements of number one.

Number three, is that obviously you need an assessment base. And the assessment base should also be consistent with the requirements that you had in Part 1. And then assess the -- four is to assess the evaluation model. And this comes in large measure from CSAU. This is not unique.

The principles that were outlined in CSAU are not unique to LOCA. They can be -- in principle they are useable in any kind of transient or accident that you may have to analyze. And then, of course, five and six are -- I think we all realize the importance of quality assurance and good documentation.

MEMBER WALLIS: So if I could just paraphrase what you've done, what I see you've done is you've taken these principles. You've expanded on them in he reg. guide so they go into more detail specifics in a way which is most helpful to the applicants.

MR. LAUBEN: Yes. I think the point that

should be mentioned is that CSAU was originally done as a demonstration that you can do best estimate analyses, evaluate the uncertainties, and come up with an answer that has some degree of conservatism based on that uncertainty analysis. But isn't something that requires all of the conservatisms that are laid out in the 40 principles of Appendix K, or the 40 requirements in Appendix K. So this is -- and it's a more risk-based idea, I think.

Okay. And the other thing that I think was the principal change from CSAU to this reg. guide was the idea of the decomposition, the hierarchical decomposition so that you made sure that the basic things that you have in the code, or the evaluation model make sense in terms of what you're trying to analyze. And this was in response to the things that you uncovered, Graham, I think, and also others that had to do with the review of reprint. So that was a principal addition to this whole reg. guide, which was different from CSAU. Because CSAU really said hey, the development is over with. We now have a code that is developed, but we want to show that it's possible to do a code uncertainty analysis and come up with an answer.

Okay. So then we took this to the public.

The public comments were -- it seemed like this was fine for complicated transients. This was fine for things like LOCA, but for simple things, simple changes, they thought that it was over-kill, so that's why we made the changes.

Now the changes that are listed on slide number 9 are the changes that were made to the reg. guide.

MEMBER WALLIS: Most of them are very small, aren't they, except for the first one?

MR. LAUBEN: Most of them are small. There's the addition of Section 5, which was the graded approach. I don't think I need to go through these additions.

MEMBER WALLIS: Unless the Committee wishes.

MR. LAUBEN: Yeah. I don't think so. I think we -- okay. Now what did we do --

MEMBER WALLIS: About the only thing you didn't do is correct about four typos in --

MR. LAUBEN: We'll get back to the new author when he comes back from vacation.

MEMBER WALLIS: No, but you did a good job of cleaning up the details.

MR. LAUBEN: Okay. Yeah.

MEMBER WALLIS: And then you added this new section, which maybe we want to hear about a little bit.

MR. LAUBEN: Yes. And we took out -- in response to the Committee comments, which have the new section in it, we took out the risk part. The idea being we weren't -- your comment, Graham, was we're not sure how you would do this risk part anyway. And when we thought about it, how would we concretely address the concepts of risk if we were going to, in terms of simplification of a graded approach. And we said no, and really you do have to do some kind of uncertainty no matter what, whether it's -- hopefully, a lot of this simplification comes out of the fact that the transients are simpler, or the changes are simpler. And this should be a fairly natural thing that would come out of that.

MEMBER WALLIS: I guess my comment which was if you're going to talk about risk, you need to talk about it in more detail. You need to talk about the model uncertainties, the fact that the code is getting wrong or a lousy answer, this has an impact upon decisions which you might make about whether or not something is risky, and how risky it is. You get into an area there where we're not really ready to do

things. We're not really ready to put model uncertainty into the PRA, so if you're going to say anything, you need to say more. Maybe you shouldn't say anything, because we don't quite know how to say it yet.

MR. LAUBEN: We opted to say nothing. Let me just say something about risk, and the design-basis events. In a certain sense, the guidance, or the regulation, Appendix A, which is the GDC. The GDC are in a way risk-based in the following sense.

Certain of the GDC are meant to address the simple transients, the AOOs that occur more frequently. And they are, if you will, more restrictive requirements. And they are more restrictive because, you know, you want to have defense in depth in a way, and I don't think defense in depth in this way is inconsistent with the risk philosophy. So the idea that you would want to have less damage to the cladding, you would want to have less threats to the vessel, are contained in the idea of in the more frequent events, the anticipated operational occurrences, you want to reduce that threat. So I think that's there for the accidents which occur, which were thought at that time, and still believed at this time to occur much less often.

The GDC allows you to have less threatening, or I should say more threatening consequences to the accidents. So this is -- if you look, there's GDC 27, 28, and some of those which apply to the non-LOCA accidents, are different from GDCs 10, 15, and 20 which are for the AOOs.

MEMBER WALLIS: I think the upshot is that you want to remove this very short two lines on risk from the document.

MR. LAUBEN: Yeah.

MEMBER WALLIS: This is where we had this confusion at the beginning.

MR. LAUBEN: Okay.

MEMBER WALLIS: I think they saw that in the SRP. They put it in --

MR. LAUBEN: The SRP didn't do that. Right.

MEMBER WALLIS: Now I understand it's in error.

MR. LAUBEN: No, it's just the one didn't catch up with the other.

MEMBER WALLIS: No, I think one didn't catch up with the changes you had already agreed to make.

MR. LAUBEN: But NRR was aware of that,

and they --

MEMBER WALLIS: I'm not sure if they were of any of these changes.

MR. LAUBEN: No, I think they were, because I talked to Mark yesterday or the day before.

MEMBER WALLIS: Well, they weren't aware of the inconsistency.

MR. LAUBEN: And I talked to Ralph also about this.

MR. CARUSO: This is Ralph Caruso from NRR. We knew that there were changes that were being made. I don't believe we had actually seen the detailed words, but there was always -- it's always been clear to us that the two documents should proceed together. And that's why you saw the change that was made to the SRP to reflect the change that was made to the reg. guide in the area of the graded approach.

We want to try to keep the guidance to the reviewers the same as the guidance to the licensees. And we want to keep the wording, as much as possible, identical, because we have many controversies over minor changes in wording, and just try to minimize that amount of controversy. So the SRP will be updated to reflect the final wording of this particular area that is in the reg. guide. The reg.

guide has got the lead in this area, and the SRP will follow.

MEMBER WALLIS: Now remind me. The reg. guide is going out for public comment. The SRP is not. Is that the case, although you've made the same changes to the SRP.

MR. CARUSO: Well, I guess we'll have to go back and reconsider that. Considering the comments that we're getting today, it probably would be a good idea to send it out together with the -- to send the SRP out together with the reg. guide for public comment.

MEMBER WALLIS: My comment personally is that in response to Subcommittee concerns, you have done an excellent job of crafting language which is clear, and allows sufficient definition of some principle, but also allows reviewers sufficient flexibility and common sense, and experience and so on, in the way in which they apply these principles.

MR. CARUSO: Thank you.

MEMBER WALLIS: Someone has done a good job, is my personal view, of crafting the document to about the right level of specificity.

MR. CARUSO: Thank you very much.

MEMBER WALLIS: While not losing the

principles involved. That's just my personal view. So maybe we should jump to

MR. LAUBEN: The graded approach.

MEMBER WALLIS: Slide 13.

MR. LAUBEN: Yeah. Right. This is the graded approach which was developed in response to the industry concerns. And there are four attributes there, I think, that you notice. There used to be five, now there's four. Risk is gone from the list of attributes.

One of the attributes that one should consider is the novelty of the revised evaluation model. The complexity of the event being analyzed. The degree of conservatism, and I think we just can't get away from the fact that if you're going -- you can't just raise your hand and swear this is conservative. You have to do some assessment. Hopefully, it should be a lot simpler if the event is simpler, and the changes are simpler. So it doesn't -- I think we got burned an awful lot in the LOCA experience last year when everyone said ah, but Appendix K is so conservative. I mean, how can you stand there and say Appendix K is not conservative?

Well, Appendix K may be conservative in the requirements, but that doesn't mean that the

evaluation models, they're developed in compliance with Appendix K, because they have many other things, besides the 40 things that are in Appendix K that you have to do. And since Appendix K models did not account for things like down come or boiling, we found that in some circumstances, if you remove conservatism from the model, you may not be overall conservative, so you do -- I think we've learned that lesson.

And the lesson there is, you've got to do some assessment of conservatism that's realistic. It can't just be I believe, and that this is conservative. So I think that --

MEMBER POWERS: Go ahead and finish.

MR. LAUBEN: Okay. So that's -- okay. Then the third thing is the extent of any plant design or operational changes. If you can show that you're still within the region that you assess the code for, that the code was approved for, that should be -- you shouldn't have to require a reassessment of the evaluation model.

MEMBER POWERS: Yeah, but how do you know -- what are the degrees of complexity? I mean, how do I answer what the complexity in the main bend is?

MR. LAUBEN: Okay. I think that this is trying to look at a design-basis event for a simple

anticipated operational occurrence, for which the analysis would show a fairly benign transient. It stays two phase. There is no DNB. The DNB ratio is still high. The pressure only changes by 2 percent in the plant. There is no boiling that occurs. The power may only change by as little as 10 percent, and it may be for only a brief fraction of a second, or a few seconds. That what your analysis shows is that the event is benign. And if you make a small change, and the analysis show the event is still benign, this also -- also what you -- it doesn't require a complicated thermohydraulic analysis to determine what the -- to measure the thermohydraulic behavior. It may be something for which you have plant data, for instance, on a pump trip or something like that, that you can use as a boundary condition in your analysis. This is what I mean by a less benign or a less complex event.

MEMBER POWERS: I think I understand the last one, that is I have data, plant data for the event.

MR. LAUBEN: Right.

MEMBER POWERS: I mean, a complicated thermohydraulic analysis, if I have to get it past Mr. Wallis, all thermohydraulic analyses are complicated

if I have to do them.

MR. LAUBEN: Okay.

MR. ROSENTHAL: May I offer a comment. And Norm and I, in talking about this -- and he used the words at the very beginning of his presentation, and what it does, this reg. guide asks the analyst to think. And it asks the analyst to think in a structured manner, and to document that thought process. And we would expect that the analyst would figure out that for a pump trip, that the pump coast-down is the dominant phenomenological issue. They're required to identify what the key phenomenon are, and make sure that they get those right. There's no substitute for good analysis, and good thinking.

MEMBER WALLIS: You know, I think the word "complexity" is the right one, rather than benign. And it really -- complexity really is a measure of the information you need to describe something, in terms of bits, if you want to go that far. But in terms of thermohydraulics it's the number of the phenomena, and the range of those phenomena. And if you simply have a small break in the pipe, and all that's happening is you're boiling off some -- maybe a simple mass balance, a one node analysis of the core will work, so you've got a simple event. You don't need to be too

precise in your analysis. There are certain events where you need much more complicated approach. Isn't that the thrust that you have there?

MR. LAUBEN: Yes. And the point really, I think, is that for less complex events, if you do the thinking right, as Jack was saying, you will find out that there's -- you need to be a lot less complicated in how you analyze the events.

MEMBER WALLIS: In fact, that may be a better way to analyze it, in spite of what Dr. Powers says about my propensity. I would welcome if the event is simple, a simple analysis which explains what's going on, rather than fogging everything up with a code with 2,000 nodes and all the kind of stuff, giving you -- where have all kinds of other uncertainties introduced because of these new things, which may not be relevant to what's really happening.

MEMBER POWERS: You made it complicated for me already.

MEMBER WALLIS: So I think this is an appropriate statement. And I think it's appropriate that you leave the interpretation up to the reviewer to decide whether the level of analysis is really matching up with the complexity of the event. You don't try to get too specific about what you mean.

MR. LAUBEN: I think so too. I think it's -- especially since this graded approach is new, I would hate to get too specific about it.

MEMBER WALLIS: This means that the reviewer has to be really sharp and experienced, and know when the complexity is there, and when it isn't.

MR. LAUBEN: That is correct. I think all of this depends upon developers, users and reviewers being reasonably capable.

MEMBER WALLIS: Yes.

MR. LAUBEN: This is just --

MEMBER WALLIS: That's really the same thing in a different view.

MR. LAUBEN: It is.

MEMBER WALLIS: So do we need to go over that?

MR. LAUBEN: No, I don't think so. I think the properties are the same as what was on the previous page. It just shows that you may -- you have a full application on one side, and on the other side a minimum application. And it really says the same thing.

MEMBER WALLIS: And the next two slides about conservatism you really addressed already, I think.

MR. LAUBEN: I hope so. I think you do need to -- right. Okay.

MEMBER WALLIS: So can we go to slide 17?

MR. LAUBEN: Sure. Okay.

MEMBER WALLIS: I think the only important word on page 17 is timely.

MR. LAUBEN: Yeah. Let's see. Where is it? Oh, second - okay. "Timely inclusion of current ACRS comments is the next step in the process." Okay. You saw the slight revisions that we did. The question would be do you feel that they're sufficient. And if we need to address this --

MEMBER WALLIS: The only thing I'm sort of bringing up here, and I'm ready to move on, was that I think there is a point that some of our consultants made, is that the problem with having something like a graded approach where you say well, if the evaluation model isn't very new compared with the currently acceptable models, you don't really have to do very much, and so on. There may be an inhibition about improving the model. The currently acceptable model is to devote K for so many things, then there may be an inhibition about improving the model.

MR. LAUBEN: I think that will always be the case in the context of --

MEMBER WALLIS: Well, I think I would just give you the example that we're up against now with something like, I can mention the word RELAP.

MR. LAUBEN: Yeah.

MEMBER WALLIS: Now RELAP has gone through a whole evolution over about 30 years or something.

MR. LAUBEN: Sure.

MEMBER WALLIS: And you go back to the days of the 70s when we were arguing about Framatome equations and all that stuff. And people put something into RELAP because they had to put something in there. Now does it mean that's cast in stone for the next century, or can we improve it?

MR. LAUBEN: Well, I think Vic will tell you that RELAP since RELAP V is a brand new code.

MEMBER WALLIS: It's a brand new code, so we have to look at these things again.

MR. LAUBEN: No, no, no, no, no. It started with RELAP V, what, 20 years ago? It started with a clean sheet of paper.

MEMBER WALLIS: Vic and I are debating this amongst ourselves too.

MR. LAUBEN: Okay.

MEMBER WALLIS: But it seems that if there is something which we all knew at the beginning about

RELAP, was something which functioned okay then, but we realized that it could be improved. And that for a realistic model, as opposed to Appendix K model, it really ought to be improved. And we don't want this graded approach to -- applicants to come back with some of these graded approach arguments and inhibit improving the model, simply because it's old, and established, and has been accepted in the past.

MR. LAUBEN: Actually, I think that the reality these days is that people are applying for models that are new and substantially better. If you look at what they're doing with TRAG-G for both the LOCA and non-LOCA, you know, that is -- I think what they are realizing is that if you use modern computer codes, that there's an advantage in that you can get things -- you can actually accomplish what you want to accomplish in a more rigorous and quicker, so they're using TRAG-G for -- they're proposing to use TRAG-G for both LOCA and non-LOCA events.

I think the same is true with the work that's being done now with RELAP V for Framatome. I think for both --

MR. CARUSO: Norm, let me jump in here.

MR. LAUBEN: Yes.

MR. CARUSO: I'll just make an observation

that in NRR we're seeing more code reviews being done, and what's driving it is economics. And it's economics on several -- addressing several issues. First, economics to reduce margins. Okay? Second of all, economics in terms of automation of the analysis process, because the old methods involved a lot of small codes that had to be -- where data had to be transferred manually from one computer code to another computer code. There was a lot of opportunity for error there. There was a lot of manual handling that costs money.

In addition, you find that people are smarter because of the research that's been done by industry, by NRC, by EPRI. We know how to do things differently, and they want to take advantage of that. And it -- I'm not really too concerned about the old codes sticking around. If they establish the baseline, and we're comfortable with that baseline, it can sit there. But if somebody wants to do something differently to improve the way things are done for an economic benefit, then they are going to use these new methods. That's really what we are seeing is driving the new methods right now.

MR. LAUBEN: Right. I put an example of analysis package that Yankee had based on old methods.

And I think what Ralph is saying it may be a lot easier to use one or two codes, instead of eleven codes and processes just to look at a few events.

MR. CARUSO: One of the vendors --

MR. LAUBEN: So I think that's economics that drives it.

MR. CARUSO: One of the vendors, I can't say who it is because it's proprietary, and tends to use one code for both reactor and containment analysis - okay - in a combined fashion. And they intend eventually to take that through, and use that one code for also neutronics. They're doing some neutronics analyses using a separate code right now, but eventually they want to get to the point where they have one model with one code, and that will tell them how the entire thermohydraulics and neutronics interaction takes place. And what's supporting all this is the fact that computers are getting faster and cheaper, so you can do it better. You can do it cheaper, and that's what's driving it.

MR. LAUBEN: And you can do it better. That's --

MR. CARUSO: You can do it faster. You can do it better. You can do it cheaper.

MR. LAUBEN: Right.

MEMBER WALLIS: And moreover, if you have better physics, then you probably have less uncertainty. And therefore, you can reduce margins.

MR. CARUSO: Yes.

MR. LAUBEN: That's right.

MR. CARUSO: And it's happening.

MEMBER WALLIS: Don't forget the better physics part.

MR. LAUBEN: No, that's right. That's better. That's the better part.

MR. CARUSO: As I said, this is because of research that's happened at universities, at NRC, in industry to do things better. They developed better methods.

MEMBER WALLIS: Thank you. And now do my colleagues have questions or points you want to raise?

MEMBER RANSOM: I only have a comment, and that has to be do with the graded approach. And there are numerous examples from the past where, you know, a more complete analysis has revealed inadequacies in simpler models, and so there is a danger in always going simpler.

I think the simpler may be useful for identifying the components of the overall phenomenon, but it may not be good enough to reveal the details,

which sometimes can be important.

MEMBER WALLIS: Yeah. My rule of thumb is you should always go one level of sophistication beyond what you need in order to check that you've gone far enough.

MR. LAUBEN: I think the problem that we always -- and this is -- I know it's not always looked up favorably, but one of the things we don't want to run afoul of is backfit problem. And I think that's what the industry --

MEMBER WALLIS: Unless they are necessary.

MR. LAUBEN: Well, unless they're necessary. Then you do rule making. Yeah. Right. But I think that's really it, Vic, is that -- I agree with you. It's better to do a better job. I think everyone realizes that.

MEMBER RANSOM: I think this move towards using a standard good tool actually is the right way to go. You accumulate more knowledge and that sort of thing, and more confidence in it in time, and greater --

MR. LAUBEN: And I think that at least as far as LOCA, and to some degree transients in the case of TRAG-G, every vendor is going to have available to them a better tool. Framatome will have a better

tool. Westinghouse has better tools. GE GGNF has better tools, so I think that's -- I think, in truth, the trend is going in that direction. Okay.

MEMBER WALLIS: It's now 12:00. We've gained some time, unless -- this is a very tough Committee. They always ask so many questions, it's going to go into its usual mode. You're going to fix up the details, such as asking for comments by February 15, 2001 on something which is issued in September 2002. And you're going to fix a few typos. And then if the Committee likes the rest of the document, we look forward to its eventual emergence as a real document and its use. Thank you very much.

MR. LAUBEN: Thank you.

MEMBER WALLIS: This has been very helpful. Any other member of the staff wish to say anything more at this point? I'll hand it back to you, Mr. Chairman.

CHAIRMAN APOSTOLAKIS: Thank you, Graham. The next item will be the Subcommittee for Plant Protection, which was done yesterday. And we were planning to have the Committee give advice of the 50.69 letter. We're scheduled to restart at 1:30. I wonder whether we should start a little earlier than that, because now it's 12. And it's essentially

Committee activities after lunch, so I'm not even sure we need the court reporter. Right? We do not. There's plenty of time. We have plenty of time.

MEMBER POWERS: We're doing the research report, and we always do it as the last thing on the last day.

CHAIRMAN APOSTOLAKIS: Tomorrow at 12.

MEMBER POWERS: About 12:00 tomorrow.

CHAIRMAN APOSTOLAKIS: No, there is --

MEMBER POWERS: Can we go off the record and talk about this?

CHAIRMAN APOSTOLAKIS: Yeah. We are off the record now.

(Whereupon, the proceedings went off the record at 12:03 p.m.)

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: 495th Meeting Advisory Committee on Reactor Safeguards Materials

Docket Number: N/A

Location: Rockville, Maryland

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.

/s/ Matthew Needham

Matthew Needham
Official Reporter
Neal R. Gross & Co., Inc.

Draft Regulatory Guide DG-1121

Guidelines for Categorizing Structures, Systems, and Components in Nuclear Power Plants Accordings to Their Safety Significance

DG-1121

Endorsement of NEI 00-04

- Received NEI 00-04 Draft Revision C on June 28, 2002
  - Numerous Changes in Approach, Including:
    - Focused Entirely on Categorization
    - Removed Guidance on Treatment
    - Incorporated System Function Categorization in Process
- Met with NEI to Discuss NEI 00-04 on July 10, 2002
- Provided Comments on NEI 00-04
- Expect NEI to Address Staff Comments
- Will Endorse NEI 00-04 When Finalized to Address Staff Comments

DG-1121

Key Comment Topics

- PRA Quality Attributes
  - Desirable for Licensee to Use Broad Scope PRAs
    - Internal and External Events
    - Full Power and Shutdown Conditions
  - Use of ASME or NEI 00-02 as Endorsed by Staff in DG-1122 for Internal Events at Full Power
  - Use of Simplified or Non-PRA Approaches (e.g., FIVE, Margins, NUMARC 91-06) Must Represent Plant Conditions and Be Demonstrated to Have Conservative Categorization Results

DG-1121

Key Comment Topics (continued)

- Risk Impact (ΔCDF/ΔLERF) Due to Changes in Treatment Must be Small
  - Basis for Factor Used for RISC-3 SSCs in Risk Sensitivity Study
    - Pro-active Engineering Considerations of Reduced Treatment
    - Reliance on Feedback/Corrective Action Programs
  - Use of Simplified or Non-PRA Approaches (e.g., FIVE, Margins, NUMARC 91-06) Must Be Demonstrated to Not Significantly Impact Risk Sensitivity Study Results
  - Recommend Industry-Sponsored Development of Methods to Determine Appropriate Characterization Factor and Associated Monitoring and Feedback Processes

DG-1121

Key Comment Topics (continued)

- Defense-in-Depth Considerations Need to Be Articulated More Clearly
  - Interpretations of NEI 00-04 Figure 6-1
- If SSC Identified as Safety-Significant for Any Reason Cannot Be Downgraded By IDP
  - Base PRA Results
  - Sensitivity Studies
  - Evaluation/Modeling Conservatisms

DG-1121

Summary

- NEI 00-04 Draft Revision C Contains Numerous Changes in Approach From Prior Drafts
- Met With NEI and Provided Numerous Comments on NEI 00-04
- Expect NEI to Address Staff Comments
- Staff will Continue to Work with NEI
- Expect Final Version of NEI 00-04 to be Endorseable with Few, if Any, Conditions/Exceptions

Development of NEI 00-04 Rev. C

ACRS

September 13, 2002

NEI

Development of NEI 00-04

- Project started in 1999
- Initial drafts based on early regulatory interactions (2000)
- Rev B based on NRC comments and input from pilot plant preparations
- Rev. C incorporates pilot plant lessons learned & NRC IDP observations
- Guideline development will continue through rulemaking process (2003)

NEI

NEI 00-04 Rev C Changes

- Functional categorization process
- Change in emphasis to a SSC categorization guideline
  - Treatment moved to an industry supplemental guideline
- Refined change control process
- Enhanced periodic review
- Improved IDP guidance

Categorization Process

- Builds on previous risk-informed activities
  - Identify safety significant functions
  - Map SSCs to functions
  - Verify results against PRA
- Option for additional engineering evaluations to better define safety-significance of components

Change Control Process

- Post implementation activities
  - Maintenance of safety-significant beyond design bases functions
- Provided guidance on action to be taken should SSC change categorization
- Use of Commitment Management guidelines (NEI 99-04) to control changes to SSC categorization process

Other Changes

- Periodic review
  - Consistent with ASME PRA standard
- Additional guidance for IDP members
  - Training & panel makeup
  - Risk information
  - Defense-in-depth
  - IDP Process

Supplemental Industry Guidance

- Rationale for categorization process
- Principles of implementation
- Treatment
  - Expansion of NEI 00-04, Rev. B
  - EQ, Seismic, Application of Code Cases
- Change control – background & bases
- Periodic review – bridging guidance

Future Revisions

- Additional appendix on technical bases for categorization
  - Parameter uncertainties
- Input from rulemaking process
- Draft regulatory guide interactions
- Amendment to NEI 99-04

DRAFT REGULATORY GUIDE DG-1120

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TRANSIENT AND ACCIDENT ANALYSIS METHODS

Advisory Committee on Reactor Safeguards
September 13, 2002

G. Norman Lauben
Safety Margins and Systems Analysis Branch, RES

PURPOSE

Present the background and content of DG-1120 (formerly DG-1096), a regulatory guide for transient and accident methods used to analyze events required in 10 CFR 50.34 and defined in SRP chapter 15 and other chapters.

OUTLINE

1. Background and Need
2. Contents of DG-1096
3. Response to Public Comments
4. New Content in DG-1120
5. Status and Summary

BACKGROUND AND NEED

The Maine Yankee Independent Safety Assessment Team (ISAT) identified the need for NRC to provide guidance on transients and accident methods to:

1. **Ensure sufficiency and consistency in the level of documentation and validation, and**

2. **Have a documented process in place to identify and rank key phenomena for relevant events, which is then used in the code development and assessment process.**

- **To implement this, the NRR Maine Yankee Lessons Learned Task Group recommended development of:**

1. **A standard review plan section for code review, and**

2. **A regulatory guide for code development and assessment.**

DG-1096 CONTENTS

- In December 1998 the following proposals were made to the ACRS T/H subcommittee regarding the reg. guide:
  - Address analysis methods for all events on a generic basis stressing verification, validation, documentation, and quality assurance.
  - Describe application of the evaluation model concept which includes all computer programs, analysis methods not included in the computer programs, and other information used to show compliance with analyses required by 10CFR50.34.
  - Describe an acceptable evaluation model development and assessment process based on Code Scaling, Applicability, and Uncertainty (CSAU) principles refined over the last dozen years.
- The proposed content was incorporated into DG-1096.
- The evaluation model development process includes development methods based on the hierarchical system decomposition principles, largely inspired by the Severe Accident Scaling Methodology (SASM).

DG-1096 TABLE OF CONTENTS

PRINCIPLES OF EVALUATION MODEL DEVELOPMENT AND ASSESSMENT

1. Determine requirements for the evaluation model and the importance of key systems, components, processes and phenomena. A process like the hierarchical system decomposition should be used to assure that all levels of evaluation model development are properly considered.

2. Develop an evaluation model that meets the requirements.

3. Develop an assessment base appropriate to the requirements and the evaluation model. (SA of CSAU)

4. Assess the adequacy of the evaluation model in light of analytical and experimental uncertainties. (U of CSAU)

5. Establish and follow an appropriate quality assurance protocol during the evaluation model development and assessment process.

6. Provide comprehensive, accurate, up-to-date documentation.

RESOLUTION OF PUBLIC COMMENTS

- DG-1096 was issued for public comment in December 2000. (13 sets of comments received)
- A Public Workshop was held in April 2001 to discuss the public comments.
- Revisions to DG-1096 were completed in February 2002 and provided to NRR for comment.
- NRR comments received June 2002.
- Received feedback from ACRS T/H subcommittee during July 2002 meeting.

SIGNIFICANT REVISIONS TO DG-1096

Added section on a graded approach to applying the EMDAP for modifications to existing evaluation models. (Numerous comments)

changed SRP chapter 15 events to SRP events since all events are not in chapter 15. (e.g. LTOP) (NRC)

made changes to A.3 to remove indications of bias against uncertainty methods other than CSAU (GNF)

page 3, the definition of a computer code is expanded to include calculations performed with spreadsheets and tools such as MathCAD or Mathematica.(CEOG)

page 2, Added reference to list of definitions in introduction(CEOG)

page 2, changed "new model" to "unapproved model" to remove ambiguity (CEOG)

reworded page 4 , item 2 (NRC)

reworded page 4, item 4 (CEOG)

page 30, added a third type of uncertainty to the definition. (CEOG)

SIGNIFICANT REVISIONS TO DG-1096 (cont.)

section 1.1.1 clarified scenario dependency on plant class specific and plant specific. (BWROG) (WOG)

section 1.2.3 added additional information about data selection for correlation development and assessment. (BWROG)

section 1.4.8 made connection from step 20 reference to step 16 clear. (BWROG)

section 1.4.8 Added discussion about treatment of "suitably conservative input" to allow best estimate + uncertainty treatment of parameters. (BWROG)

section 3.6 added instruction to document convergence studies in the assessment manual. (BWROG)

Section 4. Clarified section on the use of general purpose computer codes and generic assessment. (BWROG)

Clarified support for use of plant data in code assessments. (BWROG)

Clarified scope of reg guide. (WOG)

RESPONSE TO ACRS T/H SUBCOMMITTEE COMMENTS

Removed the grading vs. risk since there is no quantitative method to apply the grading.

Removed the proposed simplified method to determine conservatism. Detailed quantitative studies would be needed to validate the originally proposed method.

Minor clarifications were made to sections on nodalization studies and the top down scaling process.

DG-1120 TABLE OF CONTENTS

GRADED APPROACH TO APPLYING THE EMDAP

Application of the full EMDAP described in this regulatory guide may not be needed for all evaluation models submitted for review by the staff. Some evaluation models submitted for review are relatively minor modifications to existing evaluation models. The scope and depth of applying the development process to the evaluation model should be based on a graded approach. The following four attributes of the evaluation model should be considered when determining the extent to which the full model development process may be reduced for a specific application:

- Novelty of the revised evaluation model compared to the currently acceptable model.
- The complexity of the event being analyzed.
- The degree of conservatism in the evaluation model.
- The extent of any plant design or operational changes that would require a re-analysis.

GRADED APPROACH TO APPLICATION OF DG-1096 DEVELOPMENT AND ASSESSMENT PROCESS (EMDAP)

Full Application		Property		Minimum Application
Completely new evaluation model	←	Novelty of evaluation model	→	No change to evaluation model
Complex event (e.g. LBLOCA)	←	Complexity of event	→	Simple Event (e.g. increase FW flow)
Best estimate model and application	←	Conservatism of application	→	Manifestly conservative model and application
Uniquely new plant design	←	Extent of plant change	→	Small tech spec change

CONSERVATISM IN EVALUATION MODELS

Many comments stated that the current evaluation models have a large degree of conservatism and therefore do not need to undergo the full EMDAP process.

Close examination of the claims of model conservatism reveal that most of the conservatism lies in the input assumptions.

Question: **How can the degree of conservatism in the evaluation model be demonstrated without a full CSAU analysis?**

METHOD TO DEMONSTRATE MODEL CONSERVATISM

Showing the degree of conservatism in an evaluation model for a simple event (transient or accident) may be accomplished by a relatively simple uncertainty analysis, even if the underlying computer code is a large multipurpose code.

The key to simplifying the uncertainty analysis is in understanding the event and identifying the small number of parameters and physical phenomena that are important in determining the plant behavior during the event.

Application of the EMDAP to a simple event will automatically result in a simplified process.

STATUS AND SUMMARY

- DG-1120 on transient and accident analysis methods addresses the findings of the Maine Yankee panels and other review groups.

- Timely inclusion of current ACRS comments is the next step in the process of eventually releasing DG-1120 for public comment.

- After incorporation of ACRS comments, DG-1120 and the regulatory analysis will be sent to OGC for concurrence and then to CRGR for review.

- After appropriate OGC and CRGR consent, the documents will be released for public comment.

United States
Nuclear Regulatory Commission

RISK-INFORMED PART 50 SPECIAL TREATMENT REQUIREMENTS PROPOSED SECTION 50.69

ACRS
SEPTEMBER 13, 2002

Timothy Reed
Division of Regulatory Improvement Programs
US Nuclear Regulatory Commission

BRIEFING OBJECTIVE

- To brief the Committee on the proposed §50.69 rulemaking package and seek the committee's agreement to issue the proposed rule for comment

BACKGROUND

- Last met with ACRS Subcommittee on Reliability and Probabilistic Risk Assessment - - 2/02 and ACRS Full Committee - - 3/02 (focus on categorization guidance)
- SECY-98-300 (12/98) proposed high level approaches ("options")
- SECY-99-256 (10/99) provided rulemaking plan and ANPR
- SECY-00-194 (9/00) provided preliminary views on ANPR comments and thoughts on regulatory approach
- South Texas exemption (8/01) was proof of concept for §50.69
- Stakeholder interactions
  -- Public workshops (4/00, 2/01, 11/01)
  -- Commission briefings (9/00, STP/Option 2 brief --7/01)
  -- Draft rule language (11/01, 4/02, 8/02)

OVERVIEW OF PROPOSED RULE

- **§50.69(a) Definitions**
  - -- Defines RISC-1 through RISC-4
  - -- Safety significant function

- **§50.69(b) Applicability and Scope:**
  - -- Specifies who may adopt 50.69
  - -- Specifies the regulations that 50.69 is an alternative for
  - -- Specifies requirements for implementation (submittal)

- **§50.69(c) Categorization Process**
  - -- Specifies requirements that categorization process must meet:
    - – PRA requirements
    - – Internal/external events, all modes, SSCs in and out of PRA
    - – Consider both design basis and other credited functions
    - – Reflect current plant configuration and operating practices
    - – Maintain defense-in-depth philosophy
    - – Maintain safety margins - - CDF and LERF increases are small
    - – Use an Integrated Decision-making Panel (expert panel)

OVERVIEW OF PROPOSED RULE CONT'

- **50.69(d) Alternative Treatment Requirements**
  - -- Specifies RISC-1 and RISC-2 SSCs treatment requirements
  - -- Specifies RISC-3 treatment requirements

- **50.69(e) Feedback and Process Adjustment**
  - -- Requirements for updating PRA and categorization
  - -- Requirements for feeding back performance data

- **50.69(f) Program Documentation and Change Control**
  - -- Documentation requirements for categorization
  - -- FSAR update requirements to reflect categorization
  - -- Exemption for 50.59 for initial categorization

- **50.69(g) Reporting**
  - -- Reporting requirement for RISC-1 and RISC-2 events

MAJOR TECHNICAL ISSUES

- Requirements to implement "robust categorization"
  - -- Rule Requirements
  - -- NEI 00-04 guidance
  - -- Staff comments (DG 1121) modifying NEI guidance

- Level of detail in proposed rule for RISC-3 treatment requirements
  - -- High-level requirements to provide reasonable confidence
  - -- Level of detail related to confidence in proper categorization

- Requirement that any increase in CDF or LERF be small
  - -- Sensitivity studies on potential changes in reliability or failure rates
  - -- Licensee must have a basis to support sensitivity studies

NEXT STEPS

- Request Committee agreement to move forward for public comment
- Proposed rule to Commission (scheduled for September 30, 2002)
- Meet with NEI to resolve open items on NEI 00-04
- Complete preparation of regulatory guide