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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

FUTURE PLANT DESIGN SUBCOMMITTEE MEETING

ON USE OF RISK INSIGHTS IN SMR REVIEW

OPEN SESSION

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WEDNESDAY

FEBRUARY 9, 2011

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., Dennis C. Bley, Chairman, presiding.

COMMITTEE MEMBERS:

DENNIS C. BLEY, Chairman

JOHN W. STETKAR, Member-at-Large

SAID ABDEL-KHALIK, Member

J. SAM ARMIJO, Member

SANJOY BANERJEE, Member

MICHAEL L. CORRADINI, Member

HAROLD B. RAY, Member

JOY REMPE, Member

WILLIAM J. SHACK, Member

JOHN D. SIEBER, Member

ACRS CONSULTANTS PRESENT:

THOMAS S. KRESS

NRC STAFF PRESENT:

THOMAS KEVERN, NRO

STEWART MAGRUDER, NRO

WILLIAM RECKLEY, NRO

MAITRI BANERJEE, Designated Federal Official

ALSO PRESENT:

BIFF BRADLEY, NEI

JIM KINSEY, Idaho National Laboratories*

*Present via telephone

T-A-B-L-E O-F C-O-N-T-E-N-T-S

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

8:29 a.m.

CHAIRMAN BLEY: Meeting will come to order, please.

This is meeting of the Future Plant Design Subcommittee of the Advisory Committee on Reactor Safeguards. I'm Dennis Chairman of the Subcommittee.

ACRS members in attendance today are Said Abdel-Khalik, Sam Armijo, Mike Corradini, Joy Rempe, Harold Ray, John Stetkar and Jack.

MEMBER SHACK: Don't forget me, Dennis.

PARTICIPANT: Bill's here.

CHAIRMAN BLEY: And Bill Shack. I'm sorry.

We have Dr. Tom Kress as our consultant and Mr. Maitri Banerjee is the Designated Federal Official for this meeting.

And Sanjoy Banerjee is for the Committee.

The subject's of today's Subcommittee is the NRO's staff's development of a draft Commission paper that discusses the use of risk insights and the licensing review of small modular reactors. In a Staff Requirements Memorandum last year the

Commission directed the staff to integrate risk insights and develop risk-informed licensing review plans for each SMR. The SMR also required the staff to build on the next generation nuclear power plant insights and the earlier technology integral framework in NUREG-1860 and develop new risk-informed licensing framework for the longer term.

There are several policy considerations related to SMR licensing and the Commission asked the staff to identify resolution strategies for these issues.

In addition to the NRC staff, we also have representative from NEI making a presentation on the subject.

The rules for participation in today's meeting were announced in the Federal Register on January 28th, 2011 for an open meeting. Hence, any classified or sensitive information cannot be discussed in this meeting.

We have a telephone bridge line for the public and stakeholders to hear the deliberations. To minimize disturbance, the line will be kept in the listen only mode until the end of the presentation when the telephone lines will be open. We have 30 minutes on the agenda to provide an

opportunity for any member of the public attending this meeting in person or through the bridge line to make a statement or provide comments.

As the meeting is being transcribed, I request participants in this meeting to use the microphones located throughout the room when addressing the Subcommittee.

Participants should first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

We will now proceed with the meeting, and I call upon Bill Reckley of NRO to begin the presentation. Bill?

MR. RECKLEY: Okay. Thank you.

Mike Mayfield the Division Director or the Director of the Advance Reactor Program apologizes for not being able to make it this morning.

We want to accomplish a couple of things this morning. The focus the meeting, as was mentioned, is the Staff Requirements Memorandum and our response in terms of improving how we incorporate risk insights into the review process. But we're going to touch on a few other things and hope to start an increased dialogue with the ACRS.

We were here last March to the full Committee, I believe, and just gave a broad overview, and probably should have taken better advantage of that to start out a series of meetings on issues and technologies, but we did not. And now we are in a mode, as I'll talk about later this morning, of some of these issues being developed, positions on them or approaches being developed by the staff for presentation to the Commission. And we're going to have to work into that how we interface with the ACRS, either this Subcommittee or other Subcommittees. So we'll talk about that a little later this morning.

So with that, I'll go into I'm also Stew Magruder this morning because he's actually stuck on the Beltway. So I'll --

MEMBER CORRADINI: Do you have multiple name cards?

MR. RECKLEY: Yes. I'll lay them all out here.

CHAIRMAN BLEY: Before you get started, in my reading of the paper I see lots of issue identified and I couldn't quite pick up how you see reaching closure on some of these issues. As you go through this, if you can give us some hints about

the schedule and who is working on what, it would help a lot.

MR. RECKLEY: Okay.

MEMBER CORRADINI: And if I could just add to that, I didn't know where to ask this but since Dennis asked you, just to think it about. The one thing I guess I was looking for, maybe it's there and I missed it, is lessons learned from the current design centers. In other words, the staff has done recently ESBWR, AP1000 again, is the middle of EPR and APWR --

CHAIRMAN BLEY: ABWR.

MEMBER CORRADINI: Yes, I'm sorry. Get them all right. And ABWR. And I'm curious if there's lessons learned from the design centers in terms of effort that didn't need to be expended, a repurposing of effort; these sorts of things that would essentially what I'll call the working smarter, not working harder on these sorts of things. And I guess where it's appropriate I'd like to hear about where that's going to fit into the discussion and how you're going to respond to the Commission.

MR. RECKLEY: Okay. Yes, that was actually an important part of developing this

process. So Tom will touch on that as he goes through and it makes sense.

Okay. We wanted to spend a few minutes and just go through where we are right now in terms of what's in play with the advance reactor program.

We have several design centers, if you will, that we're actively working on and some others that are in the wings that we will likely start to interface with in the future.

The first two are integral pressurized water reactors, that's our terminology. The design basically show them the schematic, the NuScale A shortened reactor core, a relatively long reactor vessel. This design works on natural circulation and is probably more novel of the two in that the reactor vessel is encapsulated in a steel containment and then the whole assembly, containment and reactor vessel, is immersed in a large pool of water.

We have engaged the NuScale in some preapplication discussions. They are submitting a number of topical reports and technical reports. One important aspect for NuScale is control room staffing, so there was an initial interest in human factors an other related that we're talking to them

about. Their proposal is to have reduced, at least control room staffing, in terms of multiple modules per operator as at least a possibility.

MEMBER ARMIJO: Did they propose anything related to the emergency planning zone because of the design and the nature of these --

MR. RECKLEY: I'll talk a little bit about emergency planning later. We have papers from NGNP, next generation nuclear plant, on emergency planning and we're working with NEI. In this particular case, NuScale and B&W are interfacing and we expect to get a white paper from NEI on emergency planning. And then we'll deal with individual applicants at a later time.

MEMBER CORRADINI: I guess Sam's point, but they're not proposing anything different? There's an industry effort in this area, but they're not doing anything separate from the industry effort?

MR. RECKLEY: Not at this time, no.

MEMBER ARMIJO: You would wonder if it wouldn't be very plant design specific if you had a particular design that had extraordinary safety advantages that --

MR. RECKLEY: Right. Actually, one of the issues I'll address later this morning is emergency preparedness.

MEMBER ARMIJO: Okay.

MR. RECKLEY: So in addition to the ones they've submitted on the top, then we expect to get a number of other: Traditional design kind of topical reports on their analytical approaches, computer codes and so forth.

MEMBER BANERJEE: Are there any experimental facilities being developed?

MR. RECKLEY: Great question, and if you'll look on the slide, NuScale does a test loop, and this is just some pictures of the staff visiting the test look at Oregon State the simulation that they're developing and they actually have a thermal hydraulic test loop. And I'll apologize, it's not my area. I think it's one-third scale?

PARTICIPANT: I believe that's correct.

MEMBER CORRADINI: I think it's larger. But I think this was funded by DOE back in 2000s. It was a joint work with Idaho.

MR. RECKLEY: Right. And they're doing upgrades now to reflect later subsequent design changes.

MEMBER BANERJEE: But they have basically a chimney, I noticed.

MEMBER CORRADINI: Right. But I think the whole facility was built based on DOE grants back in the early 2000 to 2002 time frame based at Oregon State, but co-done with Idaho reps.

MEMBER BANERJEE: Separate from APEX. It's a separate facility. There's three facilities there, yes.

MR. RECKLEY: The next model we're working with is Generation mPower, it's the mPower design, another integral pressurized water reactor. A larger -- NuScale is on the order of 45 megawatts electric and mPower is on the order of about 125.

NuScale is natural circulation, this does have circulator or reactor coolant pumps.

As with NuScale, receiving already a series of topical and technical reports on the design and expect to get, again that is the typical ones on various system designs and analytical approaches.

B&W is in the process now of building their thermal hydraulic test loop in Lynchburg. You probably have heard and are aware that the lead for the deployment of mPower is currently TVA at the

Clinch River site. TVA has provided us with information that they propose to pursue that through the Part 50 licensing process; construction permit followed by operating license. We're responded basically saying there's no prohibition against that and laying basically the importance of coordinating the Part 52 review because there would a subsequent Part 52 application from B&W for a certified design and then for subsequent deployments to come under Part 52. So, just the importance of coordinating the CP and OL review for Clinch River with the B&W Part 52 review.

CHAIRMAN BLEY: Do you expect them sequentially, is that what you said?

MR. RECKLEY: Well the timing is important. And the current timing is that the construction permit for the Clinch River site would be first. Once that review has progressed to an appropriate point, right around where the staff says we have no major findings, then the design certification application will come in from B&W. And then as the construction permit played its course and they actually built, then the operating license and the final design would be tied to the B&W certified design.

MEMBER CORRADINI: So can I make sure I understand that? Because that sounds confusing to me.

So, are you saying, just to pick it, that there would be a certain level of design that would go in for the construction permit --

MR. RECKLEY: A preliminary design.

MEMBER CORRADINI: A preliminary design. And that level of detail would be enough for the construction permit under Part 50?

MR. RECKLEY: Yes.

MEMBER CORRADINI: And then as that proceeds through approvals and actual construction, then they'd be submitting a more detailed design that would meet the rigors of Part 52 certification?

MR. RECKLEY: Yes.

MEMBER CORRADINI: Okay.

MR. RECKLEY: B&W would submit that. Then at the appropriate time in the process when they're ready to apply for the operating license, TVA would have to apply under Part 50 for the operating license. But the final design reflected in the operating license we have every hope would be tied as closely as possible to the certified design on the Part 52.

CHAIRMAN BLEY: There's no process, though, in place to do like the COLs do and adopt by reference, is there, or is that something that you might --

MR. RECKLEY: Not as cleanly as we've developed for Part 52.

MEMBER BANERJEE: So the advantage of this is that they could start construction earlier?

MR. RECKLEY: Yes.

MEMBER BANERJEE: I mean, that's basically it?

MEMBER RAY: No, they don't have to invest as much money up front to get the CP as they do the Part 52 certification. That's they're basing it.

MEMBER BANERJEE: Right.

MEMBER RAY: It's not starting earlier as much as it is getting more certainty with less investment.

MEMBER BANERJEE: So this would be more almost like a conceptual design or would it actually get into --

MEMBER CORRADINI: It's the old process.

MEMBER RAY: No, it's a CP that some of us have done more than once.

MEMBER CORRADINI: I think Harold's point, it's the old process. You would come in with a level of design enough that you could start construction activities and you'd refine the design. The only difference, as I understand it -- that's what I was trying to get at and you correct me --

MR. RECKLEY: Right.

MEMBER CORRADINI: -- that as they're proceeding on the Part 50 path, a certified design would appear somewhere between the construction permit and the operating license. And then all subsequent modules would be referenced to that certified design.

MEMBER BANERJEE: The only concern I have is whether we'd be doing the same thing twice, you know.

MR. RECKLEY: Well, and that's the important part of the coordination of the activities and the intent of TVA and the staff in the bullet that says: "One Design - One Review." If things start to, by schedule or other reason, diverge, then that would be the concern is that you'd have inefficiencies in the process.

MEMBER BANERJEE: Yes. The devil is in the details of this sense.

MR. RECKLEY: Right. Yes.

MEMBER ABDEL-KHALIK: Can TVA change their mind later on and go with a Part 52 COLA once the design is certified?

MEMBER CORRADINI: No. I don't think so.

MEMBER ABDEL-KHALIK: Well, why not?

MEMBER CORRADINI: Because that's a matter of open hearings. I guess that's why I wanted -- that was the next step.

MEMBER RAY: They could start over, Said, but they couldn't switch in midstream.

MR. RECKLEY: Yes.

MEMBER RAY: They could just go back and start over again. But I don't anybody in their right mind would do that.

MR. RECKLEY: Yes.

MEMBER ABDEL-KHALIK: But if they are going to incorporate everything by reference at that point, it would seem to provide --

MR. RECKLEY: But one of the questions that we have that will be worked out in the longer term is let's say there are two modules that are licensed under Part 50, then for the longer term for their operating life how are they captured back into the Part 52 processes intended to maintain

standardization, how do you maintain that with all the subsequent B&W modules licensed under Part 52? But that's workable and we'll come up with a process for that.

The last major project activity within the advanced reactor program is the next generation nuclear plant, a project --

MEMBER CORRADINI: I know we're holding you back, but --

MR. RECKLEY: No, that's all right.

MEMBER CORRADINI: -- is there not -- what is the status of Westinghouse's IRIS? Is that a potential other integral PWR or has that been put aside?

MR. RECKLEY: Well just from the trade press, and we've had some discussions with Westinghouse, Westinghouse will pursue a small light water reactor but it'll be different from the IRIS design, which was an international collaboration of which Westinghouse was one part.

MEMBER CORRADINI: Oh, okay. All right.

MEMBER BANERJEE: What about the PRISM design? WE've sort of heard things about it, or are you coming to that?

MR. RECKLEY: Yes, I'll come to the fast

reactor.

MEMBER BANERJEE: Let me just ask you is the fuel going to be similar to the fuel we're used to and --

MR. RECKLEY: For both of the NuScale and mPower and, for that matter, other smaller light water designs, yes. The fuel is going to be similar. In the case of NuScale and mPower it's going to be shorter, but it's going to be otherwise traditional fuel.

MEMBER BANERJEE: Okay. So, fine.

CHAIRMAN BLEY: I'd ask the Committee to look on this introduction as an introduction and overview.

MR. RECKLEY: Right.

CHAIRMAN BLEY: We'll get to details later. The main function of this meeting is the SRM response.

MR. RECKLEY: Right.

CHAIRMAN BLEY: And we're due to start that in ten minutes, and you've just begun this.

MR. RECKLEY: Right.

CHAIRMAN BLEY: I think we'll get to details in other meetings.

MR. RECKLEY: Yes. And as I mentioned

before, one of the purposes of this meeting is to give you a sense and then we can talk about subsequent meetings on design-specific or issue-specific topics and work out a schedule for that.

So, on NGNP, many of you are aware of where that stands. A DOE led effort to develop a gas-cooled reactor for process heat applications. We've received a number of white papers from NGNP on licensing approach. These are risk-informed performance-based approaches as well as some technology related white papers on high temperature materials, fuel qualification and some on policy issues like emergency planning and the licensing structure for modular plants.

In terms of upcoming milestones for NGNP, we expect that we'll be issuing a fair number of requests for additional information this month on the previous white papers that we've received and have some discussions in the March/April time frame with NGNP on those RAIs.

On the DOE side if you're curious about where it's headed, there are basically meetings going on in this same time frame. The NEAC to make recommendations for the Secretary of Energy this summer. We expect that the DOE will continue to

work on developing possible interactions with private partnerships to see how this project would be deployed and if they can work out the cost sharing arrangements.

Later in the summer or maybe into fiscal '12 we would get Secretarial decisions regarding where NGNP is headed.

And from the NRC's point of view, we are reactive to however that project goes. If it stays on course, we'll stay on course. If it changes course, then we'll adjust accordingly.

I guess we didn't include a slide on fast reactors. The NRC currently, the staff has very little activity going on in the fast reactor arena. We do have periodic meetings or interactions with some of the vendors. We haven't met with Toshiba in regards to the 4S in a year and a half, I believe. They submitted some white papers.

We've had some interactions with GEH on PRISM. And some interactions with a company called Advanced Reactor Concepts that has another fast reactor design. And then we've had one meeting with Hyperion on a lead bismuth reactor design. But until the Commission really sees that things are more imminent on fast reactor funding and fast

reactor possible deployment we're keeping a fairly low profile in that arena. We do support some international activities just to keep abreast of what's being developed in Japan, France and other countries that are more actively pursuing fast reactors at this time.

MEMBER BANERJEE: But just in general, the water reactors it's sort of an extrapolation of our expertise, at least in this Committee, of what we have done.

I mean, okay, it's a different scale of things like that. The other two are qualitatively different and even the gas-cooled reactor, there are different issues completely then the fast reactors. So how are we actually planning to deploy to handle these? These seem like really big problems to me, at least in my limited area of expertise I would say that they're qualitatively different.

MR. RECKLEY: And I don't think we would disagree. They introduce a whole host of technical and design issues that we haven't necessarily addressed, at least recently, before either the NRC staff, ACRS or the Commission. And so for NGNP, as example, that's the more active one, at some point I think we would have to have a dialogue and say this

is how we see this proceeding as to how often we would meet and when we would meet on various proposals.

Some of those cross over and are related to the next presentation on risk insights. Because NGNP and to some degree the fast reactors are still trying to develop their ANS Standard on how to do design and licensing has a more risk-informed approach, for instance, than does ANS 52.1 for light water reactors.

MEMBER BANERJEE: Just to be concrete, going to passive cooling which maybe AP1000, but the AP600, we had 27 Subcommittee meetings on the thermal hydraulics; best to go with passive cool.

MEMBER CORRADINI: I guess my only observation is that they have already licensed these types of machines under Part 50. So it isn't that they can't do it, I think the question from the industry side is do they want to accede to the past assumption relative to source term, siting, containment, et cetera. And if they don't, what new information and how are we going to analyze that information?

CHAIRMAN BLEY: And these are all topics that are in the response to the SRM --

MEMBER CORRADINI: Yes.

CHAIRMAN BLEY: -- that we'll be getting into here. Although I've only seen problems outlined now.

MEMBER BANERJEE: I think this is yours.

CHAIRMAN BLEY: Who's up next?

MR. KEVERN: All right. Thank you.

Moving on to the primary topic for today's meeting, it's the Commission Staff Requirements Memorandum addressing the use of risk insights for enhancing the review of small modular reactors.

By way of introduction, the purpose of the discussion this morning is to provide the ACRS a preliminary briefing on our response, the current status of our response to the SRM.

The SRM was a multi-part direction to us. The first three parts deal in the near term with issues and review of iPWRs. And that will be the primary focus of my discussion this morning. I'm going to talk about it in some detail what we're proposing and to do in the IPWR area.

And then the fourth part of the SRM give us direction that over the longer term to address a new risk-informed regulatory framework to address to

essentially non light water reactors, a point that was just in the previous discussion here. Then time permitting, depending on how many questions we have, I'll rapidly go through the presentation today and we'll some time talking about our approach in that area.

CHAIRMAN BLEY: And you intend to bring this to the full Committee next month, I believe, looking --

MR. KEVERN: That's our plan, yes. Yes, sir.

CHAIRMAN BLEY: Okay.

MR. KEVERN: At present, the staff is responding to this SRM with a SECY paper. It's currently in draft and in its concurrence. For example:

We still have some of the technical staff giving us comments;

We have yet to complete the review by OGC, and;

We're still awaiting a review by the Office of Chief Financial Officer.

So, I want to emphasize that what we're talking about today is a draft. It's still in concurrence and however -- and it's a big however,

the overall content of the current version with all those comments remains consistent with what we provided you back on January 20th, both the draft SECY as well as the proposed revision to the Standard Review Plan.

So, I have to emphasize the word "preliminary" in the briefing, but feel comfortable that everything we're going to be talking about is not going to be significantly different than what we gave you. And if we come up with some nuances, I'll point those out.

The enclosure to the SECY is the revision to the Standard Review Plan. Now you recall that the new regard covering the SRP is kind of a strangely organized document. We've got multiple chapters, multiple sections but the generic guidance to the staff for how to do a review is in like Chapter Zero; it's the Introduction. So when I say we're making a revision to the Introduction, the casual listener that's not familiar with the SRP says "Well, that doesn't make any sense. Why are you revising the Introduction? I mean, this is kind of a nickel/dime change." Well, that's not true because the Introduction is the true generic guidance for how to do the review.

So, what we've done as you noticed in the draft that we gave you back on January 20th was that we've taken the existing material and then incorporating what we believe is the direction from the Commission to specifically address iPWRs. So, where we're not making changes in the approach for the staff review remains unchanged. And then specifically where we're proposing changes to address the Commission direction, that's where you saw the changes in the draft.

Let's see. And also, before I get, I'll address Dr. Corradini's comments.

Early draft of the SECY talked about lessons learned from review of the LWRs, primarily because although there are different designs, as Bill mentioned, one thing that's in common with all of the iPWRs that they're following the Commission's policy statement on advanced reactors; innovative and passive features. So the lessons learned really come from our review of ESBWR and AP1000.

And a number of those, we had a number of those lessons learned in comments in the initial paper. And the early comments were if it doesn't address the issue of the SRM, that's something you should be doing anyway and we were doing it anyway,

so we took all those references out. So I'm not going to address it today, but a separate activity ongoing to update the Standard Review Plan does address some of the lessons learned that we had from those reviews.

MEMBER CORRADINI: So what you're saying is staff in commenting on the SRM intro rev, but in this stuff but you felt that this has already been incorporated into current reviews of, let's say, ABWR so there's no point in putting it in here?

MR. KEVERN: I'm saying it was reversed. The folks that were drafting this revision had those elements included there as part of the overall effort. And the reviewers of that draft looking at the SRM said, you know that's really not relevant, you should be doing that anyway. And we were. So, we just took those references to include lessons learned from the large light water out of the discussion. That effort is ongoing by separate people in the staff.

CHAIRMAN BLEY: So it's just the references to where the information came from that you tossed out; the information is still there.

MEMBER CORRADINI: Well maybe you're going to get -- if you want to wait and you're going

to give examples, maybe that's the right place to put it. But I guess what I'm asking is something like since this is going to be a more risk-informed approach to these, then what did you learn and what won't you do now looking at these reactors in review? I don't care how you got to that conclusion, but if past of that database was current reviews, that's fine. I'm just trying to understand some examples of what you would not do or do differently because of what you've learned from doing the ESBWR and AP1000.

MR. KEVERN: Let me give you one example. In Chapter 8 on electrical power: The need for off-site electrical power on the grid structure and the necessity for AC power that was there on an active design for the last 40 or 50 years the wording in there for staff guidance and acceptance criteria was not really applicable to AP1000 ESBWR. And the staff as well as, I don't how many members heard presentations in front of ACRS going through that, to finally conclude with what was or was not applicable for both of those designs.

Well we are revising Chapter 8 of the SRP, but it's not to address passive designs and the need for electrical power, but it is not necessarily

related to the risk aspects of this SRM.

MEMBER CORRADINI: Okay.

MR. KEVERN: It's a separate lesson learned, if you will, or a separate issue dealing with passive designs. So, it's indirectly associated with the iPWRs because all the iPWRs have passive features and do not rely on off-site AC power.

MEMBER CORRADINI: One last thing, then I'll stop.

So you're saying that this was recognized and therefore the Standard Review Plan is identifying that if I'm in this mode, I just simply don't do that task? I don't that review? That review is not necessary?

MR. KEVERN: Right. You do a modified review.

MEMBER CORRADINI: Okay.

MR. KEVERN: And if we proceed as we hope to proceed, we will have those sections of Chapter 8 of the Standard Review Plan modified before the applications came in for iPWRs.

MEMBER CORRADINI: And that's not the intro? That's further down in the document?

MR. KEVERN: That's correct. That's

correct. That's Chapter 8 in the sections 8.3, and 8.2, 8.3, 8.4.

MEMBER CORRADINI: So let me ask a broad based question and I'll stop. So if somebody looked at the 19 or the 20 chapters, I don't remember how many there are, in a typical certification -- I guess when I read this SECY -- or the SRM, excuse me, I got the impression -- maybe I had it wrong in terms of the spirit of this from the Commission. That the spirit was to take a holistic look at this and say when you have your total totality of effort either you can reduce your effort and get the same risk-information punch for your effort or redistribute your effort into things that are more from a risk standpoint. And is that flavor in the current SRP Intro? I didn't see it.

MR. KEVERN: It is not in the current SRP. I hope you'll see it in the proposed revision; that's the intent.

MEMBER CORRADINI: Okay. Fine.

MR. KEVERN: And that's what we'll focus on in the discussion.

MEMBER CORRADINI: Okay. Thanks. I'll stop. Thank you.

MR. KEVERN: I guess this actually

following along with Dr. Corradini's comments.

What we see here on the screen in paragraph a and b are verbatim from the SRM. And the staff found it challenging to initially determine what it was the Commission was directing us to do, not to do and what constraints or absence of constraints there were. So what you see on the screen here are the red highlight where some of the key words were that we even used -- the staff was saying the working groups were focused on.

So, we recognized we're supposed to be developing a revised framework that's supposed to address the issue of risk. It is supposed to live within the constraints of no changes to Commission policy, be consistent with current regulations and do what a look at the Standard Review Plan determined which sections should be modified, deleted or whatever addressed to be specifically for iPWRs.

CHAIRMAN BLEY: I'm a little confused by that because as I read the SECY, almost every place where you're pushing into areas of being more risk-informed using the PRA, you reflect that it's going to require Commission policy decisions. So it doesn't seem like this being consistent with

Commission policy is consistent with what you're trying to do.

MR. KEVERN: Okay. Well, as we get through there, I would appreciate if you -- I mean, that's one of the reasons for the briefing.

CHAIRMAN BLEY: And in many places you cite that you need to go to the Commission for policy issues all through the document.

MR. KEVERN: Right. Well, those are issues that are -- you may need to help me on this.

CHAIRMAN BLEY: Maybe -- okay.

MR. KEVERN: Those are issues that are separate from the specific review plan here that we're talking about. Those are policy issues that Bill had on his earlier slides: Is the issue of mechanistic source term, of emergency planning, of staffing for operators, of securities. Those are all issues that are being dealt with separately, not in this paper. Not in this review approach.

CHAIRMAN BLEY: Well of using the PRA, just one that comes to mind of using the PRA to help pick the licensing basis of that. I mean, it's consistent with the SRM I think that you received, but you point out that you'll need some policy decisions to implement those things.

Yes, Bill?

MR. RECKLEY: Well, to emphasize what Tom had said before. Keep in mind that most of what we're going to talk about in the next hour or two hours are the initial part of the SRM, which is our review method for the small light water reactors. And things like licensing basis event, selection; there will be different because of the design differences, but not to the degree that NGNP or even fast reactors would introduce whole new phenomena within the accidents and maybe even whole new licensing basis events in comparison.

So, the small light water reactors, the Chapter 15, is going to look very similar. I mean, they won't necessarily have large break LOCAs because they don't have large pipes, but otherwise the transients and accidents will look very familiar and so there won't be necessarily policy issues on LBE selection for the small light waters.

So much of what we're talking about is just how the staff does the review. And when we say no Commission consistent with regulations and Commission policy, the biggest thing is we're not going back to the applicants to tell them to do anything different. We're not imposing anything on

the applicants that's different then what would have been done for AP1000, let' say.

MR. KEVERN: I was just saying, I've had difficulty explaining this, and maybe it's because the paper and the guidance on this are not adequately written. But I wanted to start out with what we're not doing. So we're not making any change -- this is the plan, that is our position. Now if we erred, why that's one of the reasons we wanted to talk with you folks and get feedback from the ACRS that, no, that's incorrect. But our plan is we are not making any changes to the regulations. We're not doing anything that's adverse to existing Commission policy. We're making no changes in the way we do safety-related or not safety-related determinations. And no changes to the way we address risk significance.

So, for PRA, it exists right now. We've got a requirement within Part 52 to have a PRA done and provide the insights, submit the insights to the staff. There's no change in that process. It's going to be different, it's going to look a little different for iPWR, but the requirements and the regulations we're not changing.

What we're changing is the way the staff

is reviewing the application to come up with a reasonable assurance finding, presumably for design certification or license.

MEMBER STETKAR: Now Tom, and you're going to get into this, but I want to kind of set the stage here.

You say no change to the SSC risk significance determination process. We've looked at three or four, or I've lost count, different design centers. I've seen three or four varieties of how one interprets what risk significance might be. I've seen three or four different sets of metrics that people use on what is determined to be important or not important. I see vastly different quality and scope of detail of the PRAs. How does your SECY and your process those fundamental issues?

MR. KEVERN: In essence it does not.

MEMBER STETKAR: Yes, that's the problem, isn't it?

MR. KEVERN: Well, we don't think so, because --

MEMBER STETKAR: Well, I know you don't think so. I think so. I think that's the fundamental problem. If you can't determine what is risk significant consistently, the whole fundamental

basis for what you're proposing is built on air. It's vapor. There's nothing that you point to in any of your references that solves the fundamental problems that we've seen through the current Part 52 submittals in terms of consistency and quality in the underlying risk significance determinations.

MR. KEVERN: Right. And if we were to address that head on, it would be a change in requirements for the staff or for applicants to do something different on PRA. And that very clearly was told us by the Commission not to do that.

MEMBER STETKAR: I didn't see that in the SRM, so I'm not too sure.

MEMBER CORRADINI: But I guess, Tom, just to push back a bit, I think what John is asking, at least since he's on a couple of Subcommittee that I got John's wrath on this, is that you don't have to change the policy. He just wants to -- this would be perfect time to do an inventory of what was done in the past and say okay, we did this, we did this, we did this consistent with Commission policy, consistent with current regulations. The iPWRs we're going to do this, although consistent, at least it somewhat harmonizes everything done in the past. So you're not changing

policy, you're not changing regulations. You're just being --

MEMBER SHACK: Moving forward.

MEMBER CORRADINI: -- you're moving forward.

MEMBER SHACK: You're saying here's what we've learned.

MEMBER CORRADINI: Right.

MEMBER SHACK: And at least at this snapshot in time here's our definition of you become risk significant and what the tools are that you used to do that.

MEMBER CORRADINI: And I'm not even going to attempt to remind myself of what he was upset with with ESBWR. But for sure, ESBWR was different than ABWR in terms of certain measures of risk significance. So the question is: Okay, now moving forward what is the common basis you want to move forward with? That's what I think they are.

MEMBER SHACK: That's better. I just wanted to get that out there a little bit as we get into more of the details here.

MR. RECKLEY: And we will and have current plans to share with the iPWR vendors all those lessons learned from our previous experience

with the design centers, the large light water design centers. The dilemma comes and where we feel a constraint is, however, that if Vendor A were to say "I think risk significance is going to be pursued this way" and Vendor B says "We're going to take a different approach"; given that we have no regulatory requirement on how you do that, we would have to look at the merits of the two approaches, and both may be acceptable. So in terms of ensuring consistency, we're somewhat constrained because the only way that we can ensure consistency is to impose an approach, and that would be --

MEMBER STETKAR: But, for example, the current SRP Introduction refers to DC/COL-ISG-018 for the basis for methodology for identifying safety significant. That, and I have it in front of me here, says things: "You should describe an acceptable methodology" -- it doesn't give you any criteria. "Risk evaluations cover the spectrum of potential events and the range of plant operating modes," you know "including fire induced vulnerability or seismic margins analyzes." Well, those aren't risk assessment so you're basically icing you don't need a full scope risk assessment but you need to somehow qualitatively do something.

This is fosters the notion of continuing ad hoc sort of leave it up to the individual applicant and the staff to negotiate what's acceptable for that particular application. And that doesn't seem to be a very clear path forward.

Anyway, continue.

MR. KEVERN: Well, it's difficult to argue with that point. It is not clear.

MEMBER STETKAR: Right.

MR. KEVERN: This whole activity is a compromise. One of those constraints not listed there in the SRM referring to near term was that we're told by potential applicants to expect an application as early as 2012 time frame. So to do anything significant, like getting a standardized approach or expectation for PRA, definitely cannot be done within a year time frame. So one of the constraints we're working with is trying to do the best we can given the constraints and given the time allowed, and that was where this activity came out.

MEMBER STETKAR: Tom, I guess I'll challenge you on that definitely can't be done in a year's time frame. We're not starting from a totally uninformed vacuum here. We do have the experience of what's been done with the ongoing Part

52 submittals. So, we sort of know the range of quality and scope of PRAs that at least have been produced to support those activities, and the evaluation of those PRAs through the licensing process.

We do have the experience of how different applicants have interpreted the use of those PRAs to determine risk significance and the extent to which they've actually use the PRA versus other qualitative arguments to do things like populate with RTNSS -- so we're not starting from a vacuum. I think we do have an awful lot of information. And although a year is only 12 months, I think just sort of throwing up your hands and saying "Well, it's obvious we can't do that in a year's time to sort of bring these things together and have a bit more consistency looking forward," it might be a defeatist attitude.

MR. RECKLEY: Okay. What we can do is to take this -- I mean it's in our interest to -- I mean, we would prefer the same from application-to-application as well. We're not trying to necessarily defend the status quo. However, I think what we can do is take that and maybe work with industry.

In this case, again, we're not really in a position to require a certain approach. And so the easiest way for us to do it is to get the industry to agree to adopt an approach. And if we can do that, then we get the consistency but we don't have to go through the processes where in the extreme if we were trying to impose it by rule or something, it would take years. Even guidance is a challenge for us to get out in a year's time frame.

So, the easiest thing for us to do is to probably engage with the industry. And we'll have an advantage that the vendors are relatively new and it's to their benefit in some respects to work together on something like this, too. So we'll take as a take away to try to pursue that with the industry.

CHAIRMAN BLEY: I think looking at the lessons learned what struck in these ones John's talked about part of the reason things were quite different were because of the level of review which often had looked at results and not looked inside to see how the pieces were put together. And, you know I think you have plenty of guidance already is very good if the reviewers actually dig in a bit. So, I think that's part of it there.

But go ahead, please.

MR. KEVERN: Okay. Moving onto the second half of that slide, given the caveat that we're going to address the SRP in one way shape or form, why then the two positive aspects of this approach that we believe we have is a graded approach to the review. So we're giving a more detailed in depth review to those SSCs that are safety-related and risk significant. And then moving off to a progressively less detailed review for the others. So we'll go through a diagram here later in the slides.

And then also, a more integrated perspective. We call it holistic. That term was used earlier in the discussions here. That's where we're taking the program requirements that in many cases have evolved, matured I would say, from a regulatory perspective over the last several years as specifically talking about RTNSS for availability controls, the RTNSS systems. RTNSS will apply here we believe because they're passive designs, and the reliability assurance program and start-up test program. So the idea here is to have an integrated review after it.

And then moving on to the next slide,

that's where we start going into we talk about holistic or the integrated perspective first.

If you pick up essentially any one of the sections in the Standard Review Plan addressing an SSC, you'll find that an observation you could make is that there are two types or two flavors, whatever term you want to use, of criteria. One is related to design aspects and the other is related to performance. And performance, we took that down to identifying four different elements or types of performance-oriented criteria:

Criteria addressing the capability SSC here. The best example would be a fluid system where we're talking about measuring the pump output, net positive suction head, the flow, minimum flow and different operating conditions;

The availability of that SSC;

How reliable is it, and;

Then maintenance aspects for inspection and testing, for example.

Also observation, look at the existing program requirements. They're requirements. They're required by some aspect of the regulations, and the ones we're looking at are applicable to both certified design or COL. They are reviewed by the

staff. And then in the current situation, this actually goes back -- we don't like it as such, but it is actually a lesson learned from the large light water reactors. As these programs matured, actually it was ongoing during the last five years of the large light water reviews, we ended up having different members of staff reviewing in some cases SSCs several different times from different perspectives. And so, this is an efficiency aspect.

Again, efficiency is one of those key words. I did the red fog back on the SRM coding, and so the program as we see listed here are the ones we want to select and then draw a correlation between the performance-oriented criteria and the Standard Review Plan. and the requirement of these specific programs. And that's what you see on the next slide. And carefully identify that where we've got the acceptance criteria on the performance-oriented aspects of the acceptance criteria on the left side and the program requirements on the right side. And with a line there that indicates there's a -- depending on the specific SSC we're talking about, there may be a correlation between one or more of those and for other SSCs there may not be. So we talk about the initial test program, for

example. Much more -- very extensive requirements existing for -- let's use the examples of AP1000 and ESBWR for initial test program. And if you look at all the different tests for one of those designs, typically capability is demonstrated, maybe maintainability would be demonstrated depending on how the test was aligned, and probably not any aspect of availability, reliability of that particular SSC. But if you look at the requirements under the reliability assurance program, typically you're find both the availability and the reliability of that SSC are going to be addressed.

And the availability controls for RTNSS likewise. Many of you were involved in the ESBWR review, and if you recall in Chapter 19 the Appendix what turned out to be a very extensive document, very analogous to the technical specifications, but for all of the systems that were in the category of regulatory or treatment of non-safety systems, extensive requirements there looking very similar to tech specs. And so availability, reliability and some degrees of maintainability were addressed. And those are requirements placed on the licensee or the operator of that design.

So, with that observation -- and I

apologize for that text, but I wanted to make sure I didn't confuse or fog the communication here as I was speaking. So the observation is what I was just going through, that for most of the SSCs, we have acceptance criteria is one of two types: Either design-oriented or performance-oriented.

And for those programmatic requirements that currently exist for design certification and COL applications and the requirements continued through the life of the licensed plant, you see a number of performance-based measures that correlate to that acceptance criteria.

So what's the result of all that? Well, down in the review process -- first of all, let's go to the second bullet under the review. For the design -- and this is key and this is where a number of the technical staff were concerned that we were moving off into a direction that was outside the limits of what we should be doing.

For the design related criteria we're making no change. Hopefully, if you read through the draft SRP that we gave you, it comes across clearly that for existing criteria that pertained to the design we're proposing no change. So it's business as usual. Now we probably don't say that

enough in that SRP because we've got a number of comments that indicated that we're proposing something that was inappropriate, but that's the case. So, we may have to do some editing to the document, but the intent just like back in earlier we talk about other issues, the intent here is that we are not changing the standard review process for any of the criteria related to the design. However--

MEMBER CORRADINI: So, can I sort of take an example. I can't remember exactly, you used Chapter 8; I don't remember what Chapter 8 is. But let's say I was looking at the electric power conversion, the power conversion system. So that means that there are certain design requirements in the power conversion system. The SRP would say the staff must follow the same path as they've done in the past?

MR. KEVERN: Yes.

MEMBER CORRADINI: So what if the risk-informed analyses said that was a wasted effort? In other words, I mean let me just be provocative.

Okay. I still produce electricity the same way. I'm spending a 1,000 person hours doing this when I should only be spending ten person hours. Shouldn't this capture that change so that

you're not wasting effort and you're working smarter not harder?

MR. KEVERN: Could I defer that until I get to the examples in the presentation?

MEMBER CORRADINI: All right. But that's where I'm still -- at least my personal worry is that somehow you guys are going to end up doing more, but you're not going to do it any better. That's what worries me.

MR. KEVERN: Yes, sir. And we share that worry. Some or us more worried than others. Okay.

MEMBER CORRADINI: Okay. Fine. Sorry.

MR. KEVERN: So looking under the review process, so I overkilled the point that for design-related criteria there's no change in the status quo. Business as usual as far related to that.

Now for the first bullet in the review. For those criteria, and you look in any section of the SSC, and then it's a mixed bag. There may be half a dozen to a dozen criteria for each of the SSCs, on average, and in some cases all of them are design-related, or almost all of them, in other case the majority are performance-oriented. So we can't do a percentage mix, but what we can say is that for

those criteria that are performance-oriented, we want to do something a little different. Here's where we come in with the efficiency.

And, say, we're looking at the criteria. If it's performance-oriented, then look at also what the program requirements are. Look at that in the cross matrix that I had on the previous slide. And identify those programmatic requirements that can be used to either augment the review or, in some cases, to take the place of a design review.

In the very simplistic, and I'll get to more complex examples in the back to address Dr. Corradini's question. But in a very simplistic way, if we're talking about a flow rate, for example, in an SSC, one option would be for the staff to do a computer modeling or to do a technical analysis of the size of the pump and the size of the pipe and then whatever restriction might be, and so on. Or if it's a low risk system to begin with, it may be appropriate just to do an observation of the start-up test that needs to be documented. And the start-up test is sufficiently comprehensive that it addresses under whatever operating modes or conditions that was to be assured to address the acceptance criteria -- sufficient to demonstrate

that aspect of criteria.

MEMBER SHACK: I mean when I read this the concern I had is that you were sort of pushing risk off, you know later in the process. You know, suppose you come to that start-up test and the capability isn't there? It's kind of late in the day.

MR. KEVERN: That's correct.

MR. RECKLEY: That's always the way a performance-based approach works. It puts the --

MEMBER SHACK: No. But as you put more and more weight on the performance-based versus the analyses and tests, it seems tome you're raising that risk. Now you may be gaining some efficiency-- you know, I'm gaining some efficiency presumably in the review, I'm adding risk. But you can always argue, I suppose, that's the licensee's choice.

MR. KEVERN: Right. That's correct. And also the performance test is going to be done -- the start-up test is going to be done anyway. We're not adding different round of requirements here as the start-up test is going to be accomplished. And so if the applicant's design was not adequate, if the staff's review was not adequate for whatever reason, then you end up with the demonstration, the

start-up test failed. Well, it was not adequately designed. The vendor didn't design it adequately, the staff erred in their review, missed something and so you end up with the same problem. But what you gain is that from a staff's review point of view we are not doing that additional element of review. We're just waiting to see what the results would be. And again, as Bill said, that the performance-based aspect of it.

Now we're doing that only on SSCs where there is less risk associated with it. And that's where we move on into the risk-informed aspect of this review record. And I'm reluctant to even talk about this slide because it infers that there is a means to determine what the risk significance is, but that's the way we packaged this document. So let me move on.

So we are not changing the process for safety determination. So, the going in position is that the applicant, as they currently do, maybe in an approach that is something the staff has recognized and has seen before and is comfortable with or maybe it's something new and more novel. Regardless, the applicant is identifying in their submittal those SSCs that are safety-related and

those that are not safety-related as well as by whatever means they're identifying those SSCs that are the risk significant or not risk significant.

MEMBER SHACK: But here again, you come to a conundrum sort of between Mr. Stetkar and Professor Corradini that you guys don't give up on the safety-related stuff. Even if it's not risk significant, it still gets more treatment than a risk significant non-safety-related component, which always boggles my mind. But, I can sort of see that. You know if you don't believe you can really determine risk significance, you fall back on your crutch that it's safety-related. If you're looking for efficiency, as Professor Corradini is, you're saying "Okay, I'm really putting all this effort in on a safety-related but nonrisk significant component.

MEMBER CORRADINI: Right.

MEMBER BANERJEE: But, Bill, how do you determine that?

MEMBER SHACK: Well as I say that of comes back to --

MEMBER CORRADINI: That kind of goes back to his point.

MEMBER SHACK: -- his point. But we've

done that. You know, that's kind of our dipping our toe in risk significance kind of stuff here. We do that with 50.69 where you come up with the same sort of thing; that if it's safety-related but not risk significant, it still gets a lot of treatment; whereas we come over here risk significant but not safety-related and it's already down to the third tier.

MEMBER BANERJEE: But you do need a--

MEMBER SHACK: Well as I said, there's a trade off here.

MR. RECKLEY: There is. Part of the rationale and the development of this, however, goes back to the premise and the direction in the SRM that we would remain consistent with existing rules and policies. And the assumption is that if it's safety-related, it's safety-related for a traditional reason meaning there's an NRC regulation or some aspect that is embedded in the traditional licensing approaching that means we have to pay more attention to it for that reason.

One can argue from a risk perspective as to whether that makes a sense. But from a licensing and regulatory approach without changing any rules or guidance, it pushes you in that direction and

we're just reflecting that approach.

MEMBER BANERJEE: At least this approach gives you whatever its shortcomings, a framework with some regulatory certainty, you know. You know where you stand. You've got all these rules, regulations, whatever, and that has a certain appeal

MR. KEVERN: Let me follow on with that, hopefully, in positive direction. The diagram that we see on the slide here is to reflect the process we've been talking about. And starting at the bottom left hand corner, those are SSCs that are safety-related and risk significant. And then we move on to safety-related not risk significant. And then finally not safety-related and not risk significant.

And along with the comment Bill made, there is not I say total uniformity but approaching uniformity in the understanding of identifying whether a SSC is safety-related or not, there's some meaning. So as the working group was putting this together and relooking at all the ways we could fail, which clearly outnumber any way we could succeed on the Commission direction, that well, we are not going to tamper with a concept of safety versus non-safety determination. That is probably a

no win approach, and as well as it's backed up in 50.69. And that was mentioned in the comment earlier. And, of course, you see the correlation of the four categories here. But we very carefully also did not reference 50.69 because that would appear to be a mandate, and that's not a requirement for all new applicants. They may or may not choose to use that. So we wanted a system where there was some consistency, some uniformity, something to live with in the experience that we've been talking about, but something that did provide a standardized approach that would make sense, hopefully, for all the new applicants.

And we went through the thinking process. The four -- the two by two metrics, if you will, very similar to 50.69. That was after some false starts was pretty well agreed upon. The terminology and the definition of those, and the guidance of what exactly goes in one of the boxes or not and if there's some uncertainty on the reviewer's part whether you can slide to the left and how significant it is. That's what we've been working with for some time.

So we took those. And this, to some extent goes back to Dr. Corradini's questions

earlier. We only had two examples to use, the AP1000 and the ESBWR. Because if you look at what we call the B1 box there, that is the not safety-related and risk significant. And that, primarily, based on the only two examples we got, 90 percent of everything that belongs in that box are going to be RTNSS systems.

MEMBER CORRADINI: Which box are we talking about?

MR. KEVERN: The B1 box.

MEMBER CORRADINI: B1? Okay. Sorry.

MR. KEVERN: The B1 box. Back in the active design days, why this didn't make any sense. So now as we're moving forward, and that's why I mentioned earlier, that a iPWR designs that Bill mentioned, there are a number of different changes, there are a different approach, different specific designs, but the one thing we know all of them have in common is passive features. So we expect that given how long it takes to get the current Commission policy and ACRS acceptance, and staff review acceptance of RTNSS, we're not going to be changing that in the near term here. So RTNSS will continue to exist, as well as the expectation, the availability controls as we most recently saw in the

ESBWR review are going to be retained. So the majority of those SSCs that belong in B1 are RTNSS.

And those are backup, whatever term you want to use. I don't want to key on one word. But they're alternate or backup, or in support of the passive design safety features for that design. So the question is well how much of a review do they need? Well, if one were to look at the lessons learned from that amount of review time that the staff and ACRS and others spent, I'd say qualitatively there was more time spent on the B1 than on the A1. We spent a lot of time trying to determine what is or what is not RTNSS and what the requirements were for those systems that are really an active backup to a passive design. That if the passive design works the way it was designed and intended to, you never rely on those active systems at all. So, how much of a review should those systems have?

Well, it's somewhat of a rhetorical question. You ask ten people and you get ten different answers. But that's where we came out on this review. Those deserve less than an intense review effort, and that's why we can use more of the program requirements as a substitute for those than

the safety-related concern.

MEMBER CORRADINI: So let me just take this diagram, which I think I get. So if you were to play out this diagram and just use ESBWR as an example.

MR. KEVERN: Yes.

MEMBER CORRADINI: And you went to the design center for ESBWR and you said "Okay, you guys did A1 sort of effort, A2 sort of effort, B1 and B2." And now I'm going to use "effort," just because it's countable. It might not be appropriate, but at least to begin with it's accountable. And you found you spent 50 percent of all your time in A1 reviews, 30 percent in A2, 10 and 10 and now because RTNSS is so important, wouldn't I want to somehow re-maneuver where I'm looking at things, all effort being the same? And so sometimes -- in other words, I would think I would take this approach and map it out into the two current designs of AP1000 and ESBWR and say "Gee, this seems historically we did this. Given this grading out of this, this seems a wrong use of effort, or an inefficient use of effort, or we're not working smart enough.

MR. KEVERN: Yes.

MEMBER CORRADINI: So had that been done?

MR. KEVERN: Qualitative, yes.

MEMBER CORRADINI: Okay.

MR. KEVERN: And what we found -- okay, let me back up one step.

We're looking at the SSCs that are submitted by the applicant in the design control document for design cert or FSAR for a license, we're only looking at the systems, the SSCs that for some reason in the applicant's mind either because complying with regulations or in their own opinion deserves look at review.

So we look at the -- the majority of the systems are going to be safety-related. The other end of the spectrum, very few systems are going to be down in that B2 block, water, sanitary systems, whatever. Not too many systems fall in that -- now maybe for iPWR designs we'll find more because we'll be less reliant on some of the existing systems that we have for large light water; don't know.

Look at the A2 block, the safety-related and not risk significant. You struggle finding the examples in there.

MEMBER CORRADINI: Oh, so there are none in terms of what you've tried to make it out relative --

MR. KEVERN: It depends on -- yes, it varies But there's insignificant -- you know, I won't say "insignificant," but a small percentage of the systems from the block. But probably the majority of the SSCs are either A1 or B1; they're either safety-related and risk significant or they're RTNSS, which means that they're in that not safety-related but risk significant category.

And again, qualitatively a significant amount of time was spent for the two passive reviews we've had so far in the B1 category because the concept of RTNSS and backup systems for past designs was a new approach, a novelty for the staff as well as ACRS and we struggled with how to adequately address that. So in this diagram we are identifying that is an opportunity for efficiency. We believe in not degrading safety in the opportunity for efficiency by looking at some of those, as I mentioned earlier, programs that matured over the last five years, like availability controls. Availability controls didn't use to exist. And so you look at what's in the current version of the

ESBWR for availability controls, all of those RTNSS systems have availability, maintainability, reliability requirements analogous to what the safety systems have for technical specifications.

So, if all of that exists, how much of an independent review; technical analysis, design type review does the staff need to do? If it's a design related acceptable criteria, it's business as usual. If it's one of those performance-oriented acceptance criteria, then that's where we're suggesting the staff use the program requirement.

It's not deleting the review. It's saying the requirement exists for this to be done, I just don't have to do an independent design analyses to be redundant and prove it.

MEMBER BANERJEE: Okay. Have you got enough information about any one of these designs to do a first iteration on this and see whether it's practical or not?

I'm sort of an engineer. I like to see real things.

MR. RECKLEY: Yes. We actually did based on the very preliminary information that we had from the vendors, run through an exercise to say what do we think is going to be safety-related and what do

we think is going to be risk significant. So we did this exercise, actually we had the national labs do it, or help us with it. And then we went back, and this is going to be a continuation of an activity we do all the way up to application --

MEMBER BANERJEE: Right.

MR. RECKLEY: -- of working with the vendors to see if there's an agreement on that. Because we may have misunderstood what they were going to rely on in the safety analysis, or something.

MEMBER BANERJEE: So you've done a first iteration on this?

MR. RECKLEY: Yes.

MEMBER BANERJEE: And it seems practical?

MR. RECKLEY: There seemed to be enough of a division of things so that there were categories, and meaningful categories. You know, if we had this whole exercise and 90 percent of things ended up in A1, then the exercise would not be worthwhile.

MEMBER BANERJEE: I understand that.

MR. RECKLEY: So we were given enough of a spread to think that it would make sense.

MEMBER BANERJEE: Right. And you think at least for the PWRs this will sort of -- for the various concepts?

MR. RECKLEY: That's what this is for.

MEMBER BANERJEE: Yes, I realize it is. But there are various different concepts possible and you've shown two of them.

MR. RECKLEY: Right.

MEMBER BANERJEE: There could be a third, IRIS or something.

MR. RECKLEY: Yes.

MEMBER BANERJEE: Yes.

MR. RECKLEY: Going back to a previous discussion, and one that was raised on efficiency, one of the points I'd like to point out on the graph is that this graph reflects regulatory decisions that we need to make as part of the process. In other words, when you say "risk significant" in the box -- I'm a licensing guy. You don't see risk achievement worth or any number like that. You are seeing the decision is, is it RTNSS or not. Is it going to be within the reliability assurance or not. That's a decision that needs to be made as pat of our licensing review, no matter what the shortcomings or limitations or concerns on how we do

that. The fact is for these designs that decision needs to be mad. And we can work on improving on how we do that.

Personally, if there was an observation on previous reviews, it was that we did a lot of the traditional work on looking at design information and then we also did a lot of work largely in parallel on the regulatory treatment: Does it belong in RTNSS or RAP or not? And if in that exercise we were to have determined that something was really a B2, was really very low risk significant and not safety-related, and no -- you couldn't get back any time you had just spent because the decision on the regulatory treatment on RTNSS was coming often late relative to the process. And so really in large part what we're doing is keeping the structures and trying to move around the time frame.

So the decision now we want to push up as early as we can is: Is it RTNSS? Now given that determination, how are we going to treat it, how are we going to review it versus reviewing it and then as a parallel activity deciding on its regulatory treatment? And so, again, from a licensing perspective we're not introducing anything new,

we're just kind of rearranging the time times. Not there's not increased efficiency that could be gained by sharpening up exactly how we do one thing or another in terms of risk significance or even some of the design reviews.

And the secondly, I don't want to lose some recognition that the SRP has been somewhat of a living document. You know, every 20 years or so we do an update. And it does reflect in large pat already some risk and safety significance. So, the SRP as it stands now already would direct the staff to spend less time on something that is generally less risk significant. The only problem that we have is it's built on traditional light water designs. And so when you enter it into the passive, we didn't necessarily get the efficiency gains because you had some aspects of the SRP, the electrical power again as an example based on electrical power had always been very important and safety-related. And so the existing SRP had us do a lot in that area. But in many other areas, balance of plant and some of the other areas, there's not that dichotomy of the SRP being at odds with the real risk significance of an SSC.

So, anyway, that's probably a tangent,

and I apologize, Tom.

MR. MAGRUDER: Let me jump in. First of all, I apologize --

MEMBER SIEBER: You must still have design-basis accidents, though?

MR. RECKLEY: Yes.

MEMBER SIEBER: Okay. And so basically the same framework that you now have for the standard reactors, okay?

MR. MAGRUDER: Yes, absolutely. Yes.

This is Stew Magruder from the staff. And I apologize for being late. The Beltway was not fun this morning.

But I did want to get back to your question, sir, about the vendors and how it applies to iPWRs and echo Bill's comment that I think one of the main benefits we're getting is the timing of this effort and working with the vendors following just on the heels of large light water reviews and trying to learn the lessons from that. And the vendors have been very receptive to this. They understand that we're trying to gain efficiencies in the reviews. And as Bill said, we shared our initial thoughts about categorizations of SSCs. And they've provided feedback. And generally we're in

pretty good agreement with them.

So, I think the dialogue before the application comes in on how we're doing things is very beneficial on at least NuScale and mPower have been very receptive to the work we're doing.

MR. KEVERN: I'm trying to be sensitive of the time. I'd like to go through, I've got two examples here in the presentation. I'd like to briefly go through those, and that would be consistent with the time for a break before we went on to the next subject.

What we've got here in the next two slides, and they're wordy, so I apologize for that but I believe you can read it. I wanted to make sure I did not plagiarize inaccurately. So what you see here is the station service water system, 9.2.1. And this is the verbatim quote of -- or the plagiarization rather, of acceptance criteria for 9.2.1.

MEMBER SHACK: Italics. It's in italics, so we know it's --

MR. KEVERN: Of course, that's how you know. Trust me.

So this is what the SRP says. And when I'm going through this generic example, it's going

to be a little bit of ESBWR and a little bit of speculation on what Stew was just mentioning as far as the advanced information we got on the designs. So I won't bore you to go through all of those, but let me take me what's in red highlights.

So if you look at that first -- and what I want to demonstrate here is the difference between the design criteria and the performance-oriented criteria.

So if you look at the lengthy paragraph there in that first bullet, we're talking about protection against natural phenomena, the criteria related to GDC 2 for the station service water system. And you don't need to read the whole thing, but in the red highlight you see that -- sorry, back up. This is a B1 system. Again, this is what we surmised based on AP1000 and ESBWR. Without any additional information, we'll just assume for purposes of discussion iPWR is going to be the same way. So this would be a B1 category. This would be a RTNSS system.

So we look at the review in red font. So this "Criterion is design-related." And therefore, we're going to have what you consider status quo: The same design type review by the

technical reviewers that you do under the current SRP process. Some combination of technical analysis and evaluation techniques, whatever is appropriate by the respective reviewer and within the respective branches going to be used to make that determination of whether the design is adequate given the criteria in GDC 2 or not. So no change there.

You go down to the next page and then under the middle of the page the acceptance criteria related to GDC 45, in the opinion of the reviewer the criteria here related GDC 45 addressed performance-oriented aspects of maintainability, which may -- and I don't know why "may," and I underlined "may" because this is at the discretion of the reviewer for what we're setting up as a framework. So the reviewer says "Yes, look at GDC 45 pertaining to this system and these are preference-oriented criteria." And it's really addressing the topic of maintainability.

Well, are there program requirements that could address this criteria? And the answer is well likely yes. We like that the applicant has incorporated this system within the maintenance rule program. And you look at the initial test program pertaining to this system, it's a word "likely,"

"possible," whatever term you want to use that the criteria here for this acceptance are addressed in those two program requirements.

So in this case the reviewer may say "Yes, I do not need to do a technical review analysis like I did back on the first criteria for GDC 2, the program requirements are sufficient."

That's the end of that review for that specific criteria.

They go onto another example and list a similar fabricated, you know it's the 9.5.7 the diesel lub system. For purpose of discussion, we're going to call this a B2 system. We're going to say that the iPWR design is such that if you had an emergency diesel generator onsite, it's a multi-module site and there's some aspects of the design that do not require AC power for safety, and maybe there's a skid-mounted diesel, a warehouse-type skid-mounted diesel like ESBWR has, and maybe some other aspect. But just that as a given that this is a B2 category: Not safety-related and not risk significant.

So we start out in the guidance, and the guidance says that for such systems there's going to be a minimal level of review effort because it's not

that important to reactor safety.

So we look at the criteria for GDC 2, and it's the same as for the previous system. This is design-related and would require some aspect of technical analysis and evaluation techniques. But because it's not safety-related, not risk significant, we would expect that the reviewed would expend less effort on confirming the design aspects for this system then he would for the plant service water system, and that's going to subjective. It's supposed to be efficiency, but it's going to be subjective. And given the number of SSCs and the number of acceptance criteria in the current SRP without doing an item-by-item review and revision for each of those, the subjective approach here is the only way we can accomplish revising the review approach at this point in time.

We used on the next page two other examples, and we're again back to the performance-oriented criteria. So looking here at what's identified under that sub-criterion B, it appears that this criterion addresses capability and likely since it's a B2 system, this system does not have availability control associated with it, it likely is not included in the applicant's maintenance rule

program. So here probably the only program requirement would just be the initial plant test program, and that may be adequate to address this criteria.

Likewise, at the bottom --

MEMBER SHACK: Again, you consider that a criterion to be determined by the individual reviewer? I mean, there's nothing here that says it's B2, therefore it does depend on programmatic. You're still giving the individual reviewer discretion on what he or she does?

MR. KEVERN: Yes and no. B2 by definition is going to have a less intense review than the A1/A2 or B1 does. A less intense review--

MEMBER SHACK: Well, what's the "may" mean here then?

MR. KEVERN: Exactly. And it may be because -- well, it means several different things. One is the discretion of the reviewer, which we need to keep in place for the Standard Review Plan, because it is guidance. And secondly, if you look at the initial plant test program, the vendor may not have proposed anything to test this objective system. So if that's the case, then we go into some detail in the guidance that says well the reviewer

has kind of an option then. It says one would be that, all right, I'm going to suggest the applicant, and perhaps in the form of a RAI, that you know if you would like to add another step in the initial startup test program or modify the existing step, then that would be sufficient for my review. We wouldn't need to review this. On the other hand, if you choose not to, why then I'm going to have to do some semblance of a design review.

And back to Bill's point, you know the first time we do this we may end up spending more time doing that and we lose efficiency because it's a haggling effort and we're not quite sure. Once we've done this once or twice then we've got some semblance of an approach, a standardization approach. The first time is going to be a little time consuming, which brings us into the team concept that we're going to talk about after the break as far as an effort to try to get this moving forward in a standardized approach we're going to say.

CHAIRMAN BLEY: Is this it?

MR. KEVERN: Yes, sir.

CHAIRMAN BLEY: Okay.

MEMBER SIEBER: This is really not the

oil system that allows the engine to run, right?

MR. KEVERN: Yes.

MEMBER SIEBER: The lubricating system that keeps the oil flowing while the engines shutdown so that it will start easier without scraping the bearings. But if it fails, the engine will still run, right?

MR. KEVERN: No, no. This is the lubricating oil system, "the" lubricating oil system--

MEMBER SIEBER: Yes, B1?

MR. KEVERN: Yes.

MR. MAGRUDER: But again, we were just providing examples. So, you know, whatever we would be looking at.

MEMBER SIEBER: Well, if the diesel itself is safety-related --

CHAIRMAN BLEY: No, not this one.

MEMBER SIEBER: Okay.

CHAIRMAN BLEY: This is some non-safety-related.

MEMBER SHACK: Postulated system.

MEMBER SIEBER: Okay. You guys are in space and I'm in a different orbit, right?

CHAIRMAN BLEY: Okay. We're going to

recess until 10:15. See you back here then.

(Whereupon, at 10:01 a.m. off the record until 10:16 a.m.)

CHAIRMAN BLEY: Okay. Meeting will come back to order, please.

MR. KEVERN: Okay. Continue on with the presentation on the staff's response to the SRM. The next topic is paragraph c in the SRM, and that's the one that directs the staff to do a design specific plan for review of each of the iPWRs. So that's the next topic.

And just a note on time. We'll go through this on several slides, and then the next topic would be the "technology-neutral" topic. And we'll spend as much time as you like to on that and see where we are on the time for the other presentations.

Okay. So, in responding to paragraph c, we address this in the SECY. And this is just a series of bullets on how we're going to address this.

First and foremost, we're going to implement the framework that we just spent the last hour talking about for each of the iPWR applications. But here we're focused on efficiency

for the iPWR applications. So, the design specific review plan has got several parts that you see listed in the bullets here.

First, in the response to the Commission direction we will have a unique plan for each iPWR design. That's not much different than what we were doing for the large light waters in the last several years.

We are going to make a couple of changes. The Standard Review Plan, we're going to tailor that to each of the designs. And by tailoring it, it's an extension of what I was referring to in the last hour here on the review approach. Now here we're not talking about the general guidance and the introduction to the SRP. We're talking about the specific SSC sections. And so as we started out this morning with Bill's orientation, and as most of you are already aware, you know the NuScale design is just different than the mPower design, is different than the XYZ design. And so for each of those designs, it's likely that we will have to have specific SSC sections in the SRP that will either need to be modified or in some cases deleted, or in other cases will have to be SRP sections written. One example being with NuScale,

the natural circulation. Clearly the existing SRP section on reactor coolant pumps has got to be deleted or identified as not applicable, or whatever, and there has to be some modification there.

For the mPower design where there are reactor coolant pumps that are mounted on the vessel, there has to be some change there. They got reactor coolant pumps, but clearly the existing guidance to the staff in the SRP has to be modified. So that's what we were talking about when we're saying tailoring to each of the designs.

And so, still work in progress exactly how we're going to modify that. We're not going to say that we're going to have a new SRP, but we are going to have versions that are applicable to the specific designs. So exact terminology as far as the Standard Review Plan, whether it's an attachment or an appendix, or whatever design, that's still something administratively to be decided.

Schedules. Again, consistent with the direction and from the efficiency prospective, starting out with scheduling for preapplication, following on with application activities again for efficiency as well as some standardization, having a

template of the Safety Evaluation Report.

MEMBER ABDEL-KHALIK: Coming sort of up with a unique plan for each design, do you think that requires just cursory knowledge of the design?

MR. KEVERN: Certainly.

MEMBER ABDEL-KHALIK: That's it?

MR. KEVERN: I'm sorry. It's more than cursory. I mean cursory is a minimum. Yes. I'm sorry.

MEMBER ABDEL-KHALIK: How big an effort would be involved in generating these design-specific review plans?

MR. KEVERN: It's to be an interative effort. So we're going to start out, right now we're in preapplication space, for example moving on to the next bullet, what the pre-application activities include. We are in pre-application time frame for both NuScale and B&W, for example. We're already having interactions or sharing design information, we've got preliminary design information, we've got some topical reports that we're reviewing, we're having meetings.

For example, next month the staff is going out to NuScale for a visit. We've already had several visits. So we're acquiring information in

this what we call pre-application space right now. Have been doing it for six months, whatever.

CHAIRMAN BLEY: Are you in the process for those plans where you've been receiving information of actually producing the design-specific SRP?

MR. KEVERN: The design-specific SRP it is work in progress, yes. As Bill mentioned earlier we've contracted four of the national labs and they are, as we speak, presumably working on some of the changes to the SRP sections. The two examples I just gave you, that's one of their tasks to actually redo those specific sections of the Standard Review Plan.

So it's we're working on those, each of the bullets there in that activity. We do not yet have what I would call a NuScale specific design review plan that I could say "Here it is." It has not yet been done. The activities are ongoing, but we have not packaged a plan per se yet.

MR. MAGRUDER: Yes. I would say the goal is to try to reach an agreement before we start the review on what section are applicable, what are not, how we're going to review certain aspects of the design. And that requires a lot of interaction with

the vendors before they submit the application, at least.

CHAIRMAN BLEY: Will these be issued as subchapters in the SRP or they will be kind of working documents within the staff based on the revised SRP?

MR. MAGRUDER: I think as Bill has pointed out several times, they're not exactly standards. They apply to one design. So the format of the document, we're not quite sure. But we will have some guidance for the staff that we'll use for the review. And we would hope to come back to the Committee and talk about what that guidance will look like before we actually -- and then publish it.

MR. RECKLEY: And this will be one of things we need to talk to the ACRS about because the process for updating the SRP includes, at least or gives the option of the Committee to look at SRP sections and weigh in. Here, given time frames, we'll go the SRP approach; again, it's design-specific and we're on a short time frame. But we'll have a review plan and certainly we don't want to wait until we're finished that review in accordance with a review plan for the ACRS to weigh in that we were on the wrong road all along.

CHAIRMAN BLEY: Yes.

MR. RECKLEY: And so we're going to have to workout with the Committee something in between updating the SRP and having this review plan.

CHAIRMAN BLEY: So there will be some kind of internal NRO document, and we'll get a shot at it.

MR. RECKLEY: I think, yes. It would only make sense that you understand our approach before we take it to completion.

MEMBER ABDEL-KHALIK: But again, you know how would you, the staff, or ACRS pass judgment on the completeness of this presumably tailored abridged version of the review plan with now detailed knowledge of the specifics of the design? How can you do that ahead of time?

MR. MAGRUDER: Yes. We don't want to fall in the trap of saying that we'll have complete knowledge ahead of the design submittal and we know everything that we're going to review. I think our experience has shown even for standard designs we get into areas that we didn't know at the beginning of the review that we would get into, or focus on different areas. So I think we have to do this as our initial guidance and we'll have to, obviously,

modify it as we go along.

MEMBER ARMIJO: Well, the framework is your starting point. If you find a problem, you've made an oversight, there's nothing to keep you from opening that issue in the course of the review.

MR. MAGRUDER: Right. Correct.

MEMBER ARMIJO: Even though it wasn't in the initial framework that you thought would be okay.

MR. MAGRUDER: Correct.

MEMBER CORRADINI: So I guess to get to Said's question, let's just to mPower just as an example.

So if mPower is going forward with Part 50, the preliminary design information is interesting, but isn't what we're talking about. We're talking about the information that would fit and map into the design certification, is that fair?

MR. MAGRUDER: I think we're still for the Part 50 application we're still thinking about how this would apply.

MEMBER CORRADINI: Well, I mean but from the standpoint I'm just trying to think about to get back to what are we going to eventually see? It seemed, at least I was listening to the discussion

and I thought we'd see something equivalent to a design certification level of information.

MR. RECKLEY: For which?

MEMBER CORRADINI: Well, for the design certification for mPower.

MR. RECKLEY: For the design certification you will.

MR. MAGRUDER: Yes, you will.

MR. RECKLEY: For the --

MEMBER CORRADINI: But to go forward with the Part 50, I would not expect to see a lot of detail.

MR. RECKLEY: Right.

MR. MAGRUDER: Right. No, the construction permit --

MEMBER CORRADINI: So it's no different than historically what was done in the past, which is we're going to have this sort of plant on this sort of site and now we're looking for real showstoppers at that phase, but then the utility and the owner, or the owner and the vendor are taking the risk that a showstopper will pop up at the design certification.

MR. MAGRUDER: Right.

MEMBER CORRADINI: Okay.

MEMBER RAY: A PSAR wasn't quite that, a show --

MEMBER CORRADINI: I'm not saying they have to argue about it now.

MEMBER RAY: I know.

MEMBER CORRADINI: But I wasn't saying superficial, but let me just to take an example, though. Just to take a hard sample where Sanjoy was going with testing.

So you have this new design that's going to have to more passive components. There'll be certain accidents. Those sorts of things will raise questions that would require enough detail in the design that would be in the certification stage, whereas we would be looking at the overall plant and how it's arranged and built in the construction phase.

MEMBER RAY: Well, again, this is probably not the place to take time on it. I rather think some of the things are going to be addressed in a Part 50.

MEMBER CORRADINI: Okay. All right.

MEMBER RAY: More than your surmising right now.

DR. KRESS: You have to have enough

information to approve the site?

MEMBER RAY: Yes.

MEMBER CORRADINI: Well, that's what I guess I was getting at.

DR. KRESS: Yes. And that requires quite a bit.

MEMBER RAY: Yes.

DR. KRESS: You have to have design-basis accidents, you have to have source terms. And enough information that the thermal hydraulics does--

MEMBER CORRADINI: If the Chairman will allow me?

So let's just say so for the construction phase they might choose a source term that is sufficiently conservative that you proceed with the construction phase, or the Part 50 part, you come back with a design certification. You have more detailed design information. Your accidents may be modified. Your source term may be reduced, but you've bounded it for the first part. Is that a fair --

MR. MAGRUDER: Yes, that's a fair potential scenario, however mPower and TVA have told us they don't want to do that. That they would

rather have one design and one review. So what we're hoping, anyway, what they propose in the construction permit application will be similar if not identical to what they propose in the design certification.

MEMBER CORRADINI: Okay. Fine. Okay.

MR. MAGRUDER: To make us more efficient.

MEMBER CORRADINI: That's better. That's better, but I guess I just wanted to get to what I thought was Said's original point: Was sometimes you can't make a determination until you have enough detail to ask enough questions --

MEMBER ABDEL-KHALIK: I mean, the implication is this plant-specific review plan is a subset of the review plan. In other words, there are sections that will be deemed to be irrelevant and there is more you've taken out, rather than an expansion to some parts of this.

MR. RECKLEY: There'll be cases where it has to be an expansion or a replacement. Because there'll be potentially components that are used in new designs that don't exist for old designs. So, it's both.

MEMBER ABDEL-KHALIK: Right.

MR. MAGRUDER: I mean the NuScale containment design is different than any we've ever released. So, we'll have different --

MR. KEVERN: Right. So we start with the existing Standard Review Plan, the one version for large light water. And then we modify that based on what we need. And that's why I was saying here in some cases there will be identified; that you can use the existing SRP verbatim; in other cases we'll need to modify it because it's the same system but it's got different aspects of it. Whatever serves the same function; the different pumps, different sizes, whatever else. They're all going to be different sizes of some sort. In other cases it's going to be something where the SSC that's identified in the SRP doesn't exist, and so we have to make some kind of modification to that. So how we address that is a little bit of an administrative challenge. And whether we called it a revision, a NuScale revision or a NuScale modification, in this case we're incorporating into using the terminology that the Commission directed us to do, a design-specific review plan. We've go the pieces being started, but what it looks like in the final document and how we interface with the

rest, we're still working on that. We haven't got all the details flushed out yet.

CHAIRMAN BLEY: The other side of this, we're going through a series of design certs without any updating of the guidance which, in fact, led to some problems along the way with people looking at things they needed to and others. So it seems sort of a step forward for me.

MR. KEVERN: We hope so.

CHAIRMAN BLEY: But it's got to be flexible because you're going to find things along the way I suspect, that it won't be the way you set it up.

MR. RECKLEY: Right.

MR. KEVERN: Right. If we could look at the slide here, the third bullet from the bottom, the one we've been talking about off and on for the entire morning. And we tried to carefully choose words there, "Determination (preliminary) of the SSCs" for this design. Let's pick on the NuScale design. So it's going to be an iterative process, but in the areas we can in the pre-application phase we wanted to have interactions with the applicant and determine what the applicant has classified as whether safety-related or not safety-related and

what their initial efforts are for risk determination. Now whether they have a semblance of a PRA, whether its professional judgment, whether its a peer group, or however they -- some combination, we want to see what the applicant is doing so we can evolve with the applicant. But the staff determines whether we're either going in the right direction, or whether you had difficulties, it's a good approach but not complete, what have you.

In fact, the staff is going out to have a meeting with NuScale next month to address this topic. So we've started those activities.

MEMBER STETKAR: I was going to ask, I was going to wait until your next slide but I might as well since you've highlighted the bullet here, I see potential dangers in that because both the staff and the applicant will get locked into a mindset of what shall be risk significant and what shall not be risk significant. And therefore, as you go forward and gain more information and, perhaps, refine the risk assessment there's an awful lot of mutual incentive to keep that existing mindset while we know this isn't risk significant because it always has been not risk significant. And therefore, you

know, some rationalization of not going back and iterating and say well this needs additional treatment as a RTNSS item or regulatory review treatment.

So, I think this preliminary determination of risk significance when you essentially have no information about the design and no PRA a, I'm a little concerned about that. And that's why I was going to wait until the next slide because the next slide is theoretically when you have a design and a PRA, but I was going to ask you about when that design information and the PRA actually becomes available. Because that's one of the problems we've had I think in the existing design --

MR. KEVERN: Well, let me clarify a little bit. We don't have a final design, of course. But we do have semblances of a design. Now whether we call it preliminary design or whatever, it's beyond the conceptual. It's, you know, the systems are identified and that's what we've had the national labs working on as far as revising parts of the SRP to deal with the information that we currently have been provided. There have been interactions ongoing with both the vendors,

potential applicants here for some period of time. And in one case we've got a vendor that says they've got a preliminary PRA. I'm not sure what adjective to put the PRA, so early version, preliminary, whatever version, but that's one of the purposes of the visit next month is for our technical staff to go out and see what they've got. And I can't say that they can address your concern entirely, the preconceived idea of what is or is not originally going to be. But that's the professional judgment of the staff in looking at them.

MR. MAGRUDER: Yes. And to address your question, too. I've thought about the same thing, and I guess I'm relying on two things.

One is the vendors will have a peer review done on their PRA in accordance with our PRA quality standards. So, hopefully, that would provide some good insight, the peer review.

MEMBER STETKAR: Glad you brought that up, because the concerns that I have in this process, I endorse the process as a process, as an undefined process right now because I've defined the process by how its really implemented.

The problem that at least I've had, and I've been through -- you know, if you want to focus

on passive, I have no interaction with AP1000, but at least ESBWR watching over the last four years that I've been on the Committee the information about the design that has evolved and the PRA evolution in trying to keep abreast of that design has been rather interesting.

Now, related to the quality of the PRA, there was no type of review that you're talking about, peer review of that PRA. Even the staff review, and many times when the staff is challenged, said "Well, we feel that capability category 1 as far as the EAS and EPRA standard is adequate to give us reasonable assurance that indeed the core damage frequency is probably low enough that it meets the general guidelines. That is certainly not a PRA that you use in licensing space to make decisions about how you will perform a licensing review of this particular valve or not this particular valve, especially if you don't even know that that valve exists.

MR. KEVERN: Yes.

MEMBER STETKAR: So that was my big question about as we go on this slide, the pre-application, to the next slide about post-application. When in post-application do you have

that level of design information that you know that this is a motor operated valve powered from whatever or a squib valve? Because there might be some uncertainty. They might change. And when do you know that you have PRA of sufficient quality and level of detail such that it even includes this valve? Because we had instances where the PRA didn't even include the equipment in the plant that we knew about.

MEMBER RAY: John, we did have a comment on AP1000 on PRA. I don't know if you read the letter or not.

MEMBER STETKAR: Yes, I did. I did. But I go back to ESBWR because those hearings were --

MEMBER RAY: Well, I'm just saying that it is, I think, consistent with what you're saying. It didn't have to do with a valve, but it had to do with plant conditions.

MEMBER STETKAR: Anyway, the concern I have is that if we're making determination about organizing the review process and categorizing those compliments into the four different categories, it's incumbent on the staff and I think industry to have as much design information as early as possible and to avoid iteration. That's the worst possible

condition. And the problem is once you start to get into a iterative mode, people get locked into the mindset: This has never been important, therefore I can rationalize that it will not be important going forward. Anyway, that's --

MR. MAGRUDER: Yes. I agree with you a 100 percent.

MEMBER STETKAR: Well, and that's why I worry about a lot of this well we're going to make a preliminary determination. We're going to get together with the applicant and go forward based on that preliminary information that we have. The train left the station --

MR. MAGRUDER: Yes. Definitely what I would think --

MEMBER STETKAR: -- we just didn't realize the track wasn't here yet.

MR. MAGRUDER: I mean, I'm hoping that the Committee would serve as a sanity check also. I mean, that's my second check things to make sure we have the right direction.

CHAIRMAN BLEY: Something came to mind. When Bill began this session he showed us some of the test facilities that are being built to make sure we get the thermal hydraulics right. Well, if

you're going to use the PRA in the licensing process, you ought to have all the pieces there.

MR. MAGRUDER: Yes.

CHAIRMAN BLEY: They ought to be building a simulator, right, they ought to be writing operating procedures. Not after, but immediately after all that's included.

MR. MAGRUDER: They are doing that, actually.

CHAIRMAN BLEY: Okay. So all that needs to be --

MR. MAGRUDER: -- in the simulator to the thermal hydraulic test facilities.

CHAIRMAN BLEY: Okay. Great. Because I think that's what you need to do.

MR. MAGRUDER: Absolutely.

CHAIRMAN BLEY: It needs to be the real thing or using it in licensing is really dangerous.

MR. MAGRUDER: Right.

CHAIRMAN BLEY: Back to you.

MR. KEVERN: Let me try to save a little bit of time. I'll just move on to the last bullet.

First of all, we share all the discussions and concerns that you just mentioned, but we're going to end up with a Final Safety

Evaluation Report, just like we always do. Now how long it takes to get there, we're trying to put together this framework and a design-specific review plan and trying to move up some of those activities that we normally do after the application comes in into this pre-application. And, yes, and there's risk.

But the point is, and we've been dealing with -- interacting with the vendors in a number of regulatory workshops for the last nine months now. And getting across this point: The staff has been directed to do this. We're trying to comply with a Commission direction and do a more efficient review, but there's only so far the staff can go along. It's a two-way street. So, industry needs to share this.

And then we've gone through all of these discussions. We did not focus on the potential mindset, Dr. Stetkar, that you said. I think we'll add that to our next meeting discussion. But we've emphasized that the way to gain some efficiency or to gain some improvement in the schedule is to do more earlier and give us as much information on the design and get us ready, help us and get us design information so we can decide what we want to do to

change the Standard Review Plan criteria and where that's necessary.

We're going to end up at the same point, the Final SER, there's just a question of how long it takes to get there.

MEMBER CORRADINI: But you've had these discussions, I guess, already. I was under the impression because you've had a workshop that some of us at least attended briefly with the SMR potential.

MR. KEVERN: Right.

MEMBER CORRADINI: And I got the impression that you are even having discussions in terms of the preliminary design; whatever the appropriate name for the --

MR. KEVERN: Yes.

MEMBER CORRADINI: -- type of design is for the Part 50 type.

MR. KEVERN: Right.

MEMBER CORRADINI: But so that you do have some information in this regard.

MR. KEVERN: Yes, we do. But I was specifically trying to address Dr. Stetkar's question. I mean, this is the way we're going to end up at the staff's reasonable assurance findings,

the Final Safety Evaluation Report and we're doing more of this earlier. The difference here is rather than waiting for the application comes in, and we're getting a head start on some of this. And there is an argument how much of a head start do you get? Because you don't want to make preliminary decisions that then you feel like you're locked into. So we're sensitive to that, but it's the process of trying to get an early start on this that is -- and we're focused on it from a schedule point of view.

And we're convincing the applicants, potential applicants that they need to support this.

MEMBER ARMIJO: I had a question. My perception of the level of detail available, design detail on the reactor and maybe the plant, the impression I'm getting is you expect that there will be quite a bit of detail design information at the Part 50 license process. That's the impression I'm getting. And that the design certification will be just a few adders. Is that correct, or is that --

MR. KEVERN: Let me try this a little bit.

The SRM and the whole effort was based on an assumption that it was going to be Part 52.

MEMBER ARMIJO: Yes, I understood.

MR. KEVERN: This nuance with TVA is a late breaking activity that the staff is still trying to get our arms around. So everything that I'm talking about here and all of the discussions we had with B&W and NuScale up until a month and a half ago were all based on Part 52 design cert. A very clean process like we have done most recently with the large light waters. So exactly how to address the Part 50 and the TVA issue is a little bit of a-- I don't know. I don't want to call it a nuance, but a little bit of a twist that we're still trying exactly figure out how to deal with.

MEMBER ARMIJO: Well, my concern, I think some of the other members share it, is that the Part 50 there won't be enough detailed information --

MR. KEVERN: Right.

MEMBER ARMIJO: -- that we're used to seeing and that a lot of stuff will be left to the design certification. If it was the other way around, I think I know I would be much more comfortable.

MR. KEVERN: Yes.

MEMBER RAY: It'd be left to the OL applicant application, actually in the case of TVA.

MEMBER ARMIJO: Yes.

MR. KEVERN: Right.

MEMBER RAY: The FSAR submitted for the OL. It's the design certification that can build off of the FSAR that is really being assumed here from the standpoint of not going back to the beginning again.

So you get an FSAR just like it was a stand alone plant, or if you went out and got a certification on an existing plant, for example.

DR. KRESS: Yes.

MEMBER RAY: You could do that. It has an FSAR, it has an operative license, you certify it and then you can replicate it under Part 52. But it's an existing plant. That's easy. And --

MR. KEVERN: Okay. In the interest of time, I'd like to move on the next part. I'll do this very quickly because I'm out of time.

And this slide is exactly what we were just talking about. I wouldn't go into that, don't need the slide because we already covered it.

So, the next topic is paragraph d of the staff's Requirements for Memorandum, and that was this new framework, risk-informed but applicable to designs other than light water reactors. And very

quickly, we do not have a framework we have an approach that we are suggesting would be a logical way over the next several years to try to address this topic. It's been on-again, off-again for the last ten or 20 years, depending on how you want to count.

So we currently had NUREG-1860 that was a draft. Let me mischaracterize it. It was a framework that was proposed by the staff, and that exists as a technology neutral approach published in a NUREG.

We went to, following Commission direction, we're going to in parallel with our review of one of the iPWRs do a pilot review of that iPWR using technology neutral type principles out of 1860, gather insights, information, lessons learned. Do the same thing, essentially, with NGNP except for our next generation nuclear plant we're already, as Bill mentioned earlier, involved in pre-application activities with a number of their white papers. So we know the approach that we're going to use. It's consistent with an ANS Standard 53.1 currently in draft version. So, again, follow along and should an application for a high temperature gas-cooled reactor come in, then we'll do a similar type

comparison with principles of 1860.

Should liquid metal reactors advance to the point where we have more intense interactions, pre-application interactions with those vendors and as the ANS Standard applicable to sodium-cooled fast reactors becomes finalized, it's currently in a draft form draft expected out by the end of the calendar year, we'll again do a comparison with the content of 54.1 with those principles of technology neutral of 1860.

And bottom line, the last bullet up there, but all that together, consolidate it as a firm recommendation in a few years to the Commission. We think that' a logical approach to address the staff's Requirements Memorandum considering both the iPWR technology and the review process, high temperature gas-cooled reactor designs and liquid metal designs.

And that's the end of the presentation. Questions?

CHAIRMAN BLEY: Thank you.

Let's go on to the next presenter. And we're running a little late, but if you can finish up by about 10 after, I think we'll have time for another presentation.

MR. RECKLEY: That's fine.

The staff produced an information paper, SECY-2010-34 where we laid out a number of issues. I'm just going to quickly go through what they were. We divided them into licensing issues such as:

License structure for multi-module facilities;

Manufacturing license provision we haven't used before;

Design requirements. Things like how do we use the PRA, appropriate source term calculations, aircraft impact assessments may be different for small reactors given their configurations.

CHAIRMAN BLEY: Let me sneak in a quick question, if I may.

MR. RECKLEY: Okay.

CHAIRMAN BLEY: Actually, this goes back to what I was asking your earlier. The current SECY refers back to 1034 --

MR. RECKLEY: Right.

CHAIRMAN BLEY: -- which have a whole catalog of these potential --

MR. RECKLEY: Right.

CHAIRMAN BLEY: -- policy issues, some

of them are here. Sometime back, a year or two, we saw a draft NUREG probably on defense-in-depth for the agency. I haven't heard any more about that. Is that work continuing, or is that coming back --

MR. RECKLEY: What we have done is roll defense-in-depth, PRA, licensing basis event selection and that whole set of information really into the risk-informed licensing approach.

CHAIRMAN BLEY: Okay.

MR. RECKLEY: When we saw the NGNP white papers and they were individual white papers on those topics, it becomes evident and NGNP realized this, it was a difficulty in producing the white papers individually versus as a set. They're so intertwined. And so we've just taken all of that to grow into that one category in terms of our action plan.

CHAIRMAN BLEY: Okay.

MR. RECKLEY: Yes. So it may be back, but it would be back in the terms of the item d action plan that Tom talked about, which is in the out years.

MEMBER STETKAR: Bill, I hate -- since you got to bring up defense-in-depth, I'll bring up risk metrics. How does that dovetail with this

effort, you know the issue of risk metrics for new reactors?

MR. RECKLEY: We've just been watching where that is going for the current set. And as you're aware, there's a SECY paper before the Commission now on what to do for new reactors, which is our term for the large new reactors. And then there are discussions going on within the community for risk metrics for this as a different category of reactors. But we will key off of -- not within the staff. I'm just saying there's a conversation. We don't have anything to point to

MEMBER STETKAR: I certainly hope we're not heading in terms of if I'm a member of the public I'm certainly hoping that I don't need to know the nuances of whether I live next to one of these little things or I live next to a different new reactor as far as how I have to understand the risk to me.

MR. RECKLEY: So just in terms of the overall topic, I'd say once we get direction on what to do for the large light water reactors, then we'll start a discussion of its applicability to these, and whether there's anything that needs to be done to that.

MEMBER STETKAR: I was more thinking in terms of, okay, you explained that you're sort of following in parallel.

MR. RECKLEY: Right.

MEMBER STETKAR: But there's a timing issue because that SECY paper in front of the Commission, the conclusion is basically where we're done fixing to start thinking about it, now we're going to start thinking about it. And it's not at all clear when we're really going to think about it. And I was curious about the integration of those two activities, you know moving forward. Because you do, indeed, have some time scales laid out for these follow-on activities.

MR. RECKLEY: Right. Right.

MEMBER STETKAR: Okay. Thanks. You at least told me. Thanks.

MR. RECKLEY: We address in the paper some operational issues for NGNP, specifically the co-location of a reactor with an industrial facility and, I'm going to get into a little more detail later, things like security and emergency preparedness. And then there's also some financial issues: NRC annual fees, insurance, Price-Anderson. decommissioning funding.

So these were all laid out in the paper. What I'd like to do is just take just a minute to talk about a couple of these and then on the last slide where we lay out some time frames, just kind of revisit and not necessarily reach an agreement today, but revisit that we need a discussion between staff, ACRS/ACRS staff, about which of these there should be an expectation and we come talk to you about which of these we would send SECY papers up to the Commission absent ACRS consultation and so forth.

So, the first one I'd like to just take a couple of minutes to talk about. Because we have been looking at these issues and from our point of view making progress in starting down a path that we would be making proposals to the Commission. So on control room staffing for an example, we have basically internally looked at whether we needed to come up with some dramatic new approach to determine if you need different numbers of operators for module or modules per operator. And really are believing that the existing general approach of just looking at tasking analyses and say what are the operators going to be called upon to do, what's their response to an accident on one reactor would

that preclude them from doing anything on other modules if they're responsible for multiple modules? But the same basic approach can work in doing this assessment.

So, on that premise we're going to go forward and start and have additional interactions with the vendors in pre-application space and kind of lay out a more detailed plan that we would expert, perhaps, in the third quarter of this year to send up a framework paper to the Commission saying we think we're on this path and if the results of the assessment that we come to at the end of this, say that one operator could operate X modules, we want the Commission to tell us now you're amenable to that kind of conclusion. Because no use to do this exercise and then have the Commission say at the tail end of the whole process "No, the existing rule of one operator and one senior operator and the current ratios has to remain in place."

And so when I say a "framework paper," which I'm going to use in a couple of different slides here, it's not a final proposal to the Commission, but a path we're on and we want the Commission to weigh in that we stayed on this path,

they'd be amenable to whatever the outcome of that path is.

DR. KRESS: Don't you need a pretty good PRA to do that?

MR. RECKLEY: Well, when I say "related issues," our big issue is going to be what are the events, what would the operators be called upon. Yes, so they would have to be --

DR. KRESS: Well, you'd get it out of the PRA?

MR. RECKLEY: Yes. Right.

DR. KRESS: Correct.

MR. RECKLEY: Some of those would ge severe accidents, some of those would be -- right. Exactly.

DR. KRESS: Right.

MEMBER SIEBER: Are you going to take any steps to look at situations where operators in a control room operate multiple units? For example, in a coal-fired plant?

MR. RECKLEY: Yes.

MEMBER SIEBER: I've worked there. When a unit is in trouble, that's where all the operators go.

MR. MAGRUDER: Right.

MEMBER SIEBER: Yes. Everything else, it sort of runs on its own. And if something happens on another unit, then there's a priority decision that's to be made. And sometimes, that's not a good decision.

MR. MAGRUDER: Yes. Yes.

MEMBER SIEBER: So keep that in mind --

MR. RECKLEY: Right.

MR. MAGRUDER: There are a couple of things --

MEMBER SIEBER: -- as you go through that.

MR. RECKLEY: Okay.

MR. MAGRUDER: Correct.

MR. RECKLEY: The next one is --

MR. MAGRUDER: Let me jump in here. I'm sorry.

Because we have done a lot of thinking about this, and vendors have done a lot. Obviously, because it's in their interest to convince us that they don't need one operator per module.

MEMBER SIEBER: Yes, I need to be convinced also. Okay.

MR. MAGRUDER: Right. Right. But I mean, one of the factors that they're banking on is

that the operator will have many less actions, many fewer actions to do. I mean, theoretically for these plants you need to stand back and let the plant operate and it'll get to a safe state. That's the goal if it works correctly.

But the other thing is we've been telling them, and then you think about what else the operators are required to do. How many people do you actually need on the whole site to handle EP issues, security issues, maintenance, good oversight of those things, refueling.

MEMBER SIEBER: Right.

MR. MAGRUDER: So it's not just how many operators do you need in the control room; how many people do you need on the whole site to do things.

MEMBER SIEBER: Well, just keep in mind that a human brain tends to prioritize and seek out. Regardless of how few mechanical things you have to do, it takes a tremendous amount of discipline to be able to do that.

MR. MAGRUDER: Right. That's true.

And our Office of Research has ongoing research looking at other industries and what operators can do. It's kind of interesting.

MEMBER SIEBER: I'm eager to see what

comes out of it. Okay. Thank you.

MR. MAGRUDER: Right. Sure.

MEMBER STETKAR: When you think about that, and both the staff and the industry, I think some of the risk insights that we see from new large LWRs merits some consideration. Where if you really take a risk perspective, some of the most risk significant events, although they've not yet been quantified very well in PRA, tend to be events that might effect simultaneously multiple modules. Things like, maybe not high winds, but external flooding in certain sites, and seismic certainly; those types of things.

MR. RECKLEY: Yes. And that would all have to be --

MEMBER STETKAR: If we think the world doesn't necessarily revolve around independent LOCAs or failure of a particular pump.

MR. RECKLEY: Right.

MR. MAGRUDER: That's exactly right.

MR. RECKLEY: That's under kind of the event analyses as to what we would assume they have to address.

MEMBER STETKAR: I just wanted to get that onto the record.

DR. KRESS: Most events appear to me to be like the dominant accidents --

MEMBER STETKAR: Well, from a risk perspective, not from a frequency perspective --

DR. KRESS: Yes.

MEMBER STETKAR: -- you know these might be different. But it is a consideration when you talk about things that Jack was talking about. That indeed if I have something that by definition shall occur only on one unit at a time, and those times are widely separated, you might be able to afford a different staffing compared to events that might effect multiple units closely in time and differently.

DR. KRESS: Yes. That might be how automatic response to events are.

MEMBER STETKAR: Right.

DR. KRESS: That's a consideration.

MR. RECKLEY: Moving on into the next one. Security is somewhat similar. We looked and preliminary conclusion leanings are that the Part 73 is already somewhat performance-based and we can look at these new designs without necessarily fundamental changes. So, we're looking at it and talking to the vendors about what their designs are.

These are -- actually to me, the first designs that are being caught early enough to actually incorporate advanced reactor policy statement and especially revision that says incorporate security aspects into the design of the plant. And the vendors are looking to see whether they can reduce some of the operational costs of security by making preliminary design information. And we're in initial discussions with the vendors about that.

Lastly, in terms of a specific issues, emergency preparedness is one that comes up often in the discussion. The staff has had several interactions with the industry:

NEI is prepared two separate white papers or position papers on emergency preparedness;

NGNP has submitted a paper on emergency preparedness;

Actually even before they changed track, Westinghouse had submitted a topical report on emergency preparedness.

So, we've had a series of proposals. The staff in looking at it believe that it is possible to take a graded approach to emergency preparedness and our leanings are to use the

Protective Action Guidelines, the PAGs, as a threshold. And if you don't exceed the PAGs at distance X, then the emergency preparedness requirements would reflect that the dose consequences at that distance wouldn't require evacuation. And so you tailor it to the actual dose calculation.

So within related issues, that immediately brings up that you're placing an importance on the off-site dose consequence analyses that's a little different in terms of its use and meaning. It's sort of like the PRA example in that you're now using that dose calculation not only to say, yes, you're less than 25 rem, but in this case you're less than one rem. And based on that finding, you're tailoring your emergency planning zone, for example, to that outcome.

And so it's a significant issue and we're going to have to -- again, we're developing a framework paper to go up to the Commission to say if we went down this approach, would you be amenable to the fact that we're going to be using source term or off-site consequence analyses for this purpose? This is the way we're going to use it and this could be the potential outcome.

MEMBER STETKAR: This, by the way, is one of the reasons I brought up the risk metrics. Because so far the risk metrics discussion is focused totally on the traditional core damage frequency and large something release frequency.

MR. RECKLEY: Right.

MEMBER STETKAR: You know, if you really want to risk-inform the process, perhaps a risk metric in terms of dose might be more appropriate integrated perspective. But people need to start making those decisions.

MR. RECKLEY: Well, and again, the purpose of the first paper to the Commission would be to say whether they're amenable to us going to that before we spend a lot of time. Because there would be a lot of time in deciding -- again, going back, what accidents would have to go into play to calculate the dose? Going back to multiple module, what role would natural disasters playing how you would have to model those. So there's a number of embedded issues even within this broader topic that we would have to address ultimately. Yes.

MEMBER REMPE: What time period for your dose are you thinking about considering if you did such an analyses?

MR. RECKLEY: Well, the --

MEMBER REMPE: Because some of these plants are very slow responding, very long -- you know, the highest amount comes out later, not earlier.

MR. RECKLEY: Right. And that's a potential factor is not just the release, but the timing.

MEMBER REMPE: Yes.

MR. RECKLEY: But if -- I'll just leave it that that's a factor that we'll address in this paper and not try to answer. Because if I was, I was just going to give you my personal opinion, and that's not worth doing it.

MEMBER REMPE: Okay.

MR. RECKLEY: So, yes. That'll be included. If not in the framework paper, it ultimately would have to be addressed in the actual policy resolution.

DR. KRESS: You wouldn't abandon defense-in-depth concept that this has to involve some sort of design-basis accident and a source term that's representative of a melting accident --

MR. RECKLEY: It would have to be reflective of a conservative, something that we're

going to be working toward decisions on. So it's going to have to be a conservative assessment of the off-site consequences, yes.

DR. KRESS: So you're going to have to come up with design-basis accidents?

MR. RECKLEY: And beyond design-basis.

DR. KRESS: And beyond.

MR. RECKLEY: Beyond design-basis.

DR. KRESS: Okay.

MR. RECKLEY: Right.

CHAIRMAN BLEY: On these last two topics, what's the extent of NSER involvement in your development.

MR. RECKLEY: Intense; they're actually writing the paper.

CHAIRMAN BLEY: Okay. Good.

MR. RECKLEY: They're writing the paper, so --

CHAIRMAN BLEY: Good.

And when do you expect to have your earlier drafts of this plan put together?

MR. RECKLEY: Well, for those that we are preparing papers -- we'll go back one and say when you look at 1034 there's also some of those issues that are licensing and financial that you

guys could weigh in as to whether you have any interest. And some of them we've decided may not even be policy issues as we've looked at it more. And we're going to send up a paper in the near term basically giving a status of which ones we don't even think are issues in a longer --

CHAIRMAN BLEY: Good. That struck me when I read it that some of those were already established.

MR. RECKLEY: Yes. But the ones that we are pursuing in the time frames here, and the ones that are in the nearest term are the one we talked about for the bulk of the meeting, the risk-informed paper is going up in February, this month.

We would hope also to send up a paper on multi-module licensing, which is the license structure. Not all of the questions about how do you handle severe external events and multi-module transients, but just the license structure.

And emergency preparedness.

MEMBER ARMIJO: Bill, I was going to ask you a question on that one.

MR. RECKLEY: All right.

MEMBER ARMIJO: Some of these -- all of them have the capability of adding modules over a

period of time.

MR. RECKLEY: Yes.

MEMBER ARMIJO: And so then the question is what's the life of the plant? You know, is it the life of each module? And are you going to address those kinds of questions.

MR. RECKLEY: That will be addressed in this paper in terms of how the licenses would work and the 40 year term, and the common structures. Yes.

MR. MAGRUDER: Yes. And the industry has already started thinking about license renewal for these facilities and how they're going to treat their structure of things. So, you know, give them credit for thinking about that now.

MEMBER CORRADINI: I mean just a reaction. To the extent that the industry wants relief so the four modular treat it as one plant, then they get the good and bad. It's one plant. So it has a life. You can't say two of them are old guys. It's not like I have a six cylinder engine and two cylinders are out; it ain't going to work, right?

MEMBER ARMIJO: It could work, Mike.

MEMBER CORRADINI: I don't think so.

I'm sorry. They're not that interchangeable.

MR. RECKLEY: There's pros and cons. The industry and staff, actually, have a common agreement that these will be licensed basically one license per module. So there will be NuScale and their standard design of 12 modules, there'd be 12 licenses in one.

DR. KRESS: When you approve a site?

MR. RECKLEY: Correct.

DR. KRESS: You will have to have 12 modules?

MR. RECKLEY: Yes, it would be licensed that way.

MEMBER CORRADINI: I'm waiting for a --

PARTICIPANT: Well, it would be 12 there and up.

MEMBER CORRADINI: I'm waiting for Dr. Kress to say something about it.

CHAIRMAN BLEY: Bill, it looks like we don't get a shot at three of these already if they're going up this quarter. This month one of them you said.

MR. RECKLEY: Yes.

CHAIRMAN BLEY: And that's the one we're vitally interested in.

MR. RECKLEY: Well, and that's part of the reason we laid out in the beginning part of these discussions.

The rationale that one can draw is that these, again, are frameworks and we're not making specific proposals at this time, but seeing if the Commission will give us a green light to proceed. That said, I don't want to underplay that if we send up a framework and the Commission says you can proceed, that there's a certain momentum that the ACRS didn't weigh in on before that decision got set in motion. But the details you would certainly have an opportunity when we came back with, let's say, the implementing SECY paper or whatever the vehicle might be. There'd be an opportunity at that time for the ACRS.

But this is a case where things were moving and we probably in follow-up to the meeting we had in March, should have been coming back saying "Hey, we're writing a SECY paper, what role do you want to play?"

CHAIRMAN BLEY: Just for me, I'll say I'm disappointed if we didn't get to look at them, and I certainly intend to read them when you send the up. And who knows what happen.

MEMBER CORRADINI: And repeat the process. So you send them up and then what?

MR. RECKLEY: Well, take emergency planning as the case in point. The paper will basically be saying the staff believes it's possible for small plants to come up with a graded approach and we would believe that it's feasible to do that based on the PAGs, either at defense or at some distance, and that we would use that in formulating what would be the appropriate emergency planning zone or what would be the appropriate emergency preparedness requirements within the zone. Let's call it the One Rem Zone.

And we don't believe that is a major, major policy issue because the rule already says that if a plant's less than 250 megawatts or for gas-cooled reactors, we can come up with a case-by-case approach to emergency planning. So it's already reflected in the existing rule that it would be somewhat different then a large reactor. And so we're just taking it one step further.

Again, when it actually comes time to implement this the guidance that we lay out is going to have to say what severe accidents, how do you handle multi-modules, how do you do all of this --

MEMBER CORRADINI: Okay, what the timing is?

MR. RECKLEY: -- in the calculation of the One Rem, or whatever the number turns out to be.

MEMBER CORRADINI: Thank you.

MR. RECKLEY: That, I think, we definitely would want ACRS weigh in on once we got down into those details. But this first one will be just to get the Commission to say "Yes, we're not going to tell you to stop, we're not going to tell you it's a non-starter."

MEMBER CORRADINI: I'm sorry.

MR. RECKLEY: Yes.

MEMBER CORRADINI: But as these are developed, the ACRS staff, we will get copies of these just for FYI purposes at least?

MR. MAGRUDER: Sure, yes.

MR. RECKLEY: But later on, we would probably expect that you would actually be in the process of.

CHAIRMAN BLEY: We would hope so.

MR. RECKLEY: Yes.

CHAIRMAN BLEY: We would hope you'd let us see the ones coming up in quarter three and quarter four.

MR. RECKLEY: Okay.

CHAIRMAN BLEY: How much time? We're going to have to talk in our full Committee meeting about --

MR. RECKLEY: Quarter two?

CHAIRMAN BLEY: -- the three that are going up right now and what we might want to say or do about them, because they seem pretty important to us.

MR. MAGRUDER: Yes. Well, I mean one of them you have seen. The risk-informed licensing one is the one that you got a draft of.

CHAIRMAN BLEY: Oh, okay.

MR. MAGRUDER: Yes.

CHAIRMAN BLEY: That is this one

MR. MAGRUDER: Yes.

MR. RECKLEY: That is this one.

CHAIRMAN BLEY: Okay.

MR. MAGRUDER: That's today's meeting.

CHAIRMAN BLEY: Okay. So this is the same thing?

MR. MAGRUDER: Yes, that's the same thing.

MEMBER STETKAR: But you mentioned three. There are three others.

MR. MAGRUDER: Yes.

CHAIRMAN BLEY: Two. Two others.

MR. RECKLEY: Ye, two others in addition for this quarter. Again, not to --

CHAIRMAN BLEY: Well, actually three of them.

MR. RECKLEY: But combine this, if you would, in your discussions you've also expressed interest in getting briefing or meetings on specific designs, and then there's these issues. And there's a lot on the plate, and you guys are constrained on how often you can meet and how much time you have. And so you may have to prioritize. Obviously, we'll--

CHAIRMAN BLEY: We'll certainly talk about that.

Are we at the end?

MR. RECKLEY: Yes, that was the last slide.

CHAIRMAN BLEY: Okay. Anything more from the Committee? I think we'll move on to the NEI presentation.

Thank you very much.

MR. RECKLEY: Okay.

CHAIRMAN BLEY: Very informative.

MEMBER CORRADINI: By the way, I didn't ask the one question: What royalties are you getting for using iPWRs?

CHAIRMAN BLEY: They don't know.

MEMBER CORRADINI: It's a wonderful acronym. I assume you paying for that or so you don't get sued for the acronym.

MR. BRADLEY: All right. I'm Biff Bradley. I'm the Director of Risk Assessment at NEI.

I wanted to say at the outset, I'm doing a bit of a pinch-hit here today. Our small modular reactor community at NEI is tied up in other meetings today. So the good news is I think we're in fundamental agreement with the staff, so it should be relatively easy for me to go through this fairly quickly.

This is an overview of what we plan to go over our previous interactions in which I, unfortunately, haven't been personally involved. But the people who wrote these slides were.

Feedback on what the staff is proposing

What we view as some of the critical implementation issues. I think we've heard a lot of that discussion this morning. There may be a couple of other flavors I can add based on some of our

discussion.

One thing I do have considerable experience is with risk-informed applications on the current operating fleet, so I wanted to just hit on that in terms of especially with regard to categorization in 50.69 what we've found.

And then our conclusions.

So, as I understand it, there have been a number of public meetings and a good dialogue with the NRC staff in developing this SRM. We understand and are in agreement with the concept of the near-term emphasis on the iPWR. Obviously, that's a little easier, the question of adopting our current methods since the designs are generally similar operating plants light water reactors.

As discussed this morning, it sounds like the staff is moving forward with incorporating the risk-informed review process into their SRP and that the risk significance of SSCs will be considered in that process to determine the type and level of review.

This is a good toe in the water, a good first step given time is limited and we all know these risk-informed discussions and applications generally take a lot of time to come to fruition. So

I believe that's appropriate.

We do like to believe that we can extend the risk concepts further as we move further with these SMRs and develop a more comprehensive plan for the use of risk insights as we go forward.

MEMBER STETKAR: Biff?

MR. BRADLEY: Yes.

MEMBER STETKAR: I was going to ask you about, I mean you're basically endorsing the scope of the current proposed informed process. If I go back and read that 2010 SECY paper and kind of bring out risk-informed applications, if you will, like there's sort of three general areas. One is risk-informed categorization best SSCs, one is risk-informed design-basis accident definition however you want to characterize that, and one is risk-informed emergency planning or off-site dose considerations.

You're basically endorsing the current process. Does the industry feel that that's the most benefit to be gained for these reactors? I know I'm putting you on the spot here.

MR. BRADLEY: Actually, John, I have some slides that --

MEMBER STETKAR: Do you have? I was

just trying to look forward. If you do, continue, go on. Go on.

MR. BRADLEY: Yes. Let me speak to that.

Yes. And to answer your question, I think we believe there's benefit in what the staff is proposing now, but certainly we believe there's further benefit to be had --

MEMBER STETKAR: You know, in terms of prioritizing the emphasis among those sort of three different focal points.

MR. BRADLEY: Right. I'll get to that and at least your question.

MEMBER STETKAR: Okay. Okay.

MR. BRADLEY: And you can --

MEMBER CORRADINI: I was trying to look forward, and I didn't see it, so that's why I wanted to ask you now.

MR. BRADLEY: If I don't fully answer it, ask it -- I'm sure you'll ask it again.

MEMBER STETKAR: I will.

MR. BRADLEY: So, in our discussions with the SMR and community, there has been agreement with the classification emphasis. I think, you know classification is one of the things we do have considerable amount of experience with. Although,

like everything else in risk-informed, there's a hundred different ways to do it. But it is an area I think, you know fundamentally risk methods are good for informing you on relative safety importance and where to focus resources. So that, I think, is a fair place to start.

And we believe there is some potential benefit here for the reviews of the SMRs.

An there was a considerable discussion this morning on exactly how this would play out, how the SRP would be developed and/or reviewed with regard to risk insights. And it sounds like there's a lot of these details that are being flushed out. I think that's really important.

One of the things we've learned I think in prior applications is that determining what's high and low sometimes is the easier part versus determining what you do with these things after you've classified them. And 50.69 is probably the obvious example of that.

We do think this is a good starting point, as I've said a couple of times.

Now this is where I'm going to try to get into, maybe try to talk about some other considerations going forward.

I know the staff has a longer term plan under development to look at extending risk methods further into the SMR arena. As we go forward, and there's been some discussion of this morning, and I think a lot of the discussion on SMRs is very analogous to the discussion we're having on risk metrics for large ALWRs. You have some of the same issues where you have the absolute safety level is lower or better, however you want to say that, then the current the plants. But we tend to go back and use relative measures, risk importance measures; RAW, Fussell-Vesely to make determinations. And that's, I believe, the approach that's being proposed. I believe the RAP uses standard RAW and Fussell-Vesely measures.

These don't necessarily take into account the absolute safety of the plants. The fact that we probably have greater margin to the safety goals, to the QHOs. And we've had considerable discussion on this with regard to the ALWRs and the risk metrics issue.

So, as we go forward and start expanding this beyond just the SRP, we believe there should be some consideration of the absolute level of safety for these plants. Again, you get into questions of

modularity and if you have 10 or 12 of these, then you're sort of back to having a large ALWR; I recognize that. But there may be cases where there's one or two of these, and it would appear that would be a different issue with regard to absolute.

Another thing that we've talked about extensively on the risk metrics, and probably is pertinent here too, is how expected external events would be important, if not dominant for these plants given that, you know like the new ALWRS we basically designed out a lot of the internal events risk factors from what we've learned, but you're still left with seismic, external floods, some of these other things. And these are generally common cause type of initiators so they would potentially effect multiple modules if you had an SMR.

So, I think if you did a full scope PRA, and I'm sure we will be doing these going forward, we're going to see, my guess is, you know external events seismic being very significant contributors. So in a big picture sense does that suggest we need to -- that's where all the emphasis needs to be? You know, how do we deal with that? Those are some of the questions, I think. We don't have answers to

those yet, but we've identified those.

And I guess there's some work being done by the national labs, and I'm not extremely familiar with that right now.

I'll still get to your question, John.

I think this has been covered pretty well this morning. I learned a lot more about exactly how the staff is going into the SRP and differentiating between low and high risk. So, it sounds like we're starting to see some definition to that process. I'll still need to think a little bit about a lot of details.

We heard this morning about design versus performance and some of the other things. But it sounds like there's progress being made there. So, I think that's good.

So, I think here maybe, John, I'll start to try to answer your question.

I guess in the near-term process there was some discussion of a longer term method to look at programs. We certainly believe that there's a lot of benefit to be had in going beyond what was laid out this morning and looking at things like tech specs, emergency planning, you know inspections; a lot of the things we do. Maintenance rule, to the

extent that applies. A lot of the things we do for the operating plants where we've seen tremendous benefit from risk. Certainly we would expect those to be applied here.

We get into some of the conundrums of the PRA, and the completeness, and how much of this you can do before the plant operates. These are similar to the questions we have for the ALWRs. And to be honest, it's been quite a challenge, you know the effort to implement risk-informed applications on the advanced ALWRs has been difficult. There's still a trepidation, I think. Some concern over regulatory risk. There's some lingering controversy over some of these things. And generally the applicants have chosen to avoid that potential risk. And that's unfortunate, because these new designs are even more amendable to the use of risk, but it seems that we still have the cultural issues and some trepidation and we haven't seen the real full blown impact -- you know, going to risk-informed for new plants that I would have expected.

So, you know I think the EP discussion was good. And, you know, so I believe there are other areas in terms of things like, you know design-basis. Well, you know we've been working on

that for about 12 years for the large plants. We got a final rule before the Commission shortly, or about now. And so that's been a huge challenge, and it's still not clear that that rule really is going to be a rule that's going to be implemented broadly, or anyone that will implement that rule. So, I guess whether we're going to jump into that on SMRs remains to be seen.

I think other areas such as, you know classification, EP, tech specs, or we've had more success on the operating plants. Our inclination would be to try to follow along on the things where we've succeeded.

MEMBER STETKAR: So from what I'm hearing, you say at least in terms of the line item, you know the three line items I brought out, you don't necessarily see a lot of benefit, at least in risk-informing the categorization if you will, or priorities in terms of design-basis type accident analyses? Is that --

MR. BRADLEY: I mean, there could be potential benefit there, but my concern is that experience has been it's a very difficult area to tackle. And we've had considerable success in risk-informed, but this has probably been the hardest

thing we've tried to do --

MEMBER STETKAR: Okay.

MR. BRADLEY: -- up to now, as evidenced by the fact that we still don't have a final rule and there's still controversy on it.

MEMBER STETKAR: Okay.

MR. BRADLEY: So, I would be a little bit hesitant on that. That doesn't obviate the fact that there are a lot of other things we can be doing though. So --

MEMBER STETKAR: I'll hold you here because of the three, we've talked about the categorization. And I recognize people kind of sort of know how to do that.

What about the emergency planning aspects? Is that a --

MR. BRADLEY: Yes. Yes. I think there was more considerable interest, if not more so here then for the large plants. Again, you get into the--

MEMBER STETKAR: Yes, I mean that's why I brought it up.

MR. BRADLEY: But to the extent someone's going to build one or two of these somewhere, certainly my opinion it could pretty much

be a showstopper for these kinds of plants. Because they're trying to get the -- you know, the financial incentive is the primary driver for these SMRs. So, I think, yes. And we have that on our slide because we do believe there's value, considerable value here.

MEMBER STETKAR: Okay. Thanks.

MR. BRADLEY: Yes.

And this is stating the obvious, I guess. But you know we have 50.69 and we finally do have a pilot plant for 50.69, you know five years after the final rule came out and very hopeful that that will drive that through to completion and that will be a success.

You know, I got a kick out of the four boxes. Now we have instead of risk 1, 2, 3 and 4, we have A1, A2 -- you know, like a translation chart to compare all that stuff. But it is complex. It's difficult for the public, you know to say something is safety-related but not risk significant and vice versa, or what have you. It's a confusing array of things just in terms of communicating it.

And it is also complex to implement because you got four boxes, that means you got four bins in the warehouse of everything, you know four

of everything instead of two. So it becomes it's own set of problems, so I know --

MEMBER STETKAR: Yes, but we know how to do that. Yes.

MR. BRADLEY: Yes.

CHAIRMAN BLEY: Biff?

MR. BRADLEY: Yes.

CHAIRMAN BLEY: Let me ask you a question, and I should have asked this of staff, but I didn't. We'll hear from them sometime, another time.

Building a framework for looking at the non-LWR, small module reactors, would you expect from a new risk-informed approach that we've had this same situation or would you expect it's safety-related or somehow, the design defined through that risk-informed process?

MR. BRADLEY: Well, I think it could be the later, or for the more -- you know for going to the non-LWR, I mean that was the whole Part 53 proposed rule, and there was some discussion about it this morning.

I'd like to think we could evolve that to a point where we just had two or something other than the confusing safety-related but not risk

significant or vice versa. So, yes, I think for that effort it would be nice to get to that end point. I know that at least back when I was involved in that, that was using FC curves, maybe you could have more. I don't know how many classifications you'd end up with out of some like that, but yes, I think that would be a good endpoint.

50.69, you know the reason it took us five years to get a pilot, it wasn't because we couldn't do categorization. We know how to do that, and it's a very robust process. It's not just RAW and Fussell-Vesely, it's got DID and all the external initiators and everything in it. But that wasn't the problem. The problem was the perceived what do you do with something that's low and there seemed to be a lot of resistance to really changing the way things were treated, even if they were low. So that's where the rub is on the operating plants. Hopefully, we'll overcome that this year.

So, I guess my conclusion is is, you know I think the staff has done a good job on this. I learned a lot this morning myself about the details of how their process worked. And we're fundamentally in agreement with what they're

proposing as the sort of the toe in the water. But we do look forward to expanding this and really trying to -- you know, it's very similar to some of issues we have, again, on the large plants. You know, how do we really deal with a framework where external initiators are the drivers and the things we've traditionally worried about seem to get diminished, at least in relative importance. So in a fundamental way how do you regulate that? I think that's a --

CHAIRMAN BLEY: Let me ask you a question.

MR. BRADLEY: Yes.

CHAIRMAN BLEY: If in fact external events are the drivers for these, and if we're moving especially for the non-LWRs too of a more risk-informed approach that will require a thorough PRA to be able to make licensing decisions, have you thought about how you'd do that when you don't have a site as yet?

MR. BRADLEY: Yes. I mean, clearly that's a problem. I mean we have some semblance of that same problem with the ALWRs because you have pretty detailed design, but you still have operating data, or you don't have -- I mean, there's a whole

bunch of parts of the PRA standard you can't meet because the plant hasn't operated yet. So, there's a question of can I implement risk-informed tech specs or something absent having any operating history of a plant or any, you know actual knowledge of how this thing works once you turn it on?

So, again, that's the same question here, probably to a greater magnitude since these are new designs that are in some cases -- I guess we have to, you know reach some accommodation on that in terms of how much the PRA can you develop practically, and is that enough, does that give you enough information? You have different sets of uncertainties for these plants. You know, so it may not be a one size fits all. There's a lot of different designs out here.

For a ALWR type, or you know some of the things that we talked about this morning that are somewhat similar to operating plants, it may be easier. But I understand the conundrum there, and we need to think about that. How do we get enough risk information so we can -- it's sort of a circular kind of question. Right. Yes.

CHAIRMAN BLEY: Okay. Any questions?

Thank you very much, Biff, for a great

presentation.

At this time I'd like to have the phone line and we'll address people there in just a minute.

Are there any members of the public in the room who would like to make a comment at this time?

And we'll wait just a minute for the people on the phone. I know we've got a group of about eight. And we will ask you folks if any of you want to tell us who you are and make a comment. As soon as the phone line opens so you can speak.

Okay. Could somebody on the phone line just say hello so we know you actually can speak to us.

JIM KINSEY: The phone line is open. This i Jim Kinsey from the NGNP Project.

CHAIRMAN BLEY: Hello, Jim Kinsey. Thank you very much.

Would any of you care at this time to make a comment for the Committee?

Thank you for listening in, and we appreciate it.

At this time I'd like to go around the

table and start with Mike, and let's see what members of the Committee have to say about today and what we might be doing with this in the near future.

MEMBER CORRADINI: Do you want me to go?

CHAIRMAN BLEY: I do want you to go.

MEMBER CORRADINI: Okay. So, I think this is a good start. I guess I have a couple of concerns.

The first concern is we kind of, and this is not meant as criticism to the staff, because I think the staff is working very hard to try to stay up with the Commission policy and where now apparently there's a need or concern to be expeditious. But I guess my first observation is although it's a good start, I see a lot of things happening in 11, and I guess I would share Dennis' concern that we ought to be involved a bit more in seeing these things and not reacting to them after they go to the Commission. So that's, I guess, observation one.

Observation two is I'm not sure what the rush is. Knowing a bit about where DOE is going in some of these designs, I don't think there should be a rush. I think we should do this, if we're going to do this in an appropriate manner, if one of the

designs coming in -- I'm not sure which, but I could take a guess, then with all due respect to that design, that's the stalking-horse that helps us do this right rather than rush to do it and then solidify it before we see additional designs.

And other than that, I think the first ones will probably be light water reactors, which means it ought to be less stressful for the staff to do this evolution. But other than that, I think it's a good start.

CHAIRMAN BLEY: Thank you very much.

Bill?

MEMBER SHACK: I found the approach very interesting. I mean, you know having been here for 50.69 and large break LOCA for many years, it's difficult to risk inform the regulatory system. And you need buy-in from the staff, among other things. And so I think this approach on the categorizing of level of the review is a good way to start.

As far as John's point, you know I think you have to deal with the PRA that you have. I mean, this has to be an iterative process. I can't envision any way we can risk-inform the process without dealing with preliminary PRAs. You know, the risk that you develop some sort of mindset and

you have to weigh that versus the benefit of being able to risk-inform the process. And to me there's just no comparison. I think the potential benefits from risk-informing the process far overwhelms. So I think that you should be doing in the pre-application and as early as possible setting up this iteration and to go through it. And so I think that this is reasonable place to start with developing it. And, you know, you might be more ambitious. But in practical terms, I think this is a good approach to begin dipping our toes into a risk-informed licensing process.

CHAIRMAN BLEY: Thank you very much. Mr. Stetkar?

MEMBER STETKAR: Yes, I think I've certainly made my views known.

Responding to Bill, on the one hand I agree with you. I think you need to start the process as soon as possible. On the other hand, I think that there is a very substantial responsibility in terms of the people who develop the PRA and the people who review the PRA, whether that's an industry peer review group or the staff, to recognize the degree of design information that's available to support a PRA that's used as input to

this type of categorization scheme and useful allocation. And to understand not only is the PRA adequate to support a particular notion of what might be required, but if its inadequate, to clearly identify the holes so that as you go forward and say, "Okay. Well this does not include the following items which could be potentially important to making these types of decisions so that there aren't surprises later." And to very, very clearly identify not only what is there, but what is not there. That's a lot more difficult to do, obviously, but I think that's something that we have not seen done very well yet on any of the current generation applications.

When pressed, people have tended to say "Well, you're right. It's probably not complete, but we're not really using it for anything."

And you say "Well, are you using it for RTNSS?" "Well, we are but we use other criteria and the RTNSS is probably okay."

And furthermore, there's no requirement for us to have a certain quality of PRA for these types of applications.

That's my concern that early on -- I think the sooner the better is good, but you know

it's incumbent for people to identify where the holes are very early, if there are holes. And there will be holes. No "if" there.

CHAIRMAN BLEY: Your comment?

MEMBER ABDEL-KHALIK: I would like to just repeat Mike's comment that I think it's important for the Committee to review these they go to the Commission, the ones that are expected to be issued in the third and fourth quarter as the one on control room staffing and the one on mechanistic source term.

The ones, the two -- the other two that will be issued in the second quarter on emergency planning and multi-module facilities if possible, I think that we'll discuss that at our P and P meeting. We really should give the full Committee the opportunity to review those and, if necessary, issue a letter. If nothing else, to provide our views to the Commission as to whether or not it's advisable to change course or proceed as the staff recommends.

Thank you.

CHAIRMAN BLEY: Thank you.

MEMBER BANERJEE: I was listening to Bill's comments, and actually I'm close to your

point of view on this. I also see that as sort of an iterative process. And we shouldn't demand too much too quickly, otherwise we will tend to kill the rooster before it lays the golden egg.

I sort of feel that we should be pragmatic and work to develop these things in an interative way. Not demand too much to start with.

CHAIRMAN BLEY: Thank you.

MEMBER SHACK: Remember that when you look at small break LOCAs. I was saving that for the end.

MEMBER BANERJEE: That's already a system which is being built.

MEMBER CORRADINI: But these small break LOCAs.

MEMBER ARMIJO: Yes. And I think the staff is on the right track. I think it's important that the staff get some of these issues up to the Commission early. That the issue of emergency planning zones, recognition of the -- the intent of these small modular reactor when they first started out was to create a safer design that would eliminate the need for some of these things, like large -- emergency planning zones. They have an inherent cost disadvantages and if there isn't

something to improve the public acceptance or reduces the cost of operation, that's where we get into the staffing issue; some of these may -- you know if we take a very inflexible position, say we're going to require the same things on these small modular plants as we do on a big plant, then these plants aren't going to be built. I can tell you that.

I managed the GE Advanced Design Group when the PRISM reactor started out right after Clinch River termination, and all these plants have a lot of potential advantages in factory fabrication and things like that. You get down to the final answer, the economics are really tough to overcome the disadvantages of many modules, so there has to be some recognition. If they are truly safer and they really don't produce much dose in the case of an accident, then there ought to be some regulatory recognition of that fact. And I think it's important that the staff take those -- first of all, I commend the staff because they're keeping an open mind on what these plants are like and what might be possible in a regulatory system. And bringing it to the Commissioners early to get a reading, that yes this is feasible, we can be flexible or we can't.

And if we can't, then I think these plants will have a short future.

And I'll leave it at that.

CHAIRMAN BLEY: Thank you.

Harold?

MEMBER RAY: Well, I think that what Bill said, let me again agree that iteration and the success of iteration is crucial. However, I guess I think that to the extent that we tie what we're doing to ultimately meeting the hurdle of Part 52, we've created a hurdle that I'm not sure can be gotten over, particularly with the likely reduction in government funding that's going to occur. And therefore, I think that keeping the option of Part 50 and making it a practical way to proceed is vital. And particularly because I think that much of the importance, it relates to siting and Part 50, is something which mostly deals with -- it's almost like an expanded ESP. And therefore, I hope that we're not going down a path that calls for things that can't be produced under the paradigm that one follows under a Part 50 application.

I think that we're going to need to make it possible for industry to determine if they can site a plant at a particular early challenging site.

And to do so with enough certainty to allow them then to proceed as you do under Part 52 and invest in the detailed design once you have a construction permit. That's just my reading of the tea leaves, and therefore I'm just asking that we not create such barriers.

And an example of what one runs into is the comment that we just made in the AP1000 letter. The AP1000 certainly has an enormous level of design detail available now, and yet we find that we have to defer until later some of the probabalistic assessments that cannot be made at this point in time as yet.

So, those are my comments, I guess. It's consistent with the comment about we have to have a barrier that isn't so high to get over that we can't get any of this done. And I happen to think that Part 50 is a better way to go from that standpoint just because it doesn't require as much investment. It does carry more risk, but the key issue that isn't solved in Part 52 is siting. It is solved in Part 50, or it is addressed, anyway. And that's why I think Part 50 is the way I would go if I was bringing one of these things to the market.

Once you get it to the OL stage, now you

can ask for a Part 52 design certification and replicate it elsewhere, perhaps. But that's my take on it.

CHAIRMAN BLEY: We'll go to Jack.

MEMBER SIEBER: Okay. I agree basically with everybody, but particularly in Harold's case. I think that he may be right, but the staff's approach does not rule that out. And the Part 50 first and then a certified design, somewhere in there but perhaps following that.

Actually, this is a situation where the staff's outline and approach is fully consistent with my view as to how this should be done. But the devil's always in the details.

I think at least on my part, my agreement with the concepts is firm and I'm eager to see what follows when detailed licensing begins to take place.

Thank you.

CHAIRMAN BLEY: Okay. Thanks.

And Tom?

DR. KRESS: Well, first I'll say I'm happy to be here because this is an area that I've always had a lot of interest in, as you know.

I think the new small modular designs

are safer, but I think the designers have done a good job in looking at the events in the big reactors and designing out a lot of the accident initiators.

That said, though, I think I agree with what John Stetkar thinks. If you're going to properly use risk insights and developing how to review these plants and what your new Standard Review Plans are going to be, I think you need a pretty good design and a pretty good PRA. I think you need a design that's equivalent to what would be used in a preliminary certification. You know, you design-basis accident, and you'll need source terms for those and you'll need something about the uncertainties in the PRA and how complete it is.

So, I guess I'd come down as I think you need a pretty good PRA to do what the staff is planning on doing.

I'm glad to see the recognition knowing staff and the industry that these plants are likely to have external events as to risk dominate accidents. The things about those is they can simultaneously affect all modules. To me, that's going to be a policy issue particularly in source terms and siting. I think we need to think about

how to develop design-basis accidents when the risk dominate accident are external events.

Then particularly you'll need that before you approve a site. And I think sites have to be -- they have to have a specification of the total number of modules you'll put on them before you can approve the site. I think that has to be part of it.

In reading the policy issues paper, I think the staff has a good handle on what the asses are. It's going to be interesting to see how we come down designing those. And I'm looking forward to more interaction.

That's it.

CHAIRMAN BLEY: Thank you very much.

You guys have ticked off everything that was on my list, except that paper on multi-module reactors is one, I would say we would especially like to see and get a shot at, even though its going up this quarter.

And I agree, too, that we have to progress incrementally. But we know how to do PRAs. We know how to use the information that's available. And what we have seen in the current designs is that not all the available information has been used.

And I think if we're really going to move into the place of using these PRAs, they've got to be good pretty quick, at least by the time you use them for making licensing decisions.

With that, I'd like to thank the Committee. And I'd like to thank all the presenters for very good presentations and discussions.

And the meeting is now adjourned.

(Whereupon, at 11:55 a.m. the Future Plant Design Subcommittee Meeting was adjourned.)

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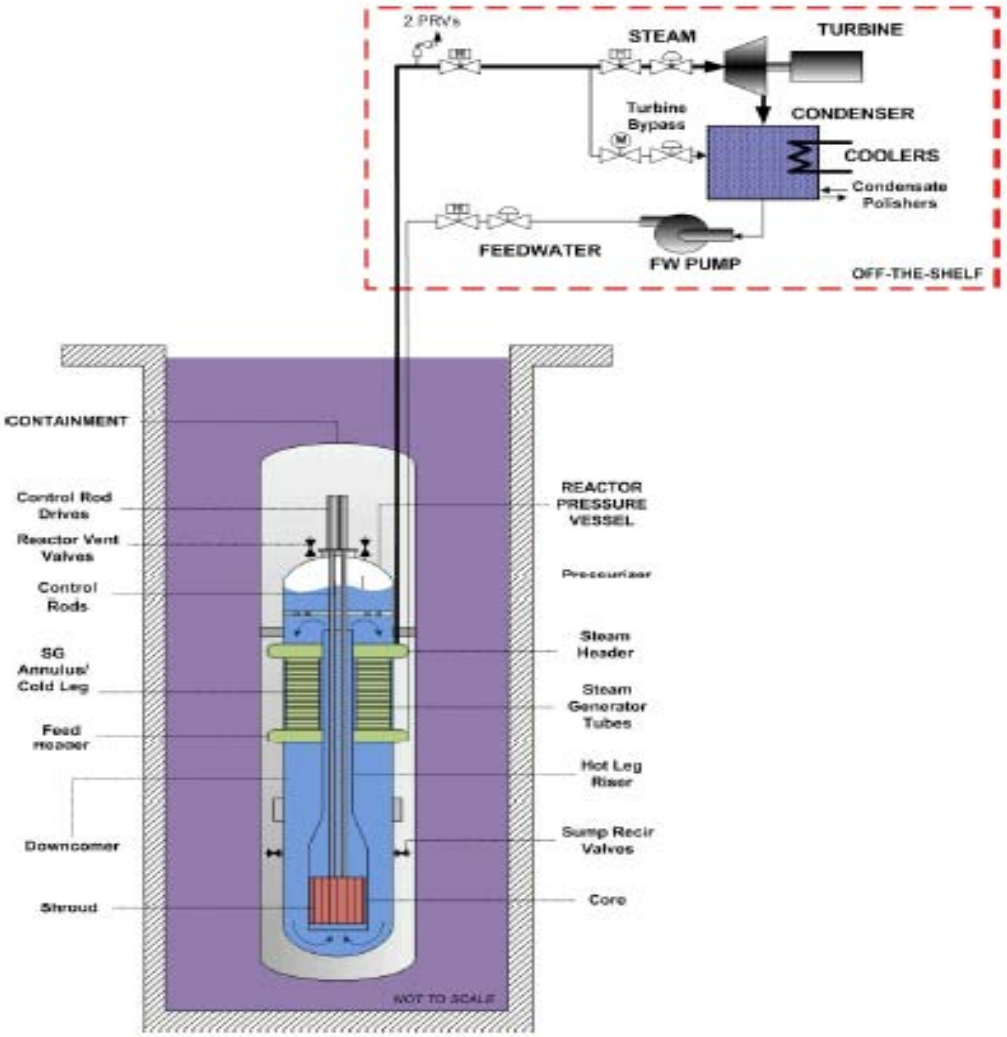
Advanced Reactor Program Overview

Stewart Magruder, Chief
Advanced Reactors Branch 2
NRO

February 9, 2011

NuScale Power Inc.



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NuScale

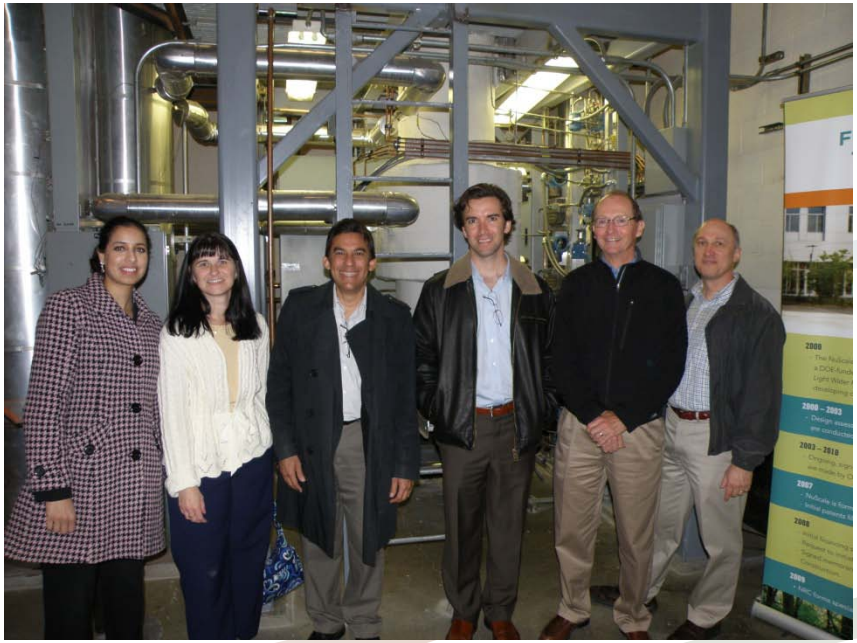
- **Topical & Technical Reports Submitted:**
- Human Factors Engineering (HFE) Program Management Plan
- HFE Implementation Plan
- LOCA PIRT – user need with RES
- Cyber Security Plan
- QA Topical Report
- Dynamical System Scaling Methodology

- **Topical & Technical Reports Expected:**
- Software Program Plan
- LOCA Testing and Assessment Plan Development
- Non-LOCA Methods Development
- Digital I&C Diversity and Defense-in-Depth Analysis
- Human Systems Interface Implementation Plan
- Fuels Development Program
- Core Analysis Code Verification and Validation
- N-RELAP5 Verification and Validation
- Subchannel Analysis Code Verification and Validation

Staff Visits NuScale Office and Test Facility

NuScale's Human Factored Control Room Simulator

NuScale's Test Facility at Oregon State University



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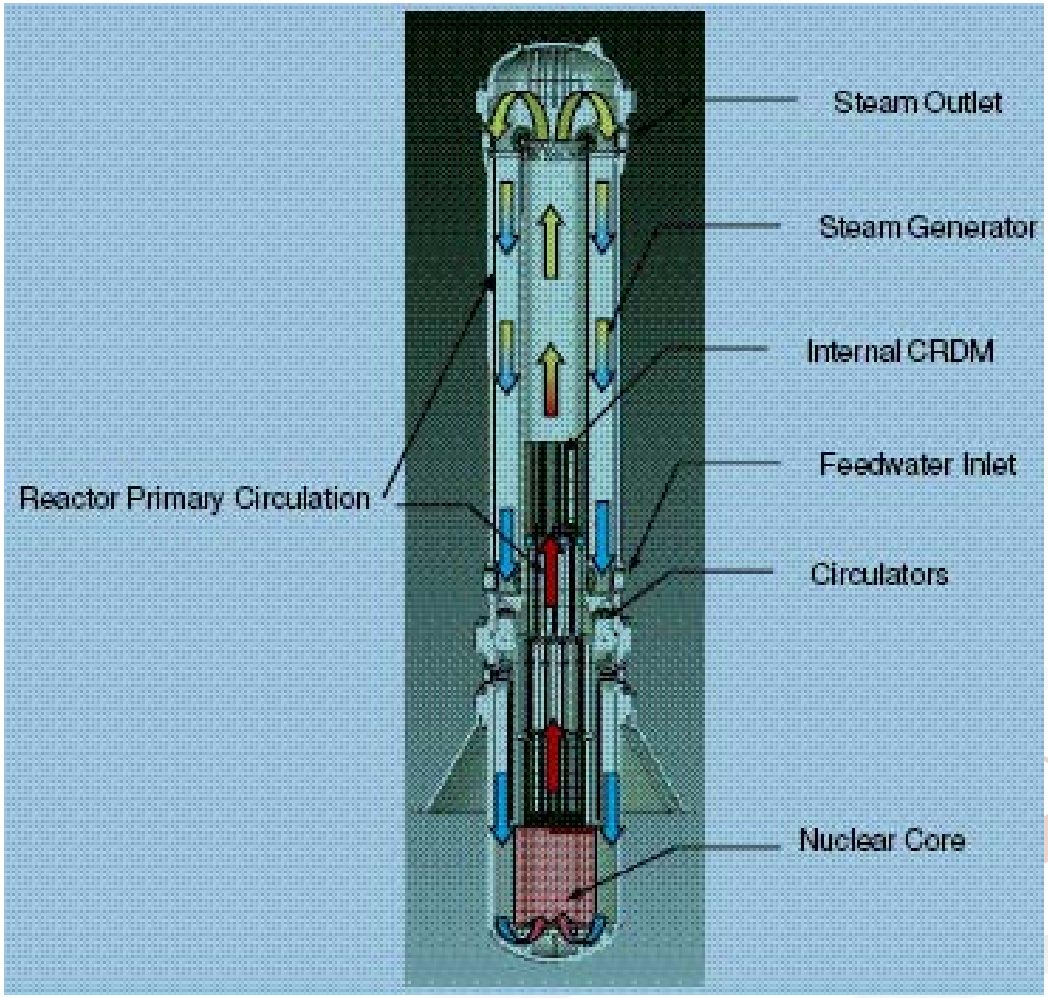
B&W mPower


Steam Outlet
Steam Generator
Internal CRDM
Feedwater Inlet
Reactor Primary Circulation
Circulators
Nuclear Core

mPower

- ***Topical & Technical Reports Submitted:***
- QA Program Plan
- QA Program Plan Revision 1
- Critical heat Flux Testing Plan
- Design Overview
- Design Overview Revision 1
- Integrated System Test Plan
- Integrated System Test Plan R1
- Core Nuclear Design Codes and Methods Qualification
- Instrument Set Point Methodology
- CRDM Design and Development
- Security Design Assessment and Program Plan

- ***Topical & Technical Reports Expected:***
- Fuel Assembly Mechanical Design Criteria
- HFE/HIS Program
- ECCS Design
- Design Basis LOCA PIRT
- Reactor Coolant Pump Design and Development
- Core Nuclear Design
- Core Thermal-Hydraulic Analysis Methodology
- I&C Software Quality Assurance and Program Plan
- Accident Analysis Codes and Methodology
- Small Break LOCA Accident Analysis Methodology
- Non-LOCA Accident Analysis Methodology
- Integrated Systems Test (Results)
- Multi-Module Staffing
- I&C System Defense-in-Depth and Diversity
- Digital I&C Platform
- Cyber Security Program
- Critical Heat Flux Text and Correlation (Results)
- Pressure-Temperature Limits Methodology
- Core Operating Limits Methodology
- Fuel Performance Analytical Methodology
- Probabilistic Risk Analysis

B&W constructing test facility for full height mPower integrated system testing

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TVA

Clinch River

- 11/5/2010 TVA Assumptions Letter
- 12/1/2010 NRC Questions Letter
- 12/14/2010 NRC/TVA Public Meeting
- 12/22/2010 TVA Addendum Letter
- 1/31/11 NRC Response

Moving Forward:

- *Spring/Summer*– Series of workshops with TVA to develop Regulatory Framework for submittal of CP
- *Spring/Summer* – Geotechnical core boring & QA visit to site by NRO/RII staff
- *2011* – Environmental staff early visits
- *2011* – Staff review of gaps between Part 50 and Part 52 requirements, determine need for Commission consideration

NRC Messages:

- no prohibition against the use of Part 50
- RG 1.70 level of detail ok, but TVA must address req's of Part 52 for CP finding
- "One Design – One Review" ok, but technical continuity between applications must be maintained
- Enhancements to NRC vendor program necessary

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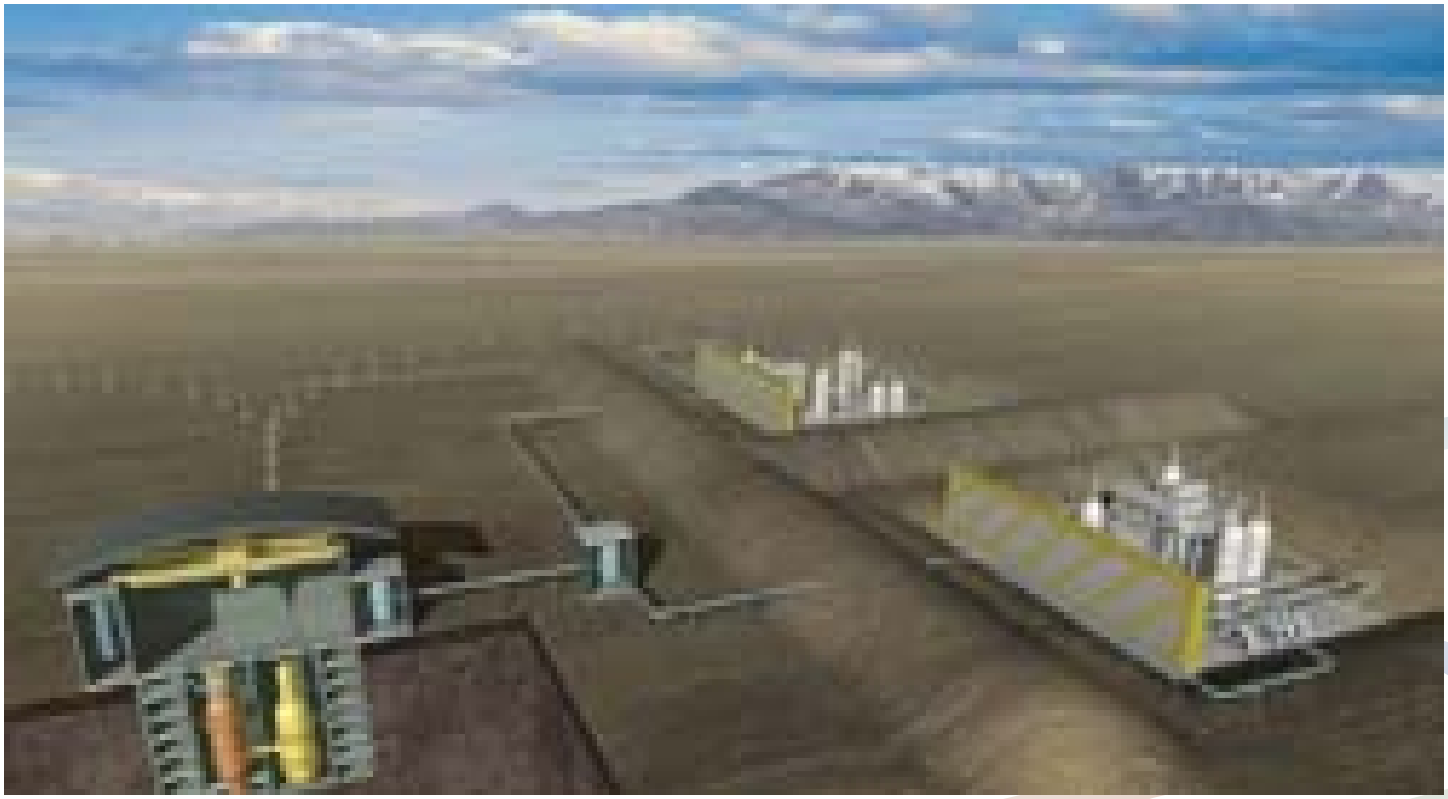
NGNP



NGNP White Paper Reviews

- Risk-informed, performance-based licensing
  - Defense-in-depth
  - Licensing basis event selection
  - SSC classification and treatment
- PRA (pending submittal)
- High temperature materials
- Fuel qualification and mechanistic source term
- Quality assurance program description
- Emergency planning
- Modular plant licensing

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Upcoming NGNP Milestones

NRC Activity

- White paper RAIs: mid to late February
- Public meeting(s) to discuss RAIs and responses: March/April
- RAI responses received, white paper assessments complete: June/July
- Infrastructure development: ongoing

DOE Activity

- NEAC recommendation to Secretary of Energy: May
- Secretary of Energy decision on Phase 2: end of August
- Projected COL submittal: September 30, 2014
- Challenges
  - Identification of private partner
  - Cost sharing scheme

Presentation to the ACRS
Future Plant Design Subcommittee

Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor Reviews

[SRM-COMGBJ-10-0004/COMGEA-10-0001]

February 9, 2011

Introduction

Preliminary briefing to ACRS subcommittee regarding staff response to SRM – COMGBJ-10-0004/COMGEA-10-0001

Staff should provide the Commission a policy paper …

- Near-term focus on integral pressurized water reactors (iPWRs):
  - Development of a framework …
  - Align review focus and resources …
  - Develop risk-informed licensing review plans for each …
- Long-term focus:
  - Develop a new risk-informed regulatory framework …

SECY-11-00XX (draft in concurrence)

Enclosure: NUREG-0800, Standard Review Plan (SRP), Introduction (draft revision)

iPWRs: SRM paragraphs a & b

- SRM:
  a) Development of a framework, implementation strategy, and plans and schedules to more fully integrate the use of risk insights into pre-application activities and the review of small modular reactor applications (SMR), consistent with Commission Policy Statements. The initial effort should focus on how risk insights would be used to identify risk-significant systems, structures, and components (SSCs) and other aspects of the design that contribute most to safety.
  b) Alignment of review focus and resources, consistent with regulatory requirements, to risk-significant SSCs and other aspects of the design that contribute most to safety to enhance the efficiency of the review process. The plan should address the use of risk insights in determining which portions of existing review guidance (e.g., standard review plans) should be applied to SMRs.
- SECY-11-00XX
- Standard Review Plan (SRP), Introduction (draft revision)

iPWR Review Framework – Approach

Status Quo:

- Consistent with current regulations
- Consistent with Commission policy
- No change to SSC safety related/nonsafety related determination
- No change to SSC risk significance determination process

Revise:

- More risk-informed review process – graded approach
  - … detailed, in-depth review (analogous to the current review process) for SSCs determined to be both safety related and risk significant and progressively less detailed review applied to SSCs determined to be nonsafety related, not risk significant, or both
- More holistic (integrated) review process –
  - … improving the integration of the performance-based programmatic requirements that are applicable to SSCs into the SSC review process

iPWR Review Framework – Holistic

SRP Acceptance Criteria for SSCs

- Design-related criteria
- Performance-oriented criteria
  - Capability
  - Availability
  - Reliability
  - Maintainability

Program Requirements

- Applicable to applicants for certified design or COL
- Staff review to support DC and COL issuance
- Include performance-based requirements
  - Technical Specifications
  - Availability Controls (e.g., RTNSS)
  - Startup Test Program
  - Maintenance Rule
  - Reliability Assurance Program
  - ITAAC

Correlation: Performance-Oriented Acceptance Criteria & Performance-Based Program Requirements

Acceptance Criteria Attribute	Program Requirements
Capability	Technical Specifications
Availability	Availability Controls
Reliability	Reliability Assurance Program
Maintainability	Maintenance Rule
	Initial Test Program
	ITAAC (inspections, tests, analyses and acceptance criteria)

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iPWR Review Framework – Holistic

Observation – For most SSCs, the SRP acceptance criteria include a number of criteria that address aspects of demonstrated performance (i.e., performance-oriented criteria) in addition to the criteria that address aspects of design. Certain program requirements (e.g., technical specifications, availability controls for SSCs subject to RTNSS, maintenance rule) include performance-based measures (e.g., SSC availability, reliability, and maintainability) that correlate with the performance-oriented acceptance criteria in the respective SRP sections.

Review –

- Performance-oriented criteria – Where above correlation exists, framework provides for identifying the program requirements as part of the SSC review and for using these requirements to augment or replace, as appropriate, technical analysis and evaluation techniques applied to address performance-oriented acceptance criteria. [e.g., inclusion of SSC within an applicant's reliability assurance program and maintenance rule program may be sufficient to satisfy performance-oriented acceptance criteria pertaining to reliability, availability, and maintainability of the SSC.]
- Design-related criteria – no change to review process

iPWR Review Framework – Risk-Informed

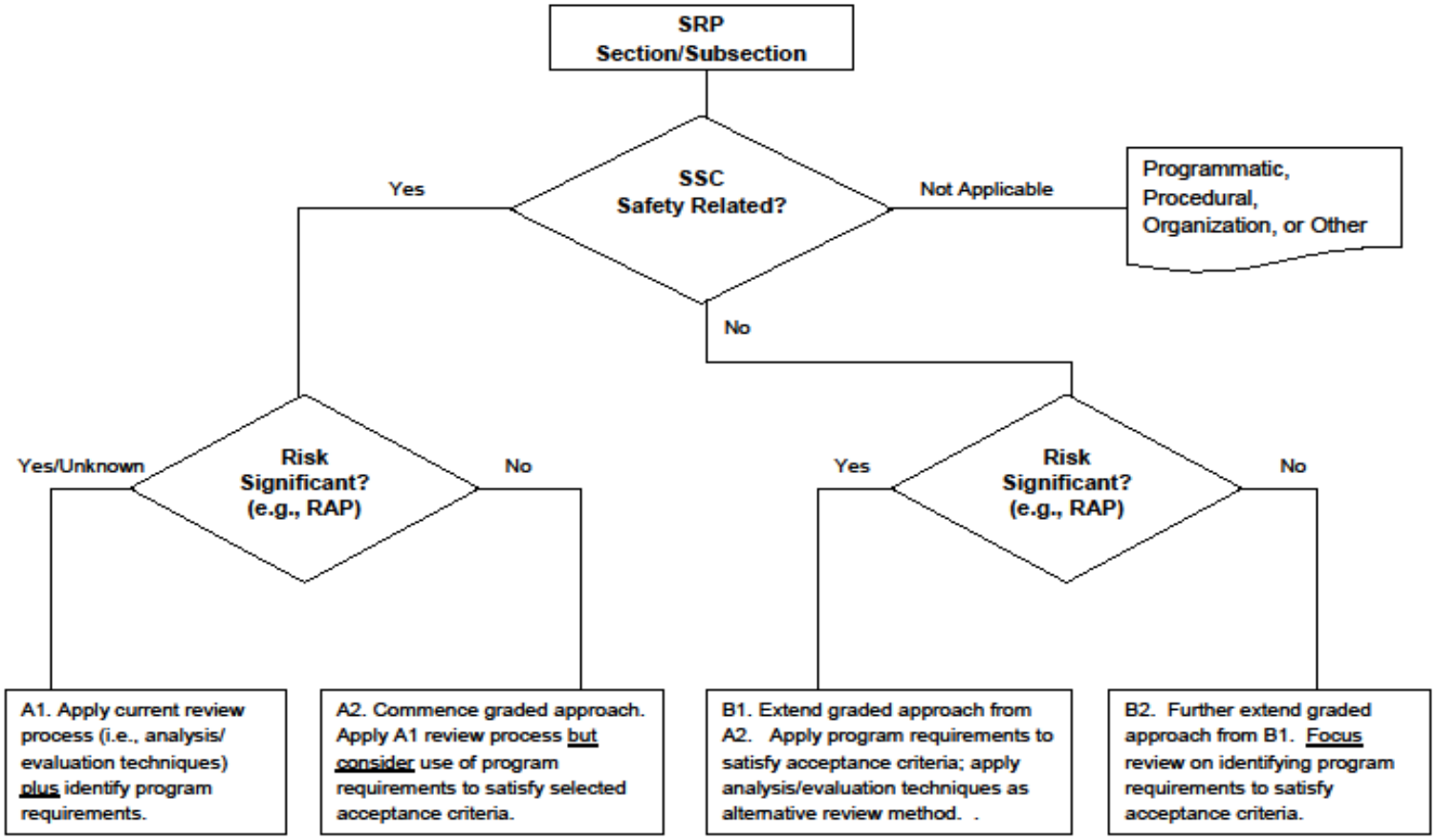
Graded review approach for SSCs

- Safety importance and risk significance determine level of review
- Detailed, indepth analysis and evaluation review (analogous to the current review process) applied to safety-related and risk-significant SSCs and progressively less-detailed review to other SSCs

Determination of whether SSC is safety related, risk significant, or both is prerequisite to implementing review framework

(e.g., risk significance may be determined using process similar to that used in identifying SSCs included in the reliability assurance program)

iPWR Review Framework – Risk-Informed



* For programmatic, procedural, organization, or other non-SSC topics (e.g., quality assurance, training, human factors engineering, health physics programs, operating procedures), the current review process is applied as provided in the SRP.

iPWR Review Framework – Risk-Informed

A1. For such SSCs, the review is consistent with the current review process in that the review typically involves detailed analysis and evaluation techniques to satisfy the SRP acceptance criteria. In addition, however, the review identifies those programmatic requirements applicable to the SSC in order to augment the review scope and to support the overall safety review of the application.

A2. The review is similar to the A1 review in that emphasis remains on analysis and evaluation techniques; however, the graded review approach commences at the A2 level. The review identifies programmatic requirements to augment analysis and evaluation techniques, as in the A1 review, and also identifies programmatic requirements to be used in lieu of some analysis and evaluation techniques.

B1. The graded review approach is extended from the A2 level. The review places greater emphasis on identifying those programmatic requirements that satisfy SRP acceptance criteria. Note that for SSCs determined to be highly risk significant, it may be appropriate for the review to be performed at the A1 or A2 level.

B2. The graded review approach is further extended from the B1 level. At the B2 level, both the design-related review and the programmatic requirements are anticipated to be minimal.

iPWR Review Framework – Examples

9.2.1 STATION SERVICE WATER SYSTEM

B1 (system determined to be nonsafety related and risk significant)

SRP Section 9.2.1 identifies the following acceptance criteria:

- *Protection against natural phenomena. Information that addresses requirements of GDC 2 regarding the capability of structures housing the service water system (SWS) and the SWS itself to withstand the effects of natural phenomena will be considered acceptable if the guidance of Regulatory Guide (RG) 1.29, Position C.1 for safety-related portions of the SWS and Position C.2 for nonsafety-related portions of the SWS are appropriately addressed.*

  Review: Criterion is design-related and requires technical analysis/evaluation techniques to address effects of natural phenomena.
- *Environmental and Dynamic Effects. Information that addresses the requirements of GDC 4 regarding consideration of environmental and dynamic effects will be considered acceptable if the acceptance criteria in following SRP sections, as they apply to SWS, are met: SRP Sections 3.5.1.1, 3.5.1.4, 3.5.2, and SRP Section 3.6.1.*

  Review: Criterion is design-related and requires technical analysis/evaluation techniques to address effects regarding internal interactions
- *Sharing of Structures, Systems, and Components. Information that addresses the requirements of GDC 5 regarding the capability of shared systems and components important to safety to perform required safety functions will be considered acceptable if the use of the SWS in multiple-unit plants during an accident in one unit does not significantly affect the capability to conduct a safe and orderly shutdown and cooldown in the unaffected unit(s).*

  Review: Criterion is not applicable to single-module site (analysis/evaluation techniques may be necessary for subsequent modules of a multi-module site

iPWR Review Framework – Examples

9.2.1 STATION SERVICE WATER SYSTEM (cont)

- *Cooling Water System. Information that addresses the requirements of GDC 44 regarding consideration of the cooling water system will be considered acceptable if a system to transfer heat from SSCs important to safety to an ultimate heat sink is provided. In addition, the SWS can transfer the combined heat load of these SSCs under normal operating and accident conditions, assuming loss of offsite power and a single failure, and that system portions can be isolated so the safety function of the system is not compromised.*
  Review: GDC 44 includes both design-related and performance-oriented criteria. Design-related would be addressed by analysis/evaluation techniques. Performance-oriented may be satisfied by program requirements (e.g., RTNSS availability controls, initial test program)
- *Cooling Water System Inspection. Information that addresses the requirements of GDC 45 regarding the inspection of cooling water systems will be considered acceptable if the design of the SWS permits inservice inspection of safety-related components and equipment and operational functional testing of the system and its components.*
  Review: GDC 45 addresses performance-oriented "maintainability" – which may be satisfied by program requirements (e.g., combination of maintenance rule program, initial plant testing)
- *Cooling Water System Testing. Information that addresses the requirements of GDC 46 regarding the testing of cooling water systems will be considered acceptable if the SWS is designed for testing to detect degradation in performance or in the system pressure boundary so that the SWS will function reliably to provide decay heat removal and essential cooling for safety-related equipment.*
  Review: GDC 46 addresses performance-oriented "reliability, availability, and maintenance" – which may be satisfied by program requirements (e.g., combination of RTNSS availability controls, reliability assurance program, and maintenance rule)

iPWR Review Framework – Examples

9.5.7 EMERGENCY DIESEL ENGINE LUBRICATION SYSTEM

B2 (system determined to be nonsafety related and not risk significant)

SRP Section 9.5.7 identifies the following acceptance criteria:

- *GDC 2 requirements for SSCs to withstand or be protected from the effects of natural phenomena like earthquakes, tornadoes, hurricanes, and floods apply to safety-related EDELS SSCs. The identification of SSCs required to withstand earthquakes without the loss of capabilities to perform safety functions is listed in RG 1.29. Comprehensive compliance with GDC 2 is reviewed under other SRP sections as specified in subsection I of this SRP section.*
  Review: Criterion is design-related and would be addressed by a minimal review – technical analysis/evaluation techniques to address effects of natural phenomena.
- *GDC 4 requirements for SSCs to be protected against the effects of externally- and internally-generated missiles, pipe whip, and jet impingement forces of pipe breaks apply to safety-related EDELS SSCs. Comprehensive compliance with GDC 4 is reviewed under other SRP sections as specified in subsection I of this SRP section.*
  Review: Criterion is design-related and would be addressed by a minimal review – technical analysis/evaluation techniques
- *GDC 5 requirements for sharing of SSCs important to safety among nuclear power units are met if each unit has its own diesel generator(s), each with an independent lubrication system.*
  Review: Criterion is not applicable to single-module site (minimal review involving analysis/evaluation techniques may be necessary for subsequent modules of a multi-module site)

iPWR Review Framework – Examples

9.5.7 EMERGENCY DIESEL ENGINE LUBRICATION SYSTEM (cont)

- GDC 17 requirements of independence and redundancy criteria are applicable to the EDELS. Acceptance is based on the following specific criteria:
- *A.. NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability."*

Review: Criterion addresses performance-oriented "reliability" - and may be satisfied by program requirements (e.g., maintenance rule program)

- *B. System operating pressure, temperature differentials, flow rate, and heat removal rate external to the engine in accordance with engine manufacturer recommendations.*

Review: Criterion addresses "capability" – and may be satisfied by program requirements (e.g., initial plant testing).

- *C. Sufficient system protective measures to maintain required oil quality during engine operation.*

Review: Criterion addresses a combination of "capability, reliability, availability, and maintenance" – and may be satisfied by program requirements (e.g., maintenance rule program, initial plant testing)

- *D. Protective measures (e.g., relief ports) to prevent unacceptable crankcase explosions and to mitigate consequences of such events.*

Review: Criterion addresses a combination of "reliability, availability, and maintenance" – and may be satisfied by program requirements (e.g., maintenance rule program, initial plant testing).

- *E. A keep-warm oil lubricating system to maintain engine lubricating oil passages in a warmed and filled state when the diesel engine is in the standby mode.*

Review: Criterion addresses a combination of "reliability, availability, and maintenance" – and may be satisfied by program requirements (e.g., maintenance rule program, initial plant testing).

iPWR Review Framework – Examples

9.5.7 EMERGENCY DIESEL ENGINE LUBRICATION SYSTEM (cont)

- *F. System design to circulate lubricating oil to the diesel engine during standby to enhance starting capability in conditions under which the engine-driven oil pump can pressurize the system quickly following engine starts.*

Review: Criterion addresses a combination of "reliability, availability, and maintenance" – and may be satisfied by program requirements (e.g., combination of maintenance rule program, initial plant testing).

- *G. Each diesel engine lubricating oil system completely independent of other diesel engines so a single failure will not cause a loss of the required minimum diesel generator capacity as specified in ANSI/ANS-59.52.*

Review: Criterion is only applicable to a site with multiple diesels and addresses a combination "reliability, availability, and maintenance" – and may be satisfied by program requirements (e.g., combination of maintenance rule program, initial plant testing).

- *H. Onsite lubricating oil storage capacity for each diesel engine sufficient for seven days operation after any design basis event and a continuous loss of off-site power as specified in ANSI/ANS-59.52.*

Review: Criterion addresses a combination of "availability, and maintenance" – and may be satisfied by program requirements (e.g., combination of maintenance rule program, initial plant testing).

iPWRs: SRM paragraph c

- SRM:
  The staff should provide to the Commission a policy paper, with near-term efforts focused on integral pressurized water reactor designs, that addresses the following:
  c) Development of risk-informed licensing review plans for each of the SMR reviews including the associated pre-application activities.

- SECY-11-00XX

iPWR Review Framework – SRM paragraph c

Implement iPWR review framework for each iPWR application

Design-specific review plan includes:

- Unique plan for each iPWR design
- Standard Review Plan "tailored" to design (i.e., SRP sections added/deleted/modified as appropriate to design)
- Schedule(s) for pre-application and application activities
- Safety Evaluation Report template "tailored" to design (correspond to tailored SRP sections)

Pre-application activities include:

- Topical/technical reports – vendor submittal and staff review
- Audits of vendor information, programs, and processes
- Review of conceptual/draft/preliminary design information
- Determination (preliminary) of SSCs – safety-related or non-safety-related; risk significant or non-risk significant
- Requests for additional information (informal)
- Documentation of pre-application review in SER template format

iPWR Review Framework – SRM paragraph c (continued)

Post-application activities include:

- Application Acceptance Review (formal protocol)
- Requests for additional information (formal)
- Determination (final/confirmatory) of SSCs – safety-related or non-safety-related; risk significant or non-risk significant
- ACRS meetings
- Review of completed/finalized application information
- Preparation of final SER

Coordination with Applicant

- Activities directed at improving effectiveness and efficiency of NRC review process (i.e., no changes to regulatory requirements applicable to SSCs or applications)
- However –
  - NRC staff review process would be assisted by improved documentation of SSCs and program requirements in applications
  - Improved coordination in applications likely means improved coordination in design and licensing processes
- NRC staff willing to explain review approach and broader licensing topics to broader audiences (generic or design specific)

iPWRs: SRM paragraph d

- SRM:
  d) Development of a new risk-informed regulatory framework building, as a long-term objective, on the SMR reviews, insights gained from the NGNP review activities and the earlier Technology Neutral Framework presented in NUREG-1860.

- SECY-11-00XX

New Risk-informed Regulatory Framework
(non-LWRs – SRM paragraph d)

Framework development process:

- iPWR pilot review
  - Conduct iPWR pilot review – apply principles of technology neutral framework (e.g., NUREG-1860) for review of application – in parallel with formal review of application
  - Develop insights applicable to technology neutral framework from pilot review
  - Schedule – FY2012-13
- NGNP pre-application activities
  - Continue NGNP pre-application interactions and review activities (e.g., white papers, ANS Standard (draft) 53.1, public meetings)
  - Compare/contrast NGNP regulatory approach (i.e., white paper documentation) with principles of technology neutral framework
  - Schedule – FY2011-13

New Risk-informed Regulatory Framework
(non-LWRs – SRM paragraph d)

Framework development process (continued):

- NGNP application activities
  - Conduct NGNP comparison review – apply principles of technology neutral framework (e.g., NUREG-1860) for review of application – in parallel with staff's formal review of application
  - Develop insights applicable to technology neutral framework
  - Schedule – FY2014-15
- LMRs
  - For LMRs (e.g., PRISM, 4S, Hyperion), conduct pre-application interactions and review activities using a review approach similar to that for NGNP and, as applicable, ANS Standard 54.1 (currently under development)
  - Develop insights applicable to technology neutral framework

New Risk-informed Regulatory Framework
(non-LWRs – SRM paragraph d)

Framework results:

- Consolidate insights from
  1) iPWR pilot review,
  2) NGNP pre-application activities,
  3) NGNP comparison review, and
  4) LMR pre-application activities
- Develop staff recommendation to Commission for:
  - technology-neutral framework – or
  - multiple-technology framework – or
  - technology-specific frameworks
- Schedule – FY2015

Questions ?

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Resolution of Key Technical and Policy Issues

William Reckley, Chief
Advanced Reactors Branch 1
Office of New Reactors

Licensing Process Issues

- License for prototype reactors
- License structure for multi-module facilities
- Manufacturing licenses

Design Requirement Issues

- Defense in depth
- Use of probabilistic risk assessment
- Appropriate source term and dose consequence analyses
- Key component and system designs
- Aircraft Impact Assessments

Operational Issues

- Operator staffing
- Operational programs
- Construction/installation issues
- Industrial Facilities using nuclear process heat
- Security and Safeguards
- Offsite emergency preparedness
- Loss of large areas due to fires or explosions

Financial Issues

- NRC annual fees
- Insurance and liability (Price Anderson)
- Decommissioning funding

Control Room Staffing

- Approach
  - Tasking Analyses (NUREG 0711)
  - Staffing Exemptions (NUREG 1791)
- Related Issues
  - Plant Design, Event Analyses and Simulation
  - Overall Plant Staffing
- Possible framework, approaches expected to Commission in 3rd Quarter FY2011

Security

- Approach
  - Security Assessments – Preliminary Designs
- Related Issues
  - Plant Designs, Mechanistic Source Term
- Performing Issue Identification and Ranking Assessment
- Possible framework, approaches expected to Commission in early FY2012

Emergency Planning

- Approach
  - Recommending graded approach based on evaluation of public dose in relation to PAG values resulting from severe accident
- Related Issues
  - Mechanistic Source Term
  - Process Heat Applications (NGNP)
- Possible approach described in SECY-2011-xx

Summary of Key Technical and Policy Issue SECY Dates

SECY PAPER	DATE TO THE COMMISSION
Control Room Staffing	Q3 FY 2011
Risk-Informed Licensing	Q2 FY2011
Mechanistic Source Term	Q4 FY 2011
Emergency Planning	Q2 FY2011
Physical Security	Q1 FY 2012
Manufacturing Licenses	TBD
Multi-Module Facilities	Q2 FY2011
Annual Fees	Complete
Insurance	TBD
Decommissioning Funding	Q2 FY2011

Industry Evaluation of Preliminary Staff Response to SRM

ACRS Future Plant Design Subcommittee

February 9, 2011

NUCLEAR ENERGY INSTITUTE

Overview

- Industry interaction with staff on SRM
- Feedback on planned staff response
- Critical implementation isues
  - Risk significance determination
  - Levels of review
  - Treatment of programs
- Lessons learned from similar approaches in current fleet
- Conclusions

Industry Interaction with NRC Staff

- Appreciate work of staff in responding to this SRM
- Discussions at several public meetings
- Understand near-term emphasis is on review of iPWR applications
  - Anticipate staff will propose incorporating risk-informed review process into SRP
  - Staff will consider risk significance of SSCs to determine type of review
- Anticipate longer-term, more comprehensive plan in future

NEI

Feedback on Planned Staff Response

- Agree with classification emphasis of staff response
- Approach could be beneficial to industry and NRC
  - Details of implementation are key
  - Important to begin early
- Categorization scheme identified by staff is a good starting point

NEI

Critical Implementation Issues – Risk Significance Determination

- Binning of SSCs as risk significant or not risk significant will determine level of review
- Key component of approach
- Process merits careful consideration
- Need to consider process most appropriate for SMRs; for example:
  - Role of traditional risk metrics
  - Relative vs. absolute measures
  - Initiators other than internal events
- Understand national labs have conducted preliminary work

NEI

Critical Implementation Issues – Level of Review

- Understand staff is articulating appropriate levels of review for each type of SSC
  - Need to identify what is done differently in review process
  - Remains to be seen where efficiencies will result
- Key will be communicating this to assist applicants in preparing documentation

Critical Implementation Issues – Treatment of Programs

- Programs not identified for inclusion in this process
- Risk-informing programs (e.g. Technical Specifications, emergency planning) could be beneficial
  - Beneficial to implement before operation
  - More efficient use of NRC and industry resources long-term
- Suggest considering
- Industry supports considering risk information in these areas

Lessons Learned from Current Fleet

- 50.69 is also based on safety-related/risk-significant matrix
- Complex implementation
- Consider emphasizing risk significant vs. not risk significant

Conclusions

- Appreciate staff efforts to keep industry informed during development of response to SRM
- Classification approach is promising
- Details of implementation key