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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

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NuSCALE SUBCOMMITTEE

+ + + + +

WEDNESDAY,

MAY 3, 2017

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ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 2:00 p.m., Michael L. Corradini, Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL L. CORRADINI, Chairman

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

GORDON R. SKILLMAN, Member

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JOHN W. STETKAR, Member

DESIGNATED FEDERAL OFFICIAL:

MIKE SNODDERLY

ALSO PRESENT:

ANNA BRADFORD, NRO

BRIAN GREEN, NRO

CRAIG HARBUCK, NRO

MICHELLE HART, NRO

TOM KENDZIA, NRO

SAMUEL LEE, NRO

MATTHEW MITCHELL, NRO

JOHN MONNINGER, NRO

LYNN MROWCA, NRO

TONY NAKANISHI, NRO

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P R O C E E D I N G S

2:01 p.m.

CHAIRMAN CORRADINI: Okay, why don't we get started? This meeting will come to order. This is a meeting of the ACRS's NuScale Subcommittee. My name is Mike Corradini, Chair of the Subcommittee. Members in attendance at this moment are Charles Brown, Dennis Bley, and soon to be John Stetkar. Mike Snodderly is the designated Federal Official for this meeting. The purpose of today's meeting is to discuss the status of the Staff's NuScale Safety Focus Review Working Group.

NRO chartered this working group to establish a new, more efficient review standard for this design. The Subcommittee's last interaction on this matter was an informal briefing on August 16th, 2016. The ACRS was established by statute and is governed by FACA. That means the Committee can only speak through its published letter reports. We hold meetings to gather information to support our deliberations. Interested parties who wish to provide

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comments can contact our office requesting time after the meeting announcement is published in the Federal Registry.

That said, we do set aside time for extemporaneous comments from members of the public attending or listening to our meetings. Written comments are also welcome. The ACRS= section of the US NRC=s public website provides our charter, bylaws, letter reports, and full transcripts of all full and subcommittee meetings, including slides presented here.

The rules for participation in today=s meeting were announced in the Federal Registry Notice on April the 28th, 2017. The meeting was an announced as an open closed meeting. We will close the meeting after the open portion to discuss proprietary material and presenters can defer questions that should not be answered in the public session. So I leave it to the staff to tell us if we are going somewhere that requires a closed session, and we will postpone that until the appropriate time.

No written statement or request for making oral statements to the Subcommittee have been received from the public concerning this meeting. The

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transcript of the meeting is now being kept -- or is being kept, I should say. And it will be made available as stated in the Federal Registry Notice. Therefore, we request that participants in this meeting use the microphones located throughout the meeting room when addressing the Committee. Participants should first identify themselves and speak with sufficient clarity and volume so that they can be readily heard.

We have established a bridge line for the public to listen into the meeting. To minimize disturbances, the public line will be kept in a listen-in-only mode. And also to avoid disturbances, I request that all attendees check out their electronic devices like cell phones and make sure they are in the off or noise-free mode. We will now proceed with the meeting. I will call upon John Monninger of the Office of New Reactors to start us off. John?

MR. MONNINGER: Thank you, Mr. Chair. My name is John Monninger. I'm the Director of the Division of Safety Systems Risk Assessment in Advanced Reactors. On behalf of the staff, we are very pleased to be here today. I'd like to thank you very much for the opportunity to brief you and supporting us on such a short notice. With that said, I'd also like to

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apologize on behalf of the staff for cycling back and forth in scheduling this meeting. We do appreciate your consideration.

With that said, when we step back, the NuScale Enhanced Safety Focus Review Approach -- it's a very important initiative for the staff within the NRO. And it's a very important initiative, we believe, for the Agency. It was directed by the Commission and we are being responsive to the Commission's direction from several years ago that Lynn will go through. You know, and when I think about the project, I really look at it as having two purposes.

One, is it has a purpose very specific to the review of the NuScale application. We want our reviews to be as effective and efficient as possible and to be very much focused on safety. So that is clearly one of the purposes. With that said, though, I do believe there is also a second purpose.

And the second purpose is the continued advancement within the Agency on the use of risk informed principles and risk informed practices. So I think it's very important in that when you look at this initiative, and if you look at the engagement of the NRO staff and the participation of the staff

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throughout all the branches, it's an example of the Agency moving forward and further adopting risk informed and performance based approaches.

There's been very strong participation from representatives, all the branches, within the NRO, and within the NRR and NSER in this effort. So to me, it has both of those purposes. One is has the purpose to service for NuScale. And it also has a broader purpose -- to advance the Agency's interest in risk informed approaches.

With that said, you know, that was all I really wanted to say. But in closing, I thought about just mentioning that Lynn Mrowca is retiring this week. And given that you may want to take it easy on Lynn, but I decided I would not mention that .

(Laughter.)

MR. MONNINGER: So with that, I will turn it over to Lynn.

CHAIRMAN CORRADINI: I have a question for Lynn.

(Laughter.)

MS. MROWCA: Thank you very much, John. I appreciate that. So good afternoon, my name is Lynn Mrowca. And I am the Probabilistic Risk Assessment

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and Severe Accidents Branch Chief in the Office of New Reactors. However, the main reason I am here is since I am also the Chair of the NuScale Enhanced Safety Focus Review Working Group. So first like John said, I'd like to thank you, the ACRS members, for squeezing us into your busy calendar and giving us this opportunity to share our progress on this review approach.

This activity, today, completes the mission we began as a working group about a year ago, to develop tools and ready the tech staff to implement the review guidance in the Standard Review Plan for Lightwater Small Modular Reactors. So as you know, we are about seven weeks into the review of the NuScale Design Certification Application. But secondly, I would like to acknowledge and thank the working group members for their dedication -- and there=s many of them here in the audience -- and our management like John Monninger for their support of this project to strive towards a more effective and efficient and optimized review.

Although we=ve made progress towards this goal, there is still more to do. The purpose of our meeting today is to provide an update on the NRC=s staff approach to focusing on safety and the review of the

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NuScale Design Certification Application. Secondly, to provide awareness of the potential changes to draft SCRs that will be provided to the ACRS for review in phase three.

And three, to inform the ACRS of continuing efforts to integrate risk insights to increase the effectiveness of safety reviews. Let=s see.

CHAIRMAN CORRADINI: Is it the intent of this -- where it says, this is the NuScale Subcommittee -- is the intent of this to go beyond that? So that whatever is found here will be instituted for other advanced reactor reviews? Or is this NuScale-specific?

MS. MROWCA: This is NuScale specific, but actually I have made two presentations. One at the RIC 2017 on advanced reactors. How some of the tools that we=ve developed for this NuScale review could be used in the advanced reactors. And then last week, I gave a presentation at the DOE workshop and talked about the same thing. And as we talk about the -- for instance, the SSC review tool -- that it may be something that will help us systematically focus on important areas during pre-application. So, I do see uses for what we=ve done beyond.

MEMBER BLEY: Have you been getting any

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outside feedback on what you've presented?

MS. MROWCA: I heard from the DOE workshop that it was a good meaty presentation providing details about what could be done during pre-application. So I did get good feedback on that.

MEMBER BROWN: I did have one question. You used the magic words that triggered my memory at this age. Pre-application. That, and I remembered -- has this advanced past or is looked at for past the pre-application stage? Or it still just for the pre-application review?

MS. MROWCA: Well for this scale, we are thinking about it as part of the actual review. How we would approach our review and implement our review. So what we're thinking about for advanced reactors is actually using the same kind of tools initially during pre-application to help us.

MEMBER BROWN: Okay. So this is really intended for the application review itself for NuScale at this point?

MS. MROWCA: Correct.

MEMBER BROWN: Okay.

CHAIRMAN CORRADINI: But if we go back to Genesis or what I was asking -- if it's being considered

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pre-application for advanced reactors, pre-application is defined as anything that either a DCD hasn't arrived or a construction permit has not arrived. Anything.

MS. MROWCA: Correct.

CHAIRMAN CORRADINI: Okay.

MS. MROWCA: So I think part of -- I know we are straying a little bit from the subject, but --

MEMBER BROWN: You can bring us back.

MS. MROWCA: Yeah, part of what we thought for advanced reactors is that -- for instance, if we needed or if there was a policy issue, you'd want to know that early. So you want to take care of it early, make a decision on which direction we're going before an application came in.

MEMBER BROWN: Okay, fine.

MS. MROWCA: So that's the idea. To do things in advance. Therefore, during the review you're not stopped or hindered by those new things that come up. You should be able to take care of them early.

MEMBER BROWN. Okay.

MR. MONNINGER: So there would also be a second example. During the pre-application meeting is when the staff is to develop the design-specific

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review standard. So we would hopefully use this tool to provide a feeder into development of the design specific review centers.

CHAIRMAN CORRADINI: If there is such a thing as to say to the --

MS. MROWCA: Correct. I don't think we've decided whether to go that way, but that's one of the things I think we mentioned before in August. That was a little bit of a problem in terms of the timing of the design information and they used this tool. The design information available to be able to write a design specific review standard in time to get it issued and used for the review. The difference between when we had to issue it and when it came in -- there were changes.

CHAIRMAN CORRADINI: Okay.

MS. MROWCA: And so the staff had to adapt.

CHAIRMAN CORRADINI: I think we want to go back to the NuScale issue. I think, because this is NuScale specific, but I guess this brings up a number of other questions that we should hold off on until we are later on in the discussion.

MS. MROWCA: Okay. So we'll quickly cover the background, framework, and technical review

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preparation and approach for this review. We will share proposed strategies that could be used during the review, and provide some examples of review emphasis and reduced effort or improved deficiency reviews. Finally, we will provide a proposed path forward during the review.

In this review, we will use a risk informed graded approach to focus on safety, resulting in increased effectiveness and efficiency. In 2011, we brief the ACRS, at that time called the Future Plant Design Subcommittee, on the staff's proposed response to an SRM. And basically, to more fully integrate risk insights into pre-application activities and small modular reactor reviews, and to align the review focus and resources to significant structured systems and components.

So we also briefed the ACRS NuScale subcommittee, as I already mentioned, in August of last year on basically the process that we plan to use. We agreed to return when we had some of those results on which items would require more review emphasis, and others require maybe less. After reviews of review emphasis -- oh. Oops. I'm sorry. I missed one.

So as you recall, we identified eleven key

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considerations as part of the thought process that the branch chief and their staff could use to determine the scope and depth of the review. This tool that we've developed, we call it the SSC review tool. And then after we determined which areas of review emphasis and which areas were improved efficiency, then the review approach would be documented in the safety evaluation report. So, the --

CHAIRMAN CORRADINI: I don't mean to stop you. But on the other hand -- I'm trying to understand what this takes the place of. So I'll ask it more directly. Does this replace something, or does it add to the reviewers' activity? I'm hoping you'll say replace, but I'm kind of curious. In other words, I do these. I look at these eleven criteria. I make some sort of judgment. And I assume that's the reviewer or some review team. And then, with that, I then would potentially change what I do downstream so that I do less of something that one would determine is -- I'll use the word unnecessary. But I can't come up with a better word, unnecessary. Is that intent? Or -- help me out here. I don't remember.

MS. MROWCA: Well, I'll give my opinion and then John is ready to say something.

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CHAIRMAN CORRADINI: Yeah, you=re leaving. You=re going out the door, so leave it to him.

(Laughter.)

MS. MROWCA: So it=s my opinion -- what John says matters. I think it=s actually a little of both. A little bit of replacement, a little bit of new. Because it does -- you know. We requested people to go through this systematic thought process. I mean, a reviewer who has experience already knows really what they want to look for. They are familiar with the standard review plan. But we are asking them to do it, maybe, in a more systematic way and keep their mind open for how their review fits into the holistic part of the design and the review.

So maybe, you know, sometimes we become too focused on what our experience is and what review we do without really remembering the relativity between what is safety significant and what is not as safety significant. So this tool -- maybe a little added -- in that you need to, you know, go through this actual process to figure out maybe what you might emphasize that you weren=t aware of before.

CHAIRMAN CORRADINI: So let me ask my

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question, because I think I heard a maybe.

MS. MROWCA: Yes.

CHAIRMAN CORRADINI: So is it the culture of the staff when they're going through a review? Since I don't -- I mean. I'm from a university, we don't have a culture. We just have students. But is it the culture of the staff, when they do a review, that once passed onto the members, the particular subject matter expert -- for want of a better word -- that they pretty much have their own decision making process? As long as they follow the standard review plan or some modification of it, they can decide what detail they need to delve into things?

MS. MROWCA: That's correct.

CHAIRMAN CORRADINI: The minimum detail, as soon as the standard review plan. The maximum detail is undefined? What I'm trying to get at is, does this help decide when enough is enough? And clearly things are too much.

MS. MROWCA: Or maybe sometimes a standard review plan may be at the maximum amount. This is what you normally do. But maybe, going through this thought process, you'll see that certain areas maybe don't require or should have the same type of review that

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you might have done in the past.

CHAIRMAN CORRADINI: Okay.

MR. NAKANISHI: Lynn, can I add something?

This is Tony Nakanishi, I work for Lynn Mrowca. I just want to add that the existing guidance in this RP already states that these safety reviews, the scope and depth of the review should be something that should be discussed with the branch chief and determine the appropriate review. I think what this is attempting to do, in conjunction with a safety significance categorization.

If you recall, the NUREG-0800 introduction part two has a scheme where the framework that identifies A1B1 A2B2. And in conjunction with that, these considerations are intended to help refine the review=s scope and depth. Because certain things, just because it=s A1, it doesn=t necessarily mean you need to do an extremely deep review on every aspect of that particular SSC. But it=s important to consider these eleven factors, if you will, as part of coming up with your review approach that you may implement. Granted, things may change as you conduct your review.

CHAIRMAN CORRADINI: So, I hear you. But let me ask it differently. So I do the eleven factors

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and I find out -- I'll use colors. Red is -- I can't remember what A1 is. I'll assume A1 is safety significant and --

MR. NAKANISHI: Risk significant. .

CHAIRMAN CORRADINI: And risk significant.

MR. NAKANISHI: Both, yes.

CHAIRMAN CORRADINI: All right. And A2 is not safety significant, but -- I'm sorry. Not risk significant, but safety graded, correct?

MR. NAKANISHI: Right.

CHAIRMAN CORRADINI: And so on.

MR. NAKANISHI: Yes.

CHAIRMAN CORRADINI: So, these should match up with that? Or these would inform where they fit into those boxes?

MR. NAKANISHI: So I think the way to look at this is the categorization is determined sort of separate. You know? The safety related or not is determined by regulations. And risk significance is determined by reliability assurance program type of assessment.

CHAIRMAN CORRADINI: Right. Which we already use as type of report for NuScale. So I'm kind

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of going in that direction.

MR. NAKANISHI: So, well. I think we reviewed the risk significance -

(Simultaneous speaking.)

CHAIRMAN CORRADINI: Potentially what would go into a thinking program, you're making that?

MR. NAKANISHI: Correct. It's a candidate, SSC. Because, you know, the topical report essentially focused on the risk metrics. But DREP consists of other aspects. You know, expert panel and things like that. So I think the way to couch this is you have this initial categorization scheme, which may change also, as part of the review.

And in conjunction with that, these are -- not all considerations may apply. For a given review issue or SSC. But where it applies, the idea is to consider these things as you develop your review plan, essentially.

CHAIRMAN CORRADINI: Okay. All right. I have another question, but I'll wait.

MEMBER BROWN: You talked about eleven -- are those --

CHAIRMAN CORRADINI: Those are the eleven things on the sheet --

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MEMBER BROWN: These are the eleven things across the top here, right? And I guess I wanted to try -- I've been struggling with this as well. Try to categorize it in terms of how are we looking to try to reduce the burden of reviews? I mean, the whole object of this is to try to have a more efficient review.

Expand -- I mean, reduce the time it takes to get through the process. Reduce the resources required, if you can. Et cetera. And make sure we still come out safe.

MR. MONNINGER: So what I would say -- we would flip it around one eighty. We would say, we want to make sure it's safe and then if it results in potential resource --

MEMBER BROWN: Okay, I hear you.

(Laughter.)

(Simultaneous speaking.)

MR. MONNINGER: If other areas -- you know, there are some new unique areas of the plant, we would go with much greater than eleven --

MEMBER BROWN: Okay. I understand that, I just put the wrong thing at the wrong end. I wasn't trying to send a message. And I was trying to put it into a category -- I don't see I&C mentioned. Maybe

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I lost it somewhere in here.

MR. MONNINGER: Oh, it=s there.

MEMBER BROWN: Huh?

MR. MONNINGER: It=s there.

MEMBER BROWN: It=s somewhere. I just haven=t read it all yet. When I got here nine years ago, and I was asked to look at I&C equipment -- I&C systems, protections, and safeguards, I was having a difficult time. Because it was outside of my previous experience from the Naval Nuclear Program. And here we had ISGs, we had reg guides, we had all these various documents. And it was like, to me, it was like we=re going to examine in great detail how the carburetor is built and how the spark plugs are put in, and how the wires are connected.

And by the time I finished all that if each one of those was okay, obviously a car would run -- which I thought was totally the wrong way to look at it. It would be better to frame it in a manner of fundamentals of -- what=s a hierarchy? And so we=ve been going at it with the independence redundancy deterministic -- you know, processing, defense and depth, and then controlled access. So that=s a hierarchy thing. If you can prove things are

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independent, if they're redundant, if they're this -- you can look at stuff underneath that and determine whether you need to look at that or not need to look at that.

I didn't see that approach, that thought process applied to various systems that we would be considering for NuScale. In other words, where is the umbrella? What are the magic bullets that you have to make? And then worry about how you would achieve for safe operation. And then where can you stop underneath that to do that?

So I've been trying to figure out for each of these systems, where is that umbrella piece for each of the critical -- I don't want to use the word critical, each of the systems. You determined what it is, safety, non-safety, whatever. And then how do you limit your scope under that? I didn't see that thought process when I was going through this. So, I've just been trying to calibrate myself. That's the difficulty I've had in reading the documents so far.

MR. MONNINGER: This is John Monninger from the staff. My thought is that this is a matter of progression in terms of the staff's thinking. If you look at any particular review area, historically,

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the level of depth and the scope has been an agreement between the branch chief and the staff. And it's been based upon the particular background of the branch -- realistically, it's based upon the background of the branch chief and its staff and what's currently going on within that area.

So what we tried to do with this is to put together a tool that could hopefully be uniformly applied throughout the staff. So you do have the eleven different bins here. One being safety, significance, defense and depth, et cetera. You know, so that's what I say in terms of progression. So we are having people use the same model. We don't have the key that says, if you have three reds, two yellows, and one white -- you know, spend fifty percent or more hours or twenty-five less.

So right now, it's progression in providing a uniform tool to facilitate the discussions between the staff and the branch chief. In the end, it's a qualitative determination. It's a subjective determination, still, between the branch chief and the reviewer in terms of the areas they will focus on and those level of resources. But what we tried to do is provide that tool to facilitate those discussions.

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And hopefully, we are coming out with a much more uniform approach across the office.

MEMBER BROWN: Isn't that subject, then, to ensuring that in the interdisciplinary way you go at this, that the branch chief is assumed to have worked in that area for fifteen or twenty years? And has a detailed understanding of all the factors that go into those?

CHAIRMAN CORRADINI: You have just identified an interesting flaw in how things are done.

MEMBER BROWN: I know. And that's why I bring it up. In the nine years, I've noticed a considerable change in the level of depth that some of the branch chiefs had. Not that they're not good people, but there's been a lot of cross-pollination without a whole lot of depth of experience in a particular technical area.

MR. MONNINGER: So for the good or for the bad -

MEMBER BROWN: And you're focusing on the branch chief to kind of focus this. That seems to me to be a difficulty.

MR. MONNINGER: So this tool doesn't help that situation or exacerbate it. Whether we were in

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the old approach or applying that to what is what it is. With that said, in areas we do have senior level staff, SLS. You have senior reviewers. The senior reviewers are supposed to work with the junior reviewers and the staff. For the NuScale review within our division within reactor systems, we have a lead reviewer, Jeff Schmidt, and all the more junior reviewers report up through him, et cetera.

With that said, we also had a cross-disciplinary -- what I would call a management review. We called it a review panel. So, after you work all the discussions between the branch chiefs and the staff, it then bubbled up to the division level.

And we then have -- all the divisions come together in a meeting and the divisions cross check each other in terms of how they were applying it. So it doesn't fully address the issue of having an expert in all disciplines as manager or supervisor. But we think it does provide some type of structure.

CHAIRMAN CORRADINI: We're getting ahead of you, so you're more than welcome to stop this. But to use John's suggestion, let me make sure I understand.

Before this existed, what was done to decide what level of review you would do, amongst the divisions and the

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various systems? I pulled up the tool and I=ve got a lot of various systems, structures, and components.

What was done? It was done without the tool?

MR. MONNINGER: It was based upon individual discussions between the reviewer and their branch chief. Period. I mean, of course they could be questioned by division management. Or, if you=re tech staff you could be challenged or questioned from the licensing organization. But the predominant decision has been between that reviewer and their first line manager.

CHAIRMAN CORRADINI: So does this -- let me ask it this way. Does this tool then forcibly a discussion across divisions, so everybody is on the same page. It=s just a level of effort?

MR. MONNINGER: I wouldn=t necessarily say -- when we say level of effort, we think of hours.

CHAIRMAN CORRADINI: I=m sorry.

MR. MONNINGER: In terms of the vision or the direction, it=s meant to provide more of a consolidated vision and direction. And in terms of how all the reviewers and how the branch chiefs and how the divisions approach it.

CHAIRMAN CORRADINI: Okay. Thank you.

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MR. MONNINGER: It=s not perfect. It=s progression.

CHAIRMAN CORRADINI: That kind of gets to Charlie=s question. I think the one thing that I heard Charlie say is -- since I can never remember all of them. I can only remember -- at any one time, I can remember three of the four of the -- and it always spills out of them. Whatever. That was cyber security. I=m going to put that one down. But there=s some principles. And what you=re saying is in lieu of a set of principles, these are the eleven factors that one needs to think through to develop a process which then leads to a discussion.

MR. MONNINGER: Yes.

CHAIRMAN CORRADINI: Okay.

MS. MROWCA: But we also have the guidance. We also have the standard review plan and we have the design specific review standards. So those also guide, and I think we=ve revised them. And in some cases, they are pretty detailed about what you look at. So it=s a combination of things. Guidance and experience of reviewers.

MEMBER BLEY: One thing jumps at me here. Which, for me, is a good thing. We=ve asked about

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this many times and we are always told everybody knows this. If I go down through the example you had up on the website we=re looking at, this chart. Get down to the sixth one, which is CBCS. And the associated SRP and the SRS, there=s about twenty different items.

That=s the kind of thing I was wondering, how do you make sure people know where to go to pick up all this? I kind of like that there=s a place you can go. On many of them, it=s much simpler. But on the ones where it=s complex -- I don=t know what you had before to help the staff make sure they find all of the relevant guidance that we=re looking at. Is that worth talking about a little?

MS. MROWCA: Do you want to say something?

MR. NAKANISHI: This is Tony Nakanishi again. I think part of this approach is to have a group that=s cross disciplined that looks at this. And so, by a nature of how we got through this exercise, that helped. I think in the past it would have been more incumbent on the -- there=s a lead for every DSRS or SRP section. And there=s a secondary reviewer and so forth. So I think in the past we were probably more reliant on just knocking on different offices. Which happens anyway. But it=s a little more ad hoc. But

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I think this approach allows a little more of a structured group kind of looking at it together, if you will.

MEMBER BLEY: In some of your examples that you're going to talk through, do we -- and I don't have the new reg guide in front of me now. Are you going to talk about what the A1s, B2s, all of that means at all? Or is that just up to me to find it all?

CHAIRMAN CORRADINI: Why don't you continue?

MEMBER BLEY: Yeah, why don't you continue and we'll see if we get it.

CHAIRMAN CORRADINI: We have hijacked you enough for the moment. Let's keep on going.

MS. MROWCA: We were trying to do a very condensed briefing of where we've been so that you could really focus on the examples themselves. So on to the technical review preparation. It's a good thing that you're looking at the internal SharePoint site that has a summary document on operational programs. Because the standard review plan says that you might be able to leverage operational programs.

And also, the SSC review tool which is, again, what you're looking at very closely. A

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framework for programmatic or non-SSC reviews is what you would call the introduction of part two of NUREG 0800, says that this is not applicable to programmatic or non-SSC reviews. But in order to try and truly optimize our review, we said we should consider this thought process across the board. Also, it should be noted that many and most, I guess really all of the standard review plan sections are programmatic or non-SSC. So, we're trying to do our best across the board.

And then safety and evaluation report, a graded approach documentation -- how we can communicate that, what our review approach was. Let's see. We communicated the review approach to technical reviewers during two training sessions, about half-day sessions, in both August and November of last year.

CHAIRMAN CORRADINI: These are folks in NRO?

MS. MROWCA: These are -- any technical reviewers of the NuScale application was invited. So they were very well attended.

CHAIRMAN CORRADINI: So let me get a feeling for this.

MS. MROWCA: Yes.

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CHAIRMAN CORRADINI: So how many people are we talking about if you lined up all the reviewers for the NuScale rollout. What are we talking about? Ten? A hundred? A thousand?

(Laughter.)

MS. MROWCA: Between about two hundred, I think?

MR. MONNINGER: I would probably guess two hundred.

MS. MROWCA: Yeah. Versus a thousand now.

CHAIRMAN CORRADINI: Two hundred, that's more than I thought.

(Simultaneous speaking.)

MS. MROWCA: Quite a few we had. Basically filled the NSER room. As well as we had the second session in the auditorium.

MR. LEE: This is Sam Lee from the Licensing Group. I would say about two hundred is about rough estimate. If you consider the four divisions, four technical divisions involved from Office of New Reactors as well as two branches from Office of Nuclear Reactor Regulation, and two branches from NSER who are involved, it comes out to about a couple hundred.

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CHAIRMAN CORRADINI: It=s like making sausage. So I=m getting into the ugliness. So if I had two hundred people, how many FTEs does that account for? Because they=re all fractional, right? So is two hundred only twenty FTEs and everybody is doing a tenth of the job? What are we talking about?

MR. LEE: No. They are not spending all their time doing NuScale work, presumably.

CHAIRMAN CORRADINI: I didn=t think so.

MR. LEE: Otherwise, we should be looking at a much more aggressive schedule. No, it=s across the board. You have numerous large scale NRO projects that are being worked on at all levels.

CHAIRMAN CORRADINI: So there=s a reviewer -- just so I understand this. I don=t -- we are not supposed to care about process.

(Simultaneous speaking.)

CHAIRMAN CORRADINI: But you=re talking about process. So I=ve got a containment systems branch fellow person who=s an expert in LEET testing.

So he or she has potentially got APR 1400 in front of them, NuScale in front of them, and potentially an APU that they=ve got to -- well maybe that=s not you guys. But they might have three or four assignments,

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but that=s their expertise.

MR. LEE: That is exactly right.

CHAIRMAN CORRADINI: Okay. All right. Thank you. Thank you. Sorry about that. Keep on going.

MS. MROWCA: Okay --

MEMBER BLEY: Then if you wanted to get through this, things that are new in this that you haven=t been doing along the way, let us know.

CHAIRMAN CORRADINI: And things that you will stop doing because of this.

MEMBER BLEY: If there is anything, yes.

CHAIRMAN CORRADINI: I will just say, that=s my advice. My advice is that this regularizes the process. Hopefully, there are standards or principles that are underneath it. That are always there and can be established. But you=ve regularized the process, it=s actually just as adequate protection of the health and safety of the public, but it=s done more effectively and efficiently. So what you=ve stopped doing is, to me, as important as what extra stuff you=re doing.

MEMBER BLEY: Agreed.

MS. MROWCA: And we=ll talk about some of

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those things in the examples, I believe. So the next thing that's new to you is that we did, as John Monninger talked about, have a senior NRO management review panel where we provided all the areas that we thought would be review emphasized in various branches in that division. As well as reduced efforts in that division.

And the idea was for, again, to kind of normalize or look at everything from a more holistic way.

And I think that has really been the beauty of this working group and this approach is to try and do that. So that everyone has an understanding of where their piece fits in, and not just looking at their standard review plan and doing their same ole review.

So that was in February and March, right around the time that we were doing the acceptance reviews. And then the NuScale DCA was accepted in March of 2017.

CHAIRMAN CORRADINI: So, let me ask about that.

MS. MROWCA: Sure.

CHAIRMAN CORRADINI: Did this tool help in deciding that things were acceptable or unacceptable or on the fence? In other words, this helped focus what you looked at?

MS. MROWCA: Yes. Focus --

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CHAIRMAN CORRADINI: If it was red, I looked at it more. If it was green or whatever color that=s not so important, I looked at it less?

MS. MROWCA: So one example, I=ll talk about PRAs. Actually, I=m stealing some of John=s examples. I always talk about this more easily because that=s our area. One of the things when you go through the tool and you think about, and maybe not the SSC review tool because PRA is a program. But when you think about something new and different that you might want to focus on or look at a little bit harder is multi-module risk.

Because we developed criteria, we actually formed a working group to look at what that criterion might be. What are we expecting as the NRC? As an initial point for these SMRs? So we developed two criteria and we incorporated them into the standard review plan. But this is the first time we=ll be reviewing an application against that criteria. So we want to look at that more. So that would be an area of review and emphasis.

But an area -- so John doesn=t have to go over this part. So then another thing is that every application that we get for PRA technical adequacy,

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we look at comparison. Like, maybe they did a self-assessment or independent assessment of their PRA against the PRA standard. And that was done in every review.

So, you know, we're pretty confident that we understand that process. And that if we take a quick look at what they did, in terms of an independent assessment. And, in our case, we've had pre-application activities since 2011 with NuScale. So we're pretty familiar with their approach and the progress and changes that they've made along the way in PRA. So we probably don't have to look at that as much as we might have in past areas.

So that gives you an idea. So, yes. It's still in the standard review plan, but maybe we just do a random quick look at it because we are already familiar with it. And we won't spend a lot of time there.

MR. MONNINGER: If I could do just a quick follow-up. So you mentioned, did it influence the acceptance review. So they're actually separate. Regardless of what the staff decides to review in tremendous depth, medium depth, light depth. The applicant is always responsible for submitting the

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complete application. What we decide to do with those particular sections are different. So this did not change the standard for the applicant to complete a testament of complete application.

CHAIRMAN CORRADINI: So there's a bar. Once you're over the bar, you're over the bar no matter if you have whatever creative review you give it? Is that what I'm hearing?

MR. MONNINGER: Yeah. So the applicant is responsible to meet the regulation and is responsible for safety and submitting the complete application. So what the staff decides to do with that -- how we decide to stylize our review doesn't change the fundamentals that the applicant needs to submit a complete application. And that is tied to the acceptance review. The acceptance review and the docketing decision is tied to submitting a complete application, which they did.

CHAIRMAN CORRADINI: Okay.

MR. MONNINGER: So the record has to be out there for the public. You know, it goes through the rulemaking --

CHAIRMAN CORRADINI: But what I guess I'm also hearing you say is this tool, which would identify

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what would need a light dusting, a medium dusting, and a heavy dusting didn't affect the bar of which you judge and whether it's acceptable?

MR. MONNINGER: That's correct.

MEMBER BLEY: Or what they have to submit?

MS. MROWCA: Or what they have to submit.

MEMBER BLEY: I'm not quite clear on the tool. Is the tool something I fill in as I do a review? Or is it something you've put together a priority, like the one we're seeing, that then if I'm going to review a particular SSC, I go here and look across the line and say I need to do all of these things at the level that's indicated?

MS. MROWCA: It's a preparation for your review.

MEMBER BLEY: It's a preparation for the review?

MS. MROWCA: Yes. So once you think about, is it a novel design? How much defense in depth is there? How much safety margin? You know, and make a note. A lot of safety margin, not much defense in depth. Whatever you do across the board, then you stand back and you look at all those factors. And you say, well. You know, it's not novel. It's this or that.

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You know, maybe I don't need to do as much as I originally do or what I thought.

Or approach it in a different way. Or maybe, while I hit its novel design, it doesn't have much safety margin, that I'm going to look at that more.

So you stand back after you think of each one of these factors and make that overall decision. Initial decision.

MEMBER BLEY: Let me try again.

MS. MROWCA: Okay.

MEMBER BLEY: So if I'm assigned a particular SSC, CVCS. I've got -- I'm thinking about CVCS for example. I'm thinking I look at this first as a template. I pull up this worksheet that has what it has on it. Maybe it's blank. And then I do a preliminary look and I decide whether this is appropriate as is, or if I ought to modify it to some extent. And then I talk it over with the lead reviewer or the branch chief, and figure do I have it laid it out right to go ahead with my review? Is that a reasonable statement of how it would be used? Have you actually used it?

MS. MROWCA: From what I understand --

MR. NAKANISHI: So I guess the way I would

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look at this is, you know. The tool was a good way to communicate the review considerations. It sort of provides a structure for how a technical reviewer might look at CVCS. In conjunction with the existing SRP or DSRS. You know, I guess I would say -- the completeness of the tool itself is not a good measure of how this activity ended up. I think in the end, some of the things that John and others up there will discuss, that=s sort of the initial results of this activity. It=s trying to kind of apply the spirit of these considerations. And coming up with a preliminary review approach, which will be discussed -

MEMBER BLEY: I=m not quite getting the question right, I think. My question is, I=m directed to review the CVCS. Do I pick up this thing as it exists now and use that to help me? Or do I change this thing? Is it a tool for me? Do I actually work on it there, or is it just sort of a summary guidance for me?

MS. MROWCA: So this is what you would start with. So what we did --

MEMBER BLEY: As we find it?

MS. MROWCA: Yes. Is we know -- and we start with what the applicant proposes for the safety classification and risk significance. So, we fill in

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-- is it A1, A2, B1 -- so we do that first. So what=s on there is --

MEMBER BLEY: I=m sorry. The we is the individual reviewer?

MR. NAKANISHI: The PRA group.

MS. MROWCA: Right. Because we have that information. In fact, we did an audit in May I think, to try to get the latest information so we could get into the tool.

(Simultaneous speaking.)

MEMBER BLEY: Okay. So the PRA group does this first?

MS. MROWCA: We start with that. And then it=s blank. So the reviewers expect it to then say, if I=m reviewing CVCS, then I start with that. Understand that. Then I go through the thought process of each of the other considerations and jot down some notes based on my experience and knowledge of the design. And at the end you step back and take a look and say, based on what I=ve written here for each of those considerations, overall I would say that I could either -- I need to emphasize something more because of what I see here. Or less.

And the beauty of having it documented on

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the tool is that other reviewers can take a look at that and say, oh for CVCS. Look at there. They're going to look at this a little bit more. Well, gee.

Maybe I don't need to look at maybe something I'm doing as much. Because they're going to be covering it in this area.

MEMBER BLEY: Okay.

CHAIRMAN CORRADINI: And prior to this, this would be collegial discussion?

MS. MROWCA: Yes.

MR. NAKANISHI: It would be -- right. I mean, it would get done somehow. But this provides a little more structure.

CHAIRMAN CORRADINI: So you come in ten months before the certification guy. You have some limited PRA which you're using. And it's either A1 A2, B1 B2. And then the reviewer with CVCS does it.

Then is there a -- probably for this word -- but is there a required discussion with the branch chief or the lead reviewer to make sure we're all on the same page here?

MS. MROWCA: In this case, there really has been. Because we said that was the expectation.

So the reviewer and the branch chief make the initial

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decision. Then they were asked to talk to their division management, to see if they agree. And then we have this NRO management review panel that then shared it across the division. So that was something new that we have tried to do to make everyone aware of what approach they are taking in all these different areas.

It helps in that holistic look to be able to leverage. Maybe I can leverage something somebody else is doing. And we found that out early in the working group that just that knowledge and communication meant a lot in terms of how we might approach a review.

CHAIRMAN CORRADINI: Okay. So I'm just trying to think. If a new application or pre-application comes in. You start with a blank sheet. The PRA team looks at the PRA and the A1 A2 stuff. The one we're looking at off your SharePoint site already had the person who's doing the HSSC fill it out and has been through that review. But that's a thing that would happen the next time? Okay. I'm sort of getting that.

MS. MROWCA: Yes. Actually, if you go forward to pre-application space. I'm straying a

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little bit again. The idea is that you would probably work a little bit more closely with the pre-applicant to figure out, what are those categories? And then help us, as we learn about the design, they know the design very well. Maybe they can even fill in part of that. And we can review it and based on our knowledge or as we're learning, understand a little bit more about their design.

And if they flag something as novel, then we might say, gee. Maybe that's going to require a new policy decision. And so let's get that in the mill so we will have that done by the time we're done with pre-application. Instead of, you know, being surprised during the review.

CHAIRMAN CORRADINI: Will we still be using this after the application is? For the next phase?

MS. MROWCA: I would think so. So once you -- and you know, there is a lot of design changes that occur between the beginning of pre-application and the submittal. And so as that goes, you expect this to be a very dynamic tool. And even during the review, as Tony said, this is an initial assessment. We in PRA have not evaluated the PRA yet. So we take

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what the applicant gives us as the starting point. So if anything changes -- if we don't agree with the classification or the risk significance. That could affect how you approach your review.

CHAIRMAN CORRADINI: So it refines along the way? Yeah.

MS. MROWCA: And that's one reason why I'm a proponent of the tool. Because if that changes, somehow we need to communicate that to everyone and say, guess what? Instead of being not risk significant, we believe it's risk significant. And therefore, that might affect all of --

MEMBER BLEY: Well then let me try something. Because this gets close to something the Committee had a discussion about in a different area recently. Well, it's a related area. If a new design comes in that's heavily anchored to its PRA -- it's been used in the design, they want it to be used in the licensing process, coming up with licensing basis events or wherever that heads to.

Along the way, even though you don't have a complete perfect PRA to start with, it guides how the designer might move. And before we get to the point where the NRC buys off on the design and the things

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that are anchored to the PRA, the PRA has to eventually become very good.

MS. MROWCA: Yes.

MEMBER BLEY: For us to buy into that. So that=s a good way to build our design events or whatever we call them. Licensing events and the rest.

But it=s a process. It can grow with the review. Back to something John and Mike were talking about, and I assume this never changes. Because they have to meet the regulations, they have to submit a safe design. As I begin to review my SSC and I start finding problems -- it seems to me, and you all have to do this.

The more problems I find, the more significant they are, probably the harder I dig, and the deeper I go. And that=s still up to me?

MS. MROWCA: Yes.

MR. NAKANISHI: Yes.

MEMBER BLEY: Maybe if I revise stuff on here. I don=t know. If it=s a tool for managing the process as it goes on.

MR. MONNINGER: So on Lynn=s last bullet, here --

(Laughter.)

MEMBER BLEY: You=re welcome.

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MR. MONNINGER: The initial review approach may change as we go along. You know, we may think there=s significant margin in areas, so we=re just doing a less review. And then we identify some errors, non-conservatives, et cetera. And the review can expand more. On the other hand if we go in and we think there=s some issues up front. Or if they=re taking some major different approaches, some novel design features and we=re in the review. And you find out there=s tons of operating experience in that area, the review could contract. So it=s dynamic.

MS. MROWCA: And it needs to be through the end. So thank you, John.

MR. MONNINGER: You=re welcome.

MS. MROWCA: So we=ll go to this next slide unless you had any other questions. Okay. So you evaluate the review approach and document your initial areas of review emphasis and reduced effort. We also looked at certain strategies for both technical evaluations and for improving review efficiency. So in other words, technical as well as process strategies. So as we know, the initial review could change based on design changes or changes in categorization. Okay.

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MEMBER BLEY: Wait. We just had a little side discussion. I'll throw it out to you. I'm wondering about how this actually improves things. One way might be that the leads in all these areas are getting a better view of what their colleagues are doing and related areas. And unless I'm a pure hobbyist, maybe I let that guide me a little more as this process goes on. Sorry for that phrase. But is that, in fact, something that's hoped for?

MR. MONNINGER: Yes.

MEMBER BLEY: Over the last year or so when you've been developing this, you've been using it. Has that sort of thing actually happened? What have you found from its --

CHAIRMAN CORRADINI: I guess what I'm asking again is I'm still struggling with process. I don't pay attention to process here. We're not supposed to, but what the heck? So I've got two hundred people that are harshly assigned to do a review of a design certification. How do they communicate to the appropriate people if this wasn't here? I assume this is a lot of meetings.

And I'm trying to decide how all the lead reviewers communicate. So it's like a battalion,

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right? There=s two hundred of them. There=s ten in a battalion or in a platoon. The ten report to one.

That means there=s twenty. The twenty got a report to five. So how is this communication done now if there wasn=t a tool like this to get things on the same page? I=m struggling. Help me.

MS. MROWCA: Well, I think the standard review plan identifies primary and secondary reviewers.

So that=s one way that instead of just as a primary reviewer, you=ve got other secondary reviewers.

CHAIRMAN CORRADINI: And then they meet on some regular basis to say, there=s some showstoppers that worry me? You know, why are you sending out that RIA? I=m sending out that RIA, and it covers it. How are these discussions done?

MS. MROWCA: Not necessarily. It=s not like a programmatic, systematic thing. That kind of goes to what we=re proposing for continuation of this thought process of going a holistic review. And having regular discussions on cross cutting issues. I mean, we have -- or we had -- program meetings. Where probably the most critical technical issues were discussed, and that type of thing at the management level. Branch chiefs. I don=t know if there=s

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anything else specifically. It=s, I would say probably more ad hoc based on a certain reviewer saying, I need to get these other people in a room and I need to share with them what=s going on. So I would say more ad hoc.

CHAIRMAN CORRADINI: So let me it less politely. Are you trying to tell me that without this tool, it=s catch is as catch can about how things are coordinated across the design cert review?

MR. MONNINGER: No. I wouldn=t say that.

CHAIRMAN CORRADINI: I=m being provocative.

MR. MONNINGER: So there was a recent issue that the staff identified. And a branch raised questions in regards to the seismic response in this certain area of the plant. And that=s typically the Division of Engineering. That aspect of the design also impacts reactor systems. Those branches know, in this review area, that they interface and work together. So very quickly, they reached out to Reactor Systems and then there was a third branch.

So in a very quick time frame -- regardless -- you know, those discussions about areas that go across boundaries have always occurred. So I don=t

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think this necessarily -- when issues come up when there=s, I don=t want to use the word weaknesses. But that=s what came to my mind. When there=s an area in the review where there appears to be weaknesses, and it would cut across. The staff naturally gravitates towards the other organizations that are involved in that review area.

CHAIRMAN CORRADINI: So then, with the presence of the tool -- I=m back with Dennis. With the presence of the tool for reviewer and CDCS, that helps facilitate this sort of communication? It just announces to everybody else that there=s been communication? Where does the tool improve that? I assume Dennis was asking in terms of facilitation of how people communicate with each other to make sure. Do you see what I=m asking?

MR. MONNINGER: Yes. So I don=t have a response quite yet on that.

CHAIRMAN CORRADINI: Okay. That=s fine.

MS. MROWCA: By the way, I think that --

CHAIRMAN CORRADINI: That=s what we were talking about privately.

MS. MROWCA: As a working group, as John said before. I mean, there=s thirty members. Not

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everyone comes every time. But it covers the broad representation from the whole office as well as any branch doing part of this review. And having a discussion on a technical subject -- maybe you didn't know that three other people there would be interested in that piece. Your experience shows that I need these three people, but maybe there's three more that say, gee. You know, I could be affected by what you're doing, too. And so having that discussion in this broad area I think is an improvement.

MR. MONNINGER: So -- it's good that Lynn was talking. It sort of allowed me time to think. If you think about the reactor event valves or the reactor -- they're not called injection valves. You've got the vent valves on top for the ECCS system. They are very important to the success of the design. In the Chapter fifteen analysis or the PRA success criteria, et cetera.

CHAIRMAN CORRADINI: It's the only thing I would call ECCS in this system.

MR. MONNINGER: Yeah. So it puts -- and not only that, but the containment for your body of injection water there. You know, when you have this tool, you clearly see the people that are in charge

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of the valves. The mechanical engineering branch. The reactor systems branch and the containment systems branch. They're all on the same page of recognizing the risk significance and the safety significance of it. So if you were to think about it that way, I think it would foster communications across the organization.

MEMBER BLEY: Do you keep a big bedsheet of this thing up on the wall somewhere?

(Laughter.)

MS. MROWCA: You could.

MEMBER BLEY: If I were trying to use it, I probably would.

MR. MONNINGER: So with that said -- so Lynn and Tony said it's out there. What it really did is it forged the communications. We were not rigid with regards to filling in every single box. People recognize the tool. And it's in a certain level of completion. But we didn't have strict adherence for every single box being filled out. But the expectation was that whether the box was filled out or not, you had that consideration in your mind. And you sat down with your management.

MEMBER BLEY: Okay.

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MS. MROWCA: And now we have the list of review emphasis and reduced efforts for all the division. So we have a pretty good idea of where people are headed in their review criteria.

CHAIRMAN CORRADINI: So I have another question. Does this -- is there an age thing, here? Do you find the younger staff find this useful? And excuse my English, the older staff like me find it un-useful? Do you see any sort of difference in that regard?

MS. MROWCA: I don=t think so. It=s not age related.

CHAIRMAN CORRADINI: You know, it=s a curiosity.

MR. MONNINGER: To me some of the -- and you mentioned the one reviewer that were initially part of the team, they wanted no part of it because of that risk informative PRA based approach.

CHAIRMAN CORRADINI: Well, I feel that way about Dennis all the time.

(Laughter.)

MS. MROWCA: But I think that once people understood that risk informed went both ways. A lot of times risk informed might have been advertised to

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just reduce effort. But risk informed goes both ways. It also can show you where you need to look harder. And so that is being effective. It=s both sides. So let=s go through this real quick.

CHAIRMAN CORRADINI: Keep on going.

MS. MROWCA: Just real quick. So I=m not actually going to read this. But we developed a list of proposed strategies for technical evaluations to try to help reviewers. And then, we also looked at process strategies for helping us do the review a little bit better. And so the ones that you care about are these two -- having to do with the safety evaluations themselves. Is to try to think of ways where we can develop and write more concise safety evaluations because we know the number of reviews that each page gets. So we are looking to figure out how we can minimize that. And then also streamline between the different phases.

CHAIRMAN CORRADINI: So let me ask you a different question.

MS. MROWCA: Sure.

CHAIRMAN CORRADINI: So if you went back in the history of the NRC and even the AEC, what did the safety evaluations look like in 1977 versus

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2017? Are we talking two pages versus two hundred?

MR. MONNINGER: So --

CHAIRMAN CORRADINI: I haven't done that. I'm quite curious.

MR. MONNINGER: There is considerable, considerable, considerable growth. In both the size of the staff's guidance, the size of applications, and the size of SERs. Some of this -- within the Agency, some of the biggest challenges are the older plants where the licensing bases isn't very well documented and defined. And you can read an SER in two paragraphs. And you're like, well, how do they reach that finding?

CHAIRMAN CORRADINI: Well let me just follow up with that. But the licensing bases isn't the SER.

MR. MONNINGER: Correct.

CHAIRMAN CORRADINI: The licensing bases ought to be the submittal from the -- in other words, it's the applicant's responsibility. The NRC comes trotting in and says, show me the licensing bases for the design of this containment spray system. And it's not up to the staff to have that. They ought to have that.

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MR. MONNINGER: It=s both. If you were to look at the size of the safety analysis report submitted in the old days versus 1920, however many volumes today. And the same thing with the staff. The size of the SER then and now.

CHAIRMAN CORRADINI: Well I unfortunately helped a member of ACRS in 19 -- I won=t say when. For Clinch River. That was a very big FSAR, for Clinch River in 1978. So --

MEMBER BLEY: And that never got built.

(Laughter.)

CHAIRMAN CORRADINI: It never got built. Which worries me, by the way. But I guess what I=m trying to get at is -- so the intent of this is to be relatively efficient on what is written to minimize, I won=t use the word extraneous. But not necessarily needed?

MS. MROWCA: Correct. To think about what you=re writing. And we also have our Office of General Counsel as a member of the working group to weigh in on anything that they review. So they can give their opinions early. And can be socializing it through their office, too. So what do you really need to document your reasonable assurance finding?

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CHAIRMAN CORRADINI: Okay. So another process question. So has anybody done a task work analysis on how much it takes to review versus write up an SER? In other words, I'm the CVCS reviewer. And I've got this thing. And I'm now starting to review it. And I write my RIS. I get a ton of responses. And I look at those. I send out a few more RISs, and I get more of those. And now I'm ready. Is it half the time to do all of that? And half the time to write the SER? Or is it ninety-ten? What is the task analysis on this sort of stuff? Has anybody done it?

MR. MONNINGER: So the tech staffer does the review and then writes the SER. And then it's management, review, and approval, and back and forth.

CHAIRMAN CORRADINI: Yeah. But I'm trying to -- I'm back to the point that you said you'd like what I thought I heard was, highly focused and very efficient SERs that might be smaller. So my question is right now, when I write an SER, has anybody analyzed how long it takes to do the review versus to write it up?

MEMBER BLEY: Since John brought it up. And then to get it through approval.

(Laughter.)

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(Simultaneous speaking.)

MS. MROWCA: We know that last piece is long, and that=s one of the things that we=re trying to avoid.

MR. MONNINGER: And I was a reviewer -- not in the old days -- but in the old days. Back in the nineties. And you know, Matt was also and Michelle still is. Ballpark, I=d probably say you spend seventy-five percent of the time doing the actual review. Flipping pages, reading calcs, RAIs, meetings, all that jazz. And maybe twenty-five percent as a reviewer writing it up and getting it to your branch chiefs. That would be my gut.

CHAIRMAN CORRADINI: Okay. And that, you feel -- again, we are into process mode. Do you feel that=s reasonable? Unreasonable? Should be more on the review and less in the writing up so I don=t see a three hundred page SER but I might see a hundred pager? I happen to have just read a three hundred pager on some really thrilling issue.

MR. MONNINGER: So the SER needs to be sufficient to support the eventual design certification rule making. And for independent reviews, the SRS, the public, et cetera.

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MEMBER BLEY: There=s a thing one always hears from. At least the new people coming into the industry -- and some have been here a long time. The real problem is RAIs. There=s too many of them. On the other hand, if I wrote a perfect application, maybe there wouldn=t be any RAIs. Is thinking about that part of this process -- I don=t quite see it jump off the page.

MS. MROWCA: Yes. I think because the safety focused review was, again, more of a technical. But we kind of increased it based on our experience with the new reactor design certification applications. That we, and I will speak for PRA, we=ve learned from each one. How to do things a little bit better. And I think we learned that communication early on is every important. And trying to answer some of those smaller questions and have the staff get a better understanding of the design and what was done for the application.

To help us focus and have fewer RAIs. And I will have that we=ve significantly reduced the number of RAIs that we wrote. For instance, for EPR and APWR for the APR 1400 -- significantly reduced.

CHAIRMAN CORRADINI: Because of?

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MS. MROWCA: I think because of that process of having -- we had bi-weekly meetings with the applicant that helped us to understand what they did a little bit better.

(Simultaneous speaking.)

MS. MROWCA: Clarifications? Yes. Instead of in the previous days, we would just write an RAI and you might have that back and forth with an applicant. And this time, to expedite it -- let's talk to them and understand what's going on. Then we can really focus on what our issue is and write fewer RAIs.

MEMBER BLEY: Yeah, sometimes they're like bring me a rock or something.

MS. MROWCA: And I think that's a huge part in being optimal in how we do a review.

MEMBER BLEY: You probably have no estimate of what being optimal, at that point, means? In terms of either calendar time or work time?

MS. MROWCA: Well, when you think of -- now, there is a burden by having bi-weekly meetings. We recognize that. But I think we have some suggestions for how to document the public meetings summaries in a pretty quick way. And the burden that goes with writing an RAI, getting it through our

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process, getting the response through an applicant=s process, and doing the review -- I think we came out ahead in that review.

CHAIRMAN CORRADINI: And this is from a regulatory -- I want to probe on this. Because this makes perfect sense. So my next question is, this was always allowed, it just never was practiced?

MS. MROWCA: Correct.

CHAIRMAN CORRADINI: Okay. Because I will point out --

MS. MROWCA: And we weren=t the only branch. There were multiple branches who took the same strategy. I think Matt=s group also did the same thing.

MR. MITCHELL: Okay. This is Matt Mitchell, and I=m Chief of the Materials and Components Branch in NRO. Yeah, and I think this is one of the process steps that we really emphasized in the APR 1400 review that we are carrying over to the NuScale review.

The value of engaging early and often with the applicant, in terms of if we identify issues that we have quickly with the application. To communicate those and to start having an open dialogue in public exchange forums, public meetings, and public telecons helps us to more quickly understand what the real issues

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are that need to propagate then through the review.

I tend to think of issues, actually at that phase, in sort of three categories. You have these very, very big issues. The ones that you know are going to take multiple rounds of discussion in conversation because they are very complex. They are very far reaching. You need to get those on the table as soon as you can because you need to start the dialogue to sort through how this can be resolved.

At the other end, potentially some issues that you identify that are almost editorial in nature.

They are maybe either typographical errors or just vague misstatements that you can understand that it is perhaps a misstatement because of other information in the application. As you can communicate those and get those resolved quite quickly by the applicant, if they're willing to provide some supplemental information, that clarifies the original information in their application.

And then in between those two, you have what you might consider your more routine RAI type questions. They are technical questions, they require answers. Hopefully, they'll require one round of a well written RAI to get the correct information the

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staff needs to complete its review. But in all cases --

CHAIRMAN CORRADINI: So just so I understand. But I want to repeat my question so I'm not misunderstanding. This was all possible. It just had turned into a process where things were written down and communicated via RAI where they could have done what you -- I can't remember what you called it. I want to call it a public meeting.

MS. MROWCA: It's a public meeting.

CHAIRMAN CORRADINI: A public meeting conversation between staff and applicant. And remember, depending on the proprietary nature of the information, can listen in. It's just a matter of communicating -- what about this? What do you mean? Oh, we made a mistake. It shouldn't be three, it should be two -- or whatever.

MR. MITCHELL: And the public nature of the engagement is the essential and critical element.

CHAIRMAN CORRADINI: Right.

MR. MITCHELL: It keeps, it maintains the transparency, the openness, doing everything in the public venue that works. So we're having this in a public forum where we are talking about these issues.

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And yes, that option would always have been available to have that kind of engagement.

CHAIRMAN CORRADINI: Okay.

MR. MITCHELL: At least in my personal opinion, I think it always would have been there.

CHAIRMAN CORRADINI: Well, I'm sure the office of lawyers would make sure that it is. But the reason I'm asking the question is, at one of these workshops like the one you said you gave a talk when we had been there, side conversations by others had said this was not allowed by the NRC. And I had always thought that was not the case. So I wanted to be clear as to what is becoming a common practice. Because this seems like a logical and reasonable thing to do.

MR. LEE: Mr. Chairman, this is Lee from the Licensing Group. Having been involved in the APR 1400. The launching of that review, which is now two years and two months old as a review. We have instituted that process for the length of that review to date. And so, that's nothing new under the sun.

CHAIRMAN CORRADINI: Right. That's fine. It makes sense. I just am more remembering back in ESP-WR times when there were a lot of RAIs. Lots. On whole categorization of various grades of

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information. So keep on going, I'm sorry.

MS. MROWCA: And so, we learned from those reviews that engaging early in a public forum would help us focus and reduce the number and the administrative burden that goes along with those.

MEMBER BLEY: Does that come about -- this comes about, I can understand some, from clarity. But by the time they actually submit a DCD or an FSAR, whatever kind of license they are coming for -- and I guess NuScale might be the only example that you have. Does it come in and improve to the point that the quality of that saves you some of this?

MS. MROWCA: Absolutely. A good quality application helps saves us from writing questions or needing that clarifying discussion.

MEMBER BLEY: And maybe the clarifications, too. Because I suspect if I wrote a good quality one, somebody else would still have questions. So that process may have the answers. It gets me to revise some of it before I even come in.

MR. MONNINGER: So we would have thought our presentation was clear, and you would not have any questions on it. So --

MEMBER BLEY: Coming in, you thought that.

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(Simultaneous speaking.)

CHAIRMAN CORRADINI: On that note, let's keep on going. Are you on to examples?

MS. MROWCA: Yes.

CHAIRMAN CORRADINI: Okay. I propose we take a ten minute break before we go to the examples. How about that? And I'm going to find some other numbers that -- unless they are chained down for steam generator site vibrations, we will see others after break. Okay, so we will take a break for ten minutes and we will be back at 3:25.

(Whereupon, the above-entitled matter went off the record at 3:16 p.m. and resumed at 3:28 p.m.)

CHAIRMAN CORRADINI: Okay. We have the illustrious Member Stetkar with us now, so we can begin.

(Laughter.)

MEMBER STETKAR: Thank you for waiting for me.

CHAIRMAN CORRADINI: Don't even start.

MS. MROWCA: Okay. So now, we are through the process part and we are going to share with you some of the examples that we have of review emphasis and reduced effort reviews.

MEMBER BROWN: Are these examples?

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MS. MROWCA: Yes, they are examples. And as a note, we have said this multiple times already, but these are the initial review approaches and they could be subject to change as the review progresses.

So we'll start with John Monninger, who already introduced himself. And he's representing the Division of Safety Systems Risk Assessment and Advanced Reactors.

MR. MONNINGER: So thank you. The reason I'm up here is our division, we have four different branches. We have one -- Branch Reactor Systems, Fuels, and Thermohydraulics. A second Branch Containment Ventilation, the PRA Branch, and the Plant Systems Branch. So opposed to having reps from all, I'm trying to cover for our division. So of those four branches, we've tried to pick up one representative example from each branch for an increased emphasis area and a potentially reduced emphasis area.

So the one -- the containment, pressure, and temperature. The containment pressure vessel is an ASME vessel, which is different. It's a very high pressure building. When you look at the margin between calculated pressure values and the capacity of the containment, there's less relative margin there than

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potentially other areas of the plant. You know the container being the last barrier, there. It is safety significant and risk significant. It's a brand new novel design.

The way they propose or don't propose to test it, pressure testing, is different. And also, the analysis. So with that, and given the lack of operating experience with this vessel in the industry, you know -- during operations, it's one, two pounds atmosphere. So you really will not be challenging the containment during operations such that if there are issues with the designs, they won't be self-revealing during normal operations.

So given all those considerations, or their representative considerations from the tool, that led the staff to say hey, we have to do more of a detailed review of the containment. The tight coupling between the containment analysis and the analysis on the primary side will lead us to that. If you look at the coupling there and the margin within the chapter fifteen analysis for containment -- the core never becoming uncovered and temperatures, et cetera.

If you look at the area where it's potentially more challenge. It's in the containment

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response as opposed to the fuel response, the reactor response. So that=s the first area for containment.

CHAIRMAN CORRADINI: Let me probe that.

Because I agree. I don=t disagree with your review approach. But is there an example of any containment you wouldn=t do that to?

MR. MONNINGER: So -- well, the question is, you know. So for example, the detailed assessment of the NuScale intervals system test data. You know, one -- there is testing. It is just one facility. A lot of the previous designs with the AP 600, the AP 1000, there were various testing facilities out there from integral system tests to separate effects testing, et cetera. So we are of the view that this data versus a large containment -- the condensation within this is much different than the spray system within the APR 1400.

CHAIRMAN CORRADINI: Sure. But where I was going with this is -- as I said, I don=t disagree with what you=re saying here. But in some sense, the containment being the last barrier, you would take a hard look at this regardless of how unusual this one was. Because of the very fact that it=s the last barrier for both CBAs and beyond the DBA analysis.

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MR. MONNINGER: Yeah. So, if another large dry came in, it=s up to the staff whether they want to do a confirmatory analysis or not.

CHAIRMAN CORRADINI: Okay.

MR. MONNINGER: If another large dry for a Siemens reactor comes in, a Siemens 1400. We would not have to do confirmatory calculations if we did --

CHAIRMAN CORRADINI: No, no. I=m with you. But let me just ask it a different way. So, if -- how was I going to ask this? I=m going to go back to the APR 1400. Maybe that=s not a fair comparison. But that=s a typical containment.

MR. MONNINGER: Yes.

CHAIRMAN CORRADINI: So you would rely on past experiments versus looking at their integral experiments?

MR. MONNINGER: Right.

CHAIRMAN CORRADINI: That=s your point?

MR. MONNINGER: Yes.

CHAIRMAN CORRADINI: Okay, fine.

MR. MONNINGER: Post event. So from Reactor Systems branch. You have GDC-26 and GDC-27, which cover our reactivity control systems. One is during normal operations, and the other is

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post-accident. You know, post-accident GDC-27 discusses the need to go sub-critical. And it talks about a control rod dry system, there. And it talks about potential credit for boron addition. So they don't have the safety related meanings for boron addition. They do have the CVCS system. However, that is not a safety related system.

So it ends up that there are certain periods of time during the fuel cycle for certain times during the fuel cycle. And the other assumption is within GDC-27, you assume one rod stuck out. So with that assumption within GDC-27, there are times in the fuel cycle where the reactor will come back in the analysis assumptions re critical. You know, a few percent power. So that's a very new issue for the staff.

CHAIRMAN CORRADINI: It's new because they don't have a safety grade boron injection. That's what makes it new.

MR. MONNINGER: Yes.

CHAIRMAN CORRADINI: Is that correct?

MR. MONNINGER: Yes. So PWRs --

CHAIRMAN CORRADINI: They would see this

--

MR. MONNINGER: But there are sometimes

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in the PWRs, there could be a very brief re criticality. It's my understanding, a main steam line break or so. But eventually it comes back with ECCS injection, et cetera. This isn't the case there. You know, it would come back re criticality. The heat would be rejected through the passive RHR system, et cetera. So it's a new issue. It challenges some of your basic assumptions for critical safety functions. You know, is the reactor shut down or not? So what the staff is wrestling with there is, what are the safety implications of that? And is it acceptable to proceed forward with an exemption?

CHAIRMAN CORRADINI: Okay.

MR. MONNINGER: So I'm not sure if I -- so Lynn did cover the two issues on PRA. So I'm not quite sure what her -- if we can skip them or not.

(Laughter.)

CHAIRMAN CORRADINI: Come on. We're here.

MEMBER STETKAR: I wish I was here earlier. So if I'm just repeating something. It strikes me as somewhat odd if I do a contrast that you're placing less emphasis on the PRA, if you characterize it as technical adequacy. You already discussed this?

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CHAIRMAN CORRADINI: No.

MEMBER STETKAR: Oh, okay. And yet higher emphasis on the multi-module risk. Now in my experience, when you start going out and looking at multi-thing effects, you often uncover subtle things that you don't think about when you're just doing a single unit risk assessment. And a kind of cursory -- I hate to characterize it that way. But let's call it a more standard design certification, chapter nineteen PRA review. It might say, yeah. It sort of looks adequate. And then the applicant would say, okay. You said it sort of looks adequate. And nobody searched for those subtleties. That's what seems to be a little bit not consistent here.

If you're really going to -- what I'm trying to say is if you're really going to take a good hard look at the multi-unit risk issue, the things that affected might be dependencies. I don't know if it's design dependencies, I don't know what it is. Because I haven't even thought about the problem. Human dependencies, environmental dependencies. I don't know. That could be easily overlooked if you focus on only one unit.

MEMBER BLEY: I think John is suggesting

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you might find something when you're looking harder because it's multi-module that would then feed back to single --

(Simultaneous speaking.)

MEMBER STETKAR: I am saying that if you develop a single-unit PRA as your template and say, we're going to use that as our baseline risk model.

And now go from that, look out for other multi-unit effects.

MEMBER BLEY: Just add them in, you might miss some.

MEMBER STETKAR: You might miss some.

MEMBER BLEY: Okay, get you.

MEMBER STETKAR: Or that you didn't think about something in your single unit carefully enough.

You said add them in, I'd say extend it out. And that's the --

MR. MONNINGER: So with regards to the reduced effort review and the PRA technical adequacy.

There will be a review done. But with that said, there are certain aspects. One is the design is much more simplified. So the PRA that represents the design is not as complex as a typical plant PRA. Given the simplification of the design.

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MEMBER STETKAR: But that doesn't necessarily mean -- when I talk about PRA adequacy, I could be doing a PRA of a beach ball and still not have a good PRA of that very simple beach ball. Because I've sort of assumed that it's a perfect beach ball and it never leaks.

MR. MONNINGER: So then there are a couple other considerations. One is, we did have quite a few interactions with the applicant during the pre-application. They did a self assessment of the PRA. They sent the PRA out an external group for their review of it. So there's things that we are aware of and have been involved in the review of during the pre-application process that provides a significant level of confidence. Such that the typical review -

MS. MROWCA: And that's in comparison to the standard, for instance. So we know those things have been done. So we're trying to leverage them so we have some level of comfort. But I will say again that this approach and is an initial review approach.

So that's how we're planning, based on what we know at this time. If we get into the multi-module risk and we find that we do need to go back, we will.

MR. NAKANISHI: Lynn, can I add something?

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Can I add something -- a little bit to that? For the PRA technical adequacy aspect. I think maybe we are sort of conveying this as one broad brush that technical adequacy is being reduced in terms of the emphasis. But I think what we also want to convey is, obviously we're going to focus on the modeling and the structure of the PRA completeness. Those things are definitely going to be -- even within technical adequacy, it's a focus. But I think what we wanted to indicate also was more related to numbers, for example. Quantification. Technical adequacy, standard elements that relate to try to obtain an accurate risk estimate.

Those are the things that may not be as important in terms of reviewing the PRA for a design certification. So, we didn't want to send the message that we're not going to do an adequate review. We will certainly make sure that those things like modeling and completeness and those things will be appropriately focused on.

MEMBER STETKAR: Yeah, but let me be the devil's advocate as I always am. That the reviews that have been done in the past -- and we've gotten ACRS subcommittees have gotten push back on this have been

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done against the notion that the technical adequacy only needs to meet capability category one. And in some cases, it has.

Because chunks of the PRA have been effectively black boxed. And capability category one kind of says, yeah. You can black box stuff. And the staff and applicants in the past have pushed back and says, that=s all we have to do. And the staff says, that=s all we have to do. And if some of the stuff that they=ve black boxed -- and I don=t know what they have or haven=t -- has elements that are subtle that can effect multi-unit stuff. That=s where the holes might be. I think of things that -- have you modeled ventilation systems? No, we don=t have to because we don=t think we have to. And by the way, our operators will be trying to go open doors. That=s okay. That=s consistent with capability category one.

MEMBER BLEY: So this brings up what we talked about before John got here. I was getting comfortable over there, what we talked about was that as the design progresses and as the review progresses, the PRA needs to become more and more toward a real good quality PRA approaching the kind you'd want for a fuel line, especially if our review is hinged to the

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PRA, if that's writing our review. If it has to before you actually get to approving the design, it truly ought to be Category 1 if we're going to live with what we've done on the existing design certs that weren't driven by the PRA. That's one thing. And if we're going to hit our review and more and more of their design driven by the PRA, that just seems like a place to end up. It's got too many holes in it and I was thinking we were moving beyond that, but I'm not sure after no response to what John said here in a way that says it does.

MEMBER STETKAR: Let me give you an example

--

CHAIRMAN CORRADINI: Before you do that; so is Dennis' point correct in terms of the level, because you're saying you're looking for more of an evolutionary --?

MEMBER BLEY: If we're going to base our review on, if it's going to be driven by the PRA to almost any extent, and here it's very heavily that PRA can't be in Capability Category 1, there's just too many bolts in it. And it might be in some limited areas, but it ought to only be in limited areas. What's happened on the previous design certs is they said,

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maybe you can take a step out of the bottle on this to make it Category 1 when they didn't need to.

CHAIRMAN CORRADINI: I just want to make sure they have a chance to, they have a chance to respond.

MEMBER BLEY: Yes, I'd like to hear that.

MR. MONNINGER: So one thought would be the PRA, the risk insights, that is just one of the 11 factors or criteria out there. It's not just safety related or not, risk significant or not; there's defense and depth, there's novel designs, there's multiple considerations out there that could trump the insights from the PRA, so.

MEMBER STETKAR: Let me give you one -- I was going to give you a different example, but let me try one specific. What are we going to do about the fact that there's a lot of instrument control systems, and I don't know if you remember the acronyms, that peer only over in the main control room for all of the modules. And I've forgotten how they're actually put together right; thought about it at one time, but I've forgotten it. In the past we've seen applicants black box the whole control system and put a number; 10 minus 4 is good enough because that's

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failure to initiate some sort of -- and I don't know whether it's a safety or non-safety function because I know that some of the safety stuff is distributed by module, so I have a 10 to the -4 for my module and I'll have a 10 to the -4 over there for that common stuff. Well, the common stuff might affect all 12, and maybe this is 10 to the -4 and maybe it's got some sort of dependencies like if the room heats up a lot, it doesn't work so well. And I don't know, that's an example even from that, from the NuScale specific stuff that didn't get tripped.

And as Dennis said, if you use the risk information and prioritize areas that you're going to place more or less emphasis on, you're going to have good confidence that that risk information comes from sort of equally logged kind of systematic examination, all features of the design. So as long as -- I think what I'm saying is that in your, on the next page on your assessment of the PRA technical adequacy, you need to be really, really sensitive to things that are either advertised as Capability Category 1 or that look like boxes with numbers in them.

CHAIRMAN CORRADINI: Did you have something?

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MR. NAKANISHI: Yes, I just want to mention we understand your comment. I guess one thing I would add; staff will make sure the PRA is adequate for what it's being used for, so in terms of the support that it's providing for this review approach, there's this one aspect of the categorization itself and that's primarily at the system level or function level. So if the PRA is not able to adequately identify the categorization, then that's one thing. And then there's other additional risk insights that the PRA may provide that'll inform the review process.

So I guess, again, kind of getting back to the original point of this technical adequacy being put here as less emphasis. What the staff will do in an adequate review is make sure it can support the intended uses.

MS. MROWCA: But maybe one of the things you would do is leverage that self-assessment, independent review, whatever they call it in accordance with Reg Guide 1200. Leverage that a little bit more and our knowledge or the approach that the applicant's taken.

MEMBER STETKAR: Just remember that in the past, anyway, what was the intended uses in a design

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certification for the PRA, had been simply to say is there reasonable confidence that the risks is according to average frequency and some estimate of large release frequency, for this particular design is not greater than from the risks from currently operating plants.

It kind of meets not hard numerical goals but the goals that the commission and the staff has set up. That's a pretty lower bar. That's a pretty low bar for that particular use of the PRA, but if the staff and the applicant wants to use the PRA for something else, then that is prioritizing how much effort in a safety review.

MEMBER BLEY: Well, and the applicant's told us, I'm not sure they've told you, they're using their PRA to heavily guide the design and the security of the system. I mean, with more and more emphasis on it, it becomes more important.

MS. MROWCA: Well, initially we'll use what the applicant proposed for risk significance, for instance, in trying to figure out the safety significance, but we'll also be reviewing that risk significance and whatever it takes to make sure that we agree with that. And I think we also, in some reviews we may not have solicited as much information as we could from other reviewers about their opinions on risk

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significance, not just the quantitative PRA, but operating experience and such, that we're going to do more of that this time and asking them to help us make sure that we didn't miss something in that operating experience venue, for instance. So, and this is initial focus, so if we find initially that the applicant classifies something as not risk significant and we think that -- and so people are working their review in accordance with that preliminary assessment and we determine later that we don't agree with that, that it should be risk significant, than we need to go back.

We have already said that this is initial and that those things can change, anything can change in the review. You might have a design change that can impact how you approach a review.

MEMBER BLEY: Well, two quick things; one is back to the job John did on the multi-module. We've had some conversations and their PRA guy said, oh, I don't want to touch that. Well, they got to. That's really key. The other thing is we're finding the purpose of our meeting, I apologize, but we just went through early review stuff on the advanced reactor design criteria, and although this is a water reactor

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and those are for non-water reactors, we were told that in fact NuScale is the first place they want to try these things. But I see your slides are still focused on the GDCs and not the advanced reactor design criteria, and I just wonder if it in fact there's an intent to use the advanced reactor design criteria during this review?

CHAIRMAN CORRADINI: Is that how they said it though?

MEMBER BLEY: No, that's what I thought I heard. I have to go back and read the transcript.

MR. MONNINGER: So, I don't want to put words in the applicant's mouth. It's our understanding that they are proposing to meet all the GVC. There are some GVC, for example, GVC27 that they requested an exemption from.

MEMBER BLEY: Those guys, so they're standing there with exemptions --

MR. MONNINGER: Yes, there's other GVC out there for containment testing or Appendix J that there may be --

MEMBER BLEY: That's enough, that's fine. It's not what I expected to hear. I hadn't heard from them, I heard from --

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CHAIRMAN CORRADINI: Yes, I was going to say the only thing I remember from the conversation at that other meeting was there are certain policy issues that if decided here, when decided, when to set it up. We'll essentially pass onto them in terms of security, emergency planning, the EPZ, that's what I remember we had checked, but we're off topic.

MEMBER BLEY: Yes, that was just curiosity.

MR. MONNINGER: So review emphasis, the fourth area there, heavy load handling, the crane with 12 modules two-year cycles, the crane will get some pretty significant usage moving entire modules, moving the fuel integral with the containment. So it is very new, very unique, very novel. If you look at the PRA now it represents the highest potential risk contributors, so the staff would focus in that area, on areas potentially to do reduced effort review, the HVAC system for the spent fuel pool area. At the time we had pulled this together it wasn't safety related and it wasn't risk significant. The review is evolving, we had some questions that are raised with regard to credit for the ventilation system and we're running those down with the applicant as an example.

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So this can be an example where as we review the design, new information comes along and it could change. For example, posts, main steam line break or heat up within the spent fuel pool, credit is take from the ventilation system to open to depressurize.

CHAIRMAN CORRADINI: We're just looking at heavy load lift accidents.

MEMBER BLEY: The French apparently dropped a steam generator last year. It was whispered in my ear. In fact, they did.

MR. MONNINGER: So then our reactor systems for the spent fuel within the racks, they're not taking credit for burn-up. In addition to that, the boron concentration within the pool is significantly greater than what they take credit for in their analysis, so they don't view the need to go in as deep a level review in that area. You fully supported the staff's statements on PRA technical adequacies, so we'll keep going.

CHAIRMAN CORRADINI: Keep on going. I want to ask about this one, though; is it that -- we're not going to talk about specifics here -- but is it something to do with the physical geometry change that leads you to this conclusion?

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MR. MONNINGER: So the reactor and all that is underground, so then when you look at the profile, and then also when you look at safety systems, safety systems aren't out there in the aux building, et cetera, the safety systems, the ECCS. So when you look at the simplicity of the design where important systems that could be impacted are, you don't have as big a footprint, plus in addition to that the containment and the reactor are in the ground. So it should be a much easier --

CHAIRMAN CORRADINI: I'll wait to see -- it's kind of a football field size, with twelve --

MR. MONNINGER: Yes.

CHAIRMAN CORRADINI: Okay.

MEMBER STETKAR: So when you say aircraft crash limited to that little box, you say systems on fire, you meant only in the context of aircraft crash or do you mean fire in the hole sense of risk assessment?

Because, again, I'll come to the fact that I have no idea how the stuff is out there in central whatever they call it, gets from Point A to Point B. There's got to be, they aren't going to do it waterlessly. I suspect it's going to be fiber optically rather than copper, but I don't know that.

MR. MONNINGER: So this is the fire

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response post-aircraft effect?

MEMBER STETKAR: Well, as long as the other non-aircraft crash parts of the risk assessment, which many people ignore for the design certification because they see we don't know anything. So as long as that picks up, you know, plain old vanilla fires that start in places.

MR. MONNINGER: So you have GDC, a five out there of sharing SSC's amongst units and we had traded correspondence with NuScale prior to the application come in, the notion of fires potentially impacting multiple units, internal floods impacting multiple units and we put out our position there essentially that fires and floods should not impact multiple modules within the design basis in that space.

MEMBER STETKAR: Well, but this is not based on access, it's based on risk assessment which is a different space.

MEMBER MONNINGER: So I think we'll have to, when we do the discussions.

CHAIRMAN CORRADINI: Keep on going.

MS. MROWCA: So the next presenter is Matt Mitchell representing the Division of Engineering and Infrastructure.

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MR. MITCHELL: Thank you, Lynn. And in pulling together our division's examples, because we were only working for a short list of illustrative examples, we basically chosen one sort of focused in the materials mechanical engineering area. I want to acknowledge that we could have put together a similar list from I&C, instrumentation and control, and/or the seismic area, but since we're only touching on part of it anyway, we wanted to start one examples that we could perhaps talk about in more depth with the staff we have available here, particularly me since I've got the honor of doing the presentation.

So the first item on our list of areas where we've recognized there will be additional review emphasis for the NuScale design specifically, comes to the question of the application of the ASME code to the design. And I'm sure the committee's aware, obviously, that we rely heavily on the certification, most designs on the fact the applicant will design, inspect, construct. It tends to the ASME code, Section III of the ASME code, the OMN code, Section 11 code and 7. In the case of the NuScale design, however, those cods were largely written to be of service to large light water reactor design, so this design does

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not fit within the box prescribed by the ASME code as comfortably as other design certifications that we've reviewed. So we're --

CHAIRMAN CORRADINI: So it's too small?

MR. MITCHELL: There are aspects of design, and principally it comes down to design and requirements that are based on size from the ASME code --

CHAIRMAN CORRADINI: So, I have an obvious question; how is the La Crosse Boiling Water Reactor licensed since it's 50 megawatts electric and about the same size in 1963?

MR. MITCHELL: That pre-dates me, I do not have the answer to that question.

CHAIRMAN CORRADINI: I just happened to have an example of a 50 megawatt reactor in my mind.

MR. MITCHELL: I understand. No, I understand and -- '63 would have gone back prior to Section III of the code, you would have been back in --

CHAIRMAN CORRADINI: No, I guess what I'm saying is it's basically too small.

MR. MITCHELL: Yes, the requirements do not align well.

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CHAIRMAN CORRADINI: Okay.

MR. MITCHELL: And -- yes, that's fundamentally the question, so in understanding how this design will meet particularly general design criteria which are heavily related to or can be largely met by meeting the ASME code for retro -- and partial boundary integrity, et cetera. We need to put some more thought and interact further with the applicant to understand how they're going to meet those general design criteria, what they're going to propose to do in terms of addressing the uniqueness of their design in some of these areas.

CHAIRMAN CORRADINI: Especially where the code doesn't align?

MR. MITCHELL: Yes. There may, for example, very small diameter piping, there may be the significance of that piping to this design may be proportionately greater than the significance of similar small bore piping for large light-water reactor design. So we need to make an informed, risk-informed view of how these various components and systems, what their importance is to design and therefore what type of application of these criteria, equivalent to the ASME code, need to be applied to various situations.

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MEMBER SKILLMAN: What are equivalent codes to ASME, for instance, that you would use for reactor coolant system pressure valving?

MR. MITCHELL: Well, I would say we're -- I didn't want to infer that we're looking at equivalent codes or other codes. I think we're looking at the principles behind the ASME code, the intent of the requirement, what the requirements are attempting to achieve and making sure that those same intentions are being met for the NuScale design for components of similar significance to the overall safety of the design. So we're really still using, or will be using the principles of the ASME code, but asking ourselves, what does this design need to do in order to meet those same kind of intent, if you will?

MEMBER SKILLMAN: Well, I appreciate the notion of intent, but it seems to me that there is so much robust experience in what Section III gives us in B31.7 and B31.1 and in some case Section VIII that to deviate from those introduces risk that quite candidly may not be worth what is considered to be the benefit of the change.

MR. MITCHELL: I would say that we're principally looking at the areas where, at least with

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regard to Section III, so for the nuclear design code that it just does not prescribe requirements, or Section XI is another example where you don't have, you don't prescribe the requirements because of the size of bolts when you get material procurement requirements for the type of material testing you need to do on bolting materials or pre-service and in-service inspection of piping of various sizes. The code has certain limits where you cut off in terms of who needs to be addressed, but that piping may be significant for the NuScale design in a way that's similar to the way a larger pipe would be significant for a large light-water reactor.

So that's where we're trying to say from a functional risk standpoint, from the impact of a design, does something more need to be done on what code would normally prescribe for these components which may not be readily already addressed by simply saying, we complied with the ASME code.

I'm not sure if I answered the question or if that helps?

MEMBER BLEY: I think the devil is in the details. This conversation has been ongoing for probably a hour before I came here, but I came here because I'm very interested in this and several other

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key aspects. And it just seems to me that the level of involvement, I guess I've been here since the NuScale application came in and tried to be in all of the meetings. There's the potential to throw out the baby with the bath water with this one, and I just think prudence might say, let's not be so quick or so hasty to for whatever reason abandon what we know. Works very, very well.

MR. MITCHELL: And I would just to re-emphasize there's certainly there's no intention to throw out or to discount or not understand and learn from what is in the ASME code that have served us well for a numerable number of years. It's just making sure that how that set of requirements is sufficient to deal with this particular design and that it doesn't overlook something of importance just because they were rose rules were tailored for a large light-water reactor design, not necessarily components of these size ranges. Again, I would go back to the word intent, we are clearly focused on what the intent was and what was trying to be achieved, similarly, from the ASME requirements for large light-reactor designs, making sure we're still doing the same thing and achieving the same end point for NuScale.

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But you're right; there is detail that we're going to have to get into as we're going through reviewing this particular topic with this design.

MEMBER SKILLMAN: Just let me push back one more time. I was at BMW 45-46 years ago, BMW was developing the consolidated nuclear steam generator.

Many of the design attributes of the CNSG are in this design. They've said, hey, I was aware of that design and a lot of the stuff, steam generators, now everything's in one pod was a fundamental design feature of the CNSG, and that was in ASME Section III Class 1 and it was approximately the size, it was a small compact device. And it was seen back then as advantageous to stick with ASME because of the abundance of data that showed the design rules, the allowable stresses, the materials for construction, fit in a way that provided the reactor cooling system boundary that was of extremely high quality.

MR. MITCHELL: And certainly where those rules are applicable and transferrable in just the same way we would expect that the NuScale design would meet those rules. I think we're talking about a subset of the requirements, things like inspection requirements where inspection requirements may not match because

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of the size difference or material qualification.

MEMBER SKILLMAN: For Section XI I would agree with you.

MR. MITCHELL: But maybe for PSI requirement, pre-service inspection requirements. So no, I'm not suggesting that in total it does not match, but there are certain aspects of it which may not match well with this particular design, and that's where we need to look at it further. But certainly where it does and where it's just as applicable to this design as to a large light-water reactor, we would certainly, our expectation is that's what we're going to see in the design application.

MEMBER SKILLMAN: Thank you.

MR. MITCHELL: Okay. The last two then on the page I think we can take somewhat as a grouping, the idea of novel design aspects and first-of-a-kind testing. And John's already touched certainly on the containment being a novel feature of the NuScale design, at least in comparison to what our large light-water reactor experience has been. Obviously, with this being an integral pressurized water reactor with many of the internals components being, again, different than what we have typically licensed in design

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certification space, we're seeing either new internal geometries, components that have different characteristics to them, they may be longer, they may be more flexible, so there may be issues about -- and this gets to the first-of-a-kind testing -- there may be testing for vibrational issues during operation, there may be testing to demonstrate that the components can fulfill their intended function, that may be unique to this particular design.

So those types of aspects are certainly in the materials of mechanical engineering world, things that we're going to be highly focused on as we're doing this particular review. So we may be running across new features, new mechanical components, new material combinations, new material choices that we're going to need to spend more time reviewing because of their unique nature. I would say, though, that not all novel design aspects necessarily require additional review; certain novel aspect design choices may have been made that will simplify ultimately our review of particular elements of this design because they may have made choices which will remove from consideration certain concerns that might otherwise exist had they made other design choices. So the new are not

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necessarily synonymous.

And then briefly on our areas of reduced effort; the first two --

MEMBER BLEY: Go ahead. I was just going to ask if you've done some of it?

MR. MITCHELL: Yes, reduced effort. So the first two are actually quite broad and, again, can be grouped together. Obviously, it goes back to systems with reduced significance from a risk perspective.

MEMBER STETKAR: And Matt, let me ask you because we've reviewed their topical report where they're proposing to essentially categorize their whole electric power system as non-safety-related. And they have arguments for that, I think the Committee's going to write a letter on that. Let's presume now -- and they've kept the safety-related label on chunks of things that when I read what they've written, I don't why they're calling the chunks safety-related. I think they figured well, we'll never get away with saying that our instrumentation is not safety-related, despite the fact that we say that it can perfectly fail and the plant is safe. So they've got this stamp called safety-related still attached to some chunks of stuff,

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and I'm not talking about piping, I'm talking about systems, certain chunks of their instrument system. Their protection system cabinets because my God, you cannot say that they're not safety-related, whatever lives in those cabinets.

I always presume they have a perfect risk assessment; they model everything in the plant perfectly, and that those things that they put safety-related stamp on are much, much less important to risk than those things that are not safety-related.

Where do you now balance your effort in your review, because this says well, you're going to do the standard review on everything they've put the safety-related stamp on and you're going to do less review on things that are, A, non-safety related and non-risk significant? Here's a conundrum.

MR. MITCHELL: I think I should perhaps defer that question back to Lynn and John because I think what you've asked is a more general, broad question coming from the example area of --

MEMBER STETKAR: Well, it's a general, broad area, but it's going to affect real full-time equivalent effort. What I'm asking is are you setting yourself up to waste time reviewing things that are

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less important to risk, which I categorize as safety than not placing as much effort on things that are more important?

CHAIRMAN CORRADINI: But John, what I think you used as example are certain things that they default to a safety-related but it may not be risking it.

MEMBER STETKAR: That's what I said.

CHAIRMAN CORRADINI: But I read the box differently; I read the box that if it's safety-related and not risk significant, it may not --

MEMBER STETKAR: No, it just says reduction in classification from safety-related to non-safety related, or reduction in classification from risk significant to non-risk. This still to me says as long as something has the tag safety-related, it's associated with, it's risk significant, it's going to get the whole treatment, traditional treatment, right? Unless I misread to your left.

MR. MITCHELL: Well, just speaking from -- I'll just broadly try to address that since it is on my slide. And I have not read it perhaps that closely.

MEMBER STETKAR: Well, I was thinking, you

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see how I'm reading it.

MR. MITCHELL: I think I would interpret that as an or statement between the two boths if you will, so if something is reduced in classification from safety-related to non-safety related, or if it sees a reduction from risk significant to non-risk significant, we would then tend to put less emphasis on the review. So two parts of the matrix that says if either of those move in the direction of being non-safety or non-risk significant comparatively to what we would normally expect that particular system to represent in a typical large light-water reactor design; in that case we would reassess and say we should put less emphasis on that.

MEMBER STETKAR: As long as you make it very clear that that second bullet applies to something that has the safety-related stamp on it and is less significant to risk than something that does not have the safety-related.

MEMBER BLEY: Even so, if it's really high risk significance and for some reason one decides not to classify it as safety-related anymore, you shouldn't low-risk examination. That's --

MEMBER STETKAR: I agree with you, but I

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personally would put more emphasis on which is A1 and which is A2.

MR. MONNINGER: So the A is our safety and the 1 is --

MEMBER STETKAR: So A1 is safety-related and B1 is risk significant. You don't make any distinction between B- or do you? Is all of A1 and B1 read on your thinking chart here?

MR. NAKANISHI: No, we made the distinction --

MEMBER STETKAR: Can you explain it? That will help us.

MR. NAKANISHI: Yes, A1 is our risk, I believe, and then the B1's are, I think it's purple in the spreadsheet.

MEMBER STETKAR: Okay. I mean, in practical application you distinguish an A1 from a B1, do I work harder on A1 or on a B1? I would be working harder on a B1.

MR. NAKANISHI: Well, A1 is both safety-related and risk.

MS. MROWCA: So it's A2 and B1 is what you're looking at.

MEMBER STETKAR: Yes, I don't have the

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matrix in my head.

MS. MROWCA: I do.

MEMBER STETKAR: Yes, you can help. So you know what I'm saying with this.

MS. MROWCA: Yes.

MR. NAKANISHI: So the question was which would you focus on more, A2 or B1?

MEMBER STETKAR: Right.

MR. NAKANISHI: So B1 I would say. I think that's sort of the grading that we're --

MEMBER STETKAR: I don't know remember if I read that as the current chart, but if that's the intent.

MR. MONNINGER: So I think when you look at the SRP intro, it goes the A1, the B1, A2, B2.

MR. NAKANISHI: Yes, intro might not exactly have that order. I think that's where we come to.

MS. MROWCA: It also might depend on what it is and what the function is, so it's hard to make a general distinction.

MEMBER STETKAR: Yes, but again, too, with -- don't fall into necessarily the traditional what the function is because I think that's why they said

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well, whatever's in the boxes that does the common rhetorics of signals, there's no way they could every justify to a regulator that that doesn't have the safety-related stamp on it, despite the fact that things supply power to those boxes. They think they can justify not having safety-related stamp on it.

CHAIRMAN CORRADINI: But you would still -- I mean, I want them to move on.

MEMBER STETKAR: Yes, but just to close this up; I thought your point was that you want to have equal or more emphasis on things that might be non-safety related but risk significant? That's what I thought you mean?

CHAIRMAN CORRADINI: Their priorities are clearly stated and understood to be A1, B1, A2, B2. Very clear.

MEMBER STETKAR: Right, okay.

CHAIRMAN CORRADINI: And understand what the criteria are for how do you determine the difference between a B1 or B2 or the difference between an A1 and an A2, then I'm thrilled.

MEMBER STETKAR: I'm glad you're thrilled.

MS. MROWCA: So the next reviewer or presenter is Michelle Hart for the Division of Site

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Safety and Environmental Analysis.

MS. HART: Hello. My division we have all the ologists, we have the seismology, geology, meteorology.

CHAIRMAN CORRADINI: All the what?

MS. HART: Ologists. But we also --

CHAIRMAN CORRADINI: Do you have zoologists?

MS. HART: We do not have zoologists at this time. We do look at the environmental impacts, so we do have some folks looking at birds and bees and bunnies and things like that. But we do also have my branch, which is the Radiation Protection and Accident Consequences branch, so you have radiation protection, shielding analyses, mission doses, and my design basis accident does analyses and some severe accident consequences for environmental impact. And so the things we thought we'd bring forward for our review emphasis, the first one is in the radiation protection and shielding analysis specifically type areas, also potentially equipment qualification. And so there's an amount of fail fuel in the core that you assume as the basis for your coolant inventory that you use for your source transfer direct dose analyses and shielding

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analyses and things like that.

NuScale design uses an assumption that is different, that is in our SRP, it's a much lower value than we have and my colleagues are calling it non-conservative. They think it's a complex and in-depth review that we need to look at the technical basis for the --

PARTICIPANT: Can you just say that again?

You said that they're looking for a smaller fraction.

MS. HART: Yes, the fraction of failed fuel that they're using as the basis for the coolant source term is much smaller than we see in other large light-water reactor designs. And so as you propagate as your source for all this other stuff, we need to look at that more deeply because compliance still matters for us, because we are one of those non-SSC topics. So all the A1, B1, that doesn't really matter to us as much; we look at the rest of the considerations trying to determine, and when we were looking at this, this was not following our current guidance, so we thought we needed to do more information on that.

The second one is the maximum hypothetical accident and that's in my review area.

PARTICIPANT: So may I just briefly go

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back? So the reason they're doing that, they must have a reason, and the reason I assume is because they're not driving fuel as much, they have a lower leaner heat rate?

MS. HART: That's the question. I don't know that we know what the reason is yet, but we do see that -- it looks like there's some examples out there with similar types of fuel. For large light-water reactors it's not exact same fuel, of course, where it would seem they have already exceeded the fuel fraction practically already, so that's where the question comes up.

So for the maximum hypothetical accident because they don't have pipes, they didn't want to say they had a LOCA, so it's a new novel access scenario, this is a mechanistic source term, it's a first implementation of a mechanistic source term, it doesn't follow our standard, our regulatory guidance in Reg Guide 1.183. And there is a topical report that I'm also reviewing right now about the methodology to develop this source term, and so this is an implementation of this methodology as well at the same time. So I do plan on doing a more detailed review of this, of the implementation of the methodology, in

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the DCD I have to look at the implementation of the methodology. So I'll do some confirmatory analyses, I may have to do some sensitivity analyses. The choice of accident scenarios they have a choice of severe accident scenarios that they use to develop the accent source term for this citing analysis. And I'll have to use colleagues in the PRA Branch and the Reactor Systems Branch to help me determine if those are the correct scenarios. And also some aerosol topics and things like that, so it'd be a little bit more in-depth detail. I do plan on doing an audit of their calculations to also help me get more information on that.

Okay, so the reduced effort reviews, these all show up in the radiation protection area, so the ODCM and Process Control Program, they have commitment to using NEI guidance, and so we just check the reasonableness, that wouldn't be a large review. Radiation protection, the LAR program, they also intend to use an endorsed NEI topical or paper. And that's also another check for reasonableness and make sure that considerations are consistent with the NEI paper.

And for the radiation protection design features and dose assessment, those are the shielding calculations

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and things like that.

Because of some of the geometry of the systems and what we understand about the layout, it doesn't look like there's much necessary for some of these direct dose assessments, the locations and features of the area radiation monitors, we just have to make sure that those look reasonable, and we just evaluate their analysis and we wouldn't necessarily have to do any confirmatory analysis. We may have to sample some of their analysis just to understand what they're doing.

MEMBER SKILLMAN: Michelle, back on Page 16 please, MHA, the topic with which I'm familiar from a previous one. What is the MHA here, 6 units, 12 units?

MS. HART: It is one unit.

MEMBER SKILLMAN: Why only one?

MS. HART: There is not enough interaction between the units to say that there would be a coincidence, accident at the same time.

MEMBER SKILLMAN: Why not? M means maximum, not maximum limited or maximum --?

MS. HART: Well, I mean I'm not calling it the maximum hypothetical accident necessarily. What they were trying to do they were trying to say

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not to say LOCA, so it's the analysis they use to show compliance with the cited criterion in 5034A1 and 5278, whatever, that you have a large release to the containment, a demonstrable leak rate and you look at the dose off-site, the 25 rem dose criteria. There's no specific requirement -- I mean, it's implied in that analysis that it is a per reactor accident, if we saw some interaction between the modules we would have questions for them why it's not a multiple module accident. But when we're looking at the multiple midget risk, we haven't seen any indication that GDC's 4, 5 and 2 are not met, that you don't have those interactions between the systems and components.

CHAIRMAN CORRADINI: Just for some background because I guess I'm looking at it differently. If I were to enlarge my water reactor to APR 1400, this is a LOCA?

MS. HART: Yes, that is correct. This is their replacement.

CHAIRMAN CORRADINI: So a certain amount of fail fuel and a certain gap release --

MS. HART: That's correct.

CHAIRMAN CORRADINI: And then with a leaky contaminant, some leak rate and show that I'm within

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the site boundary limits?

MS. HART: That is correct. That's the same analysis.

CHAIRMAN CORRADINI: Okay. I don't think that's where you're after necessarily?

MEMBER SKILLMAN: No, I'm thinking of loss of all vacuum, all my super whamodyne batteries fall off. In fact, they're not needed anyway.

MS. HART: Right, and that's beyond design basis. We're talking about design basis accident here.

MEMBER SKILLMAN: Oh, I thought MHA meant something beyond design basis.

MS. HART: No. MHA is a term that has been used in the past for the LOCA. They didn't want to use LOCA for the term that they use for this accident because it's been related to loss over pipe, the double-ended guillotine break of piping, and they don't have piping that breaks.

MEMBER SKILLMAN: But historically, this is the citing criterion?

MS. HART: This is the Citing Criterion Analysis.

MEMBER BLEY: And for current containments they choose to use a LOCA for site?

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MS. HART: That is correct.

MEMBER BLEY: But in and of itself it should be consistent with a lot of things.

CHAIRMAN CORRADINI: No, it's not the core melt accident.

MEMBER BLEY: No, it's not a core melt accident.

MS. HART: The LOCA is not, that is correct, but the design basis LOCA for the radiological assessment for citing is a core melt accident. And this is intended to be a similar accident with a large disruption of the core and a release of many of the core constituents, but not all through the vessel or the damage to the containment.

CHAIRMAN CORRADINI: Okay, but you're going to look at this closely, that is the end of this?

MS. HART: That is the point of this slide is that it's not the typical that we see for other reactors.

CHAIRMAN CORRADINI: We can't wait to look at it closely. Keep on going.

MS. HART: Yes, me too.

MS. MROWCA: Okay. So Mr. Chairman, as we prepare for the next set of presentations, do you

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have any time limitations?

CHAIRMAN CORRADINI: We can't wait to hear about it, but I don't think -- let me just point out, I don't think we're going to need to go to closed session, so we're going to proceed on with your examples. I don't see any need to, is that correct?

MS. MROWCA: That's correct.

CHAIRMAN CORRADINI: Okay. Do we have a couple other culprits coming in?

MS. MROWCA: Yes.

CHAIRMAN CORRADINI: I hoped they just were here out of pure interest.

MS. MROWCA: Well, that too. So I'll introduce Tom Kendzia from the Division of Inspection and Operational Programs.

MR. KENDZIA: Okay. So for ECIP I'm representing the division right now and we have two challenged areas, one's a human performance area, one's the operating procedure area, and the other is initial test program. So in those areas we're looking at review emphasis in the human performance area, the licensed operator staffing in the control room has been under discussion. The news gal has proposed to establish a number of lower licensed operators per reactor and

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they're going to establish their own rules on that where in the appendix that will be approved there will be an actual staffing level where they have to maintain versus following the 54M requirement. And that unique approach to staffing means that you have to look at the operator's performance in a kind of multi-module type scenarios. So if you have several events where you have an event affecting many reactors, how does the operators react, how do they control it, and that's all been in discussion for a long time. That was early, pre-application discussions they had and the staff has been involved with that proceeding and we believe we have the tools and the SRP requirements to be able to review that adequately.

CHAIRMAN CORRADINI: And just, again, for background; this is not a policy issue that the commission is going to weigh in on, this is you guys have decided that this is something to do with current guidance?

MR. KENDZIA: Well, they'll be taking exception so-to-speak from 5054N and they'll be providing separate guidance, I believe the staff will do that. The commission has to weigh in on this on final approval. I don't believe that they have weighed

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in separately on that. Do we have any additional information there? I have a lifeline for details.

MR. GREEN: Brian Green, Human Factors Reviewer. At one point I'm not sure exactly what this was, there was a SECY signed off on by the commission, they said when SMRs came in house if they wanted to challenge the 50/50 quorum staffing levels that this would be done through an exemption.

CHAIRMAN CORRADINI: An exemption? Okay. That's the process.

MR. GREEN: Yes, and I believe this is vetted up through NRO management at this point that we would be able to put this within the appendix to the rule, and that was the current correction.

CHAIRMAN CORRADINI: Okay, right. All right, thank you.

MEMBER BLEY: Are they still where they were a couple of years ago, three people?

CHAIRMAN CORRADINI: No, it's six.

MEMBER BLEY: Just curiosity. Go ahead.

MR. KENDZIA: Well, I believe the original design didn't have 12 modules either?

MEMBER BLEY: Well, the one we went out to see they ran a drill with 12 of them, which was their

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intention at the time, and they went through how they would operate them in any way. It was interesting, I guess that's not where they are. So we'll see it soon.

MR. KENDZIA: Correct. So that's one area that we've had a lot of engagement, we've continued to take a lot of staff, time and resources to go through.

The second looking at the NuScale is not part of an orange group. If you look at the emergency operating procedures for the current fleet, all the different owners groups got together and came up with the emergency operating procedures. And they were a vast improvement over the old procedures. For some of us who remember, I was a SDA SRA --

MEMBER BLEY: Some of us remember.

MR. KENDZIA: Yes, and vast improvement.

But NuScale doesn't have an owners group and they are developing their general, there are specific guidelines as they call them, GTG's, that will be a basis for the emergency operating procedures at the COL's for development. And we have a review process in place for that, including the SRP guidance that will likely allow us to review that, but it is different in that it's being developed by the design authority without

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a whole supporting organization. And so we expect that will take more effort on our part to review.

All right, second half initial test program, it is unique design. And unique design has a lot of first-of-a-kind features; you heard some of them already, unique emergency cooling system, there's a unique decay heat removal system, core flow is natural circuit all times, and so there's aspects of that that could be challenging. Containment we talked about, the differences there, unique use of instrumentation, several different types of instrumentation are being used differently in safety-related functions that haven't been used before.

Feedwater control when you think about it, just the feedwater control system for steam generators, they have not steam generator level. So there's a lot of unique aspects. They do have a proposed first-of-a-kind testing during the initial test program for the Comprehensive Vibration Assessment Program for reactor internals.

CHAIRMAN CORRADINI: You can use that one example, but so this is a once-through helical steam generator, right?

MR. KENDZIA: Correct.

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CHAIRMAN CORRADINI: So is that no different than BMW's once-through countercurrent steam generator with that level?

MR. KENDZIA: There's no level input into the system.

CHAIRMAN CORRADINI: Oh, I'm sorry; I was wrong. It's tube-side versus shell-side. I apologize.

MR. KENDZIA: Yes, that's the difference. You're making steam in the tubes.

CHAIRMAN CORRADINI: That's fine.

MR. KENDZIA: Okay. So they did one first-of-a-kind test, but then at this point they haven't proposed first-of-a-kind testing for the other ones. Now what they have proposed is first-of-a-kind testing, but what they've called it, but it's prototype testing where you're verifying the design and your control drive mechanism, so there is required prototype testing to establish that that will function the way you want in the actual reactor. But there's also first-of-a-kind testing required for that and they just haven't specified that out, and that's required by rule.

CHAIRMAN CORRADINI: This one, these sort of interest me, so the thing is they probably have to

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come up in a power extension with a good bit of testing for the first few modules to literally show this at scale. That would be my --

MR. KENDZIA: That's what we'd expect. The aspect of whether it's required or not, you have to look at the actual details to figure out if it's required or not.

CHAIRMAN CORRADINI: Sure. Okay.

MR. KENDZIA: They have not proposed anything similar to a first-plan only test, other than they required one for vibration -- vessel vibration testing. And NuScale in their submittal they left a, the submittal's a very good outline and says, okay, test this like this, but the details are in the various chapters and we have to go through each chapter to see if you have all the details required. And the argument is well, this is a design cert, but there has to be enough information there for the COL to actually fill in the details, so you have to have your design values because you have to buy equipment that's going to meet or exceed the design. So that's where we're at with the ECIP Review.

MS. MROWCA: And so our next presenter is Bob Fitzpatrick from the Electrical Engineering Branch.

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MR. FITZPATRICK: Good afternoon, I'm Bob Fitzpatrick and I'm going to talk to you about the electrical power systems.

MR. KENDZIA: You may want to have your green light on at the bottom nearest you.

CHAIRMAN CORRADINI: The button that's labeled Push that's not a button. There you go.

MR. FITZPATRICK: Good afternoon, I'm Bob Fitzpatrick from the Electrical Branch and I'm going to talk to you about the electrical review. Our review is a little different than some of the other ones you've heard, will be a little bit different than some of the other ones you've heard because we only have B2, so we don't have to choose between anything else, it's B2. But the first thing that is really important to us is they have asked for exemptions to GDC17 and 18, so that comes up as first priority, really getting into it. So we'll look at GDC17: We'll confirm with the Chapter 15 Review Staff electrical power for maintaining safe shut-down, core cooling and containment integrity, isolation. During a phone-in, a design basis event is not needed.

This is a major step towards granting the exemption. The one that goes with that is GDC18 and

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we're still going to have to confirm that we have testability of the Class 1E systems and we're going to probably develop a staff position on testing of the non-class 1E BRLA batteries.

In terms of 10CFR 5034F220 --

MEMBER BLEY: I'm just curious on that one; do you have enough to work on or do you need some research to support that battery?

MR. FITZPATRICK: Which one?

MEMBER BLEY: The battery, BRLA battery position?

MR. FITZPATRICK: I don't have enough information to answer that question at the moment.

MEMBER BLEY: Fair enough. That's just curiosity.

MR. KENDZIA: There is operating experience from your BRLA batteries.

CHAIRMAN CORRADINI: So you used the terminology and he was trying to tell me what they were.

So the batteries are non-safety related, but are risk significant or not risk significant?

MR. FITZPATRICK: The categories are not risk significant.

CHAIRMAN CORRADINI: Thank you. I just

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was trying to remember.

MR. FITZPATRICK: And the third bullet on 5034 we were actually on secondary review on this, but coordinate with the INC staff on that one. And we've already had an interface meeting with INC on that, so that's progressing. In terms of reduced review efforts, we have now under review Topical Report 081516497E which is Safety Classification of Passing Nuclear Power Plant Alleged Systems, and we've already discussed this with the ACRS. And so the staff will utilize the work that we've already completed on that in classifying the guidelines for conducting that review, so that is going to help immensely in our review.

CHAIRMAN CORRADINI: But this one, since I painfully remember this one, this one ties back to the increased review of the DCD in terms of the battery technology that would be used in support of it, isn't it? Or am I misunderstanding it?

MR. FITZPATRICK: Yes. No, that's true.

CHAIRMAN CORRADINI: Okay. So although it's reduced emphasis here, you have to put a lot of emphasis in looking at what they choose to use to retain the liability they need?

MR. FITZPATRICK: Right.

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CHAIRMAN CORRADINI: Okay, thank you.

MR. FITZPATRICK: There are no Class 20 AC or DC power supply, so there's fewer rules and targeted DSRS review will be used there. There's no highly risk significant functions performed or supported by the system, so again, a targeted review no electrical technical specifications are provided in the DCA. For that we'd have a secondary review, but we need to coordinate with the lead review as to verify that no check specs are required for the design.

Same thing goes for electrical ITAAC, the review is limited to environmental qualification in the emergency lighting sections, Chapter 8 those are our other sections, 3.11 and 9.5.3. Chapter 8 does not have any ITAAC, so we're going to have to also figure out is that okay along the way to satisfy ourselves that that's okay.

CHAIRMAN CORRADINI: So I don't think I caught that; so I don't have any or you think they need to -- there's a possibility you need to have some testing that isn't currently specified? That's not what I'm understanding? Is it the latter?

MR. FITZPATRICK: For the ITAAC?

CHAIRMAN CORRADINI: Yes.

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MR. FITZPATRICK: Well, the ITAAC is actually verifying design, okay --

CHAIRMAN CORRADINI: Not necessarily testing?

MR. FITZPATRICK: Right, and it really hasn't applied to non-safety systems. So we're going to wrestle with does it need to apply here.

PARTICIPANT: How do you treat -- I should know this, but I don't -- how do you treat things like AP1000 witness stuff?

MR. KENDZIA: Well, the witness items are all meta-quality, right?

PARTICIPANT: Yes, but that's important to put in particular box.

MR. KENDZIA: And NuScale has no augmented scale quality systems in their initial proposal.

CHAIRMAN CORRADINI: So there is an ITAAC -- ITAAC-like thing for important to quality -- I'm sorry.

MR. KENDZIA: You're beyond my level of knowledge.

CHAIRMAN CORRADINI: Well, that's why I'm asking do we have some sort of precedent for non-safety positions that do not fall under ITAAC, but require

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unlimited quality?

MR. FITZPATRICK: We don't know of any, but we're still looking at it.

CHAIRMAN CORRADINI: Can you repeat that?

MEMBER STETKAR: Okay. Well, think of AP1000, we have safety-related stuff and we have ITAAC which needs to be completed for that safety-related part of the design. We also have distinct structured systems and components that are categorized as RTNSS, they are not safety-related, but they receive special regulatory treatment and they need to have augmented quality to have that --

PARTICIPANT: They're not NQA1.

MEMBER STETKAR: They're not NQA1, but they do have -- I've forgotten the program that's associated with it -- the thing that looks like tech specs, smells like tech specs, but they're not all tech specs?

MR. HARBUCK: They are called the availability controls.

MEMBER STETKAR: Yes, thanks.

CHAIRMAN CORRADINI: What are they called again?

MR. HARBUCK: They're called investment

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protection and the short-term availability controls.

MEMBER STETKAR: ESWPR had them. They're also things that put limits on them, but you didn't have to show a plan, so they're reliability-related issues. But what I don't know because I've never thought about it or have forgotten, is that something such that when Southern Nuclear, is there something special that they need to do that sound like ITAAC for those RTNSS systems?

MR. KENDZIA: I know we don't have something that's not called ITAAC, we don't have that. I don't know if we have ITAAC or not for the automatic quality stuff, but we'll take that as a question and figure it out.

MEMBER STETKAR: Well, it sounds like that if there's something in place, it would apply here, right?

MR. KENDZIA: They're not using that terminology, so it depends on the basis for putting it into place.

MR. FITZPATRICK: And the other thing we may have to do last is Chapter 20 business, beyond design external events because they do not need electrical power to accomplish safe shut-down.

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CHAIRMAN CORRADINI: So this really isn't your forte you brought it up; so they have to satisfy Fukushima lessons learned. Do they have to have or are they seeking exemptions from flex for want of a better word?

MR. KENDZIA: Since they don't need anything --

CHAIRMAN CORRADINI: It's not your call. You can just -- by you putting less up there, it will make me think about it.

MR. KENDZIA: They don't need anything in short-term for response. I don't --

CHAIRMAN CORRADINI: So they go right to Phase 3?

MR. KENDZIA: I don't know where they're at on that, so I can't answer that question.

CHAIRMAN CORRADINI: It's not relevant to the issue at hand, it's just --

MS. MROWCA: Okay, so our last presenter is Craig Harbuck from the Technical Specifications Branch.

MR. HARBUCK: My name's Craig Harbuck and I --

CHAIRMAN CORRADINI: Speak louder.

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MR. HARBUCK: My name's Craig Harbuck, I'm from the Technical Specifications Branch in NRR. And the tech specs is kind of an unusual area for applying this, but to the extent we could we have and for the examples to present here, the increased review emphasis, in this case to have specified all the LCO's so that we can say that they should, so that we can say that they satisfy 5036 which is the essential finding for the tech spec review. I've listed here a number of LCO's that we are, our section with LCO's that we would normally expect to see, but for one reason or another they're not included in the NuScale application. We just talked about the electrical power systems, but that raises a question; there's also a battery maintenance program in admin controls that goes along with that, and whether given the different type of battery that's going to be used, whether there needs to be some kind of control over that. And unlike Chapter 3 of the Tech Specs with the LCO's, there's no detailed criteria for what has to be in administrative control, so there's a bit of flexibility there. And if administrative control is not tied to some surveillance requirement or other explicit LCO, it normally would not entail, have an impact on plant

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operation, and yet it would still be there to ensure that some provisions, whatever's being supported by that admin control was maintained.

MEMBER STETKAR: What you're saying -- let me take a minute; suppose they don't have BRLA batteries, suppose they just have plain old lead acid batteries, would your concern be different?

MR. HARBUCK: If --

MEMBER STETKAR: Given everything, it's not 1E, it's no tech specs?

MR. HARBUCK: Well, I would think it would not be quite so much since there's so much experience with the regular kinds of batteries, but --

MEMBER STETKAR: Okay.

MR. HARBUCK: But in terms of this review we want to take a look at it, I recall what happened on the ESPWR with the BRLA batteries, and so I kind of have an opinion that perhaps with this choice of batteries in large measure led to some of the reasons wanting to take everything up stream or the isolators to the Class 1E stuff and the instrumentation to make that non-class 1E.

MEMBER STETKAR: Yes, in terms of the process, sometimes back off from a particular next part.

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MR. HARBUCK: Right. Well, let me put it in a different way. The one approach would be to say it's not safety-related and there's nothing in Chapter 15 which presumes you have electrical power, therefore it doesn't meet any of the criteria. And even from assessment against operating experience or a risk assessment, it's not significant, therefore tech specs should have no say.

MEMBER STETKAR: Yes, that's why I was going to say regardless of whatever technology --

MR. HARBUCK: Right. But let me go down these other examples; for example, I point out that there's no control room emergency ventilation system specification. We have this system but it's not safety-related. But normally you would have that to meet GNC19 and yet they retained the remote shutdown system for that very reason, for GNC19, not because it meets any of the criteria, so it's a bit of an inconsistency. And so the one place you're going to require something because of a GNC19, then why not the other one? And then we can discuss what might be lesser consequences of not satisfying the LCO, but why not have it there?

In addition, the post-accident monitoring

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system, they have a handful of Type B and C variables, they don't have any Type A variables. And looking back at the split report that describes when you would have Type B and C variables, it was the absence of a significant or convincing risk assessment that led that letter to conclude that you should put Type B and C variables in the Tech Specs. Well, so from my perspective we want to see if there is any risk significant to these variables; if there's not, then that might be the basis for not having them in there. So that's how that would go.

I reflect the fact that we need buy-in on all these missing LCO's from these other branches to make sure to bring alignment, okay?

Let's see, is there anyone else? So, the CREV's actuation also would go on there, too. Another area we want to look at closely is that they want to adopt a recent improvement in the improved standard Tech Specs of a surveillance frequency control program.

The way this program works is you can remove the value you currently have to an operating plant and you can bring those surveillance frequencies to document outside the Tech Specs, and then if you want to change it, then you have a process you have to go through.

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What we don't have in their application are the initial frequencies that they would want to start out with, plus there's unusual instrumentation they have which we're not sure what the proper frequency of mine ought to be. So we're going to put more emphasis in reviewing the testing of their instrumentation.

Let's see; there was one other point I want to make. Yes, they have the definition for channel operational tests in the Tech Spec and yet there's no surveillance requirement that requires operational tests, so that may have been an oversight. I'm not sure, but we're going to find out.

Okay. And the last thing was, and it shows that there's this sharing of information between the various review groups; in the Core Operating Limits Report they have in the place of a reload analysis, instead of a name at the top of the report, they just put Later. And so we're sort of pushing back saying, hey, we'd like to know what your report is. So that's another area of emphasis.

These are just examples, there's quite a few other ones. I think that makes the point.

CHAIRMAN CORRADINI: I think you made your point.

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MR. HARBUCK: In the last page, again, if the system is not in the design, then we wouldn't expect to see a Tech Spec on it, but as is alluded to in several lines of other slides, we wanted to take a look at that function and see if it's something -- if that function's being done in some other manner, we want to make sure that it's properly addressed, tech spec or not, just to make sure that we're not leaving anything out.

And let's see; ventilation. As I mentioned before, there's existing administrative control programs which no LCO -- well, the ventilation filter testing is important. How are you going to get them to do the unfiltered and linkage testing if they don't have the specification that tells them to do it? Is there some other place in the application that addresses that? And also, I guess both of those cover that. So these will both be addressed by the absent control ventilation spec.

That concludes my examples.

MS. MROWCA: So that gives you a snapshot of the types of things that we're looking at both in review emphasis and reduced effort areas. So you had asked earlier -- go ahead.

CHAIRMAN CORRADINI: So maybe this is

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where you end up doing your summer event; so you have the tool, you utilize the tool within the NuScale which has, and I use the word socialized across the reviewers form. Where does it sit within management, is it still being considered within NRO or just now becoming policy?

MS. MROWCA: In terms of the use of the tool for other applications?

CHAIRMAN CORRADINI: Well, at least for this one?

MS. MROWCA: Well, I think we said the tool was initial help with the thought process, but we've had discussions in our working group about whether or not it's cost beneficial to maintain the tool or just to, as we're talking about now, during the review to have discussions focused on cross-cutting issues and things, make sure that we, that people need to be communicated to about issues are received in the message.

CHAIRMAN CORRADINI: But I guess what I'm guessing is I'll use Dennis's example, is okay, so now we'll start off with back in B- I can't remember where you said in 16. You have a look at their PRA, you do took their A1, B1, A2, B2, that started populating, then you brought it back within staff. You then went

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through your 11, or 10 I can't remember --

MS. MROWCA: Key considerations.

CHAIRMAN CORRADINI: Thank you, key considerations. I was going to say principles. Key considerations. And as you went through that, that led you to either similar emphasis, reduced emphasis or even more emphasis, and now that's, you said it will be documented. So now the review officially started back in March, right, so is this tool being used, modified or just part of the starting gate and now it's simply, so where does it sit?

MS. MROWCA: Well, I think the other members can weigh in, but I think what we said is it's going to be at the start.

CHAIRMAN CORRADINI: It's going to be what, I'm sorry?

MS. MROWCA: At the start, starting with I think every move we make we need to consider the cost benefit of it. For instance, is it cost beneficial to maintain that document or move to a different type of collegial discussion or sharing of issues that come up? So I think that's actually something that we discussed in our work group meeting this morning. But these are proposals on Slide 24 that we talked about.

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Because I think as a working group we found that it really does help to keep this communication going and what mechanism you use; if it's with a tool, that's like, I know that here on the second under Technical Reviewers, or just a meeting of cross-cutting issues and resolutions, I think we have yet to decide that.

CHAIRMAN CORRADINI: And -- I'm sorry, I don't want to stop you. Do you have more?

MS. MROWCA: That's okay, we just have one more slide.

CHAIRMAN CORRADINI: So let me just --

MS. MROWCA: Sure.

CHAIRMAN CORRADINI: Does it sit with him now that you are off to the races, it's John's to carry forward to decide is it a starting point, is it a living -- tell me how this is going to end.

MS. MROWCA: I'll tell you my opinion because I can. My opinion, and other people can weigh in, is that we think that this is -- I think that as a minimum, because our project management group is the one who actually coordinates the review. Now that we're in a review, it makes sense for project management to make this decision about how to more efficiently do the review.

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CHAIRMAN CORRADINI: So who is the project management group?

MS. MROWCA: Ms. Anna Bradford.

MS. BRADFORD: Anna Bradford, in the Deputy Division Director for --

CHAIRMAN CORRADINI: You have to identify yourself. Speak as efficient. Is it working? Yes, you just got to get closer.

MS. BRADFORD: Anna Bradford, I'm the Deputy Director in the Division of New Licensing, and so we have all the PM roles for all the reviews going on in NRO. And I would agree with what Lynn said, and in my mind, I mean there's one review, we're doing one review in DNRL and DSRA is leading some other review. We're doing one review while working together as a team. I think the management chain up through the NRO office has bought into the idea that we're going to use this approach to focus on our resources and our time.

CHAIRMAN CORRADINI: But in terms of -- for lack of a better term -- making it living so that as you learn more about the design, something that was less emphasis all of a sudden rises to more emphasis because you didn't realize this or that. That's still

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to be determined.

MS. MROWCA: Like I said, we just talked about it this morning in our working group and Anna hasn't had the opportunities to hear those discussions, but I would also suggest that probably a technical representative be paired and maybe be co-chairs of whatever moves forward to help with that, it could be someone from any of the technical branches that are doing the review.

CHAIRMAN CORRADINI: And then a follow-up question; so since you brought it in, is it worthwhile enough that the advanced reactor would use some pre-application things?

MS. BRADFORD: I think that's a lesson yet to be learned and we'll see how it goes with NuScale.

I think there are aspects of it that would certainly apply to some of the advanced reactor pre-app. We know far less than the advanced reactor designs than we do about the NuScale designs, the idea of being able to bend things and figure out the risks and safety things.

It will be difficult since most are not at the PRA stage yet, so we have to think about that.

CHAIRMAN CORRADINI: Right, but on the other hand this is -- you could use this as a teaching

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moment to hand them a spreadsheet and say, here, don't come back until you have enough information that you can fill this bloody thing out.

MS. BRADFORD: Well, we never tell them not to come back. But I can tell you they are watching this, and they've asked that. I think at the last advanced reactor workshop last week, we did a presentation on enhanced safety focus review because we're thinking along the same lines that this is something that might apply if and when they come in the door.

CHAIRMAN CORRADINI: Okay.

MS. MROWCA: And I think our advanced reactor group is also looking at it, they are a member of our working group for that reason that, that this is not one application and done; it's looking at what they're thinking for the advanced reactors, how what we're doing might apply to the work they're doing, and maybe how they go forward. And we're also intending to put together a report and one of the things we -- well, two things we want put in there are lessons that we learned through the work group, the process, but also technically and recommendations for going forward.

CHAIRMAN CORRADINI: A report for this

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process.

MS. MROWCA: This process.

CHAIRMAN CORRADINI: And when is that going to happen?

MS. MROWCA: We just discussed it this morning.

CHAIRMAN CORRADINI: I'm a professor, I can ask those sorts of questions.

MS. MROWCA: Yes, you can.

MR. MONNINGER: Before someone retires.

MS. MROWCA: Yes, 48 hours. I'm employed to midnight on Friday night.

CHAIRMAN CORRADINI: The only reason we really have to turn to public comments and such, and I know that, I'll let you summarize, but it seems to me that you started on this path that you feel has been a productive path and it can be applied to the advanced reactors where there is a lot less specificity, if that's a nice way of putting it. It seems that actually allows them to see what is expected of a small module reactor that's light-water versus their peanut butter, chunky or smooth cream that they want to submit. And I think that's important to them.

MS. MROWCA: Exactly. And we agree, and

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that's the feedback that we're getting that it is something that they see as important in terms of guiding our discussions with them during pre-application. So we think that that's important and I think it also meets a comment that Dana Powers had at our meeting in August where he said the NRC actually does working groups really well and that we should try and document some of the things that we do.

CHAIRMAN CORRADINI: I stopped you for a summary. Do you want?

MS. MROWCA: Okay, so in summary; I don't have to read this, but if you want to go to public comments, that's fine.

CHAIRMAN CORRADINI: Yes, why don't we do that and then we'll come back to the members. So I'll go to the control room and ask if -- I'm supposed to assume that it's open, but let's just ask.

OPERATOR: The line is open.

CHAIRMAN CORRADINI: Thank you. So do we have any members of the public that want to make a comment?

Okay. Hearing none, we'll close the line. I didn't see any members of the public in the room. Did I miss any?

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And they're welcome to make a comment.

Okay, let me go around. Let me start with Dick; Dick, any comments from you?

MEMBER SKILLMAN: I do. Thank you, Mike.

The assumption that prevails over the entire NuScale application is that these are small reactors, they are well-protected, they are well-shielded and virtually anything that could happen will be of little or no consequence. That's how I interpret, most everything I've heard in 6 or 12 weeks. And I recoiled to that notion because I think that the drift is towards seeing 6 or 12 of the small modular reactors in the same light that one might see a small industrial heating package with the potential that whether it's one reactor operator or one reactor operator per three cores, nothing significant can happen. And I offered that if one reads the gap analysis that NuScale provided and reads how NuScale justified their position against all the general design criteria, then it's not too difficult to come to that conclusion. And so I'm in a position or a place in my own mind where I'm saying not so fast there. The risks that are presented by the multiple unit design may not be fairly represented by the tools that we're using.

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CHAIRMAN CORRADINI: And to gather that.

MEMBER SKILLMAN: Well, perhaps even the tools that Lynn and her team were talking about. And so I'll just give you another example; I was intrigued by the discussion of what is the MCA. I remember MCA, it was a loss of coolant accident at Pier 95 in New York City with a SMR. And so I ran with the idea that a MCA is an event for which the public is truly at risk. And what I heard a half an hour, hour ago is it really can't happen here, the risks are so low.

CHAIRMAN CORRADINI: Well, that's they're going in stretch?

MEMBER SKILLMAN: That's their going in stretch. So just a number of areas in this application caused me personal alarm based on the years I was on the savannah and where we operated. And the very real reasons we had with that plant in New York, Philadelphia, Baltimore, New Haven, Hong Kong, we internalized the MCA and I see some of the same readings bearing down in. This was, and I'm not saying not too fast there. The exemption from general design criterion 17. It just seems that we've had years and years of industry experience that have pointed us in the direction which gives us confidence and this

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application in saying we don't need to do that. So I'm not persuaded, I'm struggling with this. Thank you.

CHAIRMAN CORRADINI: John?

MEMBER STETKAR: Nothing more, thank you.

CHAIRMAN CORRADINI: Chairman Bley?

MEMBER BLEY: Yes.

CHAIRMAN CORRADINI: I was going to say Captain Bley, but --

MEMBER BLEY: Never made it. Commander works, but -- a couple of things; it smells like it ought to be healthy. I don't quite see anything that gives me great confidence that will dramatically reduce the time for reviews. The best in all of this is probably time for interactions, the applicants early on, which I do expect will help. The tool I think if it leads to increased communication and increased focus on where we put our effort -- Tony and I had a discussion out in the hall about some things that are in current designs that have absolutely nothing to do with how much radioactivity is going to get out to the public that get dozens of detailed questions back and forth, and maybe some won't have them, because we get to areas that really don't have any significance. But we have

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to look at this design, we don't go ahead knowing yay or nay on it.

But one of the more encouraging things I think staff now has a bit of a tool to deal with newcomers to the process who are coming in with designs to let them without running through thousands of pages of guidance documents to get a feel for the breadth and depth they're going to have to support their application, and I think that helps eliminate some of the chaff that's floating around and doesn't make a lot of sense.

Thanks for the presentation, very helpful.

And for coming after all the brouhaha. Appreciate it.

CHAIRMAN CORRADINI: Member Brown?

MEMBER BROWN: How much time do you have?

CHAIRMAN CORRADINI: I have as much time as you want to use.

MEMBER BROWN: I voiced a little bit of my comments to Lynn and John during the short break.

I don't have any big problem with what they're trying, with what they're thinking about trying to establish something to do that, but I'm a little nervous on the NuScale thing about it, we just kiss off all meeting

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and not doing anything because nothing will ever happen.

I don't like that generalized thought process being applied as opposed to a more in-depth evaluation of why these things have considerable analysis to it.

I felt when we were going down this path initially when it was first a few years ago that it would be, as I stated to Lynn and John, I thought it would be a more established umbrella for what's our main mission for protecting the public from radiation. And then what if downward under that same, what are the main ingredients that do that, expand and make sure that we cover those items, and then don't work on items that need anything to be looked at. Based on the three or four new plants that we've looked at and the excruciating detail we go into, and the staff is, just the power systems, the electric plant area, I think those reviews can be somewhat more limited to some certain specific places. There are systems that I'm not as knowledgeable because the plants are totally different from Naval nuclear plants, just the existence of a back-up shutdown system that is totally different from the other one, didn't have enough room in a submarine/aircraft carrier to put those, so we don't have separation of protection systems. It's all in one

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cabinet, drawer/drawer/drawer, it's not in four different rooms protected from everything, because you can't do that.

We pay attention to other stuff for reliability because you've got to be able to fight this thing under considerable damage type situations, not to let it shut down and mold where it is. I would have liked a more -- and she phrased it a revolutionary approach to looking at how we do this as opposed to an evolutionary. It's almost as if they're looking at how do we do things today, what are the piece parts we can take out as opposed to looking at what's our mission and what are we trying to protect, and what are the parts we need to look at. And I think there's a lot of parts, I can use an example, two examples in my own thought processes where we looked at the electric plants, turbine generator, control systems, speed control systems and voltage control systems. There's a lot of detail played to that and then you have the analyses we do, but yet the turbine generator, it's a reliability, it's supplying power, it's not protecting the public. It's the stuff we have outside of that to protect the public in terms of the diesels or the flights or whatever it is and you can bring in

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to take care of things. So why do you have to pay so much attention to that at all?

The other example I gave was, and this may sound heretical, but in the instrumentation and control, even in the protection and safeguard areas.

When I first sat here I mentioned in the beginning of the meeting about five principles to look at, and if you had those principles explicitly expressed in your rules, in your regulations, independence, redundancy, deterministic processing, so it's not fly-by-night processing with a computer, defensive depth of some sort because you're going to have that in a commercial unit, and control of access, and that's not cyber, that's how do people get into the stuff and how to get that where they can change it inadvertently or maliciously or what have you. It's not cyber, it's just making sure that it gets taken care of.

If you meet those principles, why do you care whether they build it vacuum tubes, mag amps, microprocessors, whatever, as long as it's independent and you can demonstrate that and it's very, very clear.

So you can really reduce your level of review in terms of the depth of detail, so that's what I was hoping I would see in here, and I haven't seen any of that

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in this part of the overall presentations.

CHAIRMAN CORRADINI: So you want revolution?

MEMBER BROWN: I think the NRC, just a personal opinion, it has based on the extensiveness of all the SER's we see and so many pages, I think that they've evolved over the years to really -- I mean, they've done a good job, but it's expanded way beyond what's necessary in personal opinion to demonstrate protection to the public from radiation, which is the main purpose of the regulatory nature of the NRC. And that's nice to get that -- I can't believe I organized my thoughts in a hopefully coherent manner. I don't think I've ever done that in 75 years of being around.

CHAIRMAN CORRADINI: We have the transcript.

MEMBER BROWN: Now I want a copy of that transcript, I'll never remember what I said. Other than that, I do appreciate, it was a good discussion, I appreciated the interactions, I thought there was a lot of good back and forth, so I think it's been very useful to go through this, so thanks a lot. I thought you all were very prepared for answering questions and I appreciate that.

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CHAIRMAN CORRADINI: Okay. Thanks, Charles. So I'll thank the staff, I appreciate it, and I know Lynn and John labored to find a time and a place that we could do all of this, and so it all worked it out. I personally think that, I think Dennis picked up on a few points that I would just re-emphasize; one is I knew this is a teaching tool for future advanced reactors, so I'm kind of reversing what he said in the sense that they have to be aware of the sort of specificity that's going to be expected of them if they're going to actually have a design that has to be evaluated. So I think that, in and of itself, all of the things beyond that, makes this a worthwhile endeavor.

So the second thing is since it's a tool, it doesn't have to be the be all and end all, but it appears that just the process of developing tools developed more communication amongst the staff which I hope it benefits NuScale so that we can get to the details of the design and whether it's, whether they're acceptable or not acceptable or whatever, but without having to go through a lot of unnecessary and time-consuming REI's. And so that led to the other thing that I thought was interesting, that you guys

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had indicated for the APR1400 and now for NuScale, there's a lot of what I'll call informal but public communications to get through the information that doesn't necessarily have to go through us which essentially speeds the process up.

And also at least in the workshop that we were at, not the April workshop you guys presented at, but at past workshops, the whole talk was always the NRC was too rigid and would not engage in this. So to me that's very important, so all these things can mean if the tool did all that, maybe it's actually performed some function however unintended, but I do think it's of some benefit. If you folks want to come back to us to tell us more about how it's being used, then I think we're open to that sort of conversation.

With that, I'll just thank everybody, and we're adjourned.

(Whereupon, the above-entitled matter went off the record at 5:22 p.m.)

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

NEAL R. GROSS
COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701



Presentation to the ACRS NuScale Subcommittee:

**NuScale Enhanced Safety-Focused
Review Approach**

Office of New Reactors

May 3, 2017

Purpose

- To provide an update on the NRC staff's approach to focusing on safety in the review of the NuScale design certification application
- To provide awareness of potential changes to draft SERs that will be provided to the ACRS for review
- To inform the ACRS of continuing efforts to integrate risk insights to increase the effectiveness of safety reviews

Overview

- Background
- Framework - Review tools and output
- Technical review preparation
- Technical review approach
- Proposed strategies for technical evaluations and review efficiencies
- Example areas of review emphasis and reduced effort reviews
- Proposed path forward during review
- Summary

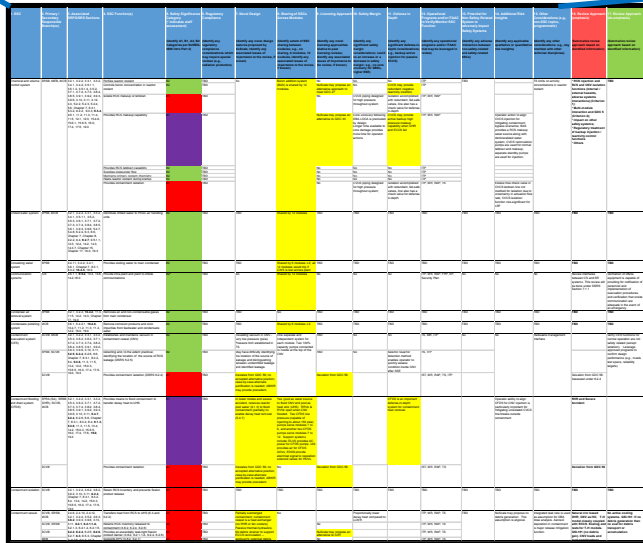
Background

- Increased focus on safety for effectiveness and efficiency
- Briefing to ACRS Future Plant Design Subcommittee on February 9, 2011, regarding proposed staff response to SRM-COMGBJ-10-0004/COMGEA-10-0001
 - Development of a framework...to more fully integrate risk insights into pre-application activities and small modular reactor (SMR) reviews
 - Alignment of review focus and resources...to risk-significant structures, systems, and components (SSCs) and other aspects of the design that contribute most to safety to enhance the efficiency of the review process
- Briefing to ACRS NuScale Subcommittee on August 16, 2016, regarding the NuScale Enhanced Safety-Focused Review Approach
 - ACRS NuScale Subcommittee invited the staff to present their results after using the tools and the process discussed at the meeting

Key Review Considerations

Safety-significance	Regulatory Compliance	Novel Design	Shared SSCs	Licensing Approach	
Safety margin	Defense-in-depth	Operational Programs	Non-safety SSCs impacting Safety functions	Additional Risk Insights	Other Considerations

SSC Review Tool



The screenshot shows a detailed spreadsheet with multiple columns and rows. The columns represent various review considerations, and the rows represent individual SSCs. The cells are color-coded: red, yellow, green, and purple, indicating different levels or types of review attention.



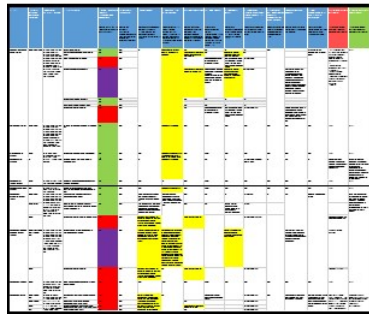
Output: Scope and Depth of Review

- Improves review decisions between Branch Chief and technical staff
- Clarifies review approach when applying NUREG-0800, Introduction - Part 2 and DSRS for SSCs
- Provides systematic thought process that may be applied to non-SSC and programmatic reviews

Scope and Depth of Review

- Apply applicable review considerations to SSC design information and SRP/DSRS review guidance
- Develop graded review approach that will be an input to safety evaluation report

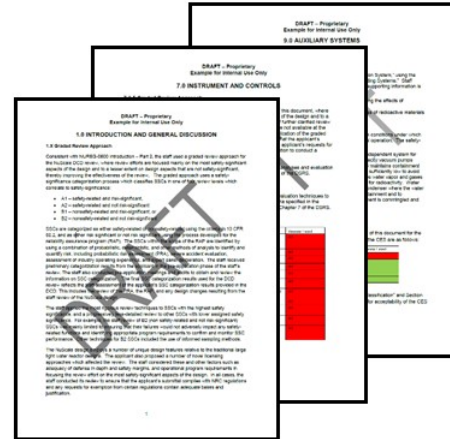
SSC Review Tool



The table displays a grid of review criteria (rows) and systems (columns). Each cell contains a colored box representing the review approach: blue for 'Not Applicable', green for 'Limited Review', yellow for 'Standard Review', orange for 'Enhanced Review', and red for 'Detailed Review'. The systems listed include Instrumentation and Controls, Auxiliary Systems, and others.



SER Documentation Approach



Technical Review Preparation

- Developed review guidance/tools:
 - Summary document on operational programs
 - SSC review tool
 - Framework for programmatic or non-SSC review
 - Safety evaluation report (SER) graded approach documentation
 - Internal SharePoint site for facilitating sharing of technical information
- Communicated review approach guidance/tools to technical reviewers during two training sessions in August and November 2016
- Senior NRO management review panel met to evaluate application and foster consistency in February and March 2017
- NuScale DCA acceptance review completed March 2017

Technical Review Approach

- Evaluated review approach and documented initial areas of review emphasis and reduced effort reviews
- Compiled strategies for both technical evaluations and improving review efficiency
- Initial review approaches may be subject to change as the review progresses (e.g., change in SSC categorization, design change, etc.)

Proposed Strategies for Technical Evaluations

- Begin by reviewing the evaluation findings to identify the arguments needed to support those findings
- Check the applicant's design review for safety related SSCs
- Consider sampling for reviews that apply broadly across the design
- Establish rationale and mechanism for requiring the first module(s) to perform specific tests of the performance of first of a kind design features
- Leverage standardized ITAAC guidance
- Perform audits

Proposed Strategies for Improving Review Efficiency

- Develop concise safety-focused safety evaluations
- Optimize safety evaluation with open items (e.g., consider eliminating interim assessments that could change in later phases of the review, reduce boilerplate language)

Example Areas of Review Emphasis and Reduced Effort Reviews

John Monninger	Division of Safety Systems, Risk Assessment, and Advanced Reactors (DSRA)
Matthew Mitchell	Division of Engineering and Infrastructure (DEIA)
Michelle Hart	Division of Site Safety & Environmental Analysis (DSEA)
Thomas Kendzia	Division of Construction Inspection and Operational Programs (DCIP)
Robert Fitzpatrick	Electrical Engineering Branch (NRR/DE/EEEB)
Craig Harbuck	Technical Specifications Branch (NRR/DSS/STSB)

Note: Initial review approaches may be subject to change as the review progresses

Safety Systems and Risk (DSRA) – Review Emphasis

Review Topic	Basis	Review Approach
Containment pressure and temperature (SCVB)	<ul style="list-style-type: none"> • Safety-related and risk-significant • Novel design, test, and analysis • Lack of operating experience • Not self-revealing from operation 	<ul style="list-style-type: none"> • Detailed review of design and analyses <ul style="list-style-type: none"> • Perform independent confirmatory calculations • Assessment of NuScale Integral System Test data
Post-event re-criticality (SRSB)	<ul style="list-style-type: none"> • NuScale approach on GDC 27 may introduce policy issues due to design of reactivity control system 	Evaluate potential for policy issues
Multi-module risk (SPRA)	<ul style="list-style-type: none"> • New issue staff has not previously reviewed • New quantitative and qualitative approaches proposed by applicant to evaluate multi-module risk 	Follow guidance in SRP 19.0 Rev. 3
Heavy Load Handling (SPSB)	<ul style="list-style-type: none"> • Risk-significant • Novel design, test, and analysis • Lack of operating experience • Highest contributor to single and multi-module CDF • Novel use to transport freshly shutdown core 	<ul style="list-style-type: none"> • Detailed review of design <ul style="list-style-type: none"> • Load drop impact • Adherence to NUREG-0554 & NUREG-0612 for determination of whether a load drop is a credible event

Safety Systems and Risk (DSRA) – Reduced Effort Reviews

Review Topic	Basis for Reduction	Review Approach
Spent Fuel Pool Area Ventilation System (SCVB)	<ul style="list-style-type: none"> • Not safety-related and not risk-significant • NuScale expected to use traditional ventilation design 	<ul style="list-style-type: none"> • Targeted SRP review – increased focus on potential safety impacts; spot check other areas
Spent Fuel Criticality (SRSB)	<ul style="list-style-type: none"> • No burnup credit • High pool boron concentration vs. the minimum boron concentration credited in the analysis 	<ul style="list-style-type: none"> • Assessment of quantitative analysis in lieu of detailed independent review
PRA technical adequacy (SPRA)	<ul style="list-style-type: none"> • Staff has already conducted two audits of PRA • Less complex PRA models 	<ul style="list-style-type: none"> • Confirm DCD contains adequate description of PRA and results • Spot check compliance with PRA Standard
Aircraft Impact Assessment (systems and fire) (SPRA/SPSB)	<ul style="list-style-type: none"> • Underground structures and equipment less prone to be adversely affected by aircraft impact 	<ul style="list-style-type: none"> • Reduced review scope due to less potential for aircraft impact damage by design

Engineering (DEIA) – Review Emphasis

Review Topic (Lead Owner)	Basis	Review Approach
Impact of ASME Code Grouping Mismatch on ASME Code Design, Manufacture, and ISI/PSI due to Sizing	<ul style="list-style-type: none"> • Many topics in ASME Code grouped by size of components • Some topics in ASME Code grouped by size due to practicality • Some topics in ASME Code grouped by size as analogy to importance 	<ul style="list-style-type: none"> • Detailed review of applicant's use of ASME Code • Close inter-branch coordination for cross-cutting aspects
Novel design aspects	<ul style="list-style-type: none"> • Passive heat removal systems remove or eliminate many features of traditional large light water reactors • Many features simpler but novel • Containment is pressure vessel and key part of shutdown and emergency cooling system • Control Rod Drive System • RPV Internals 	<ul style="list-style-type: none"> • Assess safety impact of novelty • Produce review criteria based on philosophical basis of most applicable SRP/DSRS content • Detailed review of testing programs and results
First-of-a-kind (FOAK) testing	<ul style="list-style-type: none"> • CRDMs • Steam Generators • Integral Shield Restraints 	<ul style="list-style-type: none"> • Detailed review of applicant's design and analyses

Engineering (DEIA) – Reduced Effort Reviews

Review Topic (Lead Owner)	Basis for Reduction	Review Approach
Systems with reduced risk-informed safety classification	<ul style="list-style-type: none"> Reduction in classification from safety-related to non-safety related Reduction in classification from risk-significant to non-risk significant 	<ul style="list-style-type: none"> Design approach verification Sampling-based review Audits
Systems eliminated from design	<ul style="list-style-type: none"> System is not in design 	<ul style="list-style-type: none"> Verify system is eliminated and safety impact not inherited elsewhere
GSI-191	<ul style="list-style-type: none"> Large amounts of debris and strainer blockage are not issues for NuScale. No sump screens to clog, no safety-related pumps to analyze 	<ul style="list-style-type: none"> Limited equipment to review for a limited scope of debris blockage

Accident Consequences (DSEA) – Review Emphasis

Review Topic	Basis	Review Approach
Failed fuel fractions and source terms (RPAC)	<ul style="list-style-type: none"> • Non-conservative assumption for design basis failed fuel fraction as compared to SRP/DSRS recommendation • Does not meet the acceptance criteria in the SRP/DSRS without including a TS limit • Complex and in-depth review of the technical basis for such an assumption could involve work by HPs, fuel experts and cross-office coordination (for example with RES) • Would set new precedent for source terms used for rad pro, rad waste management, and EQ designs 	<ul style="list-style-type: none"> • Engage experts in detailed review of realistic and design basis failed fuel fractions • Detailed review of source terms <ul style="list-style-type: none"> ▪ normal effluent releases and doses ▪ AOOs, design basis, accident, and EQ ▪ Neutron activation products and gammas ▪ Airborne activity concentrations • Confirmatory analyses
Radiological consequences of Maximum Hypothetical Accident (MHA) (RPAC)	<ul style="list-style-type: none"> • New novel accident scenario(s) and source term bringing issues not previously reviewed • Analysis not following RG 1.183 standard guidance • First review of mechanistic source term for DBA dose analysis • Implementation of Accident Source Term Methodology topical report, which does not provide full analysis, only methods 	<ul style="list-style-type: none"> • Detailed review of design analyses <ul style="list-style-type: none"> ▪ confirmatory and sensitivity analyses ▪ detailed evaluation of choice of accident scenarios topic (coordination with DSRA/SPRA and SRSB) ▪ evaluation of implementation of related topical report

Accident Consequences (DSEA) – Reduced Effort Reviews

Review Topic	Basis	Review Approach
Offsite Dose Calculation Manual (ODCM) and Process Control Program (PCP) (RPAC)	<ul style="list-style-type: none"> • Commitment to use NRC endorsed NEI 07-09A ODCM and NEI 07-10A PCP 	<ul style="list-style-type: none"> • Check for reasonableness to use NEI 07-09A ODCM and NEI 07-10A PCP consistent with DSRS
Radiation Protection Program ALARA Program (RPAC)	<ul style="list-style-type: none"> • Established Radiation Protection and ALARA design process controls are adopted • Commitment to use NRC endorsed NEI 07-03A Radiation Protection Program 	<ul style="list-style-type: none"> • Check for reasonableness on Policy Considerations consistent with NEI 07-03A Radiation Protection Program
Radiation protection design features and dose assessment (RPAC)	<ul style="list-style-type: none"> • Credit design features that clearly add conservatism such as MCR location • MCR is located in a separate, subsurface building • Focus on areas unique to NuScale design and plant conditions 	<ul style="list-style-type: none"> • External radiation shielding for the MCR • Verify locations and features of ARMs are consistent with DSRS • Check for reasonableness on aspects similar to new reactor licensing reviews and operating NPPs • Review of applicant's analysis • Confirmation of design features, including shielding and post-accident radiation sources

Operational Programs (DCIP) – Review Emphasis (1/2)

Review Topic	Basis	Review Approach
Licensed operator staffing (SRP Ch 18, Human Factors Engineering)	<ul style="list-style-type: none"> NuScale will establish a design-specific licensed operator staffing regulation that a COL applicant may use in lieu of 50.54(m). This is the first time an application will establish a design-specific staffing rule. 	<ul style="list-style-type: none"> Staff will review the results of NuScale’s staffing plan validation (SPV), which must provide technical justification for the design-specific staffing rule. Early engagement during pre-application activities, including two audits of activities related to the SPV, allowed the staff to become familiar with NuScale’s SPV methods and results.
Multiple Module Operation (SRP 18)	<ul style="list-style-type: none"> Unique approach to MCR design requires new Concept of Operation. May increase operator workload under some operational conditions. 	<ul style="list-style-type: none"> Early engagement during pre-application activities, allowed the staff to become familiar with the concept of operation and demonstration of feasibility. Integrated System Validation provides another chance to witness testing.
Design-specific Generic Technical Guidelines (GTGs) (SRP 13.5.2.1, “Operating and Emergency Operating Procedures”)	<ul style="list-style-type: none"> NuScale GTGs (otherwise referred to as the Emergency Operating Guidelines (EOGs)) are unlike those of previous DC/COL applicants, as they are not based on any previously reviewed and approved Owners Group GTGs (i.e., Westinghouse, General Electric, etc.). NuScale GTGs will be a “first-of-a-kind” (FOAK) submittal NuScale GTGs will need to address multiple module scenarios, which is different than previous submittals. NuScale GTGs will be a FOAK submittal 	<ul style="list-style-type: none"> Chapter 15 provides review interface support to Chapter 13.5 by confirming that the GTGS/EOGs are derived from approved transient and accident analyses. Accordingly, Chapter 15 review of NuScale plant transient and accident analysis precedes the Chapter 15 review of the GTGs/EOGs for technical adequacy.

Operational Programs (DCIP) – Review Emphasis (2/2)

Review Topic	Basis	Review Approach
Initial Test Program (ITP) (DSRS 14.2)	<ul style="list-style-type: none"> • Unique design and first small modular reactor (SMR) • Unique emergency core cooling system (ECCS) and decay heat removal system (DHRS) • Core flow is natural circulation at all times – PWR’s have experienced hydraulic stability issues • Very high pressure containment (~1000 psia) and low normal operating pressure (~ 0.1 psia) • Unique steam generators (SGs) (reactor coolant outside the helicoil tubes) • Unique use of instrumentation, ultrasonic for RCS flow, radar for pressurizer and containment level • Feedwater control system has no SG level input • NuScale has proposed only one first-of-a-kind (FOAK) test, the comprehensive vibration assessment program for reactor internals (RG 1.20) • NuScale has provided test abstracts that only include an outline, no detailed test requirements 	<ul style="list-style-type: none"> • DCIP provides the program review for ITP and a support function for the detailed review of proposed testing. DCIP will do the following <ul style="list-style-type: none"> • Detailed graded approach review of applicant’s proposed ITP in accordance with the guidance of DSRS 14.2 and RG 1.68 • Interface with technical reviewers when testing does not seem adequate • Interface with technical reviewers to determine which FOAK tests are required • Interface with technical reviewers and design experts (inside the NRC) to determine if First Plant Only Tests or First 3 Plant Only Tests should be required

Electrical (NRR/DE/EEEB) – Review Emphasis

Review Topic	Basis	Review Approach
Electric Power Systems (EEEB)	<ul style="list-style-type: none"> GDC 17 Exemption 	<ul style="list-style-type: none"> Confirm with Chapter 15 review staff that electrical power for maintaining safe shutdown, core cooling and containment integrity/isolation during and following a DBE is not needed Confirm defense-in-depth in the design Confirm level of independence and redundancy within the non-Class 1E systems
	<ul style="list-style-type: none"> GDC 18 Exemption 	<ul style="list-style-type: none"> Confirm testability of the non-Class 1E systems Develop staff position on testing of the non-Class 1E VRLA batteries
	<ul style="list-style-type: none"> 10 CFR 50.34(f)(2) (xx) Exemption 	<ul style="list-style-type: none"> Coordinate with I&C staff (lead) resolution of this issue Develop staff position on the definition of “Highly Reliable” as applied to the DC Power System. Staff will utilize completed (soon) staff’s SE of NuScale Topical Report TR-0815-16497-P “Safety Classification of Passive Nuclear Power Plant Electrical Systems”

Electrical (NRR/DE/EEEB) – Reduced Effort Reviews

Review Topic	Basis for Reduction	Review Approach
Onsite Electric Power Systems (EEEB)	<ul style="list-style-type: none"> • TR-0815-16497-P “Safety Classification of Passive Nuclear Power Plant Electrical Systems” 	Staff will utilize the work already completed in establishing the safety classification guidelines for conducting the review
	<ul style="list-style-type: none"> • No Class 1E ac or dc power supplies provided 	Fewer rules, Targeted DSRS review – increased use of samplings and spot checks
	<ul style="list-style-type: none"> • No highly risk-significant functions performed or supported 	Targeted DSRS review – increased focus on any potential safety impacts; spot check other areas
	<ul style="list-style-type: none"> • No electrical Technical Specifications provided in the DCA 	Secondary review – coordinate with lead reviewers to verify no TS are required for the design
	<ul style="list-style-type: none"> • Electrical ITAAC review limited to Environmental Qualification and Emergency lighting sections 	ITAAC reduced <u>but no change in actual review scope</u> of either item
	<ul style="list-style-type: none"> • Beyond Design Basis External Events (Chapter 20) – no electrical power needed to accomplish safe shutdown 	Secondary review – coordinate with lead reviewers to verify no power needed

Tech Specs (NRR/DSS/STSB) – Review Emphasis

Review Topic (Lead Owner)	Basis	Review Approach
Lack of Limiting Conditions for Operation (LCOs) (STSB) (SPRA) (SRSB) (EEEB) (ICE) (SCVB)	<ul style="list-style-type: none"> • TS Section 3.8 Electrical Power Systems • TS Section 5.5 Programs - Battery Maintenance Program • TS Section 3.7 Plant Systems <ul style="list-style-type: none"> ▪ Control room emergency ventilation system (CREVS) ▪ Control room temperature control system • TS Section 3.3 Instrumentation LCOs <ul style="list-style-type: none"> ▪ Post Accident Monitoring (PAM) instrumentation ▪ CREVS actuation instrumentation 	<ul style="list-style-type: none"> • Assess design and analyses against 10 CFR 50.36 LCO Selection Criteria • Assess safety impact of NSR SSCs • Assess risk significance of Type B and Type C PAM variables
Surveillance Frequency Control Program (SFCP) (STSB) (SPRA) (ICE)	<ul style="list-style-type: none"> • Section 5.5 Programs - Surveillance Frequency Control Program (SFCP) • Surveillance frequencies not provided with surveillance requirements (SRs) • CHANNEL OPERATIONAL TEST (COT) definition included in TS Section 1.1 but not used in any SR • RCS flow instrumentation testing and test frequencies 	<ul style="list-style-type: none"> • Original frequencies needed in SRs • COT should be specified in SRs • Review basis for proposed testing of RCS flow Function
Core Operating Limits Report (COLR) (STSB) (SRSB)	<ul style="list-style-type: none"> • TS Section 5.6 Reporting <ul style="list-style-type: none"> ▪ Core Operating Limits Report - analytical methods not provided 	<ul style="list-style-type: none"> • Provide methodologies • Verify staff approves methodologies

Tech Specs (NRR/DSS/STSB) – Reduced Effort Reviews

Review Topic (Lead Owner)	Basis for Reduction	Review Approach for Reduction
Typical PWR Systems eliminated from design (STSB) (All)	<ul style="list-style-type: none"> System is not in design 	<ul style="list-style-type: none"> Verify system is eliminated and safety impact not inherited elsewhere Determine need for associated function; if so, how implemented
Ventilation Systems (STSB) (SCVB)	<ul style="list-style-type: none"> Not safety-related and not risk-significant NuScale expected to use traditional ventilation design 	<ul style="list-style-type: none"> Determine if LCO or administrative control program needed to capture requirements usually included in TS; e.g. Ventilation Filter Testing Program, and Control Room Envelope Boundary Control Program

Proposed Path Forward During Review

- **Goals**
 - Maintain visibility of enhanced safety-focused review
 - Hold each other accountable for optimizing the review
 - Ensure review proceeds in a holistic way
- **Proposed internal meetings during review:**
 - **Technical reviewers:**
 - SSC review tool changes
 - Cross-cutting issues/resolutions
 - Safety-focused review approach changes
 - **Management:**
 - Review issues/resolutions
 - Safety-focused review approach changes

Summary

- Approach is an evolution and focuses on safety and risk insights
- Review approach embraced by staff and management
- Technical reviewers and their branch chiefs developed safety focused review approaches based on:
 - SSC review tool results,
 - Current optimized review approach, and/or
 - New optimized review approach
- Initial review approaches may be subject to change as the review progresses

Acronyms

ACRS	Advisory Committee on Reactor Safeguards	DSRA	Division of Safety Systems, Risk Assessment, and Advanced Reactors
ALARA	as low as reasonably achievable	DSRS	design specific review standard
AOO	anticipated operation occurrence	ECCS	emergency core cooling system
ARM	area radiation monitor	EEEEB	Electrical Engineering Branch
ASME	American Society of Mechanical Engineers	EOGs	Emergency Operating Guidelines
CDF	core damage frequency	EQ	equipment qualification
CES	containment evacuation system	FOAK	first-of-a-kind
CNV	containment vessel	GDC	General Design Criteria
COL	combined license	GSI	Generic Safety Issue
COLR	Core Operating Limits Report	GTGs	Generic Technical Guidelines
COT	Channel Operational Test	HP	health physicist
CRDM	control rod drive mechanism	ICE	Instrumentation and Controls Branch
CREVS	control room ventilation system	ITP	initial test program
DBA	design basis accident	ISI	in-service inspection
DBE	design basis event	ITAAC	inspections, tests, analyses and acceptance criteria
DCD	design control document	LCO	limiting condition for operation
DCIP	Division of Construction Inspection and Operational Programs	MCR	main control room
DEIA	Division of Engineering and Infrastructure	MHA	maximum hypothetical accident
DHRS	decay heat removal system	NEI	Nuclear Energy Institute
DSEA	Division of Site Safety & Environmental Analysis	NPP	nuclear power plant

Acronyms (cont.)

NSR	non-safety-related	SPSB	Plant Systems Branch
ODCM	Off-site Dose Calculation Manual	SPRA	Probabilistic Risk Assessment and Severe Accidents Branch
PAM	post-accident monitoring	SSC	structures, systems and components
PCP	Process Control Program	STSB	Technical Specifications Branch
PRA	probabilistic risk assessment	SVP	staffing plan validation
PSI	preservice inspection	T-H	thermal-hydraulic
RCS	reactor coolant system	VRLA	valve-regulated lead acid
RES	Office of Regulatory Research		
RG	regulatory guide		
RPAC	Radiation Protection and Accident Consequences Branch		
SCVB	Containment and Ventilation Branch		
SER	safety evaluation report		
SFCP	Surveillance Frequency Control Program		
SGs	steam generators		
SMR	small modular reactor		
SR	safety-related		
SRM	staff requirements memorandum		
SRP	standard review plan (i.e., NUREG-0800)		
SRSB	Reactor Systems, Nuclear Performance, and Code Review Branch		