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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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FUTURE PLANT DESIGNS SUBCOMMITTEE

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THURSDAY

NOVEMBER 18, 2021

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The Subcommittee met via Video Teleconference, at 9:30 a.m. EST, David Petti, Chairman, presiding.

COMMITTEE MEMBERS:

DAVID PETTI, Chair

RONALD G. BALLINGER, Member

VICKI BIER, Member

DENNIS BLEY, Member

CHARLES H. BROWN, JR. Member

VESNA B. DIMITRIJEVIC, Member

GREG HALNON, Member

JOSE MARCH-LEUBA, Member

JOY L. REMPE, Member

DESIGNATED FEDERAL OFFICIAL:

DEREK A. WIDMAYER

ALSO PRESENT:

AMY CUBBAGE, NRR

BRIAN GEREN, NRR

JORDAN HOELLMAN, NRR

STEVEN LYNCH, NRR

WILLIAM RECKLEY, NRR

JOHN SEGALA, NRR

JESSE SEYMOUR, NRR

BOYCE TRAVIS, NRR

JUAN URIBE, NRR

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P R O C E E D I N G S

9:31 a.m.

CHAIR PETTI: Morning, everyone. The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Future Plants Design -- Designs. I am David Petti, chairing this Subcommittee meeting.

ACRS members in attendance are Vicki Bier, Charles Brown, Dennis Bley, Greg Halnon, Jose March-Leuba, Joy Rempe, Ron Ballinger, Vesna Dimitrijevic, and I think that's all I see, I don't see the others. Okay.

The purpose of today's meetings is to discuss three subject concerning preliminary rule language for 10 CFR Part 53, licensing and regular nuclear reactors.

The agenda includes discussions on Subpart F, requirements for operation. Specific language on staffing training, (audio interference) and human factors (audio interference) H, licenses, certifications, and approvals, specific language on manufacturing licenses, construction permits, operating licenses, and combined licenses.

Preliminary rule language adding a deterministic analysis for advanced reactors to Part

50 will also be discussed.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate. This meeting is one of a series of Subcommittee meetings being held to discuss Part 53. And at present there isn't a session scheduled yet for this matter to be taken up with the full Committee.

The ACRS was established by statute and is governed by the Federal Advisory Committee Act, FACA. The NRC implements FACA in accordance with its regulations found in Part 7. The Committee can only speak through its published letters. We hold meetings to gather information and perform preparatory work that will support deliberations at a full Committee meeting.

The rules for participation in all ACRS meetings, including today's, were announced in the Federal Register on June 13, 2019. The ACRS section of the US NRC public website provides our charter, bylaws, agendas, letter reports, and full transcripts of our full and Subcommittee meetings, including the slides presented at the meetings. The meeting notice and agenda for this meeting were posted there.

As stated in the Federal Register notice

and in the public meeting notice posted on the website, members of the public who desire to provide written or oral input to the Subcommittee may do so, and should contact the designated federal official five days prior to the meeting, as practicable.

Today's meeting is open to public attendance, and we have received one request from Mr. Cyril Draffin of the Nuclear Industry Council to make and oral statement. Time is provided in the agenda after presentations are completed for this statement, as well was spontaneous members -- comments from other members of the public attending or listening to our meeting.

Today's meeting is being held over Microsoft Teams, which includes a telephone bridge line allowing participation of the public over the computer using Teams, or by phone. A transcript of today's meeting is being kept.

Therefore, we request that meeting participants on Teams and the bridge line identify themselves when they speak, and to speak with sufficient clarity and volume so they can be readily heard. Likewise, we request that meeting participants keep their computer and their telephone lines on mute when not speaking to minimize disruptions.

At this time, I ask that Teams attendees make sure they are muted so we can commence the meeting.

With that, we'll now proceed, and I call on we have Derek, again? To make -- Steve, Steve Lynch to make a brief opening remark,

MR. LYNCH: Great, and thank you. Appreciate being ACRS' time today. I just wanted to give a quick introduction of the work that the NRC staff is doing and the -- and our presenters for today.

So the vision for Part 53 is to establish a transformative regulatory framework for advanced reactors that provides at least the same degree of protection of public health and safety and common defense and security for advanced reactors that is required for current generation lightwater reactors.

The goal for this optional framework is to provide technology-inclusive, performance-based requirements in lieu of existing prescriptive technical requirements, reducing the need for regulatory exemptions for advanced reactors. The framework will also provide operational flexibilities for advanced reactor designs that have been demonstrated to provide enhanced margins of safety.

In this preliminary rule language stage, the NRC staff is actively soliciting and considering feedback to update the preliminary rule language to best serve the needs of stakeholders. Today we have a number of topics that we are looking forward to presenting to the ACRS and receiving feedback on.

We will have Boyce Travis this morning kick things off talking about the Part 50X supplement on technology-inclusive alternative requirements for commercial nuclear plants. And after lunch we will have two additional presentation topics, the first regarding Subpart F language Part 53 related to requirements for operations.

These are sections related to staffing, training, personnel qualifications, and human factors. We have two staff members leading this discussion, Jesse Seymour and Juan Uribe.

And finally, we will have discussions on Subpart H, on licenses, certifications, and approvals. And this includes sections related to manufacturing licenses, construction permits, operating licenses, and combined licenses. And we will have Jordan Hoellman presenting on this.

So again, thank you for your time, and at this point I'll turn it over to the NRC staff and

Boyce Travis to begin with the formal technical presentation.

MR. RECKLEY: Okay, thank you, Steve. This is Bill Reckley. I'll do the first couple slides as the introduction, and then Boyce will get into his presentation. So Olivia, if we can go to slide 2.

This is the agenda, and both Dave and Steve mentioned what we will be talking about. I will mention on the agenda that it works best for us if we keep the personnel-related discussions in that two o'clock timeframe, just because of the availability of our staff.

So if we do go through the -- the traditional or deterministic option that Boyce is leading, if that topic goes a little quicker, we might have a decision, and we can talk about that at the time. But one option would be to bring up the Subpart H discussion before we break for lunch.

But we'll see how that goes. We intentionally put the licensing subpart as the last topic, thinking if the technical discussions are taking up the time, that's where we would like to focus. And we can come back to the licensing topic, and if necessary we can even pick that up at the December meeting.

But we're going to be a little fluid, and it'll in large part go to how much the discussion goes this morning on the traditional option. So if we --

MEMBER HALNON: Bill, this is Greg Halnon. That actually works very well, because my availability is assured between two and four, and I need to be part of that. So that works for me too.

MR. RECKLEY: Okay, great, okay. So if we -- let me to go to slide 3. This is our standard framework slide that shows how the pieces fit together. And you can see that, again, we're just trying to show what we're going to talk about today. We can just go ahead and go to slide 4, it's a very similar slide, just laid out in a table.

And you can see this is the current status of Part 53 and the text that we've released in preliminary form and those that we're working on that'll be brought up in future meetings. So again, today is a very -- a couple very important pieces.

If you look at Subpart F for operations, the way I think of Subpart F, if you think that the safety case as it's talked about in Subparts B and C focus on those core things like the three Cs, control, cool contain, Subpart F goes to how do you actually accomplish that.

You do it through the plant, the people, and the programs. So you have the three Cs for safety and the three Ps for how you actually accomplish those safety goals. And a lot of the focus is always on the hardware. Today we're going to talk about that very important people part of the equation.

Then as we mentioned, we are able, if we are -- if we have the time today to talk about a licensing component, and this is Subpart H. And in particular, that part of Subpart H that goes to the licensing, manufacturing licenses, instruction permit license strategy, or a combined license strategy. And Part 53 is addressing any of those combinations.

And then first off this morning, we're going to talk about an initiative that we undertook directly in response to stakeholder requests and comment, which was to provide a more traditional approach, sometimes referred to as a more deterministic approach.

And in large part we undertook that because some stakeholders, and in particular designers, who were dealing in the international markets and would be doing designs and regulatory interactions perhaps based on an IAEA kind of methodology, or in the Canadian Nuclear Safety

Commission, the CNSC type of approach, which reflects that more traditional Part 50, Part 52 approach.

That it includes probabilistic elements, but at it's -- it also has more of a deterministic dependency than what we had prepared in our first preliminary language for Part 53.

MEMBER BLEY: Bill, can in interrupt you?

MR. RECKLEY: Please.

MEMBER BLEY: This is Dennis. That section is kind of aimed at Part 50, and I'm wondering if indeed people like that it's adopted, is that going to get, or do you know if that's going to get factored into the other rulemaking work on bringing Part 52 and 50 together.

MR. RECKLEY: It -- our current plan would be that it would not get transferred over to that other activity.

MEMBER BLEY: That seems a shame.

MR. RECKLEY: Well, it -- but we are, and Boyce can talk about this, we are well aware of that activity, and we're coordinating them. But --

MEMBER BLEY: I guess where I'm hanging up is if it is aimed at Part 50 and they're doing a rulemaking affecting that, it seems like it would naturally fit there. And if it goes into Part 53 as

something aimed at Part -- well, if Boyce is going to tell us about how it all fits together, that'll be great. But I'm not -- I'm a little confused.

MR. RECKLEY: Okay, hopefully we can clarify it. And you're right, in theory we could and have incorporated. It's largely a matter of the timing of these activities and these rulemakings. But right now our plan would be, whether it goes in Part 50 or Part 53, that it would be accomplished under this rulemaking. Keeping in mind that we always short-hand the discussion that this is Part 53.

When this rulemaking goes out, it's going to touch a lot of the parts, including 50 and 52. You see the security stuff under Part 73 and fitness for duty under 26. We'll have conforming changes throughout the whole title. And so it's not a leap to say that we would have even a fairly significant section like Boyce is going to talk about in Part -- go ahead.

MEMBER BLEY: I hadn't really appreciated that. So all these pieces, this is a rulemaking, but it's not just Part 53. It would change various other ones as well. And I didn't quite realize that. But it makes sense, I don't know how else it could work.

MR. RECKLEY: Yeah. And if you want to

look, just, we have the row at the bottom, the conforming changes, if you go back and look at the Part 52 rulemaking. And how many just conforming changes need to be done. And so anyway, yeah, we'll talk about that a little more, actually, Boyce will. If Libby, you want to go to slide 5, I'll just

MEMBER BROWN: Bill.

MR. RECKLEY: Yes.

MEMBER BROWN: This is Charlie, Charlie Brown. Just spring-boarding off of Dennis's query on the Part 50 or the supplemental or however it's going to be done on the alternative that you're talking about.

Does that mean, based on looking at the stuff, which says Part 50 if you go look at what's provided to us, does that mean then that Appendix A and general design criteria become part of that alternative? Or has that even -- because we've been discussing the lack of a general design criteria section in 53.

MR. RECKLEY: Boyce'll talk about this in a little more detail, but the short answer for this particular option is yes, it brings in all of those existing things. Unless we are specifically saying this is an alternative to another set of requirements,

then all of those things that are currently in Part 50 would be applicable.

Now, Boyce is going to talk, because we have a particular item on the role of the principal design criteria, or Appendix A, for lightwater reactors. So we'll talk about that in a little more detail.

MEMBER BROWN: Okay, thank you.

MR. RECKLEY: Okay. With that, Boyce, you want to take over?

MR. TRAVIS: Sure, thanks, Bill. Can everyone hear okay?

MEMBER BLEY: Yep, go ahead.

MR. TRAVIS: So if we'll move on to slide 6. So to preface this discussion, I want to say the slides are more of an outline to facilitate the discussion with ACRS. And I welcome interruptions at any time. I'd much prefer this to be a back-and-forth rather than me just presenting.

I also want to note the language we've issued is draft. And you know, we, the NRC staff, recognize that there are going to be changes that will be made, assuming the form remains very similar to what we've issued, just based on all the feedback.

And so if you have feedback to the effect

of there are parts that either don't understand -- you don't understand or don't make sense or don't link together, that's the kind of feedback we're very much looking for at this stage.

And so the background on this option relates to the, what Bill alluded to a couple minutes ago. We, the staff, have received comments from some stakeholders suggesting that a PRA shouldn't be required in a leading role for licensing an advanced or a new reactor design.

Separately, some other stakeholders have expressed a desire for our streamlined application for the US and international market. And so, as a result, what we tried to do with this option is provide an updated licensing pathway that uses PRA in a more traditional role to support deterministic design philosophy and is consistent with broad international standards for design.

And so one of the things we'd like to get out of this is an equal standard of safety to the existing regulatory framework while we streamline some of the requirements to accommodate a variety of different technology types, including advanced non-lightwater reactors, and also accommodate potential international approaches that are more rooted in a

deterministic method that's supported by PRA, rather than being driven by -- or using the PRA directly to justify the safety case.

One piece of feedback we were particularly interested in getting from developers was related to things like the IAEA approach.

And so if there were developers looking to use a design internationally and then bring it to the NRC to be licensed, we were especially looking for developers with that kind of experience in evaluating what the international framework and any discrepancies in the approach we've proposed. And so -- go ahead, sorry.

CHAIR PETTI: Just a question here. On the staff bullet, you're meaning the Part 5X supplement when you say this framework.

MR. TRAVIS: That's correct, yes.

CHAIR PETTI: So to me, because I thought I'd heard this before, that the language in Part 53 on PRA was being modified somewhat to potentially enable PRA in a supporting role. The question that's sort of obvious here is why isn't this, in Part 53, why is it going to be moved into Part 50?

MR. TRAVIS: So --

CHAIR PETTI: I couldn't figure --

MR. TRAVIS: Yeah, so I guess I will -- I will try to address some of the question, and Bill may jump in to correct or modify what I say.

The -- what's being -- or what -- this framework or this approach, the Part 5X, we, the staff, haven't determined where the appropriate -- when necessarily the appropriate location for it is. It could be 50, it could be 52, it could be 53, it could be a new Part 50-whatever.

The -- it was issued as draft language assuming it was placed in Part 50 mostly for the kind of expediency of understanding that if you use -- if you leverage the 80% of the skeleton of Part 50 that you could already use, it was easier to produce a framework quickly. Be we could see a case for putting it into 53.

Now, as to the linguistic changes in 53, I think right now the -- what's currently being discussed and what -- where the proposed rule language is in 53 is a PRA will be required in a role that is greater than the current traditional approach, in that there are acceptance criteria and -- there are pieces of 53 where a PRA is necessary -- a PRA that encompasses a certain scope is necessary to meet some of the high-level criteria and specifics in 53.

Bill, if you could help me out. I'm sure you've said this more than once in better ways than I'm trying to.

MR. RECKLEY: Well, no, but that's basically the direction we're headed, this is what Boyce has said. That as we've looked at this and tried to develop that framework in Part 53, we really see these as being the two approaches.

And Part 53, where we had previously talked about maybe trying to come up with a more methodology-neutral approach, we're just skeptical that we can do that. And so because we would -- because we're using risk-related metrics as the foundation for Part 53, PRA comes in as the logical tool to show how you meet that.

And as Boyce will be talking about in the coming slides, the -- by picking up a more traditional approach where the acceptance criteria can be informed by PRAs, but the underlying acceptance criteria are more the traditional deterministic approaches, then we can not focus on the PRA as the primary tool.

I, you know, I wish a little bit we would kind of back up from focusing the discussion on the PRA and focus more on the, what are the acceptance criteria in the two approaches. How are we as a

regulator going to make our decisions. Part 53, again, it's crafted that we'll make the decisions based on risk-related metrics. And so if the PRA again comes in as the logical tool.

On this side, as Boyce is going to talk about, there's a more deterministic, more traditional approach, so the PRA plays what's in the last bullet, a more, a supporting role. So I know as we've gone through public stakeholders, we've kind of meandered a little bit on how that's going to go. But right now that's the approach we're taking.

And if you look at some of the later subparts that we released for Part 53, it reflects our keeping of risk-related metrics, so.

CHAIR PETTI: That helps, Bill, great.

MR. RECKLEY: Okay, thanks, David.

MEMBER DIMITRIJEVIC: Hi, this is Vesna. You know, I am also very confused with these, because in this, as you're presenting it, it goes in the, you know, is a part of 50, which is already deterministically mostly based things. So it doesn't really have to have additional things, you know. It had so many deterministic regulations.

So, and when it comes to the 53, if the 53 is a risk-based approach, that doesn't mean it's based

on the PRA, risk-informed. Because risk-informed approach is somewhere between deterministic and risk-based. So you can be anywhere on that spectrum can be more towards deterministic and can be more toward the risk-based.

So I don't see any problem why cannot be part of the 53 because I don't even know why you need it in the 50. That's totally confusing to me, so. I just want to say, defining the place for this is extremely important to understand how it fits in the process.

MR. TRAVIS: So let me try and address this in a couple of different ways. We agree that both approaches are risk-informed in -- to different degrees in different fashions.

The acceptance criteria and some of the driving forces in Part 53 use probabilistic, frequency-derived and frequency-based, and then dose consequence acceptance criteria that are, I'm not going to say intrinsically linked to a PRA, but are the logical outgrowth of using a PRA.

And so in that sense, it's risk-informed through that lens. In the deterministic option that's being discussed here, the -- it's still risk-informed, but the role of the PRA is more open-ended. It is up

to the developer to use the PRA as best they see fit to drive their design decisions.

And the higher level deterministic, I'm going to say deterministic, that's not quite the right word here, higher level criteria that are more driven by, I'll say bounding or conservative analysis, and then informed by various risk approaches, is the tack that's being taken in this Part 5X supplement.

Stepping back a step, where this resides is we think not as important as where the -- how we can best fit the approaches in a logical fashion into the regulatory framework.

NEMA, that's driving the Part 53 rulemaking, doesn't specify where something would go. And so given that the goal of this Part 5X supplement is to provide an alternative approach that in many ways looks a lot like what already exists in 50 and 52.

But you know, we want to note that 50 and 52 have some not technology-neutral language and pointers and things that are based on, you know, an inherent assumption of a large lightwater reactor.

This is an opportunity to clean some of that up while providing a framework that looks a little more like an internationally based framework so

that a developer can bring a design either from the US to an international, another international regulator, or vice versa, without having to make a lot of licensing changes, recognizing that the designs are going to be similar, except to satisfy requirements that are in place on a country-specific basis.

Does that make sense?

MEMBER DIMITRIJEVIC: Okay, I understand. I want to say your title here is fine because it says a concentrate some technology inclusive. It doesn't concentrate on making something deterministic. So you know, that thing, the event, the (audio interference) talk about making something deterministic not technology inclusive, so.

A lot of your discussion is pointing that you guys think that Part 53 is going to be risk-based, not risk-informed. I mean, it could be -- I mean, we will listen carefully, and I understand what you want to say, how does it fit in the -- in the, you know, total regulatory. That's fine, but it will be even better when we understand why it's out -- what are the other alternatives.

So is other alternative, Part 50 and then Part 53. Okay, I am still confused, but I will listen carefully. Okay.

MR. TRAVIS: Understood. I think I'm going to speak from own personal perspective. I view this and Part 50 as kind of parallel paths in that 50 or 52 would be used by a developer that's either further along in their design or is a, you know, more of a lightwater reactor or -- you know, either further -- a non-lightwater reactor that's further along in their design and wants to leverage the experience they already have.

Whereas this is kind of sprucing up the portions of 50 to make a less gated approach that isn't -- that doesn't have or rely on -- or doesn't make an assumption that we're a lightwater reactor. And while we're there, also leverage portions of, you know, the rulemaking process that we're doing under 53.

CHAIR PETTI: Boyce.

MR. TRAVIS: Yeah.

CHAIR PETTI: A question, what's -- to me there are two key things we're talking about, and we may be mixing them. The first is the need for technology inclusive.

If that's the primary, then we could call what we've heard previously as technology inclusive but is a risk approach, let's call it Part 53(a).

This approach is still technology inclusive, but not as risk centric, we'll call it maybe Part 53(b).

So you know, I could see arguments for not -- if technology inclusiveness is the key thing, that you keep what you have in this sort of together. Whereas putting it in Part 50 or 52, which is LWR focused, you might lose that sense. But I can also see the argument the other way. So it is kind of, you know, difficult in terms of where to place it.

MEMBER HALNON: So this is Greg. It might help me to understand, are you talking about an all-inclusive separate regulation framework, or are we talking about putting off-ramps in Part 53 to have alternatives to where PRA is first and having that off-ramp go off to and here are some alternatives?

MR. TRAVIS: So right now, we don't think the off-ramp approach is practical because it would undercut some of the scaffolding and framework that exist in 53. And so this is, I'm going to say right now the 5X approach is built on the regulatory framework skeleton that exists in 50 as an alternate -- it's -- I think Dave characterized it pretty well as 53(a) and 53(b).

And 53(b) looks a lot like a revised 50 or 52, if that makes sense.

MEMBER HALNON: Okay, it seems like a huge undertaking at this point. But I understand, I got what you're talking about.

MR. TRAVIS: I won't disagree with you in the slightest that there is a lot of thought that needs to go into the process.

Any other questions at this time, or can I move to slide 7? Guess I'll move on to the next slide.

Okay, so the goal here, and this kind of gets to Member Petti's point that the technology inclusive I don't think was the primary goal of what's being done here. But given that we were doing it, it needed to be technology inclusive, especially because of the other efforts that are being undertaken under 53.

And so the goal was to update and build on the existing deterministic framework while also allowing use of the appropriate Part 53 provisions that involve performance-based standards, rather than standards that use risk criteria in the acceptance criteria that can fit within the overall framework that's being proposed. As is, when I say the overall framework I'm talking about everything, not just the Part 5X.

And so while we're doing that, we wanted to make the requirements as technology inclusive as possible. Note, and the title of this is more in the specific language, note that may not always be technology neutral in all cases.

Because there are -- I think there is a division in some cases between, for instance, a lightwater reactor and a non-lightwater reactor based on regulatory precedent, if that makes sense. And so we'd like to leverage some --

(Audio interference.)

So the goal here is to try and leverage portions of 53 that do involve performance-based standards while we're going through this process. And so it is in that sense a hybrid of what exists in 50, build on that with a technology inclusive framework, and then leverage what we can from 53, given the regulatory framework updated processing we're doing o that.

CHAIR PETTI: So 5X is a performance-based approach?

MR. TRAVIS: There will be portions of it that are performance --

CHAIR PETTI: Portions, okay.

MR. TRAVIS: Yes. I mean, in a sense,

50's performance-based, right, because there are specific dose criteria that have to be met a high level. But yes, I mean, I would more think of it as various portions of it have performance-based criteria that will drive the regulations, yes.

CHAIR PETTI: So my only comment is, you know, words sometimes don't convey as well as pictures. You guys should really think about something that shows how it -- where it fits and how it fits in the overall, you know, regulatory landscape. Because it, I think it would really help in the communication.

MR. TRAVIS: Okay. I have seen some slides being produced for other efforts that could be incorporated. I think, as we kind of note, part of the problem -- not problem, but part of the issue is we're early in the process here. We still aren't sure exactly where this is going. And so that drives some of the confusion.

But we will take that back, and I think can provide something to that effect at some point.

CHAIR PETTI: Okay, thanks.

MR. TRAVIS: Yeah. So if we could move on to slide 8. So the general layout of the proposed draft for the draft proposed rule language is on this

slide. I won't go through the list, you can read it, because we'll talking about them in some more detail here as we go forward.

Currently, and this goes to some of the discussion we've already had, currently the draft language is being provided using 50 as a baseline because a lot of what exists in 50 is usable for this purpose. And so duplicating that wouldn't be effective or efficient at this stage.

But it's not necessarily indicative of any particular final plan for where we want to put the -- all this rule text. I think we see benefits in 50 and we see, you know, upside to putting it in 53 as well.

But we're -- taking a step back, we're looking at this under the umbrella of the greater rulemaking. And where this goes is not as important as the concepts that it's trying to communicate and what it affords to an applicant.

But we are explicitly looking for feedback on what the most appropriate location is. And you know, we've heard a little of that already. We'll continue to take that sort of feedback, recognizing there are various pros and cons to the options.

And so if we could move on to slide 9, we're going to start looking at -- I mean, I'm just

going to -- it's a high level outline, and I'll kind of explain what is in the rule. And feel free to, again, stop me or ask questions at any point.

210 is just a basic applicability that conforms with what's in NEMA and the existing Part 50 -- Part 53 language. Sorry, I just was trying to -- saw the Teams message. 50 -- or 5X.220 contains definitions, some of which are here because they are modified from the 50 definitions, and some of which are here because they only exist in parts of 50 that would not be being referenced at this time.

So for instance, AOOs are only defined in Appendix A. We'd be requiring PVC, and I'll talk about that further. But we'd be losing the AOO definition. So we'd want to make sure that that got caught.

Reactor coolant pressure boundary is another that, where the -- or reactor coolant pressure boundary is lightwater reactor specific, but the safety-related definition contains reactor coolant pressure boundary. And so we wanted to insure that is adequately captured.

MS. CUBBAGE: Boyce, could I interrupt for a moment? There's a problem with the slides. Elizabeth, if you could check your display. We're

only seeing half of the slide.

MEMBER BLEY: I'm seeing the whole thing.

MR. TRAVIS: Yeah, I am too, Amy. I have a --

MS. CUBBAGE: There are several of us that are seeing half. This is strange. Thank you.

MR. TRAVIS: I had this problem when I first logged on, and I recommend disconnecting from the call and reconnecting, because that fixed it for me.

MS. CUBBAGE: Thank you.

MR. TRAVIS: I'm going to pause for just a second while everyone tries to get the technical worked out.

MEMBER DIMITRIJEVIC: Boyce, while you are paused, I want to ask you about this numbering. Because those -- if you change X with 3, those same numbers exist in 53 and they have a different subject. Why did you keep this numbering, you know?

MR. TRAVIS: So --

MEMBER DIMITRIJEVIC: Because there is no equivalency, so.

MR. TRAVIS: So right now, the numbering is purely for a construct for discussion. If we went to 53, for instance, these might be Part 5X 2010

instead of 210. But recognizing that if we put this in 53, we'd have to do a lot more plastering to make this a usable framework. Because right now it's relying on -- it's relying on the existing 50 framework.

If we put it into 53, we'd either have to build in references to existing Part 53 language, or recreate regulatory framework for, for instance, you know licensing processes and various requirements that are being kind of implicitly relied on right now. And so that's part of the motivation behind why the language as it exists is leaner, because it's relying on 50.

We recognize that if it goes in 53, there is a fair amount of work that would go into making this usable and standalone, if that makes sense.

And so if I think we're okay to continue, .230 is some top-level requirements that applicants using this section would need to comply with. Right now, there are, I'm going to say two and a half, there are three bullets listed. The first is the single failure criterion.

Because of the way the single failure criterion is implemented in 50, it's really in Appendix A, we tried to draw that out at high level

and basically just say -- and some -- note that some international regulators do this similarly. Just to say that you have to consider an active failure when looking at safety-related -- or DBAs, basically.

And it's basically consistent with the existing approach that's taken for LWRs that's implemented through GDC requirements. PRA, a requirement to have a PRA but no prescriptions on how that's being used.

I'll note the language that we were -- are using to require a PRA is consistent with what's being proposed in the 5052 rulemaking update and consistent really with what's in 52 right now.

And then a requirement to consider and demonstrate adequate defense-in-depth. And this is more of a catchall that gets delineated and discussed further in the sub, you know, the various levels of analysis requirements that we'll go through moving on.

If there are no questions on these, I'll move on to the next slide. And I suspect there will be questions on this slide. And so this is where we require principal design criteria. And the goal here was to extract the guts of the PDC requirement from 50 and clearly describe what's expected of an applicant providing PDC.

And so the -- this has been discussed in previous meetings with ACRS, and I think this approach is more, here, more consistent with the existing LWR framework, without relying on the GDC explicitly. And so the expectation, as in .240(b) -- so, and before I say that, .240(b) is specific to non-lightwater reactors.

Right now, if we were to go forward with the language as is, you know, not that we would go exactly as it is right now, but the expectation is LWRs would continue using this approach, would continue to leverage the GDC at Appendix A. Because that's the regulatory requirement for lightwater reactors.

Non-LWRs would be expected to provide PDC using the GDC or other generally accepted consensus codes and standards. And so the reason we say that is you could the GDC to build your PDC, you could use the ARDC in Reg Guide 1.232. If you wanted to use the criteria in IAEA SSRT 2/1 as your initial starting point for building the PDC, that's something we would find acceptable here.

And so we wanted to allow for a little more flexibility in what constituted principal design criteria while retaining the concept of a set of a

top-level design goals that you're designing towards. Whether that's, you know, an internationally derived set from the IAEA or what's in Reg Guide 1.232, or even the GDCs. So that they're -- you're adequately capturing the umbrella of what constitutes PDC for the design space.

And so I'll open it up for questions here, because I think there might be some. If not, though, I can move on.

CHAIR PETTI: I think it's just it's, how do I, I don't know how to explain this. I really like the way it flows in Part 53, right, how you get to PDCs. Whereas in Part 50, it's stuck in the appendix. So they're kind of like not at the same level, you know, and that I think is just one of these structural problems figuring out how it fits.

MR. TRAVIS: Yeah. So I think I understand what you're saying. I'll note that when you say 53 -- at first I'll ask a question to make sure I understand. Do you mean the Part 53 language if we go back -- don't go back in the slides, but going back to what Bill's provided, this is 5X. But you mean Part 53, Subparts A-K or whatever.

CHAIR PETTI: Right. I mean, you know, you start with the objectives and you divine the

safety functions and then the criteria. You know what I mean. It's just a very logical top down approach that doesn't -- that just doesn't jump out at you when you read Part 50.

MR. TRAVIS: Right, I agree with that. I guess I will note that what's in 53 and what's in here are not covering the same space for design criteria in that this design criteria here would include design, fabrication, construction, testing, and performance requirements. Whereas the design criteria, the RFDC I think in 53, are the top-level design goal requirements.

And so it might be, again, the -- going to the IAEA fundamental safety functions, control reactivity, control heat removal, contain radionuclides might be your RFDC employed down from there as you said. But they don't get to the same level of granularity as design, fabrication, construction, and testing, right. It's more performance.

CHAIR PETTI: Yeah.

MR. TRAVIS: And so that's the -- that's the thought process that's being used here. And because PDC, we believe, are fundamental to the sort of deterministic approach that we're talking about

here, if that makes sense.

And so I can move on to slide 11. So --

MEMBER BLEY: Can I interrupt you, please?

MR. TRAVIS: Yeah, go ahead. Yeah.

MEMBER BLEY: I'm trying to remember, because I don't actually remember, current lightwater reactors, we have the GDCs, but they also have a requirement to define their principal design criteria, which generally are the GDCs.

But what I don't remember is what kind of guidance is there for the staff on how to review the principal design criteria to ensure they're not missing something. What is there now, and I assume you guys are preparing some for the future.

MR. TRAVIS: So I'm going to kind of abstract that in a couple of different ways. For large lightwater reactors, there are -- there is not really guidance to that effect because, as you know, the GDC exists. And those are expected to be the baseline.

And so if they're going to either propose a different PDC or take an exemption, for instance, from a GDC, that would be evaluated on a case-specific basis for the design and kind of reviewed through the lens of, well, what are they trying to do.

And we saw this, I don't want to get into too much detail on a specific design, but we saw this in the NuScale application, for instance, right. They proposed some different PDC than the GDC, and ultimately many of those were found acceptable because of the design-specific solutions.

For a non-lightwater reactor, the staff -- I mean, there is a process that's laid out in 1.232 for a couple of different technology types. I'm going to say I know gas reactor is one of them, so let me use that an example. There are MHTGRDC that are proposed, and some of the GDC went away. But there were new criteria added for systems that are important to safety.

And that same sort of process would be involved for a new technology type. But the expectation here is that the PDC that are provided would cover the full scope of, and I'll go back and reread the design, fabrication, construction, testing, and performance requirements.

And so if there are SSCs that are important to safety for a given transient or initiating event or accident sequence, whatever, there would be a PDC that somehow distills that, the requirements for that function and component at a

higher level. And so --

MEMBER BLEY: I'm sorry, I'm trying to read between the lines of what you say, and I appreciate everything you've said. It sounds as if the ARDC document and it has the column that explains things, kind of stands as the best guidance you have for how to accept a new set of PDCs. Is that right, or are you going to actually write new guidance?

MR. TRAVIS: I don't want to commit one way or another. I think right now the -- what -- it's between what exists in the ARDC document and the various other guidance documents that capture content of applications. I think that there are pieces in those guidance documents that can be extracted to get us to a certain point.

But at the same time, it would be difficult to produce a guidance document that covers all the possible technology types that we're looking at, if that makes sense.

MEMBER BLEY: Could do it in advance. Yeah, this is one of the places a number of us have had some trouble in it being too much of a blank slate. And anyway, go ahead, you're doing a good job.

MR. RECKLEY: Boyce, this is Bill, if I can just weigh in to Dennis's point. Right now we're

not planning any more generic guidance. But what you, ACRS, would see for those using this kind of approach, usually the designer as one of the first things they develop are their PDCs.

And so, and we've seen that for a couple of the current designers, as well as if you even go back to the 2010 timeframe, we saw that for reactors like the Toshiba 4S, for example. That was one of the first reports they submitted.

And so I think you will be able to see as you start to interact on specific designs that for those designers using this approach, one of the first things that they'll be bringing forward are their PDCs.

MEMBER BLEY: So in addition to you, we would -- this committee would be seeing those for any application that comes across pretty early in the process.

MR. RECKLEY: That's been the tradition, and I think that would continue, yeah.

MEMBER BLEY: Okay. That was me, I don't know about everybody else.

MR. RECKLEY: Okay.

MR. TRAVIS: No, I think that's a good point, thanks, Bill.

So I'm going to remain on slide 11 and begin talking about AOOs and DBAs, the first of, well, I mean, I kind of look at it as a player of analytical requirements.

And first to kind of head off any comments in advance, we got some stakeholder comments that -- I'll just note, the goal here wasn't to conflate AOOs and DBAs, except for the fact that there's kind of an equivalent expectation of analytical rigor in how an AOO and a DBA are justified analytically.

They do not necessarily have the same requirements for acceptance criteria in SSCs being used to defend against them. And so how that's expressed in the rule language, you know, will probably need to be updated at some point, provided we continue going forward with this exact -- this -- the way it looks right now.

And so if there's any comments to that effect, they're appreciated, but we definitely recognize and understand there may be issues there.

And so this section kind of takes the 5034S and 5046S requirements and puts it at a higher level of technology neutral slant on what's expected for providing and demonstrating safety for AOOs and DBAs.

And so the analysis for these events would be subject to the same dose criteria and acceptance criteria they are now, with the similar sort of expectations but provided at the much higher technology neutral level that's been outlined in the proposed rule language.

And the allowing for some, I guess, streamlined analytical approaches. For instance, there's an option to provide bounding analyses to kind of bend, for instance, a designer could have the flexibility to bend their analytical requirements or their analysis into various, say, two or three categories and say here's my limiting cases for these categories.

I can demonstrate that these are limiting. I don't need to go through the exercise to show you all the ones underneath. And that's to some sense already done in some Chapter 15 analyses today. But this kind of puts it at a higher level and puts a pin on it in the rule text.

It also, this section also provides for, I'll call it a technology neutral 5046 requirement in that we recognize that there are important analytical models in demonstrating the safety case for the design.

5046 is technology specific legally, but the kind of technical impetus for that crafting of that rule is not a technology specific, you know, it's not -- it wasn't specific to lightwater reactors. It's a reactor rule.

And so this kind of takes that and at a higher level, slightly less onerous requirement, but would still require applicants to provide limiting -- to identify what limiting parameters for their design are from a safety acceptance criteria perspective and ensure these -- those parameters are tracked appropriately.

And if there are errors or changes, that the NRC is, you know, duly informed in the same way 5046 exists today. And so I don't think what is in this section from a concept perspective is different than the Part 50 approach used today.

It's just this is -- this kind of tries to do it in a technology neutral fashion and kind of put a -- draw a line under what constitutes a safety-related DBA analysis in order to distinguish it from the analytical requirements we'll discuss below.

And so if there are no questions, I'll move on to slide 12, but first I'll pause for a second. Okay. So 260 provides beyond design basis

event requirements. And so for some background, the kind of thing we're thinking here is in the same vein as station blackout or ATWS requirements.

The requirements in Part 50 for those events are technology-specific. And in fact, they not only are technology-specific, but they prescribe specific solutions for mitigating those events. And so in this -- in this rule language, which again, note that it's draft.

This section is -- this and the next section are perhaps the most subject to change. But this language tries to draw on some of the international concepts of, for instance, defense-in-depth level 3B or 4A, depending on what regulatory framework you're looking at.

And take the specific prescribed requirements for SBO and ATWS and kind of provide at a higher level to say, okay, we expect designers to consider events like those, you know, in terms of frequency and design-specific consequence. And, but there -- and so they'd be part of the licensing basis but not part of the design basis for the plant.

And so in 260(b), and I'll kind of read a little of the language to capture some of what we're looking for, is recognized initiators, such as ATWS or

loss of, you know, all AC to the plant auxiliaries, complex accident sequences that may have substantial uncertainty associated with them, conditions specific to the design derived on the basis of engineering judgement and PRA, and in order to provide some additional assurance of defense-in-depth.

And so this is more akin to a combination of the ATWS and SBO rules, except without the prescribed solutions, and the sort of things that are seen under RTNSS in Chapter 19. And then this section ultimately says if, you know, once you've established what those events are, you should, you know, point at or provide some appropriate treatments for the SSCs or design features that are accredited for those events.

These are, again, I'll reiterate, the things in this section are not part of the design basis, just the licensing basis. And they are not required to be defended against with safety-related equipment. Nor are they are they required to, you know, impose single failure here.

This is -- we got some, I'll say a variety of feedback on this section when we presented this publically. But ultimately this is not terribly different from what's done now, except that it doesn't stop at SBO and ATWS, but it doesn't look all that

different from the Chapter 19 RTNSS analysis. And so I'll again open it up for question or comment.

MEMBER HALNON: Yeah, this is Greg.

You know, one of the biggest issues with the new technology is the lack of operating experience. I'm just interested in your thoughts on how that might factor into down the road discoveries, and backfitting, and other things, is that going to be kind of factored into this rule, knowing that we're going to be growing in experience as we go? Or are we assuming that we got it after all this time with the experience, reactor experience that we have?

MR. TRAVIS: Yeah. So, I'm certainly not arrogant enough to think that we're going to get it right the first time. I mean, obviously I would prefer that to be the case.

I think this rule does try to create an avenue that -- I mean, the expectation is that the designer would consider events. But, we recognize that there are substantial uncertainties surrounding things that don't have operating experience. The sample size is in some ways just too small.

I don't think it's going to be gotten right every time. I think this rule, or this section brings an avenue to point at and say, you know, hey,

you missed the uncertainty. Where is the -- you know, at least provide some analysis to that effect.

But, at the same time, we are still going to be subject to the backfit rule. It's going to be question of if operating experience does occur, do we need to impose changes on account of adequate protection subject to the backfit rule.

And so, I think this rule tries to straddle that line a little bit in that there is an expectation on the designer to at least have considered some of these things. And if, you know, the uncertainty is really high and they find out down the road that those initiators or the operator experience there were some improper assumptions being made, that would be an avenue to update that.

Whether that results in specific design changes, it would be hard for me to forecast that at this point.

MEMBER HALNON: It will be interesting to see if it does. These prevention mitigation features, are you assuming that that could be operator actions as well?

MR. TRAVIS: In this section, yes.

MEMBER HALNON: Okay. That could factor into what we're going to hear this afternoon on the

subpart F, the new certified operator program. And it will be interesting to see how that kind of factors into each other. But I'll wait. We will talk more this afternoon about it.

MR. TRAVIS: Yeah. And as I say, what's being done in this section is, it's not wholly independent of that. But the subpart F discussion is more under the guise of, well, the Part 53 language rather than this section. Although, we are still evaluating whether we would -- whether we could leverage what's in subpart F under this section. So, that's an open question.

MEMBER HALNON: Okay.

MR. TRAVIS: So, it's worth considering.

MEMBER HALNON: Thanks.

MEMBER DIMITRIJEVIC: Well, you reference Chapter 19. You said it's similar to what you've done in Chapter 19. Can you elaborate what you meant by that?

MR. TRAVIS: Yeah. And so I'm thinking the consid -- like, areas such as consideration of equipment that is designated as RTNSS for the purpose of risk importance.

So, for instance, a designer under 260 would be expected to consider some of the, you know,

the non-design basis events above a certain frequency, just as an example, and evaluate whether the design is adequate -- has adequate defense-in-depth for those scenarios.

And if it, for instance, if it's a no- nevermind, that's a simple statement to make. If it's not and, for instance, there's some important operator action or important non-safety piece of equipment, this would be an avenue for a designer to identify, okay, I need some kind of special treatment. For instance, this needs a, this might need an availability control, or something to that effect, or some alternate quality that isn't necessarily safety-related because there's a recognition that this SSC or design feature is important to -- for defense-in-depth purposes for defending against these DDEs.

MEMBER DIMITRIJEVIC: So, basically, you are referring to the, you know, 10 CFR 50.69, the special treatment for things important to safety and to the frequency of the same areas? That's what you mean the Chapter 19 means which would be to this?

MR. TRAVIS: No. I think either I'm miscommunicating or not coming across correctly.

I'm thinking more along the lines of, oh, I get it, when it's things like RTNSS in, for

instance, the ABWR or the AP1000 designs that are -- so, I'll use the AP1000 as an example, there's, like, a 7-day water storage on site for refilling containment cooling, for instance. That's not safety-related but it has additional controls associated with it for RTNSS and other considerations that are greater than just a licensee control component, if that makes sense.

And that, the need for that is identified, the importance of that equipment is identified as derived from a scenario in -- well, may be derived from a scenario that's analyzed in Chapter 19 that's not part of the plant design basis.

MEMBER DIMITRIJEVIC: But that's your 50.69. You know, in 50.69 you declare that the classified component's based on the safety classification and the safety importance. So, if you want to say this was classified as safety important and then required additional attention, you know. So, that would be related to the 50.69.

And at the same time if it comes to the -- which I saw in the book, the Atomic Agency Standards, then here, if you want to discuss the something that's supported by frequencies, that's a different part of that. But they're not really, you know, they use

input for Chapter 19, but those things are discussed outside of it, so.

MR. TRAVIS: Okay. I think I may have to take that kind -- I'll say this: I expect the section to be iterated on. I, I don't think I'm referring to the 50.69 or 50.69-like process here. This is more akin to what's in, and I'm just going to say SRP-19.3. But I don't have the -- I can't, I can't fully explain what's being -- I would have to take that back for a future engagement. I'll just leave it at that.

CHAIR PETTI: So, Boyce, then how does this compare to the defense-in-depth assessment that's done in Part 53?

MR. TRAVIS: I think that's a good question. I think that we're trying to come at -- So, let me characterize it.

In the existing regulatory framework, defense-in-depth is not, it's never explicitly, you know, required -- not -- required's not the right word. It's not something referred to. And so what we're trying to do here is capture some of the thought process that goes into defense-in-depth because it is, it has always been a matter of Commission policy and an expectation that designers consider defense-in-depth.

But, defense-in-depth has kind of traditionally been approached through the lens of we have a very conservative analysis. We have three barr -- you know, three independent barriers. And that's instead of looking at defense-in-depth on this more scenario-specific basis.

And so, what's in 53 is a more formal defense-in-depth evaluation for the design, because in 53 there's an assumption that you went through a process that covers the full analytical, like the full -- it throws a blanket over the full analytical space above a certain frequency.

In this, this framework that's being discussed today, the 5X framework, there isn't an expectation that the designer will have a full scope PRA because that, being part of the reason we've developed this or tried to develop this is based on feedback that there isn't, you know, there are some designers that don't want to go to those lengths.

And we recognize that, obviously, you can still make -- I mean, we have plants today, we can still make a design op there, we just don't license a plant safely without a full-scope PRA. So, without that expectation of a full-scope PRA and the formalized defense-in-depth process that 53 would

require, we're trying to institute some of the thinking behind the layers of analysis that are required for -- or not required, but that can provide for additional defense-in-depth.

And I rambled a little bit, so I'm sorry. Did that sort of answer your question?

CHAIR PETTI: Yeah. No, that helps.

I just, you know, my problem with looking at the thing about the Part 53 that is one of its strengths, you know, taking, putting the full, the full PRA aside, is you're coming in with a technology that has a little operating experience, and how to establish what are the right events to know that you've really looked at everything. That structure is, to me, very appealing for new technologies.

Here you're trying to do something that's, you know, certainly not at that level of detail because you may not have the full risk assessment results. But it seems like it has to be risk-informed because how do you know, you know, the sort of completeness issue with a new technology that you've looked broadly enough, so.

MR. TRAVIS: I absolutely agree. And developing this language it was difficult to lock that title up. I mean, the language refers to, you know,

using risk insights from a PRA. But, as an example, because, again, there is -- this language or this part was developed without any, trying to make any assumptions on what the scope of the PRA that's been performed is.

But, I mean, my expect -- personal expectation is that the best way to go about this is to use insights from a PRA to inform you when performing this scope of analysis.

CHAIR PETTI: I just also think that people, because the PRAs, the PRAs we have on the existing fleet are so incredibly detailed that they, they think that that's what's needed everywhere. And I'm not absolutely convinced that there are capabilities out there to do, you know, let's call it a PRA-lite, if you will.

They still provide incredible value and from the design perspective to know that you've looked at everything, and you thought about everything systematically, and yet it is not at Level 3, you know; that there's ways to do this in terms of this toolbox to get you the value without necessarily getting so bogged down in, you know, all the event trees and the fault trees and the event trees and the like, so.

MR. TRAVIS: No, thank you for that comment. I mean, I think it's a great point.

And I want to just kind of emphasize something, is that that gets to why 53 is developed and why fifty -- why this is being developed. Like, the PRA-lite, as you say, could be used in the framework that's being presented here. But how we, the regulator, establish, you know, acceptance criteria and quality, you know, expectations for quality of the PRA, and various things to that effect, where we draw the line is the difficulty and is part of the reason why we've established these processes as separate.

Because, as you say, for the new technologies in non-LWRs, for instance, there is a, there is an experience, and so uncertainties are going to be higher. And so, what, how we, how we denote something as acceptable, it has to be based on some minimum level of rigor.

And so 53 assumes a certain level of rigor. And that's inherent in the process that follows. And this framework doesn't assume that same level of rigor and provides some flexibility to that effect. But, consequently, there are some deterministic requirements for the analysis because

that -- we can't assume that level of rigor is necessary, if that makes sense.

MEMBER REMPE: I think I can follow up, Boyce. This is picking up on a brief comment that you made in passing earlier in the discussion. And I don't want to put too much on this because it may be something you kind of said casually and, you know, are not banking on.

But you made a comment on if a designer feels that they need some availability criterion such as, you know, tech specs are allowed average times, or whatever, on a particular component. And are we envisioning that those would come in as part of the designer's process of please put these regulations on my design? Because that seems a little implausible to me. And I'm hoping there's a method whereby staff can say, well, the designer said this is fine, but we think there need to be some availability criteria.

MR. TRAVIS: I think that's a very good question. I'll note that I am not only with the NRC staff but am a technical reviewer in my normal day job, and so I would be the one asking those questions.

And I think that it cuts, it cuts both ways. There is -- the burden is on the applicant to demonstrate the safety of their design. And in doing

so, for instance in this case, let's use an example of, for instance, there's some beyond design basis event of like an ATWS. But we don't want to prescribe that they have feed water control systems in the same main as we do for the current ATWS rule. But I believe the rule tech doesn't exist now that would -- the burden would be on the designer to provide and demonstrate that the, for instance, their defense against an ATWS is appropriate.

But the rule, as it exists now, would allow the staff to say, hey, you have this event. It clearly is -- could create safety implications. You need some additional controls on that.

I guess I will note, though, that this rule text is being -- is subject to change. I think there does need to be an avenue for something like that. But we are in space, specifically here at beyond design basis events, where there is established Commission policy and we want to remain consistent with that.

And so it is a -- your answer, the answer to your question is it's very easy for me to say, yes, there is an avenue for that for a design basis event for the staff. Going beyond the design basis event I am -- this rule is not wholly new, but it's trying to

remain consistent with Commission policy. And so, it is a very thin tightrope to walk.

And I hope that answers your question to a certain extent.

Barring any other questions, I will move on to slide 13.

CHAIR PETTI: So just, Boyce, --

MR. TRAVIS: Yes?

CHAIR PETTI: -- we needed to take a break around 9:00. You know your upcoming slides. Is there a natural stopping point?

MR. TRAVIS: There is. But I think now might be the best. I mean, if we, if we start on this slide it might be a half hour before we get another chance to stop.

CHAIR PETTI: Okay.

MR. TRAVIS: Now may be the time to stop.

CHAIR PETTI: Okay. So, let's take a break and come back at 15 minutes after the hour.

Thanks.

(Whereupon, at 10:52 a.m., the above-entitled matter went off the record, and reconvened at 11:15 a.m.)

CHAIR PETTI: Okay. I have 15 minutes after the hour, so let's begin again. Boyce.

MR. TRAVIS: Thanks.

So, now we're on slide 13. Point 270 is titled "Severe Accidents," which may not be the correct title for this section based on some of the feedback we received. But that's okay.

One of the things this section does, it works with severe accidents kind of in a similar fashion to the international defense-in-depth concept, either 4 of 4B, depending on what source you're looking at.

The requirements in this section are consistent with the severe accident policy statement. We're all tying together existing requirements with a commensurate analysis. And so, this section's kind of trying to do two separate things.

The first is, as I said, address severe accidents.

The second is this is where the requirement for a bounding dose analysis in the similar fashion we see today in deterministic Part 50 analyses resides. And so, that deterministic analysis is subject to dose criteria that the normal 25 rem dose criteria by the, yeah, 25 rem TODE and got the same boundary in the EPZ reside here.

But it specifies that that is a minimum

set for this criteria, noting that, and I'll note that minimum is used because an applicant may elect, based on how we implement or how we reference Part 53, may elect these more stringent acceptance criteria such as 1 rem for the EPA PAGS to reduce the size of the EPZ, for instance. And that would replace these criteria because they would need to meet that in order to meet the reference criteria.

That dose analysis in operational Part 50 is specified as, you know, through a footnote as being traditionally conducted via a core melt accident. And so, that whole set of language is very LWR-centric. And so, in this section we've tried to step back and distill that to a higher level, and provide either an option to use a mechanistic source term based on a physical model with a facility response for a -- I'm not going to say a severe accident, but an accident more severe than the design basis accident.

Or to take an approach where the applicant defines what constitutes that design basis dose accident, which is not a design basis accident, looks like, considering some element of fuel or effectively some element of fuel damage in order to demonstrate that adequate defense-in-depth exists.

And so the severe accident requirements

are akin in this section, are akin to what exists today, except that our technology for level -- for a light water reactor we'd be talking about what's been done in Chapter 19 to set forth things like core concrete, or steam explosion type analyses that are just, again, purely for a defense-in-depth demonstration.

And then independent of that in this section, there is an expectation that an application, or a requirement that an applicant provide an analysis of an accident that could lead to a fission product release. And how they do that, there's a couple of avenues here that would provide for even a mechanistic source term based on a non-severe severe accident. Or, I'm not phrasing this correctly again.

Severe accident's probably not the correct term for that, but an accident more severe than a design basis accident that results in fuel damage. Or provides this, what's laid out in 270B which is, you know, demonstrate what their dose consequences are for a scenario at a sufficiently low probability or low -- basically, what is the scenario point and can, below which can be excluded scenarios of a sufficiently low frequency with the high degree of confidence that the events, those events can be exclusive.

And so that was a convoluted discussion on this section. And I can open it up for questions. But at a high level, it's severe accidents and dose analysis requirement is what exists in 270.

MEMBER REMPE: So, this is Joy. And I guess I'll start what you anticipate might be a 30-minute discussion raising the questions or comments.

This thing about it will be about a frequency threshold, if you had a PRA leverage, and what would be done if you didn't?

We've heard people talk about to the past in these discussions about what's a credible event. And some folks have a better imagination than others on what they consider credible. And I would think that this would make it significantly increased regulatory uncertainty. Again, I guess let the buyer beware if they try and pursue this option is, I guess, a question I have.

Have you started having some of the folks that are design developers start thinking about what this would entail?

MR. TRAVIS: So, yeah. I think, first of all, good question. I had similar thoughts. I'll try and address it through a couple of different angles.

So, we provided initial draft text

publicly. We've gotten varied feedback. I very much expect that this section is going to be iterated on in order to decrease that uncertainty that you allude to.

I do think there is -- so, I think there is a point we can get to in this, in this section where we are consistent with the existing regulatory framework in 50 and 52 on a more technology-neutral basis that captures things like a mechanistic source term under this section. What the precise language is they use to define that is, is a challenge. I mean, this is a first cut.

Obviously, you hit on -- I mean, in all honesty, speaking personally, I can probably define, you know, what the frequency threshold I expect here would be and how that would be laid out. But, again, as we noted, there isn't a requirement to have a PRA here.

And so, barring that, and, again, noting that I think there's already language in Part 50 that some people would refer to as problematic that we're trying to side -- or not sidestep, to rephrase here in something more useful. I'm not sure that we got there necessarily on this first cut. But, yes, I expect there is a threshold that could be established.

Yes, I expect that we can decrease the

certainty and provide something that looks like a here's what the minimum expectation for the accident analysis under this section looks like.

Can I tell you that right now? Unfortunately not. And so, hopefully, that sort of addresses what your question is getting at, but fully recognize that there is some uncertainty here.

MEMBER REMPE: Yeah. And, again, this lack of operating experience, the need for completeness that was mentioned in the prior slide.

And then it's not your language I'm picking on, it's the concept of what's credible versus not credible with an incomplete knowledge due to lack of operating experience. But I think this is going to make this approach very difficult for anyone trying to pursue it.

But, you know, you're drafting for it. You guys are trying to give them what they want. I just, you know, it will be an interesting discussion to follow.

MR. TRAVIS: Yeah. I mean, absolutely. And I guess to take this to an even higher level, I mean, fundamentally what we're, what the, what the desire here is to demonstrate the plant has adequate defense-in-depth to show that dose consequences are

below the necessary regulatory thresholds. And that, you know, that's an easy statement to make.

As you note, that what goes into that statement is -- will involve probably a lot of discussion and a fair, you know, haggling back and forth to get to what the language in this section looks like for an appropriate analysis there. But, fundamentally, it's the same defense-in-depth requirement that exists in our 50 and 52 today.

And I guess I would posit that it looks different in this section. I'm going to say it may be just as difficult right now to come in with something under 50 or 52, depending on what your, what your ultimate limiting dose, bounding dose analysis is, because there's an understanding that, I mean, obviously the more conservative you make it and the easier it is to accept, but the more penalty you pay in design space. And so, there's a tradeoff there.

MEMBER REMPE: I'll yield the floor to someone else. I see Vicki's hand's up.

MEMBER BIER: Yeah. You had mentioned again -- I mean, I don't want to read too much into this specific choice of words, but this could involve the design identifying a scenario and looking at the source term, or consequences, or whatever for that

scenario.

I think PRAs for the existing reactors there's often lots of scenarios with very different levels of offsite consequences. So, do you really mean that they would need to evaluate only one, and they could kind of pick which one they wanted to do? It just seems, again from a perspective of completeness, pretty limited.

MR. TRAVIS: Yeah. I mean, that's a good question.

I agree with the sentiment you're expressing. And I think that, again, this may be a miscommunication in either -- well, both, both the words that I used today and the words that are in the section.

This, the analyses that we're talking about here are not necessarily the same as those that are in the PRA. And so, I mean, how do I phrase this? The, the analyses in a PRA for a severe accident are not the same as those that are looked at in the Part 50, 52 space for what's sometimes referred to as the design basis dose analysis. And so, what we're trying to capture in this section is that design basis dose analysis that is performed to demonstrate adequate defense-in-depth with respect to regulatory dose

criteria.

That accident may be the result of a "severe accident," or it may be the result of something slightly different. And so there is not, I guess what I'm trying to really say is there is not a direct dose criteria necessarily on those accidents that are explored in the PRA. That, that may be different from the accident that is used in this section to dem -- or perhaps the scenario that is used in this section to demonstrate compliance with the regulatory dose criteria. If that makes sense.

But they may be similar. I mean, how that's, how that's implemented is, I guess, going to be the subject -- it's going to be design-specific and may involve, again, additional iteration on this language to make sure we get that right.

CHAIR PETTI: Yeah. To me there is what's being done in 15.52 and is laid out in 53, this seems to be a bad compromise in terms of, in terms of I know what you're trying to do but it seems like it's fuzzed up. And, again, it may be the language. But I sort of agree with Joy, just it, it just doesn't get, it doesn't get to the same level as those alternative options because those alternative options, you know, are either prescribed by the footnote, right? You've

got the PRA and you can find events that are very low frequency that satisfy it.

Using some sort of PRA information, this beauty is in the eye of the beholder, I think. I think that's what's really difficult.

MR. TRAVIS: Well, I appreciate and respect your comment. I mean, I don't necessarily disagree. But this is, what's here is not an ideal compromise. But I will say that, I mean, like, certainly it would be very difficult, even though it might be appropriate, for the NRC staff to go recreate that footnote for non-LWRs. There is, I'll say speaking personally, I do not believe there is an appetite for, for doing that.

And so what has tried to be done in this language is, I mean, to split the baby, for lack of a better term. And I think this first iteration, you know, is not necessarily indicative of what the final language will look like.

But it is a step forward from Part -- what's in Part 50 in terms of a technology neutral space, and lacks the same -- or it, going back to what Dr. Rempe said, I think that, I mean this was, effectively this option has been requested in some circles. We are putting forth a best effort to

deliver it. And recognizing there's going to be some iteration and bumps along the road. And it may be difficult or challenging to provide that.

But, ultimately, you know, as the NRC we have a statutory requirement to get there, and trying to fit language to that is challenging.

CHAIR PETTI: You know, it might be worth considering some words, and maybe not in the language, maybe in the statements of consideration, or something, you know, you'd be looking for, you know, more than one safety function to fail to be assured. You know, some sort of guidance to, to try to put some bounds and a little more specificity on it.

I'd have to think about it some more.

MR. TRAVIS: I think that's good feedback. And certainly something to be considered here.

MR. RECKLEY: And if I can, Boyce, this is Bill.

I mean, keep in mind that just as Boyce has said, we're trying to do it a traditional approach based largely on existing NRC policies and regulations. And the severe accident policy statement, the challenge here is the severe accident policy statement focused on additional design measures, severe accident design features under Part

52. So, it, it didn't include as specifically the consequence assessment that we, that we're trying to kind of join these two things together here.

And as Boyce said, you know, it was a first shot. But, you know, another challenge is the severe accident policy statement itself cites the PRA as a major tool to both identify and try to resolve severe accident issues. And, so, in the absence of a good PRA to do any of those functions, I think you can then look over to a kind of more straightforward IAEA approach and basically say, in the absence of an argument otherwise, the design will have some design features to mitigate that equivalent of a core melt accident in a light water reactor.

Now, in the past when we've looked, all the way back into the 1980s, when we've looked at non-light water reactors we've try to argue that they -- that those kind of things aren't warranted, the PRA was a big tool in making the arguments.

So, it's a double-edged sword here, as you've all pointed out. And what tools do you bring is going to depend on what argument you're going to try to make. But what we're laying out here is a set of design rules, because that's what the traditional approach consists of largely.

And one of the design rules is you're going to, unless you can convince us otherwise, you're going to have something to both limit the consequences of and the probability of a severe accident. So, and then that's existing policy: severe accident policy statement, the footnotes Boyce mentioned. So, it is messy, but the existing process is messy.

So that, you know, we're kind of stuck with what we have.

MR. TRAVIS: Thanks, Bill.

MR. RECKLEY: Sorry, Boyce.

MR. TRAVIS: No, no. I think that was --

CHAIR PETTI: No, I appreciate that, Bill. I do. Yeah, you are where you are. Right?

MR. TRAVIS: No, I think that is an accurate summary of what makes constructing this so challenging.

Are there any further questions or comments on this section?

(No response.)

MR. TRAVIS: If not, I'll move on to slide 14.

And so, now we're into the more specific portions of the proposed rule text that clean up and enact in the technology neutral fashion for this 5X

supplement. And so, functional containment is an area that has been explored and the staff has issued, and the Commission has put out an SRM on the SECY related to functional containment.

Consistent with that policy, the language in 280 tries to establish what the requirements and boundaries on a functional containment are. And, effectively, that SSCs relied on as part of the functional containment for design basis accidents need to be safety-related.

And SSCs relied on, for instance, in the functional containment to defend against DDEs, need to have some sort of special treatment associated with it, because otherwise they would not be caught by existing -- I mean other than the dose requirement analysis they would not be caught by the existing requirements. And so, that's why 280 exists, to strike the requirement for a non-LWR to have a pressure-retaining traditional containment if they elect to provide a functional containment approach.

290 is then a cleanup section to provide some design requirements that we could either fix or adjust based on what's being done here. Technical specifics, as an example.

There are four criteria for an LCO in

50.36. If you, if an applicant was to follow this approach they would need only to comply with B and C, provided the criteria that identified, identify appropriate requirements on systems that perform safety functions.

And then this section has some reserve space to catch, again, as we published this knowing this was the initial, we don't think there are other requirements that we need to catch in 50. If, provided this is issued as part of 50, we would use this section to augment or replace requirements that are not technology neutral and/or conflict with the purposes that are provided here.

If we could move on to slide 15.

So, slide 15 has some items on it. The staff's still in the process of exploring how best to provide these options to applicants pursuing this proposed approach.

The issues here are representative examples of areas in Part 53 we think that can be leveraged for applicants following this approach. But how these specific items are referenced or implemented will be dependent on a number of factors, including both where this proposed rule is located, and how it's integrated into the framework, and the specific

language that needs to be referenced in Part 53 or elsewhere as part of the broader rulemaking.

And so, they're listed as examples of where we would be looking to leverage portions of Part 53 that are part of the Part 53 itself rule text. I don't know how best to phrase that.

And, again, just examples. As we go through the process we may identify more.

If there are no questions, we'll move on to slide 16.

And so, we issued this proposed, draft proposed rule text within the last month. And received some feedback that will be on the next couple of slides.

The one major point of feedback was relating to the scope. Again, that's provided in the 210 of the proposed rule text, which is consistent with the Part 53 scope by goes beyond "advanced reactors," which is different than the definition -- yes, sorry. It's preliminary proposed rule text. I apologize. I, I keep mistaking that.

It's not, in other words, it hasn't been issued formally for public comment yet. It's still draft and will be iterated on.

So, the proposed text has the same scope

in terms of application as Part 53, which is a different scope than NEMA, partially because of how NEMA defines advanced reactors vis-a-vis the Commission definition of advanced reactors, and trying to delineate who can apply for these sections.

The staff's position is that the requirements in the sections, provided an applicant can meet the requirements in the sections, there are no specific scope requirements under an advanced reactor, but the level of safety is the consequent demonstration of the requirements, not an inherent, an inherent characteristic of "advanced reactor."

And so that's why it's scoped the way it is. But that's something we will continue to try to communicate, I guess.

The concept of PRA is something that was brought up multiple times. And so how PRA is used, I think, I believe the comment has been made a couple of times that I've been -- I can be, and I think everyone can be loose in how they use the term, some specific terms. And PRA is, I think, an easy one to misuse.

What constitutes PRA tools versus insights versus the full scope PRA, like Level 3 has been referred to here, and so how we -- we're trying to do a better job of how we refer to a PRA. I think,

again, the expectation of this part is the PRA, the applicant will have a PRA to use and will use insights from that PRA in their design.

That differs from the full scope PRA that is envisioned there in Part 53. And so, you know, going forward we will attempt to do a better job to distinguish those. But, again, a PRA is a tool, and insights from PRA can be used or misused, accordingly, and expectations on the scope and quality of the PRA are part of what's in Part 53, and notably less defined here in this, this approach at 5X.

We received feedback areas, industry stakeholders that said Part 53 should be modified to allow for the Part 5X approaches. That's something we've taken and I guess we're still considering in turn.

We're on slide 17.

Again, along the same lines as the previous comment, stakeholders stated that the NRC has created a binary choice in how PRA is used. We recognize that, that how a designer uses the PRA is -- may differ. But, ultimately, the NRC has to have regulatory criteria to create a predictable approach, framework, whatever we want to call it such that we can make findings that are consistent, transparent.

And that's the reason we have taken the approaches that's laid out in 53, and tried to provide this as an alternative, considering that the more flexible we allow -- the more flexible we are in allowing what the role of the PRA is, the less weight we can place on insights that are gleaned from that PRA.

The next set provides kind of similar feedback.

We received a variety of comments related to how the role of the regulations are versus how we evaluate the safety case. And so, I mean, I guess in response to that, that's something we're considering. But with flexibility and predictability are kind of on opposite ends of the same axes, and we're trying to strike an appropriate balance between that flexibility and predictability, recognizing that if we allow for infinite flexibility it is very difficult to provide a transparent, predictable framework that works the same for every applicant.

And, again, relating some problems that I discussed to accidents and DDEs, the comment was 5X brings DDEs into the design basis. That's not what's stated in the rule text. I think there's a misunderstanding there.

The expectation is that those events would be part of the licensing basis and would be handled, you know, not that dissimilarly from how they are handled today in most cases, with the expectation of a more technology-neutral disposition of those events and how they're handled, you know, with regards to prevention and mitigation.

And so I think I have one more slide, going on to 18.

And so, yeah, next steps on this proposed option include, again, to continue to evaluate and iterate on the feedback we've received.

We want to produce an option that is high quality and usable. Again, I think as has been noted from the comments today, some of this, that is more difficult than others. This was a first, best effort we could, you know, on a pretty aggressive timeline. And so, you know, we'll continue to evaluate on that feedback and try to produce a high quality option.

And, again, assessing the placement of where this resides, which, again, will allow us to firm up some of the aspect, further aspects of this and produce something that is, you know, closer to a final set of rules -- or final draft set of rule text.

I believe that's the end of my

presentation. And I welcome your questions.

CHAIR PETTI: Let me just ask about the thought process of how you're going to figure out where it best fits.

I saw a lot of discussion -- you know, your last slide before you got into the stakeholder comments -- about potential leveraging of parts, words from and sections in Part 53.

You know, this part is ten pages in the PDF that we were sent, and Part 53 is much longer.

At least, you know, at first glance, there seems like there ought to be a way to put it into Part 53, especially if it's going to leverage the EP and the security, and all those other things that you leveraged.

How are you going to think through that? What's it going to look like?

MR. TRAVIS: So, I mean, we are in the process of thinking through that right now.

The issue here is that it is as much a legal question as a technical question, and there is an element of how do we build the framework that is most usable and most efficient in doing that?

The reason it's been developed the way it exists right now is because we have a workable

framework under 50 that we can build on and substitute in where it's needed to make this approach work.

One thing we don't fully understand is what the motivation behind putting this in 53 is, under those circumstances.

Again, this looks a lot like the Part 50 approach.

If we put it into 50, and this is something we're balancing, how do we build out the framework for this without, you know, either creating a conflict with 50 and 52, or I'm going to say not undercutting 53 -- I'm not sure that's the right terminology -- but again, this right now exists separate from the Part 53 path.

And so it's a delicate set of challenges that we're trying our best to evaluate, and where it goes is going to be a function of those issues, and sorry I drug on.

MEMBER REMPE: Travis, this is Joy, and I apologize if this got asked at the beginning of the meeting because I had an issue that came up that I had to miss some of the discussion, but if you put this in Part 50, what about the folks that don't have a site? Would they be able to use it?

MR. TRAVIS: When you say the folks that

don't have a site --

MEMBER REMPE: The design developers.

(Simultaneous speaking.)

MR. TRAVIS: a DCF --

MEMBER REMPE: And a lot of them are just doing a design, they don't have a site where they want to put it, and so they need to have a process that doesn't require that they have a location, right?

In Part 50, you've got to have a location.

MR. TRAVIS: Yeah, so yeah, so I think that we believe that this -- you could enter into 50 here and exit into -- using the 52 processes with this approach, and so, you know in some of the rule texts, it says, in lieu of 52.XX.

A design certification applicant could enter into 50 and use these substitutions, for lack of a better term, in 52 through a design certification.

So we think that that would be a workable alternative. If not, we could do similar text in both 50 and 52.

MEMBER REMPE: Okay. And again, I apologize. I think this might have been discussed at the beginning, but I got sidetracked, so thank you.

MEMBER DIMITRIJEVIC: Hi, this is Vesna again.

As I said in the beginning, I really would support this idea that this should be option under the 53 because as, you know, I said that, and you used the PRA light.

Between PRA light and PRA heavy, they're all risk-informed processes so there is no reason they cannot be offered in the same, you know, the regulation, so I saw that you already got some similar comments and I totally agree with this because it doesn't really make sense to introduce deterministic approaches to Part 50, which is deterministic -- you know, the deterministic version of Part 50 is Part 50.

So, I mean, I don't really know how this out except if you really want to concentrate on that, what is light-water reactor applicable versus not what is light-water reactor applicable.

Also, I saw through the presentation that you struggle sometimes in determining the frequencies and determining the significance of events without the PRA inputs, and as I remember, there was in the reactor oversight process, there was a qualitative ranking introduced to determine the significance of event, and even using some time, and it was similar to the EPRI risk-informed ISI methodology.

And that was based on, you know, the

frequency of challenge or frequency to some SSC or item is called upon, and the defense in depth and you need redundancy actually, so how many redundant strains you have.

So basically, this logic, which is a qualitative logic, would reflect in all PRA models is that what is the -- what we are deal, what is your final scenario frequencies dependent on how often this item would be called upon, which is determined by the AOO, or is this design-basis event or design-basis events, and what is the size of redundancy you have?

So when we say frequency, we usually just think the PRA, but that actually, the frequency is a part of your license basis events in the deterministic mode because is it the AOO -- you know, anticipated operating occurrence, or is this design-basis event or beyond-design-basis event is dependent of likelihood of that event, which, you know, it means actual frequency of that event.

And also defense in depth, it means scenario frequency because it's dependent on how many mitigation trends you have.

So, this is what they say, the PRA is actually just reflecting, the reality existing is not really existing in vacuum, it's not some apparatus

which is there to produce some numbers. It's already reflected in the design.

So, my point is that from that point of view, I think that you think logic of the framework which will become logic, is a part of 53, is the affecting in all of these qualitative insights, and this is why I think that we'll belong there as option.

Like the PRA light options, so.

I mean, I wanted to make a couple points, which I hope you will sort of like hear that the PRA logical model reflect everything you discuss in here because, I mean, PRA was there to model design and then become a part of contributing to the design, so.

All right, that's what I wanted to just say as my insights.

MR. TRAVIS: I appreciate the comment. I mean, I think holistically we're considering a number of approaches, some of which may involve qualitative insights.

I think I'll note a couple of things that -- I mean, inherently, a qualitative insight is going to involve some level of subjectivity, especially in cases where, as we noted earlier today, we lack the operational experience, and therefore have a higher degree of uncertainty.

And then I guess one further thing is, I think in the deterministic process, I would slightly disagree on the nature of frequency in that while AOOs themselves have a frequency expectation, the design-basis accidents are not constructed under a frequency framework, I guess.

For light-water reactors, there's an agreed upon set of initiating events that have to be defended against using only safety-related equipment with a single failure, and frequency doesn't factor into that equation at all.

I mean, I know for instance, a large break LOCA is an event that has to be defended against, and so is something like a steam generator tube rupture.

Those have wildly different frequencies, but they're both design-basis accidents.

But I understand the comment, and I think we will try to, you know, integrate some of that into our thought processes as we continue to iterate on this and develop the various framework that'll fall under this rulemaking effort.

CHAIR PETTI: Any other comments, members?

(No audible response.)

CHAIR PETTI: Okay. I'm using the five second rule, I guess, so that's it.

You know, I'd be really interested in seeing, you know, follow on iterations here because this is a really fine balanced line and there's a lot of touch points and integration issues with, you know, other parts of the regulatory landscape, so.

We'll be hearing from you I'm sure in the future, Boyce.

MR. TRAVIS: Certainly hearing from the working group and the staff, as well, as we continue on the totality of this effort, yes.

MR. RECKLEY: Nice trying to escape, Boyce.

CHAIR PETTI: No.

MR. RECKLEY: So, Dave, if it's okay with you, I think we have an hour and we can fit in this Subpart H discussion, I think, and then that --

(Simultaneous speaking.)

MR. RECKLEY: That would free us up to have all afternoon to talk about the staffing, which is probably a good use of time.

CHAIR PETTI: Yeah, and I agree, let's keep going.

MR. RECKLEY: Okay, Libby, if you could go to Slide 51, and Jordan, if you're on, you can just start from there.

Jordan Hoellman will be leading this discussion. Jordan?

MR. HOELLMAN: Okay, thanks, Bill. I'm Jordan Hoellman, I'm a project manager in the Advanced Director Policy Branch in NRR.

Just to make sure everyone can hear me okay?

MR. RECKLEY: We can hear you.

MEMBER REMPE: Yes, we can hear you.

MR. HOELLMAN: Okay, thanks. I assumed so, just you never know.

So, this presentation today will cover the second half of the released Subpart H that covers manufacturing licenses, construction permits, operating licenses, and combined licenses.

Today I'll briefly recap a presentation we gave in September and cover some of the adjustments or notable differences in Part 50 versus the existing licensing processes. There --

MEMBER BROWN: Jordan?

MR. HOELLMAN: Yes?

MEMBER BROWN: I thought you were finished, I'm sorry.

MR. HOELLMAN: No, I am. I'm finished with this slide. Yeah, I was going to move to the

next. Go ahead.

MEMBER BROWN: Okay. I didn't hear the words certifications mentioned.

MR. HOELLMAN: Yeah, so, yes --

MEMBER BROWN: To me, that means the design certification process, the earlier design phase that you would get in a normal license application -- not a license -- well, whatever, a new plant application.

MR. HOELLMAN: Right. So for efficiencies in getting the first iteration of the rule language out, we actually split Subpart H into two separate releases.

The first release of Subpart H I think occurred in August and that included the design certification portion, early site permits.

MEMBER BROWN: I forgot that. Okay.

MR. HOELLMAN: And that was discussed in September. So --

MEMBER BROWN: I apologize.

MR. HOELLMAN: No, it's okay. And it'll come up I think on the next slide and as we move through the presentation, and probably impact -- you know, some of the things we've included in the second part of Subpart H will need to be reconciled as we

combine the two releases into one version.

So, if you have any questions, we can address them as we go on, but since we covered them in September, I didn't plan on really recapping all of that, but I did want to touch on a few aspects of what we discussed then.

MEMBER BROWN: Okay. That's just fine. I just obviously forgot. I apologize.

MR. HOELLMAN: Not a problem. I know it's maybe a little confusing how we split up this release, but it's something we'll need to consider as we reconcile the two parts here.

Okay. So on Slide 52, this is intended to represent the staff efforts to leverage and combine the existing licensing processes and integrate them accordingly in Part 53.

In September, we showed this figure and noted that the dotted lines indicate our proposal to allow a design certification to reference an issued operating license or issue a custom COL.

That would allow an applicant to leverage the staff's safety evaluation report and provide safety review finality.

We think that this will provide efficiency and that finality would be relied upon by the staff,

unless significant new information is present that affects the earlier determination.

So, Libby, I guess let's move to Slide 53. Okay, so this slide recaps ongoing activities that impact Subpart H.

As we discussed in September, there are several issues within Subpart H that are related to items being addressed by the Parts 50 and 52, lessons learned, rulemaking.

A full reconciliation between the two rulemakings will occur at a later date.

This first iteration of Subpart H reflects largely the current version of Parts 50 and 52.

The requirements for applications for licenses and other approvals have been tailored to match the Part 53 technical requirements.

Our goal in Part 53 is to not have any technical requirements contained only in the content of application sections, so we would, you know, include requirements elsewhere in Part 53 that then would be additionally captured in the content of application section.

This is a little different than how it happens in Parts 50 and 52, where some technical

requirements show up in the content of application section only.

And then I think we discussed earlier this year some guidance activity that's currently being developed under the industry-led technology inclusive content of application project, and the NRC-led advanced director content of application project, and these efforts will support the content of application sections of Part 53, and I believe there are topic-specific ACRS meetings scheduled in early next year or mid next year to discuss these efforts.

So, Slide 54.

Okay, so on this slide, I'm attempting to provide an overview of what we intend to adopt for a consistent for the content of application section for each permit or license type, and hopefully this will improve clarity in some portions here.

So, in general, we have the content of application sections set up into a content of application section for general information, a content of application section set up for technical information, and a content of application section set up for other application content.

In the general information section, we previously presented on Section 53, 1130, which

provides the equivalent of information in Section 5033 for general content applicable to all applications, and in each specific application section, under this general information, in some cases, we'll have, you know, requirements to supplement the information provided in 53 1130.

And some examples include financial qualifications for non-electric utility applicants.

In the technical information, this is where we're trying to set baseline equivalent information for both site and design information.

So in the site information, we'll say provide information equivalent to that required for the ESP, or early site permit, and in the design information, we'll say provide information equivalent to the design certification as a baseline, and then supplement that information per the specific application.

Where this becomes a little interesting is where we talk about the construction permit and recognizing that the level of detail available at the construction permit phase is less detailed or less mature than would be at the design certification stage, so we continue to consider what the role of the CP, and what it would look like in Part 53 with

respect to aspects of the application that are not fully yet developed.

And this includes the PRA and information related to planned research and testing activities that would ultimately need to be reconciled to support the operating license application.

CHAIR PETTI: So Jordan? Just a --

MR. HOELLMAN: Yeah?

CHAIR PETTI: I'm not sure where to make this comment.

As I read the Subpart H, just in the way that it was structured, that there was a lot of duplication of requirements under each of the, you know, whether it be an ML, a CP, an OL, or a COL, and so it seemed repetitive where the requirements looked to be identical or very similar.

And from a structural standpoint, you could reduce the number of pages by coming up with all the generic stuff, and then where things were different, break out, you know, the unique requirements for the different types of licenses.

Did I just have a bad dream, or is it duplicative in a lot of ways in the different sections?

MR. HOELLMAN: Yes, it is, and that's

something we recognized as we were going through the second part, and because we had already released the first part, we tried adding a little note in the discussion column to sort of try to point to areas where we thought we could reduce duplication by including things upfront, and we'll touch on that a little more on the next slide, but you're right, and we are looking into how to do that better when we merge the two parts of Subpart H together.

CHAIR PETTI: Okay. Thanks.

MR. HOELLMAN: Mm-hmm.

So then the last bullet on this slide is the other application content, and this would be things like the environmental report, technical specifications, ITAAC for COLs. Things like that would be captured.

And it would vary depending on the application type. So this is just the general format that we're trying to implement for each license type.

So I guess let's move to Slide 55, and we'll touch on Member Petti's comment here.

So, in the relationship between the subpart section, so this is a new section where we're -- intend to capture information from Part 52, the relation to other subpart section, as well as explain

the relationships between different licensing processes.

The inter-relationships for manufacturing licenses and construction permits is an area where we'll likely need additional discussions as we continue to develop the rule language.

We'll discuss this a little further when we get into specific portions of the presentation on manufacturing licenses and construction permits.

And then the second little sub-bullet there is addressing references, and then operating license application that were not included at the construction permit phase.

So, this is where we'll likely address how that can be done, and what that would look like in the content of applications, and then we're also considering, like Chairman Petti mentioned, including provisions for referencing an ESP or design certification at this stage, and these would be things like information that would not need to be submitted when a license application incorporates an ESP, or a manufacturing license, or a design certification because they would be incorporated by reference.

And this is I guess subject to whether the portion that's being incorporated by reference, you

know, it has to fall within the site parameters of the specific application.

So let's move on to manufacturing licenses on Slide 56.

We're using the term reactor module to define the part of the plant that is subject to the manufacturing license.

We're accommodating factory installation of fuel, but not criticality testing, and to allow this appropriate Part 70 licenses must be issued for transportation, storage, et cetera, of special nuclear material.

And the technical information, this is where we'll probably need additional guidance and discussions with stakeholders, and et cetera, but the interface requirements will be important for manufacturing licenses and to address how to make it workable for manufacturing license that references a CP or an OL since they won't have ITAAC.

Though in this iteration, our initial proposal is to track the ITAAC as technical requirements through a process such as conditions on a construction permit, and the reviews of the operating license application would then confirm that the conditions are met without introducing other ITAAC

processes from Part 52.

And another area of importance here is the deployment of a completed reactor module and the responsibilities of each entity in cases where a designer, a manufacturer, and an applicant could all be separate entities, so the deployment strategy for these various scenarios will be important to consider and guidance will probably be needed to get that right.

Dr. Rempe, I see you have a hand raised.

MEMBER REMPE: Sure. I'm not sure if you're done with this slide, but I had a question about Part 53.1247 and one of the comments.

It said that Part 53 might not address the back-end of the fuel cycle with respect to these modules.

In other words, if you don't address it, there's this potential for an accumulation of what might look like a parking lot of spent modules, and I thought that was part of NEMA.

I thought they explicitly said, you need to consider the whole fuel cycle, so what's this about?

MR. HOELLMAN: So I think what we're talking about here is it might be addressed through

something like Part 70, in the Part 70 space, or storage at the end of, or disposal. I --

MR. RECKLEY: Yeah, if I can, Jordan, this is Bill.

All we were trying to do is set some constraints on what this current activity is going to try to conquer, and so we can take the manufacturing license provisions from the factor to the site and storage at the site, but if it were to go back, let's say to a facility for refurbishment, or if it was to go to a waste storage facility, we think that would fall under a different part, and we're under discussions, you know, with both our transportation and waste site and NMSS to see if that can be addressed within the current regulations.

But largely, we just for self-serving reasons, to some degree, we needed to set some bounds on what we were going to try to tackle here.

It's not ignoring the issue, it's just that it might need to get picked up as another activity within another part of the regulations, and we're not likely to have that at this preliminary rule stage.

MEMBER REMPE: But again, I'm curious -- you're cognizant of the problem, we've brought it up

several times -- and I thought that it has to be addressed as part of NEMA.

And so, if you put, well, we're pursuing this as a revision to Part 70, then I wouldn't be asking this question, but the way the comment is is that it may not address this, so maybe having another sentence saying, nevertheless in accordance with NEMA, the staff will address this issue as part of this activity, or some activity.

Do you see what I'm saying?

MR. RECKLEY: Yeah, okay. Yeah, I do, and we can add some things like that.

There'll be other areas, quite frankly, that this first draft even at the proposed rule stage, may not fully address.

One is since we're in Subpart H, we don't address renewal, and I don't think we're going to get to it by the proposed rule stage.

That's just an admission, and so, some of those activities will get picked up, and it's a good point, Dr. Rempe, and we'll make a note that this isn't going to get lost in the mix, we're just not able to do it as part of the first effort.

MEMBER REMPE: So I've not looked at NEMA for a while, so correct me if I'm wrong, but license

renewal, I don't think the Congress folks thought about that, and I don't think it's called out in NEMA, but they did call out the whole fuel cycle, and I think that just not doing it because we didn't have time in this first stage is not going to satisfy NEMA.

That's my interpretation of it.

MR. RECKLEY: Okay. We will --

MEMBER REMPE: That's why I'm emphasizing it because I think it's something we should do. I know we don't with the current fleet, so, but I'd like to see that happen here.

MR. RECKLEY: Okay. Point taken, and we'll look into it. Go ahead, Jordan. Sorry.

MR. HOELLMAN: Okay, thanks Bill, appreciate that.

So the last bullet on this slide just touches on special considerations for factory fueling, and this is where we address receipt storage and loading of fuel into the manufactured reactor module, and required application content to prevent inadvertent criticality during various conditions, and when subject to potential hazards and human errors.

So Slide 57.

Okay, in 53 1245, this is the other application content section, we include provisions for

severe accident mitigation design alternatives for applications that include the installation of fuel and the reactor module at the factory, and severe accident mitigation alternatives for the factory itself.

53 1247 currently doesn't address the potential removal of the reactor module from the operating site.

This is what Dr. Rempe was noting, and we'll continue looking at that.

And this is another place where the interface requirements will be important, and that's related to potential license modules for the possible stages in the manufacture, transport, storage at the site, installation, operation removal, refurbishment, disposal of the reactor module, and this is the discussion we were just having.

So, on Slide 58, these 53 1249 is pretty much based on the Part 52 requirements.

One change to note here is we made that the holder of a manufacturing license may not begin manufacturing the reactor module less than six months before the expiration of the license, which is revised from three years in Part 52.

And that's generally due to the time expected to be able to manufacture these things, and

so, there's no questions, or --

CHAIR PETTI: I just, I look at that.

I think it sort of implies that they'll work on one reactor module and then another reactor module and then another reactor module, when in fact, they might have different, you know, locations in the factory, where they're working on the components and the subcomponents.

So, you know, I'm not exactly sure how one interprets that.

That just means that they can't stop anything new six months, unless they, you know, have their license extended.

I mean, maybe in practice it won't make any difference, but --

MR. HOELLMAN: Yeah, I mean, to be honest, this is one of the things that we're trying to provide a little assurance, that at the end of the day, the license doesn't expire and a whole bunch of money hadn't been building reactor modules that are then of no value.

CHAIR PETTI: Right.

MEMBER BALLINGER: This is Ron. Why is this even in here? This --

(Simultaneous speaking.)

MEMBER BALLINGER: That's the issue for the manufacturing. It's not a safety issue, is it?

MR. RECKLEY: Yeah, you're right. So we'll look at it because it is largely for that purpose. So.

MEMBER BLEY: Well, Bill when you say largely, what else are you guys thinking about?

MR. RECKLEY: Well, it ties into the timing of the expiration and the renewal, and again, we haven't really thought that much about the renewal, so.

But yeah, we'll take a look.

We largely took this from Part 52, the existing one, and like Jordan said, we paired it down, thinking the factory would be operating quicker than offshore power systems, which was the original derivation of this, so we pared it from three years to six months, but you all have a good point.

Maybe we just don't need it at all.

CHAIR PETTI: Yeah, I mean, you know, what -- the fuel vendors.

Do they have licenses that are just open-ended, or do they have to go through renewals, the guys who make fuel today?

MR. RECKLEY: No, there's a term to the

license.

CHAIR PETTI: There is? That model may, you know, may be better if you're going to keep it, you know.

MR. RECKLEY: Okay.

MR. HOELLMAN: Yeah. Okay, thanks. We'll continue considering these things.

So, on Slide 59 is where we get into construction permits.

This slide expands on some of the things I discussed earlier relating to using information equivalent to an ESP and design certification for site and design information for construction permits.

This is an area where we think we need to, you know, consider guidance, and I think some guidance is already underway because many aspects of the design will not be fully developed at the construction permit phase.

There will probably be plans for future research, analysis, test programs, experience that's required to demonstrate design features.

Our expectation is the completed design and plan future analysis will be expected to be available for and described in the final safety analysis report that supports the operating license

application.

In addition, the PRA will be inherently less detailed based on the design and information available at the time of the construction permit application, and it will be supported by a list of assumptions that will be verified or revised as the plant is built.

So the updated information end results will be expected to be described in the final safety analysis report, and like I mentioned, we understand that this is an area where we need to continue dialogue with stakeholders and, you know, guidance development to support this.

So Slide 60.

So this continues touching on construction permits, and so the staff continues to consider what the role of the construction permit will be in Part 53, including the interfaces with the other licensing processes.

And there are some expected changes expected in the design certification content of applications.

That's that 53 1235 section, and this is what is sort of referenced as our baseline for design information, and this will affect the remaining

licensing processes as we point to design certification as the baseline, as supplemented in that section for each licensing process.

And they're kind of listed here, but as we continue to, you know, reconcile the two parts we've issued so far, we need to continue looking at how these things, you know, fall out in the consolidated version of Subpart H.

MEMBER BALLINGER: This is Ron. Again, have you taken a look at what's been going on with the SHINE?

Construction and licensing issues where they have the staged construction and operational thing.

Building one module, then building another, then building another, to see if you could learn something from that process?

Because I don't think it's going so well.

MR. HOELLMAN: Okay. So I know we have folks on the team that have experience with the SHINE application.

(Simultaneous speaking.)

MEMBER BALLINGER: -- the guy in charge. Yeah.

MR. HOELLMAN: Yeah, exactly.

MR. LYNCH: Hey Jordan, this is Steve Lynch, acting chief of the Advanced Reactor and Policy Branch, and recent former lead project manager for the SHINE operating license application review.

Where that stands right now, we are still seeking additional information from the licensee on their approach to phased construction and operation, so that we can be responsive in our licensing to meet the needs of the applicant, and certainly any lessons learned from that experience we will apply as appropriate to the work that we're doing here in Part 53.

MEMBER BALLINGER: Yeah, I mean, I'm not talking about the nitty-gritty details, it's the process issues that may be coming up. You know?

MR. LYNCH: So, you know, as far as process issues, the big thing that, you know, we need to consider when doing -- and this is more applicable to a Part 50 process that has both a construction permit and an operating license as two distinct licenses that are issued -- is when a staggered approach is introduced but not originally contemplated at the initial licensing, we have to take a look at both the construction permit and the future proposed operating license that could be issued, and determine

what modifications need to be made, such that as construction is completed, one module as authorized by the construction permit, but the language in there matches up with what's in the operating license.

So for the SHINE review, that is the challenge that we are addressing right now, is if this was initially contemplated when we drafted the original construction permit, so we were considering, are there modifications to that construction permit that need to be made to match what is now being proposed for operation, and are there any conditions to the operating license that would be needed to, again, match back up with the construction permit?

And some of the --

MEMBER BALLINGER: I just thought there might be some lessons learned here. That's all.

MR. LYNCH: So yeah, lessons learned are certainly coming as we move forward, and I guess the point I was making here was that certainly some of the process may be smoother when up in the initial licensing and upfront we deal with anticipated construction versus trying to address it on the back-end.

So, that's something we would certainly take as a lesson learned upfront, is the sooner we

have information, the easier it is to respond to that in a way that is predictable, and certainly as we continue working with SHINE on this issue, we'll apply lessons learned. Thank you.

MR. HOELLMAN: Okay, thanks Steve. And obviously, you know, none of that's been incorporated into this first iteration of Subpart H.

So with that, I guess we'll move to Slide 61. Okay, 61 is on operating licenses.

Again, like the other licensing processes, this section includes the ESP and design certification as the baseline for application content and supplements it accordingly.

As I mentioned before, the final safety analysis report will need to include and update information provided in the preliminary safety analysis report submitted under the construction permit application.

And we're, you know, as Chairman Petti mentioned earlier, we are continuing to consider how to address references in the operating license application that were not previously included at the CP stage, and how we can sort of streamline that by including some of this generic information upfront in Subpart H.

So Slide 62 is on combined licenses. Again, this slide touches on the fact that we're trying to use the ESP and DC as baseline for application content.

In the combined license section, is where we include the provisions in sub-bullet 2 there, like DEF and G, that provide requirements that apply if a COL application references an ESP, an SDA, a design certification and/or a manufacturing license respectively, and this is another area where we're considering if this can be done more generically upfront, and that would apply to all license types.

And these are things that would be expected to be included in the application, but not necessary if any one of these is incorporated by reference, and everything falls within the site parameters.

And then I guess finally, you know, as we discussed in the beginning of the presentation, where we're trying to enable a process for an issued COL or a custom -- or an issued operating license, or a custom combined license could be used to support a future design certification and sort of, you know, increase efficiencies on the review of that process.

Slide 63 I think is the discussion slide,

so if there's any further questions or comments?

I know that these administrative sections sometimes, you know, sort of end up falling in place as the rest of the rule gets developed, and I think we expect that to happen, but also, like Member Brown mentioned at the beginning, sort of having them in two separate parts has created a little challenge in seeing the entire picture at this point, but I'll stop.

MEMBER DIMITRIJEVIC: This is Vesna. I would like to make a comment, that, you know, as you discuss with Ron on his comment on using experience from the SHINE.

You know, I was thinking that using experience also for the advanced reactor design certification, and variables was not as the some flow -- information is not clear how it flows, and how we'll process to the operating license, or you know, before the full load license.

I know there is struggling some of our reviews and these, and since I am PRA person, I'm mostly talking about the PRA, how would the PRA inputs be, you know, led to the end when the variable information is changing through the stages?

So, I was thinking the lessons learned

from the design certification for advanced reactors could be definitely used in this process, you know.

And also the PRA in the Part 53 is much more dependent than on location, the PRA requirements as presented so far in Part 53 seems to be very strong and dependent on location because of the level 3 results require an Fc curve, so it may not make sense to have a PRA in the design certifications whereas in the combined, you know, operating license and things like that.

You know? PRA inputs to the different programs, and how they change through time. So, that was just my comment.

The lessons which we have learned in the design certification so the advanced reactors could provide useful inputs.

MR. HOELLMAN: Yes, thank you. I agree.

I mean, I think we'll continue looking at the experience we gained from all the other activities going on and try to incorporate them into the Subpart H here, I think as we continue iterating on the language, and I think this is something I sort of mentioned earlier.

As the language continues to be iterated on, the Subpart H administrative sort of content of

application stuff should fall into place a little more cleanly.

CHAIR PETTI: Members, any other comments?

(No audible response.)

CHAIR PETTI: I'm not hearing any. I guess you're done, Jordan.

MR. HOELLMAN: Okay. Thanks a lot everyone.

I don't know if I'm turning it -- I don't know. Chairman Petti or Bill, I don't know who to --

(Simultaneous speaking.)

CHAIR PETTI: Bill, what do you --

MR. RECKLEY: I propose that we come back at -- I mean, we were scheduled to break at 1:00 anyway, so -- and you had a member -- and our staff are really prepared to come back at 2:00 our time. So.

CHAIR PETTI: Sounds good.

MR. RECKLEY: Okay.

CHAIR PETTI: So, let's be in recess until 2:00 Eastern. Thank you, all.

(Whereupon, the above-entitled matter went off the record at 12:43 p.m. and resumed at 2:00 p.m.)

CHAIR PETTI: Let's begin again.

Bill, who is going to lead Subpart F?

MR. RECKLEY: Hi, Dave. Yeah. This is Bill Reckley. I'll just introduce -- Olivia, if you want to go to the next slide.

Again, in the context of what we're talking about, this just reiterates the whole -- the whole structure. And as I mentioned this morning, you know, the safety of plant and plant operations is ultimately determined by the plant and the hardware, the people and the programs that tie things together. And today we're going to talk about that -- that people part that we largely address within Subpart F.

So --

MEMBER BLEY: Bill?

MR. RECKLEY: Yes, Dennis.

MEMBER BLEY: Yeah. Just something -- you folks are probably going to talk about this. But when you get to the part about certified operators, if you could give a bit of an introduction laying out what's pushed to this and what the real goals are, it would be helpful.

MR. RECKLEY: Okay. I'm getting ready to hand it off to Jesse, but I'll make a note, and I'm sure when we get to that part we'll provide a bit of an explanation to the -- to what motivates it and what our thinking -- what our thinking is.

So with that, we can go to Slide 22, and I'll turn it over to Jesse Seymour from our human factors area to talk through the preliminary language that we released and provided to the subcommittee.

So Jesse?

MR. SEYMOUR: Thank you, Bill. I appreciate it. I don't actually see Slide 22 up. Do others see it displayed currently?

CHAIR PETTI: Yeah, I do.

MR. RECKLEY: Yeah.

(Simultaneous speaking.)

MR. SEYMOUR: Okay. So I'll go ahead and I'll start presenting, but what I'll do is on each slide I'm just going to confirm, you know, the slide number that we're on at the beginning of the slide. Okay?

So with that being said, my name is Jesse Seymour, and I'm a human factors technical reviewer and operator licensing examiner in NRC's Office of Nuclear Reactor Regulation. I'm one of the staff members who developed the preliminary proposed rule language that we'll be discussing as well as the related White Paper on risk-informed, performance-based human system considerations for advanced reactors that was issued earlier this year.

My White Paper helped -- helped to inform the development of this rule language.

As background, key drivers behind the White Paper were a recognition that the regulatory framework for advanced reactors should be capable of addressing novel operational concepts for a wide variety of advanced reactor technologies. Additionally, we recognize that some advanced reactor designs may present very low radiological risk and requirements, and the regulatory framework for operational large light water reactors may be unnecessary for reasonable assurance of safety.

Also, we recognize that the development of a risk-informed, performance-based, and technology-inclusive framework that appropriately considers the role of humans and human system integration is warranted for advanced reactors.

Today's presentation will follow along the general structure and content of our preliminary ruling, which -- and for the sake of time, I'll only be summarizing a number of the areas involved.

And so if we can move on to Slide 23, please?

Okay. To begin with, we'll start with an overview of the structure and content of the Subpart

F ruling, which is what we're discussing today. The sections that we'll be discussing today are located at 53.750 and go through the 53.799 portions, and it's divided up into four subsections at present.

And just to go through and explain what those cover and just some of the general highlights, 53.750 through 759 covers general requirements that apply to all operator operating license and combined operating license applicants and holders under Part 53.

Within the subsection, two key sets of requirements are located at 53.750 -- I'm sorry, 53.753 and 53.755, respectively. First, 53 --

MEMBER BLEY: Jesse?

MR. SEYMOUR: Yes.

MEMBER BLEY: May I interrupt you? Since you jumped to that one, why have -- this is just something to alert you. 750, 5-0, Item (a)(2), I think you have a typo in there that you want to correct. It says, "Combined licenses for commercial plants under this part who do not meet the criteria provided under 755(b)," and down there it says, "who do meet," and that's what you really mean. So you have a contradiction in there. That's all.

MR. SEYMOUR: I appreciate that. Thank

you.

MEMBER BLEY: You kind of gave me a heads up on your background, but I was going to ask you who the operations experts are who helped in this development. Are they former licensed operators? Are they people who have done, as you talked about, testing? Or can you give us a little background on them?

MR. SEYMOUR: Certainly. So, again, I've introduced myself before. I'm a former, you know, Navy nuclear operator, a former commercial senior reactor operator and shift technical advisor, and a former operator licensing examiner. Currently, I work as a human factors technical reviewer.

The other folks who are involved in key roles in the development of this language include Theresa Buchanan and, you know, she is an experienced operator licensing examiner with the agency. Additionally, we've had Marin Sheetz, Lauren Nist, working on the product as well. They are both operator licensing examiners and individuals who are experienced with human factors. Additionally, they were both formerly commercial instructors and Navy nuclear officers as well.

We also have Dr. Brian Green, who is an

expert in the area of human factors, and also Dr. David Desylers. So, collectively, you know, that has formed, you know, the key membership of our group as we work through the development of this language.

MEMBER BLEY: Thanks, Jesse. That helps me. Okay.

MR. SEYMOUR: Thank you. So continuing on with the overview, the 53.753 section -- and, again, I'm just going to hit the highlights for right now; we'll talk about these in more depth -- they address technical requirements for operating license and combined license applicants.

And these include human factors engineering design requirements, human system interface design requirements, concept of operations, functional requirements analysis, and function allocation requirements, staffing plan requirements, licensed operator and certified operator programmatic requirements as well.

53.755 addresses certain conditions of licenses for operating license and combined operating license holders, and these include provisions for not using licensed operators at all, and also provisions for load thawing. And, again, those are just highlighted areas that I want to call out here at the

beginning.

Other subsections include 53.760 through 769, which covers the operator licensing requirements, and this includes training, examination, requalification, and simulator requirements. Separately, 53.770 through 779 covers operator certification requirements. And then, lastly, the 53.780 through 789 section covers general training and qualification requirements.

If we can move on to Slide Number 24, please?

Okay. So we'll begin our overview with the 53.750 through 759 section. This section fulfills a role similar to certain aspects of the 50.34 Foxtrot post Three Mile Island requirements, the 50.54 conditions at license requirements for facilities, and, additionally, the Part 55 operator licensing requirements.

So, again, you know, this section does not duplicate those requirements, but it incorporates elements that are similar to what we found over in those portions of 50 and 55.

However, a major difference from the current regulatory framework is that the requirements established in areas of human factors engineering

staff and operator qualification within this preliminary Part 53 ruling, which are now directly linked to design-specific safety functions and the fulfillment. And I'll explain what is meant by this at a high level.

First, human factors engineering is required where needed to support safety functions versus being generically applied to a control room.

Second, operator staffing is required to the extent necessary to support design-specific needs for safety function fulfillment versus relying upon a prescribed number of reactor operators and senior reactor operators.

And, lastly, the fundamental role of the licensed operator centers around the management of -- the management and fulfillment of safety functions in addition to the manipulation of facility controls.

If we can move on to Slide 25, please?

Okay. So beginning with Section 53.750 -- and, again, you know, some areas that tend to parallel existing requirements, I'm just going to, you know, highlight, you know, very briefly to go through -- and I place greater focus on areas of greater change and that are more substantively different than what we currently see in Parts 50 and 55.

So Section 53.750 contains applicability and definitions, and Sections 751 and 752 parallel certain existing requirements. While much of this content is administrative in nature, it should be noted that this preliminary rule language introduces some new definitions that are necessary to support various aspects of what is covered here, such as load thawing.

Section 53.753, that require operating license and combined operating license applicants to develop, implement, and maintain specific measures to ensure that human actions needed to fulfill safety functions prevent or mitigate licensing basis events, or otherwise meet safety criteria, are satisfied.

Those measures are covered under Requirements A through G, which we'll go through now.

A is the human factors engineering design requirement and is performance-based. Under this requirement, facility designs would need to reflect the state of the art in human factors engineering principles for the same kind of reliable performance in all settings that human activities are expected for performing or supporting the continued availability of plant safety or emergency response functions.

Guidance for reviewing this

performance-based human factors engineering requirement in a scalable manner is currently being developed by the staff via interim staff guidance. And what I'd like to highlight here is that if we look at the existing post-TMI requirement for human factors engineering, that requirement focuses on the application of the state-of-the-art human factors engineering to the control room.

So with this requirement, what's important to note is that it's now linked to where the human touchpoints are for fulfilling safety functions and for maintaining plant safety functions, irrespective of where they are located at.

So instead of taking the human factors engineering requirement and applying it in a blanket manner to the control room, what we do is we now apply it to where those -- where those areas of safety are actually located at, where people are going to be, you know, controlling systems, and so forth.

So, you know, where this gets to be important is it's now neutral with respect to whether or not the plan has a conventional control room, because even if the plant lacks a, you know, traditional control room, the requirement would then essentially extend out to wherever those control

systems are located at. And that can include, you know, anything up to and including a portable device or anything like that.

So, again, it's a performance-based requirement, but it's applied in a more flexible manner that is now neutral with regards to an advanced design that may potentially not have a control room.

If we can move on to Slide 26, please?

Okay. So Item B contains the human system interface design requirements and requirements facility designs to provide for the following to support operators in monitoring plant conditions and responding to plant events.

And these design requirements include -- and I'm just going to step through and highlight these -- first, features for explaining to operators a minimum set of parameters that define the safety status of a plant, and that is similar to, you know, the safety parameter display systems that we see in current plants.

However, in this case, it is important to realize that the language is more flexible, in that it doesn't mandate that it needs to be a distinct display like we have conventionally seen that can be incorporated into, you know, the HSI in a more

integrated manner. And the language that we use is actually comparable to what is being considered for the 50.52 lessons learned rulemaking that's ongoing.

The next item is automatic indication of bypassed and operable safety systems status. Next is direct indication of SSC status that relates to the ability of the SSC to perform its safety function. And what that looks like in practice, you know, common examples of this, would be relief and safety valve position for barriers where heat synch cooling system status are involved.

So, again, if we're talking about a pressurizer relief valve or key component like that, those would be the types of things that would fall within that scope.

Next is instrumentation, to measure, record, and read out key plant parameters related to the performance of SSCs and the integrity of barriers important for fulfilling safety functions. And examples of that would be, you know, temperatures and pressures associated with core or fuel systems. And, additionally, you know, indications that would be reflective of cooling system status.

Next, radiation control and detection in the design of systems of passthrough barriers to the

release of radionuclides. And here specifically what we're talking about are systems, structures, and components that penetrate containment structures that may contain radioactive materials.

And the last item here is the monitoring of in-plant radiation and airborne radioactivity, as appropriate, for a broad range of routine and accident conditions.

MR. HALNON: Jesse, Greg Halnon. Quick question. The third bullet, direct indication of SSC status, are you trying to direct the type of indication or how the indication is displayed? In other words, are you trying to get -- like you mention relief valves. Are you trying to get some kind of positive indication of relief valve status, or are you trying to get a picture of where the relief valve is to the operator?

I don't know if that's clear, but I'm trying figure out if you're trying to determine hardware or we're just trying -- it's just an indication of the shear.

MR. SEYMOUR: So this is -- this is aimed at, you know, getting the information on the state of that component to the operator. And I appreciate that comment because, again, one of the things that we're

looking for feedback on are, you know, areas where we potentially lack clarity.

So, again, I'll make a note of that. But, again, the key thing that we want here -- and if we think back to the Three Mile Island accident and, you know, really the intent behind, you know, many of the post-TMI requirements, it was to get, you know, clear and easily understandable information about the state of important components to the operators.

So really here what we want is, you know, is this valve open or closed? We want that information in some readily understandable and reliable, you know, manner presented to the operator.

MR. HALNON: Okay. As opposed to a demand signal like there was at TMI.

MR. SEYMOUR: That's right. And, you know, again, this is a place where, you know, the clarity of the wording and the guidance that is provided, you know, is something we're sensitive to and communicating the right intents, because there is, you know, other indications that are involved besides the -- you know, just the status of the valve, you know, tailpipe temperatures and other things that are confirmatory that factor into that as well.

MR. HALNON: Okay. In the scope of this,

you mentioned, you know, it's pretty high level from the standpoint of safety-related, safety function-type stuff. There's a lot of things that operators do that induce pain on themselves. How deep do you go in this?

I mean, I'm not sure I -- how to even ask the question, but, you know, if you go back to the TMI, the whole transient started on the secondary system in a very -- you know, in an air system, condensate system. I mean, how far down into the -- are you asking the operators to have this?

And the same thing with the human factors engineering. If you're just looking at safety functions, where the rest of the plant, depending on how complex it is, could induce additional issues into a transient that can make it worse.

So I guess throughout this I am going to be kind of probing around that point on, you know, just sticking with the safety function portion of this. With so much else in the plant that can induce pain and suffering on the operators, that could actually make the transient worse.

MR. SEYMOUR: Yes. And that's a -- that's a great point. I think when we get into the training requirements, we'll see where, you know, we'll hit

upon other -- other aspects of that.

MR. HALNON: Okay.

MR. SEYMOUR: And when we get into training, what we'll see is that, you know, there's a heavy reliance upon a systems approach to training, and also the need to ensure that, you know, operators have the required knowledge, skills, and abilities to perform the job, right, you know, and incorporated both into the training program and into the examination process.

And one of the -- one of the key things in how that is developed is through task analysis, right? And also, when we look at human factors engineering and how -- how that process plays out, task analysis is a key factor there. And what -- what that begins with is, you know, looking at, you know, the functions that have to be performed.

You know, and again, you know, while we talk heavily about, you know, safety functions, you know, really, that process does involve the full range of functions that are performed, you know, for the job. And ultimately what you're doing through those two processes is you are, you know, designing the control systems that need to be used. But also, what you're doing is ensuring that the people using those

control systems would have the, you know, knowledge and abilities to do that.

So a good task analysis should, you know, drive ensuring that, you know, people have the abilities and the controls to address, you know, the full scope of the job. But, admittedly, you know, a wording does -- it does gravitate to the -- you know, the safety side of things, right? So --

MR. HALNON: Right.

MR. SEYMOUR: -- focusing on -- oh, sorry.

MR. HALNON: That's okay. Let's -- we can move on. Let's revisit that discussion when we talk about the scope of limited versus full scope simulators. That may be applicable there as well. So we can move on to the next --

MEMBER BLEY: Well, not completely. Jesse, Dennis Bley again. Since you brought it up, and it's repeated over and over and over again throughout this part of the rule, the systems approach to training -- and you gave a pretty good description there that was a lot better than -- and so the only place it's defined in here is in the last definition with five bullets, and probably the low keys are the first couple.

It's a pretty thin explanation of what the

systems approach to training really means, and it sounds a lot like what we've been doing all along. So I'm -- can you say anything more about that, or is there any -- do you have any guidance documents that really explain what you're talking about here by a system approach to training?

MR. SEYMOUR: Yes. So when we -- when we go through and we talk about systems approach and training, you know, generally what we see in the -- in the definitions, you know, just kind of affects the high-level steps, right? And it's a five-step process, you know, and we refer to it, you know, as ADDY. You'll hear that term used sometimes.

But essentially what that process goes through and does is it starts with identifying the job requirements, and then what you do is you move through -- you know, there's the door open into the task analysis that pulls apart that job and figures out what the discrete things are that people need to do that then, you know, develops, you know, the discrete knowledge and abilities that are associated there.

MEMBER BLEY: Can I interrupt you?

MR. SEYMOUR: Oh, yes.

MEMBER BLEY: I kind of know what you mean, and I know you know what you mean. But if I'm

a new potential applicant, I'm not sure I know what -- I would know what you mean. That's why I was asking, is there anything that points out to people how they do this systems approach to training.

MR. SEYMOUR: So what we -- what we currently, you know, have are, you know, documents that do address that. And I'll preface this by saying that, in general, what we see with the large light water reactor fleet that's out there now is that, you know, there is, you know, currently, you know, the tendency to go through the INPO accreditation process.

And what we do is we see that INPO accreditation as being an acceptable means of meeting those, right? So there are certain aspects that, just as a present practice, that we don't normally get into in terms of reviewing that SAT-based process.

However, you know, we do have documents that, you know, can be used for guidance, and a key one is NUREG-1220. So NUREG-1220 is one of our primary guidance documents that, you know, goes through and, you know, provides a discussion of the SAT process.

Additionally, when we get into inspection space, and we encounter issues where we have to take a -- you know, a deep dive, if you will, on the

training program and actually look into aspects of that.

Inspection Procedure 41500 provides another source of guidance as well.

But that being said, one of our guidance development projects that is currently ongoing is refining our guidance that's available with regards to SAT-based training programs and their review, because one of the things that we have to account for is the possibility that an advanced reactor designer may opt to not pursue INPO accreditation, in which case, you know, we would, you know, perform the, you know, direct review and approval of that SAT-based training program as well as the ongoing inspection thereof.

Again, you know, we don't have any intention of, you know, not allowing for INPO accreditation under, you know, these processes that we're describing. So, again, you know, that's an initiative that would be left, you know, to INPO, obviously the licensees, and so forth.

But, you know, we don't have any intentions to not allow for that. But what we have to be prepared for is the possibility that, you know, if someone doesn't go that route, that we need to go ahead and review. So what we're doing is we're

looking to improve our guidance that we have to make it more readily available. But, of course, those are the primary guidance documents we have.

MEMBER BLEY: Thank you. You just brought up something I was going to ask you about. I mean, all of the current 2:24:54 are members of INPO, and the driving force, at least in the beginning, was if you wanted insurance you have to do that.

And if I'm a new designer and really believe my own hype that nothing bad can happen, maybe I decide I don't need that -- either of those two things, and that -- that's something NRC hasn't really been involved in in quite a few years. So that will be interesting.

Go ahead.

MR. SEYMOUR: Yes. No, it's a great point, and that's exactly why one of our -- one of our guidance projects that is currently ongoing is to revisit that guidance and, you know, to look at it and to, you know, make sure that it's going to be, you know, the product that we need when we need it on the terms of, you know, having that guidance ready to go, because, again, you know, some of it was developed, you know, quite some time ago.

But one thing I will say real quick, and

then I'll get back on topic here, is that, you know, when it comes to the system approach to training, there is a wealth of information out there in terms of, you know, IAEA documentation and other sources, too, just because of the breadth of organizations that use that. It's very heavily used within the Department of Defense and other applications as well. So that does provide a very deep, you know, kind of resource base to, you know, draw guidance from.

So --

MR. HALNON: So before you get back on topic -- this is Greg again -- the INPO approach, which is actually labeled a systematic approach to training, the INCAN documents, as I read through this, I don't see an encouragement to go that direction based on the -- you know, going through the process several times with INPO.

So if that's one thing you want to encourage, you might look at your language to help encourage that. It's really not -- when I read through it, I didn't get that feeling that it would be something that as a designer I would want to go through.

MR. SEYMOUR: I appreciate the insight. That is something that, you know, we have been

discussing in terms of the extent to which our language should speak to that. And, again, I'm going off memory, but I believe in Part 55 I -- I think what we do is we essentially outline the, you know, requirements and then --

MR. HALNON: Correct. It's in there. There is a definition of systems approach training. Just pointing out two things, one, it's not the same thing. It just labels what an employee uses. But it's also much simpler to go through that process, I think, at least from a guidance perspective in the ACAP process, although there is a lot of peripheral benefits in being an INPO member as well.

MR. SEYMOUR: Yes. You know, something that -- you know, again, that we've discussed is the, you know, correct location for that, you know, discussion of INPO accreditation being an acceptable, you know, way to go about doing that.

And currently, you know, we have documents like our memorandum of understanding with INPO where we -- we go through and do discuss that. But, again, it is something that we're sensitive to, and we have we have had some discussions about, you know, how the language should be worded in that regard.

MR. HALNON: Okay.

MR. SEYMOUR: So if we could go ahead and move on to Slide Number 27, please?

Okay. So Item C would require an applicant to provide a concept of operations, and this concept of operations would need to describe a number of items. And as I go through these items, what I'd like to point out is that these are, you know, pieces of information that would be extremely helpful to us in a very, very broad sense for understanding a novel design, and also for understanding the human role within the context of the novel design.

So, again, historically, we have not required a con ops, as we often refer to it, to include it as part of a, you know, application. But a big -- a big driver here is that when it comes to many of the concepts that are articulated here, we, you know, generally have a good understanding of that, you know, at the front end for a large light water reactor just through decades of experience.

With an advanced reactor, many of those, you know, assumptions may not hold true. So, again, you know, having this information helps us to implement other parts of the process as well.

So the items, again, I'll go through and list them, facility goals --

MEMBER BLEY: Sorry, Jesse. I just want to jump in with one more quick comment. I pulled NUREG-1220 off of the shelf to look at it, and I had forgotten when it came out. It's 30 years old now, and there has been an awful lot of revisions in the way we think about things, to some extent how we operate, and certainly how control rooms are designed and have happened in the last 30 years.

And I'm just thinking maybe that's not quite recent enough to be what we need, but I didn't go through the details of it yet to see if that matters.

MR. SEYMOUR: Going back to my earlier comments on it, that's something that we recognized, you know, early on in this as well, too, and that's why, you know, I point to those as -- you know, that and Inspection Procedure 41500 as being, you know, some of our existing documents that primarily deal with those topics.

But we also recognize the need to do an update and to, you know, gather things together into a better and, you know, more updated guidance document.

So, again, you know, our current guidance development projects that we have -- you know, the

primary one right now is supportive of the tailored operator licensing examination process that we'll discuss here shortly. But we do have a secondary effort underway as well, too, and that is aimed at developing, you know, updated guidance for the review of the starting programs, because we had a very similar observation when we pulled NUREG-1220 off the shelf.

MEMBER BLEY: Okay. Thanks.

MR. SEYMOUR: Okay. So, again, just going down this list earl quick, facility goals -- the roles and responsibilities of personnel and automation that are responsible for completing plant functions.

Staffing qualifications and training -- the management of normal operations, off-normal conditions, and emergencies, the management of maintenance and modifications, and the management of maintenance inspections and surveillance tasks.

So, again, this would provide us a high-level overview for how these items would look at, you know, a novel design. And, you know, this potentially could reduce the need for, you know, future requests for additional information, and so forth. But also what it does is it provides us with a good common understanding of, you know, the big

picture as we get into some of the more detailed aspects of what this review would look like.

So, next, Item D, and this is -- this is entirely new within what we've had in the regulation up to this point. D would require a functional requirements analysis and function allocation to be provided. And what those two items are comprised of, they are taken from, you know, the human factors engineering process.

But, again, they're profitable tools within the context of a novel design, because what the functional requirements analysis does is it describes how design-specific safety functions are satisfied. So starting with the actual plant goals, and specifically the plant goal for safety, what it does is it descends through and looks at the specific safety functions for that plant, which, again, for an advanced reactor, you know, maybe there's -- maybe there's three or four, you know, again.

If you're talking about something like a high-temperature gas reactor, those safety functions look much different than a large light water. And what it does is it decomposes those down into who or what is actually satisfying them, and that's what the second item gets to. So the functional -- the

functional allocation would then describe how the safety functions are assigned to, you know, combinations of human action automation, active safety features, passive safety features, or inherent safety characteristics at the facility.

And ultimately what this does is it gives you a clear picture of, you know, who or what is satisfying those safety functions. And not only does it paint a picture of whether people or machines or performing those safety functions, but also, if you're talking about things like active safety features, it helps you to gain an understanding of where the human role as a -- as a backup to an active feature at work or defense-in-depth may lead as well, too.

If we can go on to the next slide, Slide Number 28, please.

Okay. Item E would require a description of the program to be used for the evaluation and application of operating experience.

Item F would require a staffing plan describing the numbers, positions, and qualifications of ROs and SROs. So, again, reactor operators and senior reactors operators, or, as applicable, certified operators, if that's the case, across all modes of plant operations.

So the staffing plan that's described here, this is -- this is a significant change from what we currently do under 50.54. And what we are doing here is building to a flexible staffing requirement that we will see later on in this language.

So initially what is required is a detailed staffing plan. And as we'll see, in the case of plants that require licensed operators, this plan would be supported by human factors engineering-based analyses and assessments.

So what would be happening here is that a plant would be providing a staffing plan for, you know, the number of licensed operators in their positions and roles, and then supporting why that number and why that alignment and complement is adequate for their design using human factors engineering analyses and assessments.

So what does this look like compared to the existing practice? Well, right now what we do is we provide a prescriptive staffing number via 50.54, and then if plants want to get an exemption from that, they go through the NUREG-1791 process. NUREG-1791 then relies upon human factors engineering analyses and assessments to determine whether or not the new

number that has been come up with is adequate or not.

So, really, what we're doing here is we're just starting from a standpoint that is flexible and performance-based and using that same process to come up with a number. Not quite exactly the same, but a very similar process. In fact, the guidance that we're developing to support this is in the form of interim staff guidance that augments NUREG-1791 and will borrow from those -- from those same tools.

So, again, ultimately, you can end up in the same place supported by the same evidence, but we're just not starting from a prescriptive standpoint to get there. And we'll see the actual staffing requirement language a bit later on.

MR. HALNON: So, Jesse, this is a Greg. A couple just "looking into your head" questions. Part of the licensing basis is a living program, living plan, one that -- maybe that our licensee control a change, or is it something that is hard-fast NRC stamp of approval and don't change it?

MR. SEYMOUR: So we see this as being the latter category to where a license amendment would be needed to make modifications that reduce the -- you know, the number of people or the qualification. And we're still -- we're still working on refining the

language to control that. Right now we are tried to Subpart I's controls, which the wording has, you know, kind of changed for that subpart, so we need to, you know, control that in a different way.

But our ultimate intent there is to have that number controlled so that anything that would, you know, reduce numbers, you know, anything that would diminish qualifications, anything that would, you know, lower the bar so to speak, would have to go through the license amendment process.

MR. HALNON: Okay. Anything expected as a minimum requirement plan? So how does this relate to the part -- or Section C above the con ops?

MR. SEYMOUR: The two are not -- they're not quite the same, and yet they're not completely -- they are somewhat intertwined. So what we would expect for C is a higher level, you know, discussion of staffing qualifications and training, you know, in a very broad sense across the -- across the organization.

When we drill down to F, what we would expect at that point is something more detailed because, really, the central theme of F is that we're looking at the operations organization.

Now, and I'll get to -- I'll get to the

other roles that we talk about here as well, too, because, you know, we do ask in F for information about, you know, support roles and functions that are being provided in areas of radiation protection, chemistry control, fire brigades.

And we do that for a few reasons, but the key reason and the one that I really want to highlight here, and a way that this is different than C, is here what we're looking at is, you know, what type of support is being provided to the operators?

And also, if you are at an advanced reactor facility, it's possible that roles are being combined into new positions in ways that we haven't seen before. So it's possible that if you have a staffing complement that's very small -- a microreactor -- perhaps the same person is both an operator, a radiation protection technician, and a maintenance technician, they are wearing all three hats.

So, you know, if we want to fully consider whether or not the operations complement is -- is adequate. What we need to understand is, is your reactor operator also wearing the hat for other responsibilities?

So if you get into an emergency situation

where they have to perform an action, is there going to be a concurrent responsibility for them to go, you know, evaluate, you know, radiological conditions elsewhere in the facility?

MR. HALNON: Okay. They would need to see both of them next to each other to be able -- in order to make an assessment.

MR. SEYMOUR: Yes. Exactly.

MR. HALNON: Okay. Last question. Do you anticipate for first of a kind there might be an additional layer on this, or are you looking at -- we'll go back to the operating experience and lack of personnel in these plants. And I'm just curious what you're thinking on first of a kind.

MR. SEYMOUR: So this has been an area that we have talked about quite a bit. It is a question that, you know, we still continue to work through, and we're definitely receptive to feedback on it.

One alternative that we have considered is, you know, the possibility that where uncertainties may exist on a pilot build of a plant, that may be warranted to impose a more restrictive staffing requirement for some period of time that could then be relaxed. So that maybe, you know, perhaps having an

extra individual on the shift, you know, through, you know, the first fuel cycle or something like that.

That is an alternative that we can do in, you know, the licensing of that facility, and that could potentially be a way to offset some of the uncertainties that are there.

But, again, you know, that's not specifically mentioned within the language that's here. It's something that we've discussed, you know, outside of the wording.

MR. HALNON: Okay. Thank you.

MEMBER BLEY: Jesse? I'm sorry. Are you done?

MR. HALNON: Yeah, I'm done. Go ahead, Dennis.

MEMBER BLEY: I wanted to jump in with three quick things. One, do you think you folks will be bringing that ISG to us to see as you go through this whole process? I hope so.

MR. SEYMOUR: So, you know, and actually, Bill, I will, you know, ask if you have anything that you want to add on here with regards to process.

MR. RECKLEY: I'll just say that is part of the normal process is to offer it to you, Dennis.

MEMBER BLEY: Thank you. A comment about

your discussion with Greg about C versus F. And I think it all comes out in the wash kind of in one application we reviewed, when you got to the con ops part it was, in my opinion, content-free. But then they covered everything over in the human factors engineering. So I -- but I suspect that means that the guidance isn't clear enough for people to know where to put things, but I don't think that matters too much as long as it all gets covered.

And now a really quick question. A little bit ago you told us the inspection manual number, and I think I wrote it down wrong. I thought you said 4500, but I don't think that's right.

MR. SEYMOUR: Oh, no. It's going Inspection Procedure 41500. So it's IP 41500.

MEMBER BLEY: Thank you. Okay. That's it from me.

MR. SEYMOUR: Okay. So --

MEMBER BIER: Excuse me. I have a couple of quick questions or comments as well on this slide. This is kind of related to the idea that, you know, any significant staffing changes would need to be brought back as license amendments. And it's not directly related to this because it doesn't concern, you know, a license amendment for a specific plant.

But if you're looking at the kind of situation where, for instance, a licensee could get approved that, yes, it's fine for one operator to manage 12 plants, or whatever it happens to be, has the staff thought about how they will review subsequent requests? Because if you have five or 10 years of operating experience with 12 plants, you may say, "Hey, everything has gone swimmingly; now we can do 24 plants," or whatever.

And, you know, on the one hand, yeah, you have evidence that the 12 was okay. On the other hand, you know, if you keep going with that logic, eventually you will keep going until something fails and is not okay. So I realize this is kind of a tangent from what you're talking about here, but I just wanted to see if you -- if the staff has thought about that issue yet or any thoughts of how you might deal with it.

MR. SEYMOUR: Our current perspective on that -- and it's a great question because especially when we're talking about, you know, modular designs or micro reactors where, you know, the capability to just keep adding units is there, our current perspective is that we have a very robust tool for doing those types of analyses with NUREG-1791.

And, again, NUREG-1791, you know, it was developed for a different premise. It was developed to look at staffing exemptions, but its methodologies are very robust because, you know, ultimately what it's going to do is go through, you know, essentially, you know, a multi-step process, including -- you know, including validation work that's done.

And, you know, the types of things that you'll see within there, you know, are things like, you know, staffing plan validation activities, and so forth, you know, the implementation of that, so things that we would expect to see would include, you know, simulator scenarios where you actually, you know, put people into high workload situations and make sure that, you know, important tasks can still be carried out, and that the staffing is adequate.

So what we would expect is that if a license amendment was submitted that would, you know, change, that we would ultimately be going back to that same kind of guidance to review, you know, the acceptability.

It does, you know, raise that question. Again, I'm sensitive to, you know, point that you made there that, you know, eventually, you know, if you just keep extending that out forever, you know, what

types of unknown unknowns are you building into the equation? And, you know, again, that is -- it's an excellent point.

You know, right now I think NUREG-1791 really represents the state of the art in human factors engineering for how we would answer those questions because it's performance-based.

So, but that -- you know, to answer the high-level question, I would see those license amendment requests going back through a 1791-type process to determine their acceptability.

MEMBER BLEY: Okay. Dennis. One last thing. I took a look at the inspection procedure, and while it's not quite as old as the NUREG, it's pretty close to the same date as, you know, that. But I think you gave us enough of an indication of how you're trying to bring these up to date.

MR. SEYMOUR: Thank you. I appreciate that, and that is a -- that is an ancient document. So -- okay.

So continuing back on with the bullet points here, so -- additionally, so facilities that will require licensed operators will also have to describe how their proposed licensed operator staffing would be sufficient to provide assurance that plant

safety functions can be maintained. And we discussed how we would, you know, want to see that supported by each of the analyses and assessments.

And, additionally, we talked about the guidance project that we are working on to that effect.

So if we could go ahead and move on to Slide 29, please?

Okay. So now a point that I'll discuss that is not explicit in the rule language, it is something that we included in the discussion column of the preliminary version that was released publicly.

So while not addressed by the staffing plan requirements discussed here, it is important to note that at present the staff preliminarily did not intend to require the shift technical advisor position for Part 53 applicants.

And just to go through and explain, you know, the overall basis on, you know, why we're proposing that and how we got there, what I'd like to do is just talk about the background on why -- why, you know, we're saying that in a preliminary status.

So the shift technical advisor position was originally established as a short-term action following the Three Mile Island accident to improve

the ability of the on-shift operating crew to recognize, diagnose, and effectively respond to plant transient and abnormal conditions. And that was associated with longer term actions to improve the qualifications of shift managers and senior operators, as well as the upgrade of human system interfaces in the main control room.

The 1985 and 1989 Commission policy statements on engineering expertise and other topics subsequently supported continuing the STA position to provide engineering and accident assessment capability, as well as for the enhancement of plant safety.

However, the 1985 policy statements did note that the original intention was to be an interim measure until those upgrades were configured.

So as we've gone through this process, and as we've worked through these various areas of staffing and human factors engineering and operator licensing, what we've done is we've drawn upon the recent experiments that we gained from navigating the review of a recent staffing plan that did not include the STA, and we've considered that work within the context of our Part 53 development.

And in reaching our current perspective,

what we've noticed is that the key considerations for addressing the need for an STA would include considering basically four aggregated effects, and those would include the licensed operator training, the control room and human system interface design, a licensed operator workload, and also the degree of defense-in-depth.

And what we found when we've compared that to what we've developed within the Part 53 framework, we've reached -- we've reached some preliminary conclusions on that. And what we have -- what we found is that the Part 53 framework that's proposed here addresses each of these areas in a manner that we feel is substantively different than the status quo of the 1980s when those policy statements were written.

So, and, again, I'll go through those four areas just to talk about them. But, first, the licensed operator initial and continuing training programs under Part 53 would be required by regulation. And, again, we'll see this later on in the language, but they would be required by regulation to ensure that operators possess the knowledge, skills, and abilities necessary to maintain plant safety functions that are specific to the facility design.

And while the proposed examination programs would offer flexibilities, we intend to incorporate into our approval of such programs acceptance criteria that would pertain to the need to test and evaluate areas of reactor theory, thermodynamics, and other areas such as, you know, plant system and component design.

And that would be in addition to emergency, abnormal, you know, and normal plant operations and characteristics.

So the second area is the regulations that we propose -- and we have talked about the human factors engineering aspects -- but what we're proposing here with regard to the state of the art in human factors engineering is that it would have to be applied in settings where operators are fulfilling plant safety functions. And that would include the context of control room human system interfaces where it's relevant.

Going further, though, what we -- you know, what we find is that we also establish design-specific requirements for these human system interfaces, which we have talked through, and we also mandate that operators have to be provided with plant safety parameters, safety systems status, with

information on important components like primary relief valves, and information on possible core damage dates.

So, third, the approach to staffing requirements here is fundamentally different within this framework. And to begin with, applicants will need to demonstrate, you know, their use of human factors engineering-based analyses and validations to show how their proposed license operator numbers and positions will be adequate to provide assurance that plant safety functions can be maintained.

The very nature of that process directly serves to provide evidence that the operator staffing will be able to implement the full range of tasks needed to support plant safety, irrespective of any requirement to have an STA.

And something that I think is worth noting here is that there would be nothing in this that would preclude an applicant from still electing to have an STA within their staffing model. So, again, they could -- they could elect that, you know, to include that role and it would be evaluated as part of the process.

However, the staffing process that we envision is performance-based and would not be limited

to the prescriptive necessity of an STA to make the needed conclusions about the staffing model's adequacy. And then what --

MEMBER BLEY: I'm sorry. This is Dennis Bley again. I want to jump in, because in a recent application -- not the same one you're talking about we supported the staff in, you know, alleviating the STA but made a strong point to the Commission that we didn't think that should be a precedent, and that there were very unique features about the design -- and you're talking about some of those features, but they are not required in a design -- that led us to -- to that conclusion.

And I'm personally not completely comfortable with doing it in a generic sense as we're doing here and not requiring it anywhere. And I guess I'm one of the few voices out there who really appreciate the idea of an independent set of eyes when things don't go the way we planned.

MR. SEYMOUR: I do appreciate, you know, the sentiment regarding the generic application. And that is something that we've had, you know, considerable internal debate about.

You know, something that I -- you know, I would go back to is, you know, our, you know,

preliminary proposal to approach this in this manner is -- it's limited to the context of Part 53, and it is intertwined with the other requirements that, you know, we'll talk through today.

What we're not endorsing is, you know, trying to apply, you know, any type of a generic treatment outside of, you know, the construct that we have -- you know, that we have laid out here. So --

MEMBER BLEY: Under Part 53, even the way you've limited it, which I wish we weren't doing, to the particular sized reactors, you're still getting -- you could have -- you know, we're not seeing any coming now, but you could have some that are pretty decent sized and maybe multiple modules that are pretty decent sized.

So just because some of them are likely to have very low source terms doesn't mean they all will. So I'm saying it's -- fitting within 53 still leaves me a little cold.

MEMBER BALLINGER: Yeah. This is Ron Ballinger. You're not alone. In the words of that great song, I'll second that emotion.

MR. HALNON: Yeah. This is Greg. I am not necessarily opposed to it, but I would like to see how -- I guess what I'm more uncomfortable with is

what technology would -- is out there. I mean, I'm not as familiar with the new reactors as some of my colleagues are, but it's -- sometimes it's beyond just the normal reactor theory and thermodynamics that we may be talking about in abnormal conditions.

And really what attributes you didn't mention is diversity of thought, and people always -- when they say I'm an engineer, they look -- they look at me sideways because we think differently sometimes and that level of training is different.

So I would like, overall, to see how it may fit into the big picture of some -- you know, maybe a simple type micro reactor to more complex set of reactors. And then you add in the whole aspect of what we'll be talking about with those limited scope versus full scope simulators, and you start asking the question, you know, can you -- can you effectively train a non-degreed person?

And I'm not saying that they're not smart enough, but can you effectively train within the training program the level of depth of thought that an engineer may have coming from an engineering program?

So that's just kind of where my head is at. Like I said, I'm not initially opposed to it, but I'm not 100 percent comfortable either, given the

unknowns of the new reactors of different types up there, plus the simulator scoping issue I mentioned.

MEMBER BALLINGER: Yeah. Again, this is Ron. It's very easy to say that subsequent events to Three Mile Island have allowed us to take care of, and now no longer need the STA. But when you have to sit down and make a list of what the STA actually does, and what technology is replacing what, it might get a little bit more complicated because now, as Greg was saying, technology does not substitute for brains. It just doesn't.

MEMBER BLEY: I'd go and pull something up I was saying until later, but it kind of fits here. In 53.755, Option B, it talks about, you know, when you don't need licensed people. But it gets down at the onion and something related.

It says, "Which are not subject to being made unavailable by credible human errors of commission or omission." And I am pretty much concerned that it's almost impossible to say that without a full testing of procedures, extensive operating experience -- and we'll have none for some of these -- and convincing human reliability analysis, including a really thorough search for all of the EOOs, the errors of omission and commission, and it's

pretty easy to say, "Nah, there's none of those around here," until you really start digging.

And it's pretty easy to say, "I've got an emergency operating procedure that works just great until you exercise it." You know, when we did that with all of the new procedures in plants, we found all sorts of places they got tied in knots and you had to fix them.

And then we got a new set of procedures for shutdown conditions on LWRs, and then they were perfect until we started walking through them and you found all kinds of dead ends you could walk yourself into.

And then the whole issue of what accidents can happen, you know, we're dealing with designs we don't know and possibilities we haven't examined thoroughly, and building things like this one into the regulation until we've actually seen some study done very thoroughly and run them a little bit. It seems premature.

MR. HALNON: Yeah. I would be more comfortable with proving you don't need one than proving that you don't need one up front. In other words, saying that you have one, but if you can show why in your design it's not required, from either

simplicity or other -- show us, and maybe that's part of the staffing plan requirements as we're -- start with you need one or you're required to have one unless you can show otherwise.

At least the burden of proof is on the licensee instead of it just being a given.

MEMBER BLEY: I think a lot of us are in that same boat, Greg, and agree with you.

MR. SEYMOUR: I appreciate the feedback. One of the -- you know, so we have talked through the development of this rule language. You know, we did we did discuss at one point, you know, the possibility of having the position, you know, codified within the language with the -- you know, along with the attendant, you know, requirements to not have it as part of the -- you know, the staffing process that you go through.

So, again, you know, essentially doing just that, starting from the assumption that you need it and then, you know, building in the out to justify its omission.

And, again, you know, as we've gone through the process, we have reached out preliminary, you know, position presented here to -- you know, to not do that and instead to, you know, not require the

STA in a blanket manner within this context, obviously not to preclude people from using it.

And, you know, but, again, we are open to the feedback, and, you know, that's something that we're in the process of doing is gathering feedback from this body as well as from our stakeholders to determine, you know, the correct path forward with that.

So I definitely do -- you know, do appreciate the feedback.

MR. HALNON: Yeah. And before I finish my thought -- and Vicki has her hand up -- but my thought was, you know, in the NuScale they justified it and we supported it. So even in a fairly complicated plant, it can be justified. So it takes some work to show and convince not only them but ourselves that it is okay.

So I don't think that we're saying, you know, a blanket requirement that's going to put -- be put on everybody, but we are putting the burden of proof that they don't need it on the applicant.

MEMBER BALLINGER: I'm not sure -- I don't particularly care what you call it, but you need the capability, however it's -- or you need the capability -- you need the -- effectively, a shift technical

supervisor. You need his brain. And so what you call it is kind of not the same as ensuring that you have that -- what he brought to the table -- he or she, excuse me -- as part of your design.

MEMBER BIER: So I want to expand a little bit -- this is Vicki -- on I think it was Ron's earlier comment that technology does not substitute for brains. And I agree kind of in the large, but I think in the small it's a matter of degree. You can never get rid of the brains altogether, but how much brains you need may depend on how great your technology is.

So like right now you should not be driving a Tesla if you're going to fall asleep at the wheel or be, you know, working on your laptop, or whatever, because it doesn't work well enough. Who knows? Maybe 20 years from now we will have technology where you really can do those things, most of the time at least.

But I think that issue of, how do you decide whether the level of human brains and capability is adequate, given the level and maturity of the technology, is going to be complicated with new designs? So I don't have an answer, just a lot of questions.

MR. GREEN: This is Brian Green, the human factors team leader. If I could just jump in for one second, because I thank the committee for all of their positions, and to a large part these -- the positions you have all said echo the discussions we have had internally.

And I just want to point out one other point to this argument that I have not heard come up yet. And then this is the challenge here.

You know, I think it was Greg who said, "Hey, you know, we saw NuScale work through and use and evidence-based approach to justify it," and that's true. One of the challenges is that as the plants get smaller and smaller, the resources that go to, you know, verifying these sorts of claims become harder and harder.

So that's not to say that we can't or shouldn't do that. It's just the challenges that, you know, you've got a very small design and the effects or the consequences of an accident may be much smaller. The question then becomes, well, how much -- how much effort can go into human factors design? And do we want to run lots of expensive tests to prove this STA issue?

And that's just kind of the opposing

argument, too, and I just want to put that on the table for consideration. Thanks.

MR. HALNON: I agree with you. This is Greg. And, you know, maybe there is a consequence cutoff or maybe it sounds like a quantitative thing, but where you say -- I mean, we still want -- we still want to prevent accidents, and we still want to prevent challenges to the licensing basis.

So, you know, that's going to be the same regardless of the size or complexity of the plant. So, you know, maybe there is an argument that you can make that -- and along with what Vicki said, the technology can -- but that's part of the -- part of the argument that the staff should look at to say, "Okay. Your staffing plan is approved."

MR. GREEN: Understood and agreed. That's the line -- you know, we're trying to find the right spot around that line, and that's what we're --

MR. HALNON: Good. Yeah, I agree.

CHAIR PETTI: So just a question here. Do the requirements for staffing differ for, you know, a TRIGA reactor, a small test reactor like NIST? Is there value looking at how it's done there to make sure that you get the balance right and give them the range of sizes that you're having to write this rule

for?

MR. SEYMOUR: So my understanding of the research and test reactor staffing requirements -- and, again, I'm going off memory, so I would ask any of my counterparts if I get this wrong to please interject, but, again, the actual regulatory requirements for staffing are very lean. And I don't think that they are graded at all across those designs.

We do see gradations in the operator licensing process for those research and test reactors, so they do acknowledge, you know, that we're -- you know, the change in complexity, and it's based on power level, you know, break points of, you know, 500 kw, for example, and so forth.

But those requirements change, but staffing does not. And my understanding of the requirement is basically that you have to have a -- you know, a licensed operator, you know, at the control area, you know, for the facility, and that you have to have a senior reactor operator who is on call, if I remember correctly. And I don't think that that actually, you know, changes from a regulatory standpoint for those facilities.

Now, in terms of their actual day-to-day

staffing, you know, I can't speak to whether or not they choose to use some of the larger facilities or not.

Okay. So if I can here, I'll go ahead and move on to Item Golf, which is the -- you know, the last of the, you know, 53.753 items.

And Item Golf requires -- and we'll talk about these items in more detail, but what it's going to do is require applicants to describe their programs for the operator licensing initial training program, the operator licensing examination program, and for the operator licensing requalification program.

So these would be, you know, programmatic descriptions that would have to be submitted as part of the application. And in a comparable manner, for the facilities that are allowed to use certified operators, they will instead be submitting, you know, the three equivalents.

So, you know, the actual training program, you know, the certification examination program, and continuing training program would all be submitted at the front end as well for review and approval.

So we can go ahead and move on to Slide Number 30?

Okay. So -- and, again, just from a

purely, you know, process standpoint, certain requirements here, you know, I'll just touch upon because they mirror, you know, existing requirements.

But Section 53.754 covers general exemptions, and really what that does is, you know, it provides allowances for who can operate facility controls in a similar manner to what we already see in 55.13.

And now getting into Section 53.755, this contains a number of requirements. And in some ways, as we go through this, some of these requirements will be similar to what we see within 50.54, some of them will be quite different, but I would just caution that even the ones that read similarly are substantively different in many regards.

So what 53.755(a) does is it would require facilities to have licensed operators unless they can meet the criteria contained in (b) for using certified operators. So what we envision here is that there would be no -- there would be no facilities within this framework that would just have no operators required. Facilities would either be required to have licensed operators or certified operators.

A facility -- there is no combinations where facilities would have both. You know, that

isn't part of the logic here. You would either have one or the other.

And just because a facility is permitted to use certified operators does not mean that they would be limited to that. They could elect, you know, -- and perhaps it's part of making their safety case, or whatnot -- but they could elect to go with more restrictive licensed operator requirements.

You know, perhaps, you know, they would see value in that as a selling point, you know, that they use licensed operators. You know, I can't speak for that, but just understand that they would still have the option to use licensed operators.

But the criteria for justifying being able to use certified operators, again, who would be non-licensed, right, that's a new rule that's described within Part 53. Those requirements are articulated in (b).

And we've had many discussions regarding, you know, the nature of these requirements and options for, you know, how we would go about, you know, doing that. But before I get into those, what I want to do is circle back around to the question that was asked earlier. And that is, you know, why -- why are we even entertaining a notion of allowing non-licensed

personnel to fulfill, you know, a formerly licensed operator role.

And, you know, what I'll say is that, you know, as we go through these criteria, you know, one thing that, you know, I want to point out is that we see a high bar to get over from a safety standpoint and from a plant design standpoint to even qualify for this in the first place, but, still, you know, widely consider that.

So a current perspective is that for, you know, advanced reactor designs, that there will exist a certain breakpoint where the influence of human operators on the overall safety of the facility will no longer be a significant factors.

And, historically, operators have been licensed here in the United States because of a need for increased public confidence when operator actions or inactions could have safety implications for the surrounding population.

And, again, if we go back to the original genesis of the program, and some of the discussions that happened in the 1950s surrounding the Atomic Energy Act, you know, we can see -- we can see that public confidence driver that's there.

So, again, if we encounter new

circumstances where those safety implications are no longer present -- and, again, we're talking about the influence of operator action and inaction.

Then it seems reasonable that we should also reassess the types of qualifications needed for facility operators and evaluate whether licensing is needed universally or just when a significant operator role in a safety context actually exists.

So I think it's important to note that we can historically allow production facility operators at fuel cycle facilities to conduct operations where safety considerations exist, but we have opted not to mandate licenses in their case even though, you know, the Atomic Energy Act, as I -- then, again, I -- you know, this is, you know, not, you know, the official legal interpretation. This is just, you know, me kind of restating my read of it.

But, you know, in theory, the Atomic Energy Act would allow us to impose licensing there if we so desired, right? It speaks to production facilities and utilization facilities. But, again, we, you know, decided, you know, over the course of, you know, our, you know, agency's existence that, you know, we would impose licensing in one context but not the other.

But the reason I bring up that example is just because, you know, there are safety considerations that do exist, and there are operators, you know, that are doing things that are important in that context.

Similarly, when a plant goes into decommissioning, we allow non-licensed certified fuel handlers to assume certain responsibilities that would have been assigned to an SRO during the operating phase. And an important responsibility that's embedded there is they actually inherit the responsibility to involve 50.54(x) to depart from the license conditions in the event of an emergency. So, again, a very important responsibility.

So we have precedent, and we have an experienced base that supports that certain important safety responsibilities can be given to non-licensed personnel under appropriate contexts, provided that adequate requirements are in place to enforce the requisite degree of training and qualifications that are warranted.

So, again, I'll -- you know, I'll turn things, you know, back over for any questions or discussion. But I just wanted to go ahead and lay that out, so --

CHAIR PETTI: So, Jesse, to me I can see some of the safety functions to be fulfilled, to be done passively, like heat removal. I mean, we've seen enough designs. But, to me, the real requirement for a licensed operator has to do with startup, pulling the rods, and all of that.

I would think you would want a licensed operator, not a certified operator, for the controlled reactivity. And I don't know how you get around that. I mean, that's what's different between a reactor and in a fuel cycle, a reactor in a decommissioned, you know, system where the fuel may be already taken out of the core, that's the safety function that I mentally have trouble seeing. You know, there is a human action there when the rods get moved.

And given that, you know, we're not arguing that it's something autonomous, we'll take that sort of off the table.

MR. SEYMOUR: That is a very important consideration here. And, you know, as we -- as we worked through, you know, these problems, one of the, you know, thaw experiments that we did was to consider an autonomous reactor, you know, where you just need someone to come in and do the initial startup on it.

So, you know, you start it up, and then

once it's up and running, you know, it's going by an autonomous control system. And, you know, one thing that we questioned is, you know, if you need a licensed operator to come in to do that startup, so be it. But what would be the -- you know, what would be required to say that, you know, that level of, you know, qualification wasn't needed.

And something that we considered is that the person's, you know, qualification would still have to include, you know, the knowledge, skills, and abilities to conduct reactivity manipulations.

So some of the same attributes that we require for licensed operators, as we get into the certified operator program discussion, we'll see that, you know, there are similar aspects that are embedded in that program as well, too. So we have a requirement to conduct, you know, reactivity manipulations as part of the training process, and so forth.

But, still, at the end of the day, you know, we would be allowing a person without a license to, you know, conduct that. So what -- you know, what makes that different from doing that at, you know, a different reactor?

And we currently -- you know, our current

perspective is that when we go through the criteria for not having the licensed operators, that's an important consideration because a facility that qualifies for this will have demonstrated a very robust level of safety assurance.

And in this case, what we have to ask ourselves is, you know, the types of errors that a person would make in a course of coming in and doing that startup, for example, you know, could those errors, you know, conceivably lead to significant safety consequences?

When we go through and we look at the types of criteria that we have established here, our perspective is that these criteria would be -- would be bounding for that. So, again, you know, could someone, you know, commit an error that causes something bad? Yes. But it would -- you know, the degree of how bad that could be would be bounded by the criteria that that plant had to meet to be able to qualify for this in the first place.

And, again, I know that that's a little bit convoluted sounding, but the premise is that, you know, it -- you know, starting up a nuclear reactor is -- you know, it is something that is special. I mean, I -- you know, I started doing it when I was 20 years

old and in the Navy, and it's something that, you know, does have special characteristics to it. And there definitely are important knowledge, skills, and abilities that are needed to do that.

There are other countries out there that don't require, you know, operator licensing to do that, and that's not to say that we -- that we should just, you know, benchmark off that and stop requiring operator licensing. I'm not saying that at all.

But it does provide a data point that, you know, with a certain degree of qualification that, you know, there are -- there are possible outcomes where people aren't necessarily holding a federal, you know, licensure to go through and conduct that activity.

And our current perspective is that these criteria, you know, are what would make that acceptable from a safety standpoint.

MR. HALNON: Just real quick. Is it -- and I'm going to try to phrase this real quickly. Is it fair to say that if you put an SRO or an RO next to a certified operator you wouldn't be able to tell the difference from proficiency and performance? I mean, and their level of knowledge.

I mean, isn't the certified operator program essentially an SRO program without a federal,

you know, license?

MR. SEYMOUR: It is extremely close. And as we go through those requirements, what we'll see is that in many ways the two programs parallel each other, and --

MR. HALNON: So I guess my -- I don't mean to cut you off, but I'm trying to support the fact that the delta is just that level of testing from the NRC that provides a different level or maybe a different perspective on assurance.

But the training programs, I've been certified and I've been through a certification-type program in SRO, and I don't see a big difference in the level of knowledge. Now, that's from a licensee who had both SROs and ROs, plus certified operators.

It would be a little bit different story if someone just had certified operators and you'd have to take a hard look at their program to make sure that it's to the level you need. And I'm sure that's what the staff would be looking at.

But from -- we shouldn't go through this I think thinking that there is no -- no difference in proficiency and knowledge of these folks relative to

MEMBER BLEY: Well, that's kind of where

I was -- wanted to come from, Greg, but trust it a little bit. I was having a little trouble seeing what great burden is relieved by having certified operators.

Now that licensee will do the certification and the testing, but the requirements on what you need to know and be able to do are pretty much the same. So is it just that some potential licensees will be more comfortable under this approach? I'm not sure there is a great change in burden.

MEMBER BALLINGER: Yeah. That's exactly where I've been coming down, too. I mean, we need to be careful that we don't use the extremes on this. You know, you can construct a deficient battery that can run by a blind squirrel and not need any operators, but at some point the complexity gets to the point where you need operators.

And I've been going through the criteria, and I, for the life of me, can't find much of a -- much of a difference except for the fact that from a human point of view -- and I was a naval operator a long time ago, and I was also a reactor operator in school. And the fact -- the mere fact that you had to take an NRC test made a difference in the way you

studied and is an intangible.

And so I'm with -- with Dennis. I just don't see that much of a difference, and I'm curious as to what -- who or what provided the impetus for going to this different mode of operation. Is it because of the European and non-U.S. area? Or is it being driven by, I don't know, for -- for lack of a non-crass word, economic considerations from vendors?

MR. SEYMOUR: This concept, what it grew out of is -- and some months back we presented a White Paper, you know, that basically went over the -- was the basis for what we're talking about today.

MEMBER BALLINGER: Right. And I get that. But my question is, did you start from an assumption that you wanted to get rid of it? Or did you start from an assumption of, let's see what we really need, and then at the end you tumble to the fact of, well, this is a little bit redundant; maybe we don't need this.

MR. SEYMOUR: So what we -- what we did is the thing that kickstarted this is our paper really began with consideration of how would we deal with an autonomous reactor? And that was -- that was the thing that really kickstarted all of this.

So we said, you know, what would happen if

you had a design that was autonomous, you know? Could it just sit there, you know, in a shed in the middle of a field somewhere and run and, you know, no one needs to monitor it or do anything for it?

And we started running with that thaw experiment to say, you know, what human role would still exist? And what we did is we said, okay, you know, for such a reactor to be acceptable, you know, that we would let it run without people controlling it, you know, without opportunity for human intervention that was there, you know, we started realizing that, well, you know, the safety bar would have to be high, right? You know, that in terms of the level of assurance that you're getting, this thing won't, you know, create a public hazard in the absence of human intervention.

You know, the technological bar would be a high one to get over. But once -- once we went through and we kind of fought through, you know, a perspective of, you know, what context that might be acceptable within, we said, okay, so let's imagine that we involve all the licensed operators at the equation, right?

If we do that, what is still left behind that needs to get done in the ops sense as operators,

if it's not -- if it's not mitigating events, right, you know, or, you know, necessarily being involved in the day-to-day, you know, control and reactivity manipulations, and so forth.

And what we ended up with were, you know, a litany of important responsibilities that were still there, and, you know, I'll just -- I'll just highlight what a few of them, you know, are, because, you know, they're important for understanding, you know, how we get there.

But we said even if you could justify not having any licensed operators at that facility, okay, when it has to refuel, who is going to, you know, refuel the core? You know, who will ensure that technical specifications are complied with to ensure the plant is maintained in an analog state? You know, who will have the authority to depart from license conditions in emergencies?

And then, you know, if manual reactivity manipulations are needed for some reason, you know, who will be able to come in and do that?

So in order for such a plant to kind of pass this thaw experiment, we said, you know, this plant can't require human intervention for, you know, satisfactory accident performance, right? So that's

a given, right, within our thinking, that if you need human beings to ensure that, you know, a plant can, you know, mitigate access, and so forth, that you need licensed operators in that role, just from a public confidence standpoint.

But, you know, provided that you clear that bar, you know, how do you -- how do you address these functions that are left over? And so what we began to do is to say you would have to have an individual that has sufficient, you know, abilities and qualifications to implement those.

And then what we said is, you know, would this individual necessarily need to be licensed? So, initially, when we looked at this, we started from an assumption of perhaps not, you know, and we -- we began working, you know, from that standpoint.

And our, you know, presumption as we worked through that process was that, you know, as we kind of built from the ground up in this thinking that there would be a breakpoint where things became so similar that -- or, you know, just warranted from a safety perspective, that licensing would be -- would be mandated.

And, you know, something that gave us pause as we went through that was making the

comparisons to things that are certified through handler, you know, programs that we, you know, routinely review and approve, and so forth. And also, you know, I drew the comparison with, you know, fuel cycle facility operations.

And so that led to our current perspective that, you know, provided that there could be a sufficient degree of, you know, regulated assurance that, you know, a class of individuals have -- would have knowledge and abilities to do those things that we talked about. That, you know, would be the key thing, irrespective of, you know, whether they are licensed or not.

Our current perspective is that licensing wouldn't be -- wouldn't be mandatory for those individuals. But as we go through and we look at, you know, the certified operator programmatic requirements, what we'll see is that, you know, from our current perspective that there is a number of opportunities for added flexibilities that could be justified.

So, you know, again, we'll see that the two programs tend to parallel one another. But there's a number of, you know, carefully targeted relaxations involved in that certified operator

process as well. And, again, you know, there is reasons for that, but a key one being is that, you know, if we look at the knowledge and ability base that the certified operator has to have compared to a licensed operator, by the very virtue -- by the very nature of the plant that, you know, they would be allowed to operate that they would not have a credited role in mitigation of plant events.

So when you talk about, you know, what is the role in emergencies, you are just not talking about the same, you know, pedigree of qualification that would be needed there, because that would be a part of their job that, you know, wouldn't be warranted by the nature of that plant.

MEMBER BLEY: Jesse, have you had any feedback from, say, INPO or vendors or potential buyers of these technologies that indicate people would -- it is taking on a responsibility, take on the responsibility of certification as opposed to, you know, handling NRC's licensing capabilities? What have you heard from outside of NRC?

MR. SEYMOUR: When we presented, you know, a similar set of material to the industry last month in a stakeholder meeting, some of the feedback that we received, both verbally there and also through some

written comments that we received back -- and, again, these comments were coming from organizations like NEI and, you know, the U.S. Nuclear Industry Council.

You know, we haven't had any specific interaction with INPO, you know. Again, you know, we have, you know, extended, you know, information regarding, you know, what we have put out in various opportunities for engagement, but we haven't heard anything back yet on that end.

But with regards to these other organizations, what we've gathered from a comment standpoint so far has been generally in favor of having this certified operator track. And, you know, we have seen it express itself to be desirable. What we have primarily seen are some concerns that the bar to qualify for certified operator treatment may be too high from their perspective.

And that's an area that, you know, I'd be more than happy to speak to because we have our own perspectives on why that bar is as high as is. But that has been primarily what we have seen is that, you know, it seems to be at least conceptually well received to this point to have this non-licensed yet highly qualified, you know, track, but just a concern that the barrier to entry may be -- may be too high.

MEMBER REMPE: So this is -- Dennis, are you done, or --

MEMBER BLEY: So I was talking away, but my mic was off. I'll just be a second.

MEMBER REMPE: Go ahead.

MEMBER BLEY: I know INPO doesn't operate in a public arena very much, and I don't know if they ever get involved in potential rulemakings. It would be really interesting to hear from them on this area.

MR. SEYMOUR: So we will -- you know, again, we have a memorandum of understanding with them, so, you know, we do -- we do, you know, have a structured interaction with them. But we will -- you know, we have and will continue to extend those, you know, invitations to, you know, participate, you know, in appropriate settings like our, you know, public meetings, and so forth.

But, again, just, you know, to -- at this point yet we haven't received anything formally, you know, from them.

MEMBER BLEY: Okay. Thanks.

MEMBER REMPE: So I thought it was interesting that --

MEMBER BALLINGER: But you haven't asked; is that right?

MR. SEYMOUR: Well, we have -- we have -- you know, we have made sure that they're aware of, you know, specifically our White Paper that we discussed earlier, this draft, you know, preliminary proposed rule language, and then also, you know, the timing and date of some of our public interactions. We forwarded that along, so --

MEMBER BALLINGER: I guess I look at there's -- look at it as there's a difference between notifying somebody and then being proactive and asking them to comment.

You know, the INPO rating is, at least in part, based on operating and training and that kind of thing. So you would think that INPO could play a significant role.

MR. SEYMOUR: So under our memorandum of understanding with them -- and, again, I'm going to paraphrase this because I'm going off of memory. But the way that that is structured is that what we -- what we generally would not do under that agreement is, you know, any direct one-on-one interaction, provide a regulatory matter that we are considering, and solicit their comment directly on that.

What we would do is in a -- you know, a stakeholder engagement-type forum, where, you know,

they are a participant and they have that information, receive their comments, you know, as provided within that format.

But, again, you know, it's a very structured process that we have under that memorandum.

MEMBER BALLINGER: Yeah. I mean, I think other people will know better than me, but I think INPO exists or became existent because of problems in the industry. And it was -- it's structured to help solve those problems.

And so in terms of training and qualifications, and those kinds of things, they might be a useful -- very useful tool.

MR. SEYMOUR: You know, I do -- I do appreciate the feedback on there. I know, you know, when I -- when I worked for the utility, I attended training that was, you know, provided by INPO, you know, their supervisor training course.

So, you know, I've had exposure to, you know, the training, and so forth, you know, that they -- that they provide. And beyond that, there is their training accreditation role as well, too, so, you know, again, they are a -- you know, an important stakeholder in these discretions.

So -- and, again, I just kind of go back

to the -- you know, the need for us to, you know, remain consistent with our memorandum that we have with them.

MEMBER BALLINGER: Yeah. Okay. A bad INPO rating results in people losing their jobs, right?

MR. SEYMOUR: From a plant that had a bad INPO rating at one point, I can -- I can say that that is the case, so --

MEMBER BALLINGER: Sometimes you need a hammer.

MEMBER REMPE: So, okay for me to take a turn here, Ron? I guess I was -- I appreciated the history of why you came up with this approach, but as you mentioned earlier, that the license requirements for the spectrum of test reactors that are in universities, for example, vary dramatically based on power level because of the challenges that the operators will encounter and the potential consequences from an event.

And as you go through, like in the next section or so, you're going to be starting to talk about what an operator might -- or a certified operator versus a licensed operator might have to do with load following and some of the other things they

are going to have to do.

I'm puzzled why the staff didn't just vary the -- say that we're going to vary the licensee requirements instead of going to a certification approach where you are going to have this argument of, well, can I go into the certification option, or do I have to stick with the licensing option?

It seems like that would avoid that argument, and then you'd just get into what specifics would be required for a particular type of design. Any reasons that you could cite on why you didn't just vary the requirements?

MR. SEYMOUR: So it's a really good point because this is something that we have debated extensively over the preceding months, because there's -- there's, you know, multiple moving targets, you know, that are embedded in this process just because you get, you know, multiple flexibilities that are introduced.

And one of them is, you know, the fact that we -- you know, we lay the groundwork here for a flexible, you know, operator licensing process where the scope and, you know, the contents of that program can vary dramatically based upon, you know, the specific job needs because of -- because of that

plant.

So -- and, again, we'll, you know, go a little further into this later on. But when we look at what can happen within, you know, that context, both, you know, the scope of the training program, which, you know, could affect its duration, content, and so forth, you know, could vary under this, you know, systems-approaches training process.

And then the examination composition could vary provided that acceptable methodologies are used, and we'll talk about that. And what this means is that for a small simple facility that -- you know, that still requires, you know, operators to be licensed.

You know, we'll say that they cannot clear this technological hurdle. You could -- you could theoretically have, you know, a power plant licensed operator that goes through a program that ends up resembling something that would be akin to an RTR operator licensing process.

And some of those -- some of those programs, from what I understand -- I was never, you know, a non-power, you know, operator, but from what I understand from those programs, you know, the actual training may be six months, you know, and then you've

got a -- you know, a relatively, you know, simpler examination process going through.

But something that, you know, is very interesting, when we benchmarked that program as part of what we're doing here, we saw exactly what you brought up, and that is that the examination process is graded upon the complexity of the facility.

And, you know, it's a recollection I think they -- you know, they essentially say, okay, the AGM 200, if I remember right, designs, you know, the five-watt, you know, sources, those, you know, have the simplest version of the exam, right, so the fewest items required.

And then you step up to, you know, the facilities that fall between there and 500 kw, and then from there all the way up to the largest at 20 megawatts, you know, you've got, you know, a complex facility examiner.

So, and we thought that was very interesting, that that grading was built in, and that did influence our thinking going through this.

So what we have is a process, you know, for operator licensing where because of flexibilities in staffing and flexibilities in exam content, we really could take the licensed operator program that

we're using here and scale it all the way down to exactly what you're talking about.

Yet at the same time, you know, the other end of our thinking, you know, taking that concept of the autonomous reactor and running that thought experiment and saying, you know, start from the standpoint that no one is needed for safety, you know, what do you still need to accomplish, and what type of a person would you need there?

And we independently, you know, arrived at this -- this operator, you know, certification process.

It is an ongoing, you know, thing that is on our mind regarding, you know, if you were to draw a Venn diagram of these two things, right, there is an area of overlap, right? And at the end of the day, you know, it -- you know, we're doing these stable interactions and, you know, we're reaching out in large part to gather feedback.

And we are -- we are receptive to that, that perhaps at the end of the day there -- there is limited value in a separate, you know, operator certification track, because, you know, the flexible licensed operator process could accomplish the same thing and still maintain the licensing.

The stakeholder feedback that we have received, you know, on the industry side has been supportive of having that separate track, but what we are, you know, sensitive to is the fact that, you know, does it just create another layer of administrative process and regulation that doesn't need to be there?

So hopefully that answers the question, but, you know, it's a point that we have been mulling over quite a bit ourselves.

MEMBER REMPE: I just think when you think about some of the -- when you've gone through the design certifications and how we've struggled, while they don't have to do the procedures until later, all of the issues encountered, I'm not sure that -- I think it will be difficult for them to justify that they can go in a certification track at the beginning when there is a lot of uncertainty in their design, lack of experience, et cetera, et cetera.

And so they are going to be spending a lot of their resources to argue which track to go into before they ever get the thing approved, or the plant approved. They would be arguing on how a licensee -- the operator should be licensed or certified. And so it just -- I don't know. To me, it seems like an

easier way to go, although I think what Ron and Dennis have suggested, getting a broader set of responses from stakeholders, might help determine which is an easier approach to go to, if you've only talked to NEI and NIC. Have you heard back from them?

MR. SEYMOUR: Oh, sorry.

MEMBER REMPE: I heard back from them is what I meant to say.

MR. SEYMOUR: Yeah. You know, something that we have been, you know, considering, too, again, kind of doing these thaw experiments is what happens if a plant, you know, comes in, you know -- and by this I mean an applicant, you know, they come in and they want to have certified operators.

And so they, you know, invest their time and resources in that direction, and then, you know, it is almost like imaging, you know, a high jumper, right? They don't quite make it over that bar, so, you know, they don't meet the criteria.

You know, what happens at that point? In part, and this -- our thinking thus far has been this, right? One of the great upsides to the parallels between the two programs is this, right? Because they're both relying upon, you know, essentially the same type of guidance for developments of their

examination programs. They're both relying upon, you know, the same type of SAT-based development of their -- of their training programs.

And because of their very similar, you know, requirements, again, with targeted relaxations between the two, the types of legwork that they would be putting in, and investments that they would be making to develop that certified operator program, would translate relatively readily over to a licensed operator program, if they had to do so.

And that has been by design on our part, and one of the things that we -- we have also considered here is that if you have a -- you know, a circumstance where, you know, the plant -- you know, the applicant, right, that they want to have this certified operator program, you know, and they don't quite -- they don't quite clear that hurdle is, you know, what does that do in terms of them being able to progress through that process?

So, again, you know, we are sensitive to the -- you know, the potential for wasted time, resources, and effort, and also for how that could potentially affect, you know, the licensing process.

And, again, that's part of the driver for the degree of parallel between these two, because we

see, you know, a relatively well-defined transition that could be made, you know, stepping up that certification program and adding the additional, you know, regulatory touchpoints, and so forth, and grading it up to a licensed operator program.

So, again, we don't see it as -- you know, you couldn't quite clear that bar and now, you know, you end up falling back into this, you know, 18 month operator licensing program, a big training building, you know, full scope simulator, and a large training staff, you know, like you'd see at the large light water reactors.

What we see is you fall into a relatively comparable process that is still graded and scaled based upon your plant-specific needs, and so forth. And that is, you know, tailored, you know, to what you need. And perhaps, you know, if you -- if you are that, you know, close to meeting those requirements to not have any licensed operators at all, then perhaps, you know, your program would resemble something more like an RTR operator licensing program.

So, again, you know, we see part of the value in having that parallel because it provides a fallback, you know, to, you know, take the applicant that didn't quite make it and not have it be this

catastrophic, you know, events in their -- in their licensing process, but, rather, you know, they simply revert back over to a comparable process.

MEMBER BALLINGER: You know, there is another way to look at this, and what you are sort of describing, but not quite, is what amounts to a type certification in the aircraft business. You get a pilot's license, and then you get a type certification.

So it would -- something like -- but you still call it an operator. So if it's reactor type X that's much less complicated than reactor type Y, your reactor -- take a reactor operator exam, which amounts to a type certification for that particular reactor, if you go to another reactor where you've got to go -- you've got to do it again.

But is that what you're describing? Because that's works very well. I mean, that's the way -- that's the way it works in the aircraft industry.

MR. SEYMOUR: So at a high level what we're -- what we're envisioning here is that, you know, for -- you know, for a company that is, you know, just manufacturing a fleet of micro reactors, and perhaps wanting to centrally train and license,

you know, their people, that, you know, this could be compatible with that. But we're not thinking about a more, you know, generic type of, you know, licensure that could go, you know, more broadly than that.

So that being said, something I want to point out because you brought up the comparison with aviation, and what we're doing in terms of developing this, you know, tailored operator licensing program that would support, you know, anything that is being developed as regulatory guidance to support those, we have a contract with Idaho National Lab, and we have been working with them for some months in the development of that.

And that is still, you know, a work in progress. But one of the things that we are doing in the course of doing that is we are -- we are benchmarking other industries and trying to draw, you know, upon, you know, the types of licensures and professional certifications that are done within, you know, human roles that have safety impact. And one of the key industries that we have drawn upon in the course of that project is aviation.

So, again, you know, we are still in the process of, you know, looking at those types of examples to see what can we take away. But at this

time, you know -- and, again, I don't have full understanding of, you know, the aviation type certification.

But what we -- what we don't see is, you know, a license that would, you know, translate to multiple facilities. A key thing that I'll point out is this, right? What we do have built-in -- and we'll see this -- is a mechanism by which you can provide a justification that you have extensive operating experience on a similar facility, and use that to justify an exemption from examination requirements, and thereby to get licensed on a comparable facility.

So, again, and that's a mechanism -- we actually currently have that, you know, in Part 55 as well. It's just a little bit -- a little bit different there. But, again, we see that -- we see that here as well, that, you know, if you just go into a similar facility, that you would not necessarily need to go back through, you know, that entire process, that with adequate justification you could -- you could license the individual there.

MEMBER BALLINGER: There is this intangible, what I call the yellow scarf/purple scarf problem, in that you -- it's human nature to observe a hierarchy. And if you consider yourself or get

considered to be of a lower standard than somebody else, I don't know that that's so much of a good idea. And it probably would behoove us to try to avoid even the perception.

MEMBER BALLINGER: And by that -- by that you refer to the -- you know, the titling of the certified operator --

MR. SEYMOUR: Correct.

MEMBER BALLINGER: -- versus that of the licensed operator.

MR. SEYMOUR: Yeah.

MEMBER BALLINGER: Yeah.

MR. SEYMOUR: Yeah.

MEMBER BALLINGER: You know, it is an interesting point. There are special authorities that are, you know, conveyed with -- with a license, you know. And, again, I followed what I thought was senior reactor operator license of plant and it did provide, you know, a unique ability to -- you know, if needed, to push back, you know, because you have the license to conduct the operations. That wasn't necessarily the case with, you know, the plant management.

So, you know, that gives you unique authority. Something that I will say is that within

this construct we don't -- we don't envision that ever being combined, you know, organizations where you have licensed and certified operators simply because there wouldn't be any reason for that.

So within the same organizational hierarchies, we wouldn't necessarily see that coming up. But, again, it does make an interesting point if you're just comparing two different plants and one has certified and one has license, you know, how that comparison could be perceived.

MR. HALNON: So, Jesse, there is also -- you know, as we go through the language, we hold the licensed operators to a much higher standard for enforcement specifically, and you don't have that same enforcement section in the certified operator portion.

So, to Ron's point, you have built in that there is a hierarchy already in the fact that it looks like you rely on just the other regulations for accountability and honesty and all those other attributes as opposed to a license you specifically list them out, saying, "Here is what you are accountable for."

MR. SEYMOUR: Yes. And that is a very important difference, right? When you take away the individual licensing, you know, what happens is that

the ability to take enforcement action, it does shift to an extent. And, again, you know, we still have to consider that in instances like willful misconduct, and things like that, that, you know, we will -- we will take enforcement action against non-licensed individuals.

I mean, there's times where things like that happen. But, by and large, you know, when we look at the certified operator, you know, construct, even though we see things like conditions of certifications, and so forth, all of that is being directed against the facility licensee.

So if there, you know, are things that are done that violate requirements, you know, by certified operators, you know, in general, the enforcement would be directly against the facility licensee and not, you know, the individuals.

And again, you know, we're not talking about things like willful misconduct. So, you know, it is an important difference, right, the fact that, you know, the enforcement action would be directed against a facility licensee versus the individual.

And there are implications for that for accountability, and so forth.

MEMBER BLEY: It starts to sound a little

like the Navy where the captain always is responsible if the ensign runs you aground.

I wanted to jump to something a little different, if I could, Jesse.

MR. SEYMOUR: Okay.

MEMBER BLEY: You've mentioned simulators a few times. We didn't have simulators at all the plants until after TMI, a while after TMI. Before that, you had to go to special locations where the vendors had simulators.

The level of our training and the ability to make sure our procedures really work were greatly enhanced by having simulators that to the extent that at one plant at least I know of found that their main simulator software would run on these glass-top simulators, and they bought half a dozen of them and put them all over the plant, so any operator could go work on it at any time they wanted to, and they found it was a great enhancement.

If we don't have a full capability simulator or one that really models the way the plant actually responds, we could lose an awful lot. And what have you thought about that?

MR. SEYMOUR: So I -- you know, I want to highlight the example that you provided of, you know,

the glass-top simulators. That was something that was just starting to get rolled out when I was, you know, working at the utility.

And, you know, again, used -- you know, used appropriately, they were a tremendous training tool, and, you know, great value. And the thing that I want to begin with is by saying our objective with the simulator requirements is to afford reasonable flexibilities.

And the glass-top -- the glass-top simulator is a great example of that. So what we want to do is, you know, to provide, you know, the most flexibility that we can in terms of, you know, simulator training, and so forth, while at the same time, you know, ensuring that, you know, adequate training and examinations are provided to them.

And when we look at the requirements that would be associated with a full scope simulator, you know, if you're -- if you're -- you know, we'll use the example of a micro reactor. You know, you're a micro reactor facility, you know, perhaps you've got, you know, some hard controls, and you've got some -- you know, some soft controls associated with that.

And, you know, perhaps you are locating this facility remotely to where, you know, it's just

not practical to have a large training facility there. But, you know, what can you do with a glass-top simulator, right?

If you have a glass-top simulator and, again, I'm just using this as an example -- you know, if -- you know, and, I mean, you're familiar with those, you know, folks that haven't seen those, you know, really, you're talking about something that can fit in a broom closet. I mean, they're very compact. And you can model, you know, a variety of plant panels on them just by, you know, changing what it's got pulled up on there.

And yet at the same time, you know, you're running, you know, a computer simulation of the plant's behavior while you're running the models in there.

So, you know, are you -- are you necessarily meeting with our current standards would point to and say that that is a full scope simulator? No. Are you able to conduct, you know, very valuable training and within, you know, an appropriate exam structure, perhaps even a valuation, you know, using that tool, you know, perhaps my -- you know, modifying the type of wording and requirements that we use with simulator, that has been our overall objective is to

try to, you know, allow for some reasonable relaxations that would permit those types of flexibilities.

And in doing that, what we've done is, you know, we've gone all the way back to the Nuclear Waste Policy Act just to, you know, ascertain what the actual requirements are because, again, simulator training is something that is discussed there.

And as we have dug back through that, what we found is that there isn't -- you know, looking at that and looking at the Commission's interpretation of that, and implementation over time, that there isn't necessarily a firm requirement to have, you know, full scope simulators.

And, in fact, what we see in implementation over time is that, you know, certain facilities were, you know, allowed to not have simulators at all, like, you know, research and test reactors, for example, right? You know, they're not required to have, you know, simulators.

In other cases, you know, provisions were left there for plants to where it may not have been practical for them to construct the simulator when that requirement came out, that they could, you know, potentially justify using the plant itself as a

simulation facility.

So, again, we looked at that, and we saw that from a -- from a standpoint of what could we do within the context of statute, our takeaway was that we had flexibility to, you know, allow certain facilities to not have simulators at all.

We did have to provide, you know, requirements for, you know, simulators and simulator training, and so forth. But what we -- what we felt that the right answer was when we look at the totality of everything was to, you know, provide for requirements that, you know, were -- would require, you know, with flexibilities simulators, you know, within certain contexts.

And by doing that, what we -- what we envision is that there may be justifications that a facility could provide to use alternative means to show how they are going to accomplish their exams and training, and, you know, human factors engineering, you know, validations, and so forth, but at the same time that a simulation facility of some type is probably going to be the most straightforward way to do that.

And we felt that that combination of factors, you know, with NRC approval required within

the licensed operator contexts, when a simulator is being credited in certain areas, we felt that that, you know, offered, you know, the greatest flexibility while at the same time encouraging simulators to be used.

MR. RECKLEY: Dave, this is Bill. Do you think we might use this as an opportunity for -- to give Jesse a few-minute break and --

CHAIR PETTI: Yeah. I was --

MR. RECKLEY: -- let Libby maybe exercise her finger and go to the next slide when we get back.

CHAIR PETTI: Yeah. I was thinking the same thing. We've been doing this for two hours, so

MR. RECKLEY: Okay.

CHAIR PETTI: -- let's break until 15 minutes after the hour.

(Whereupon, the above-entitled matter went off the record at 3:59 p.m. and resumed at 4:16 p.m.)

CHAIR PETTI: Okay, I see we're more than 15 minutes after the hour. So, Jesse, continue.

MR. RECKLEY: This is Bill, Dave. I guess one of the things that we'll just ask you, I think it's clear on this topic, both the interest, the complexity, that we'll add this. Or the staff, at

least, will propose to add this to our December agenda with this Subcommittee in order to continue the discussions.

So for today, we can try to make it through the slides which basically just outline the preliminary text. And obviously we'd take some questions. But try to at least today get through the preliminary text and then pickup discussions in December.

Or we can continue these general type questions and observations. We'll leave it up to you as to whether we should make the effort to try to get through them or not.

CHAIR PETTI: I'd like to see us get through the slides. And then if, you know, there's more discussion, let's push it to December.

I do think we'll probably want to write a letter. I had to poll my colleagues in subcommittee, but you can just tell, given the interest, that I think they'll want to get their thoughts down on paper some.

MR. RECKLEY: Okay.

CHAIR PETTI: I see Dennis has his hand up.

MEMBER BLEY: Yes, I just wanted to say I

think I've raised all the issues I had scribbled in all my notes. So I'll try to just shut up and let them go through them. But I'll agree with you. I'm happy that I've seen both.

MR. RECKLEY: Okay. So with that, Libby, if you want to go to Slide 31, and I'll turn it back over to Jesse.

MR. SEYMOUR: Okay. Thank you, Bill. So moving on, and again we're going through items that are conditions, you know, of a license for the actual facility licensee here.

So C would respect whose allowance you conduct control manipulations to licensed personnel or certified personnel.

D would require the operator re-qualification program to commence concurrent with when, you know, folks start to get licensed or certified, again just to drive that programmatic requirement.

E, and again, we'll get into some new stuff here, E would require that those operations other than control manipulations which can affect reactor power level, only occur while plant conditions are being monitored by a licensed of certified operator.

And initially, with the exception of the certified operator, the first part of this requirement reads somewhat similar to what we see in 50.54. However, nested under that is a new allowance.

And so what we have here that modifies E is that load following would be permitted provided that certain conditions are met, such that demands from the grid operator could be immediately refused when they could either challenge safe operation or when precluded by plant equipment conditions. For example, if you have a technical specification action that limits the reactor power level that's allowed.

And specifically, one of the following would need to be provided to meet this. And the three items that are called out specifically in the preliminary language are the actuation of an automatic protection system, an automated control system, or a licensed or certified operator.

So again, it would have an allowance for load following there, but it would be predicated on one of those three things being available to, you know, to truncate that power change if it reaches a limitation.

MEMBER BROWN: This is Charlie Brown. With that, would you have intended that, this is a

reach, that the actuation of an automatic protection system would somehow automatically preclude the demand from the grid operator being honored?

MR. SEYMOUR: So that's one possible outcome of that. What we'd envision is that, and again if we think about, you know, how load following is implemented in countries like France, you know, there's a demand signal that originates externally that, you know, causes, the secondary to respond. The turbine will move in order to control grid frequency or what not.

But what's provided there, and this is what gained when we looked at the international operating experience to see how load following is implemented, is that's predicated on this notion that there is a human operator that's overseeing that and that can put the brakes on if you're going to challenge, you know, plant safety or reliability.

And so, you know, that can be overridden by the operator. But what's different, and what we don't allow now, is for that to be initiated externally like that. You know, what is allowed currently is that a good dispatcher could call the plant and request that they change their output and so forth but not that that grid operator could send that

directly.

So the automatic protection system that we refer to here, and again, you know, the language here is fairly high level, right, there will be different ways that you can implement that. It could be, you know, something that's located on the turbine side or something that is going to initiate some sort of a higher order type of protective action, like a rapid trip or something like that.

But the bottom line is that you would have to have something capable of, you know, not only preventing you from exceeding, say, the thermal limits of the plant, but also if you have a more restrictive limit such as might be seen if you have a technical specification, for example, limiting you to 75 percent plant output or something like that.

So again, you know, that provision is there, but there's a bit more to it, because the concept here is a bit more restrictive than just what your normal reactor trip set point might be.

MEMBER BROWN: It's interesting that this is brought up right no. I'm just recalling discussions we had on a recent new plant design module, you know, the SMRs where you had a very limited number of operators, very, very limited number

of operators for ten plants. I think it's ten, maybe it's 12. I don't remember the right number.

I'm just trying to think. With a sparse number of operators, with other plants operating and supplying the grid, and one plant doing it, that sounds like that's a very difficult thing for operators to handle on their own if you just don't have enough backup.

It's just a thought. I'm not asking for any conclusions. It just seems to me that this popped out, and I don't remember this action ever coming up on any of the LWRs that we looked at other than this other plant, the SMR that this thought process came up because of grid operators demanding when the plant was in some other situation that had not been responded to by the operators yet.

MEMBER HALNON: So the original BMW plants had a circuit that the dispatch could change power based on their demand. And it was disabled because they didn't want to have to license the dispatch --

MEMBER BROWN: It did what?

MEMBER HALNON: -- for making reactivity changes. So sort of along the same lines, this kind of gives me a word picture of an operator sitting there watching a meter and waiting for something to

happen that he doesn't like. And he refuses it as opposed to some other mechanism.

So I think the details of how this would be implemented is interesting. And certainly there are some design aspects of putting limiters in, and fuel bands, and other things. But the word picture is a little bit disturbing in not being able to figure out what it would look like in practice.

MR. SEYMOUR: And the examples that I've seen here, and again, you know, I've had some discussion with a French regulator that touched upon this topic. You know, I was licensed at a plant that had similar circuitry, I believe, to what you're describing, abandoned in place, left over from, you know, the early 1970s.

And I've seen some, you know, discussion by developers in this regard. And everything that I've seen so far really supports that you'd be looking at something kind of in that second category, that there would be, you know, typically some sort of a control setting that would limit how far the plant could be externally driven.

And again, you know, I'll use the example of what we had abandoned in place at my former plant, essentially. And this was analog circuitry, but you

had a high and a low limit that you would set the rheostats and you could then, you know, select a control that would go ahead and allow that external control system to run the turbine up and down within those limits, right.

So, you know, the outside operator would not just be able to drive the plant to an arbitrarily high or low point. But rather, they would be given an acceptable tolerance where they could run the plant, you know, back and forth. So again, from an implementation standpoint, all the data points so far kind of look like that.

What I will say is that from the benchmarking that we did, you know, in terms of looking at international operating experience, yes, that was something that was called out in the IAEA report that we reviewed, is that operator oversight was considered part of the equation there.

(Simultaneous speaking.)

MEMBER HALNON: So again, we did build that in. But in practice, you know, all the implementations that I've been exposed to thus far have always been some sort of a setting where you provide a band, and things can be, you know, moved a little in that band. But you're not going to take a

plant from five percent up to 100 percent back just --

MR. SEYMOUR: Right, even with the digital systems going forward, it seems like an easy software setting stuff. And I say that with a tongue in cheek, but I'm sure that there is, given that capability, you could easily put it there.

MEMBER BROWN: I can tell you there are some plants that operate that way.

(Simultaneous speaking.)

MEMBER BLEY: Ha, ha, ha. They have to. But it's interesting. There's a ring buff on one particular class of ships where you've got multiple -- all the TG sets are fundamentally operating, supplying everything.

And so we had to deal with this and managed to -- it works quite well. But that's a much smaller, the ship is a much smaller, sees a much smaller overall load than does a grid. I mean, you've got some of the grid type stuff that could come in on you from disparate or unusual places.

It's more controlled where we had to deal with it. That's why I asked the question. It's just kind of difficult thing. We didn't have any automatic protection system other than the normal reactor protection trips and/or operator interaction. But

that was manual.

So, all right, you answered my question I think. It's just going to be interesting.

MEMBER HALNON: Okay.

MEMBER REMPE: So I'm curious about the international experience with this. Do they actually have drills for the operators where they have to detect a condition that the automatic protection system or control systems fail to do what they should, and it calls on an operator to detect the situation and take action?

And do they have, like, time limited actions that have to be accomplished? How far do they go into monitoring this?

MR. SEYMOUR: So I can't speak to that level of detail. I will say that, you know, our international outreach activity in our pursuit of that is something that's ongoing. So, you know, there is a certain amount of research and benchmarking that we've done thus far. And it's something that we still continue to pursue so that we can continue to gain some of those more specific details on staffing, and training, and so forth.

So I can't speak to that, you know, aspect specifically in terms of what does the operator

training, you know, implications look like and so forth, unfortunately.

But what I will say is that, you know, what we did see was akin to what I was talking about earlier, that there was, you know, kind of a bracketing of where things could be moved within, and that there was an operator oversight component to it as well, so that the operator could, you know, take action if things were behaving inappropriately. But unfortunately, I can't speak to the specifics of what the training piece of that looks like.

MEMBER REMPE: It'll be interesting to see how it's propagated in and what would be required for a certified operator or licensed operator, and the training, et cetera.

MR. SEYMOUR: Yes. And we foresee that, because of the nature of, you know, the SAT-based developments and also for the examination process to be derived from K/As that are descended from a task analysis that provided that, you know, those activities are present, they would at least show up in training.

And if they have a, you know, substantial enough importance to facility operations, that they would also be within the testable content domain to be

tested on as well too.

So, you know, we think that the process, if a plant chooses to do this, we envision that that would be captured within the operator training and, you know, examination processes as needed.

Okay. So continuing on, Item F simply requires that plants of licensed operators have to include SROs as part of their staffing. So, you know, again you cannot propose a licensed operator staffing model, only ROs.

G would require a facility licensee would need to maintain the staffing complement described under the approved facility staffing plan. So in other words, we talked about how, you know, that staffing plan, once approved, would become a binding aspect of that plant's licensing basis and that, you know, modifications that took away from that would need to go through the licensing in the process.

And so that means that, while facilities would be able to take a flexible approach in determining their required staffing, once the staffing plan's been approved by the NRC the staffing plan, you know, would then become enforceable.

And if we move on to the next slide, please. Okay. H requires SRO supervision of core

alterations and is similar to existing requirements for SROs with two key differences.

First, facilities that don't require any licensed operator staffing are instead required to use a certified operator in an equivalent manner instead. And again, we're talking about in core alterations specifically here.

And secondly, this requirement doesn't apply to those facilities capable of refueling online while at power. And that's a matter of practicality here. Because if a facility is doing online refueling, if we consider the, you know, the specifics of the real wording and what would be implied by having, you know, that core alteration oversight, it's just not a practical conversation.

But what's important to realize though is that because of the structure of the requirements, there would still have to be, you know, SRO or certified operator oversight of those facilities, even though it wanted the, you know, direct observation of the core alterations.

So again, you know, we're intending to build in a provision here that accommodates online refueling and yet still provides the level of control that we need over, you know, core alterations that are

done.

I contains specific requirements for plants using certified operators. And as a reminder, the certified operator is a non-licensed role that is required at facilities that don't require licensed operators.

Importantly, and we talked about some of these administrative functions earlier, certified operators would be responsible for certain administrative functions that would have otherwise been assigned to an SRO that must still be performed by an adequately qualified individual at these plants.

And these administrative responsibilities include things like compliance to technical specifications, making operability determinations, implementation of maintenance and configuration controls, compliance with radioactive release limitations, responsibilities under the facility emergency plan, as applicable, and also making notifications to federal, state, and local authorities if they're accredited to do that.

So again, when we take away the licensed operators of these facilities, we find that those are still important administrative functions that need to be accounted for by someone with adequate

qualifications.

So while a specific number of certified operators is not prescribed, certified operator staffing would be performance-based and would need to provide for a continuity of responsibility for facility operations at all times during the operating phase.

Specifically, this would entail the continuous monitoring of fuel in the units from wherever the certified operator is located. And from that location they would have to have several capabilities that we spell out in this preliminary language.

And those specific responsibilities that they would need to able to accomplish from wherever they happen to be located at would be the ability to receive plant operating data and parameters, the ability to immediately initiate a rapid shutdown, the ability to promptly dispatch operations and maintenance personnel, the ability to implement any relevant emergency plan responsibilities that they're accredited for, and also the ability to conduct any reactivity control manipulations that require human action.

So again, you know, this is fairly

prescriptive. But this outlines what, you know, the operational scope would be for the certified operator and spelled out with those, you know, conditions a facility license would be for such plants.

Okay, if we could move on to Slide 33, please. So with regard to certified operators, it should be noted that allowing such non-licensed operators to manipulate plant controls and conduct reactivity changes presents a policy issue. And it is the present intention of the staff to use this rulemaking process as a vehicle for Commission engagement in this area.

And again, without going too far into the background, you know, we have had past work that we've done in terms of looking at the Atomic Energy Act and looking at, you know, where we have latitude for us to licensing and so forth.

And that is our current stance, is that it does represent a policy issue, so that is a place where we would have to get Commission engagements on that. And again, we intend to do that through this rulemaking.

So moving on, J would allow facility licensees to take reasonable actions that depart from license conditions and technical specifications in

emergency situations when that action is immediately needed to protect the public health and safety.

And again, this probably sounds, you know, familiar, because it's comparable to the provisions of 50.54 Act, so it's essentially just moving that requirement over here within Part 53 for this context.

So what we do is, in concert with that, we also have Requirement J. And what that does is it says who has the authority to invoke that. And the key difference here is that, you know, we historically have granted that authority to SROs and to certified fuel handlers. But in this case, we also extend that to certified operators for the plants where that is applicable as well.

And again, move on to Slide 34, please.

MEMBER HALNON: Jesse, this is Greg. Just one last thing on the reactivity changes and special nuclear material. I think I would put in there the decisions, under hostile action type situations and other things, that a license may feel better to the public or certainly from the standpoint of having a higher level of accountability.

I would think that even one senior operator or an officer in the company that is licensed, or certified, or something to that effect,

that increases the accountability of the organization, if not the people actually operating the controls, might be considered.

I think that's something that, you know, in my head I think that there's some room there, probably in the staffing plan, and in the operations reorganization plan. But I know you hold officers also to a higher level of accountability too. And that might be something to consider.

MR. SEYMOUR: I appreciate the feedback. In our discussions going through we had originally, you know, and I kind of went through the thought process that we approached this in terms of building, you know, from the technology and kind of coming up in that direction.

And initially, when we had this pool of responsibilities, and we were trying to figure out, you know, who would own them, at one point we did think about the notion of, well, perhaps there would be a designated facility manager that, you know, would have these responsibilities and so forth.

And we hadn't fully determined, you know, what the level of qualification would be. But at one point, you know, we had kind of played with that notion that a senior corporate officer or plant

manager type of individual would have some special level of authority within this.

And I don't think we had necessarily thought about that being a licensed individual. But again, I've captured that feedback. That is an interesting point.

MEMBER HALNON: Yes, when you move into the multiple facility certifications also you might, you know, when you're talking about the classes and classifying them together, it kind of feels right to say that there's at least one person the NRC would go to as a chief officer, chief nuclear officer, chief manager, whatever you want to call it, that is responsible for the overall decisions to be made.

MR. SEYMOUR: Thank you. Yes, again, I've captured that point. But we'll definitely take that feedback and think through that. Because that is an interesting twist on things that we hadn't really thought about previously.

So Slide 34 here, so this talks about 53-756. And all this talks about is medical requirements for licensed and certified operators. And very broadly, how I'll summarize this is that, you know, we would impose similar medical requirements for licensed operators that we currently do. And what we would do

is we would extend those medical requirements over to certified operators.

But there would be one key exception. And again, this talks about, this speaks to some of the targeted flexibilities. But it wouldn't require the submittal of the certifications, you know, using Form 396 that we do for licensed operators, for the certified operators.

So again, you know, there would be a regulatory requirement for them to have the medical examinations and so forth, and for medical fitness. And while it would be inspectible and enforceable, we wouldn't require those certifications to be submitted.

And again, that's a function, because for licensed operators those submittals, you know, occur in tandem with the licensing and so forth, these individuals being certified. We would require that. And we could inspect it and take enforcement action if it's not being done, but we wouldn't require the submittals.

Okay. And then, again, Sections 53 757 and 58, you know, those basically just translated over comparable requirements to what we currently have.

And if we go on and move on to Slide 35, okay. So now we'll transition into discussing

Sections 53 760 through 769. And this section addresses the operator licensing requirements. So this is essentially a stand-alone operator licensing program that's, you know, nested within Part 53 here.

And I'd like to note that the sections provide a framework that includes an operator license pathway that's independent of, but borrows from, that of Part 55. And we'll discuss this present iteration of our proposed approach here.

But, you know, I do want to point out that the extent to which this operator licensing pathway remains independent of Part 55 going forward is an area of ongoing work, and it's subject to change under future iterations. It was preliminary rule language.

So, you know, long term, whether this will remain a stand-alone entity that's embedded in Part 53 or perhaps, you know, becoming a new aspect of Part 55, we haven't fully settled on that yet. But for now, we kind of have this residing in Part 53.

So Section 53 760 just covers the applicability. 761, 62, and 63 generally parallel existing Part 55 requirements. And again, you know, part of this is just an extension of the fact that we have a stand-alone program. So there are certain features that we need to have present within the

language.

But when we get to 53 764, we cover the operator application process. And again, here's where we start seeing some of, you know, the flexibilities that are built in here.

And what this reflects is a desire to, you know, allow for reasonable flexibilities where we can have requirements that are performance-based instead of being prescriptive. So we see these as opportunities to allow for reasonable flexibilities that we don't, you know, have over in Part 55.

And I'll provide an example. So currently on Part 55, when someone applies for an operator license, they have to, you know, show that they completed five significant reactivity manipulations. And that's documented on Form 398 and submitted to us.

And what we propose here is that part of the application left to certify that they, you know, demonstrate confidence in conducting control manipulations. And that can be done either at the facility or, you know, a simulator. But we don't prescribe any specific number of manipulations.

So again, you know, here the high level objective is the same, that we want people to be practiced and proficient in their ability to conduct

reactivity manipulations. However, what we do is we, you know, we remove the prescriptive number. Instead we make it a performance-based requirement.

So if we can go ahead and move on to --- oh, actually, I did want to point out C too, because C also shows a flexibility. And again, when we look at Part 55, what we see is that if someone fails their licensing examination, that there are required waiting periods until they can reapply. And it's actually staggered so, the more times that you fail and reapply, the longer those waiting periods get.

So again, something that we do here is we, you know, we allow for the re-applications and the re-examinations, but we remove that waiting period. Because at the end of the day, the important thing is the ability of the individuals to, you know, be remediated, and to retake the exam, and to show that they can pass. It doesn't necessarily have any bearing on their ability to safely operate, how long they waited in between those points.

Although I will say, from a practical standpoint, it usually takes, you know, a couple of months to get everything turned around with that process anyway. But again, we saw an opportunity to remove something that was unnecessarily prescriptive

within this context.

If we can move on to Slide Number 36, please. Okay. So 53 765 covers the training program for licensed operators. And Item A requires licensed operator initial training programs based upon a systems approach to training, which we discussed.

Those programs have to ensure that licensed applicants will possess the knowledge, skills, and abilities, and again, we use some key wording, right, to both protect public health and also to maintain design-specific plant safety functions, and then also that those programs be approved by the Commission prior to their use for licensed training. So again, that wording covers the initial training program.

D discusses the initial licensed operator examination program. And that requires facilities to establish licensed operator examination programs that test the knowledge, skills, and abilities needed for ROs and SROs. And those programs would need to include both the examination methods and criteria used to assess pass and performance. And it would also have to have Commission approval before use.

So here, this is a substantial new flexibility that, you know, we propose from this

preliminary rule language. And that is, and we were using a prescriptive examination process like we had outlined under NUREG-1021 and, you know, using the vendor-specific K catalogues that we have, a process that would take sound testing methodologies and follow, you know, a high level structure that's similar to what's being accomplished under NUREG-1021.

However, it would be more flexible and ultimately allow facilities to tailor that examination a lot more readily for their specific designs.

And, you know, a key attribute of this is that when you're talking about advanced reactor technologies that are evolving quickly, and you look at the legwork that's required to, you know, generate things like K catalogues, and publish them, and so forth, you know, we see opportunities where things like that could be accomplished a lot more efficiently within a flexible process like this.

Additionally, if we look at a small, simple facility where perhaps, you know, a reasonable licensed operator examination program would look more like an RTR operating licensing examination, the ability to take the existing power reactor program and, you know, adjust it to allow something like that to happen, requires exemptions.

You know, there's really not a well established pathway to go through and do those types of analyses and so forth, or the substantive, you know, the changes that are being proposed in an all exam process are acceptable. This process, again, would build all that in.

And guidance for reviewing those facility-developed operator licensing examination programs is currently being developed by the staff via an ISG. And I mentioned that before, that we have a program that we're working on under contract with Idaho National Lab to go through and develop that.

And again, we're going all the way back to, you know, testing theory, psychometrics, benchmarking other industries and so forth. And we're looking for examination best practices to develop guidance that would let us take, you know, a proposal that's different from what we're used to, right, that's different from the prescriptive process, and let us make a judgement on that as to whether it's going to give us reasonable assurance that someone can do the job safely.

And then additionally, a further flexibility built in here would be the capability for some of the licensees themselves to administer their

licensing examinations.

However, we would retain the licensing authority. And that does sound considerably different than what we do know. Right now we send a team of examiners out. We administer the license examination.

But what I think is important to note is that when we look at how we currently do re-qualification training, when we go out and we re-qualification examination, which we have experience with inspecting, you know, we've been doing that for years, we have allowed the facility to administer those re-qualification examinations.

And what we do as the regulator is we, you know, we will observe that process, right, we'll inspect it. We will sample aspects of it, and so forth. So again, we do have experience with that.

And the other thing that we've done is we've reached out to, you know, in the past we've reached out to our Canadian couterparts. And the practices, as I understand it, by the Canadian Nuclear Safety Commission, because again they certify their operators, right, that's done by the government, the Canadian government will allow the facility to administer the examination.

And what they'll do is supply the

documentation and, you know, evidence that things were completed in a satisfactory way to the regulator. The regulator will review everything and, provided that the requirements were met, will go ahead and issue the certification. So again, we do have, you know, some experience with the data points that indicate that that would be acceptable to do.

But an important thing here is that, you know, within this construct we still foresee ourselves as, you know, reviewing and approving the examination to be given, right, on top of approval of the initial program itself.

And then, you know, we see us as most likely having a presence during that process. You know, so we're not administering, actually observing, you know, and inspecting that process, and also, you know, taking the outcome from it, reviewing the documentation, reviewing the individual performance, and so forth, and then issuing a license to the individuals.

You know, at a high level, if we just say the statement that, you know, we're considering allowing the facilities to administer their own license exams, you know, that tends raise eyebrows. Because that is a departure from what we do. But I

think if we look at that in a broader context and the bigger picture, it's not that radical of a departure from other data points that we have.

Okay. Can we move on to Slide 37, please? C would require facilities to establish re-qualification training programs for licensed operators. These programs would need to, and again, we talked about some of these items previously, be based upon a systems approach to training. They would need to ensure that the ROs and SROs maintain the knowledge, skills, and abilities to, and again, the same data points as before, protect public health and safety and to maintain plant-specific safety functions.

And those programs would still have, you know, a two-year requirement as we currently see, and will have to be approved by the Commission. And facilities would also need to propose a biannual re-qualification exam program for tests and topics from the re-qualification training program.

And similar to the initial program, they would have to propose the exam methods and criteria for pass and performance. We would have to review and approve that.

And additionally, that same guidance that

would be used to verify that what's being proposed for the initial exams is acceptable, would also be applicable here as well.

And then lastly, Item D, you know, would carry forward our requirement for examination security and making sure that, you know, there's no cheating or other improprieties that could compromise the exam.

Could we move on to Slide 38, please? So E, and again when we see the certified operator requirements, we'll see that there's, you know, a parallel wording for certified operators, but we'll notice that some of the requirements are slightly different. So it will sound similar.

But E covers the simulation facility requirements for plants that are required to have licensed operator staff. And again, it should be noticed that separate, somewhat less stringent simulation facility requirements are provided for plants with certified operators.

And key aspects of these requirements would be that full scope simulators would not be mandated, and we discussed this earlier. Instead, partial scope simulators may be acceptable provided that their scope is adequate to meet the intended usage. And we'll talk about some of the details of

what that means.

So simulation facilities would need to be approved by the Commission if the facility licensee will rely upon them for training purposes, meeting experience requirements, such as reactivity changes, or for initial or re-qualification examinations.

Additionally, use of a simulation facility for conducting human factors engineering analysis or assessments would require demonstrating that an adequate simulator scope is provided as well.

So when we say that a partial scope simulator may be allowable, I think an important qualifier there is that the scope of the simulator still has to be sufficient to do these things that we're talking about here. You know, really when we said partial scope, what it allows is some flexibility from, you know, what's usually a very strict interpretation of what a full scope simulator looks like.

And it does allow for potentially, instead of if something's represented on hard controls, maybe using a glass top simulator to accomplish it. But again, you know, I think the wording here amplifies a little bit what some of the, you know, provisos are there.

So additionally, a flexibility that we intend to incorporate is that to allow for operator licensing to occur prior to initial fuel load, simulator models would be allowed to replicate intended core loads.

And the reason why that's an important addition in here is because I currently, to license operators, you know, cold license operators for a facility that hasn't had the initial fuel load yet, you actually need exemptions, because your simulator can't model, you know, the current core load, because it's not in there yet, so again, just to add in those full ten.

Continuing on, F establishes requirements for the waiver of exam requirements. And we talked about before, you know, the flexibilities for extending a license to comparable facilities. So this is what would allow that. And that includes those instances where additional units are constructed at multi-unit sites.

G requires that facilities establish Commission approved programs for both maintaining and re-establishing a licensed operative proficiency. And that's a difference from the prescriptive approach of Part 55.

So again, in Part 55 we go through and were very prescriptive. We mandate, you know, the number of watches, the number of hours that must be stood. You know, if proficiency is lost we mandate how many hours of watch has to be stood in order to regain proficiency and just acknowledging that there could be wide variances in the staffing models and what, you know, the con ops looks like for these advanced reactor facilities and, you know, perhaps even designs in con ops that we haven't even envisioned yet.

What this does is it allows for flexibility and, you know, matching the proficiency requirements to what the day to day operations actually look like.

Could we move on to Slide 39, please? Okay. And I'll just touch upon this. So again, you know, the remaining sections are generally parallel to Part 55 requirements.

And I'll just, again, highlight that, you know, the structure of the section and the degree to which it remains independent as a stand-alone. Anything from Part 55 remains an ongoing area of work. So in a future iteration, you know, the way this is structured and where it's located could potentially

change.

So could we move on to Slide 40, please? Okay. So now we'll talk about the certified operator requirements. And so Sections 770 through 779 cover the requirements for operator certification programs.

At those facilities that are allowed to use certified operators and licensed operators, and certified operators are defined under Part 53 as being individuals who are certified in facility controls without being licensed by the Commission.

It's important to note, and I talked about this at length before that, you know, a very simple concept here as we talk about these training requirements, and exam requirements, is we'll see that there's relaxations.

It is important to note that certified operators are not intended to be credited for fulfilling plant safety functions. So by virtue of the design of the plants that they are allowed to be used at, you know, if there is a human role in fulfilling plant safety functions, then our process would drive the requirement that these individuals be licensed.

So again, when we look at these relaxations, it's all being done within this context

that these individuals are not being credited to fulfill safety functions.

To the contrary, the design for facilities that qualify to use them, you know, would not have a human role in the mitigation of plant events. So again ---

MEMBER BLEY: I'm sorry, I said I wasn't going to ask you anything, and that last discussion prompted a quick question. The operator isn't required to fulfill a safety function.

I can imagine two ways you could define that. One would be in the tradition of licensing sense that, given a single failure, the operator won't be required to fulfill a safety function.

Or if you've done a complete PRA, I could see that if the risk, the combination of frequency and consequences were low enough, they'd have to be above some threshold for which the operator wouldn't be required to operate. Because at some point, enough stuff will fail that he'll need to operate. Have you thought that through?

MR. SEYMOUR: Yes. And so again, you know, getting back to the no licensed operator criteria, what I want to do is just kind of, you know, go back and kind of talk about that in more

depth.

Because, you know, what I discussed here is more, kind of, the high level summary of the concept. But when we talk about, you know, what are those no licensed operator criteria really trying to accomplish? And again we provide two options for how they can be approached.

One, you know, takes a certainly different approach than the other. But primarily, you know, the objective of the no licensed operator criteria is that acceptable safety performance of the plant design is independent of operator performance, right, that's really what those criteria are trying to accomplish.

In general, that means that there should be no credited operator role in the mitigation plant events. And it also means that the SEES that are depended upon to support the response to the licensing basis events shouldn't be able to be defeated by, you know, errors that operators could credibly make.

And when we look at the two, the two options that we provide there, and again they take different approaches, but they both share that general underlying philosophy.

Option A provides, you know, more a P.A.-based approach to get there. Option D, instead,

borrows from some IAS, so integrated safety analysis related concepts. But in any case, you know, they share similar objectives.

And I think what's important too is keep in mind that Part 53 codifies, you know, defense-in-depth in a way that we haven't seen previously. That is explicitly discussed in Option A. So when you talk about, you know, what happens if things break down, and so forth, what do you fall back on?

And, you know, the current wording that's in, again, Bill, if I present this incorrectly, please correct me, but when you look at, you know, 53 250 in Sub-part B, which covers defense-in-depth, if we kind of parse out what the requirement is really speaking to, you know, it really does build in a robust incorporation of defense-in-depth principles.

And those provisions include, you know, I'll use examples, right, measures to ensure that appropriate defense-in-depth is provided to compensate for uncertainties including, you know, those that are related to the stated knowledge and your modeling capabilities, right, so where those design uncertainties may exist for, you know, a pilot build of a plant.

And as to where those uncertainties about

the reliability, and performance of plant personnel, and programmatic controls, so again, when we think about the uncertainties that could exist in the human role, and whether there could be gaps in your understanding, what we see with the overall construct of Part 53 is that you have, you know, overlapping coverage of requirements that tend to support you if you end up in that space. And you have a key one here as Part 53's treatment of defense-in-depth, really.

MEMBER BLEY: Okay. And I guess that's a good story when I stare at Options A and Option B. The strict criteria aren't quite there.

Option B, if it's exactly as I read it, that might imply that you don't have to consider a single failure for that deterministic approach. And that seems a real relaxation of what we've had in Part 50 and 52.

And Option A is kind of vague about the level at which we have to be able to survive without any human action. So we can look at those later. But I don't think the clarity is there unless Bill can tell us that if we go back to Part B, way up front, that it makes that clear.

MR. RECKLEY: And it's worth looking at, Dennis, and we'll go back and look at both of those.

We weren't really considering, strictly speaking, that B is deterministic, and Option A was the more probabilistic approach. But it does break that way.

And then another key aspect, I think, that both options are trying to do, but in my mind is a little trickier, we can assess the human role in mitigation easier than on the prevention side.

And both A and B have a prevention side. How could a human mess it up? Even if you have a machine that you can say it will work, how could a person mess it up? And both of those are trying to address it.

So between now and December, I guess I'll just plant the idea for you guys to give a little thought to that too. Because in my own mind, it's a little trickier on that side.

MEMBER BLEY: And on that side I mentioned it earlier. You've anchored it to that fuzzball word credible human actions of commission and omission and done an awful lot pretty thorough work. You can't be sure that there are no credible actions that could get us in trouble.

(Simultaneous speaking.)

MR. RECKLEY: Yes, okay. And I'll shut up, okay. As Jesse was saying earlier, our goal here

was not to imply that this is easy. It actually, from our point of view, should be quite a significant challenge to be ---

MEMBER BLEY: And my goal isn't to say it won't work. It's to say it isn't clear to me from the words here --

MR. RECKLEY: Right.

MEMBER BLEY: -- how it really addresses those points, ha, ha.

MR. RECKLEY: Right, right. Okay. Thank you.

MR. SEYMOUR: I appreciate that. And, you know, that's something that in the discussion table format of this preliminary rule language, we tried to be very open about the fact that we're still working on those criteria, and discussing them, and very receptive to feedback as we try to, you know, ascertain exactly how it should read most appropriately.

So again 53 771 and 772 are, you know, just high level programmatic things associated with certified operators. 771, you know, essentially is a requirement that says that to do certified operator roles, you have to be certified by the facility. And additionally it would require that the facilities

established in this would maintain their certified operator programs.

772, again we talked about how certified operators would be subject to medical requirements. 772 would impose the requirement. Some of the licenses immediately remove individuals from the performance of their certified operator duties if they stop meeting those requirements.

Similar to licensed operators, they would allow for, you know, reasonable restrictions to be imposed, that that offset whatever medical criteria that they're no longer meeting. So again, just as it would allow restrictions for licensed operators, we would extend that reasoning here as well too.

So moving on to Slide 41, okay. And again, this will mirror in many ways what we talked about for licensed operators. But I'll try to point out some of the targeted, you know, flexibilities and relaxations that we apply here to the certified operators.

So 53.73 describes the training program for certified operators. A requires that the operator certification training programs be based upon a system approach to training, and that's to be able to ensure that the trainees will possess the knowledge, skills,

and abilities to protect public health. And they would have to be approved by the Commission before use.

Item B requires facilities to establish an exam program that tests the knowledge, skills, and abilities for certified operators. The program would need to include the exam methods and criteria used to assess pass and performance. And the program would have to be approved by the Commission before use.

And again, the guidance that, the same guidance that we're working on, you know, that would cover the initial licensed operator examinations and the continuing training examinations, would also be applicable to here as well. So that same batch of guidance we're working on would have broad applicability to, you know, be able to navigate this new flexible process.

Facilities would develop, administer, and grade their certification exams, again keeping in mind that these aren't licensed individuals. The facilities would also issue their operator certifications. And again, you know, the NRC would not be licensing. So we would not be issuing those certificates.

And we explicitly call out in the

preliminary language that we would reserve the ability to observe the process. So we want to attain that ability to inspect, you know, that process as needed to make sure that it's being implemented properly.

Moving on to Slide 42, please. Okay. So C requires facilities to establish and maintain training programs for certified operators. These programs would be required to, again, be based on a systems approach to training. Similar to initial, they would have to ensure that the certified operators have the knowledge, skills, and abilities needed to protect public health. And they would require Commission approval as well.

And facility licensees would also need to propose a re-qualification exam program for testing, continuing training topics. And that program would have to include, you know, exam methods and criteria similar to the initial program.

A difference from the licensed operator program is that for the certified operators we would allow the facility to also, as part of the program, propose the re-qualification exam periodicity.

So in the case of licensed operators, we intend to carry forward the two-year requirement that we currently use in Part 55.

For certified operators, we would allow the facility to propose, you know, any periodicity for that as part of the program. And again, the overall program would have to be approved by the Commission prior to its use.

And then as operator certifications would not have renewal requirements, again, we would also modify some of the record retention requirements since that would no longer be tied to a license renewal periodicity.

So if we could move on to Slide 43, please. Okay. So again, Item D simply addresses examination, security, and integrity, again, very similar to the licensed operator program.

Item E establishes simulation facility requirements for plants with certified operators. And key aspects of those requirements are that full scope simulators are not mandated, again similar to licensed operated plants. Partial scope simulators may be acceptable provided that the scope is adequate for the intended usage.

The simulation facilities at those certified operator plants would not require Commission approval though, right. That's a key difference from the licensed operator plants. However, it's important

to note though that they would be subject to periodic inspection so that, you know, we don't foresee never putting eyes on that simulator. We just don't, you know, see the justification to do the initial Commission approval thereof.

What would still need to be met though are the regulatory requirements that we would spell out here in Part 53. So again, if they were using a simulator for certain applications, there would be certain regulatory requirements for that. And those would be inspectible and enforceable.

So again, those requirements would apply to the facility if they're crediting their use for training, for meeting experience requirements, and the big one there is reactivity changes, or if they were being used in the initial or continuing training examinations for their certified operators.

If they were going to use the simulation facility to support, you know, human factors engineering analyses or assessments, again that would require demonstrating that their simulator scope was adequate to support those analyses. So again, while we say partial scope, you know, the scope still has to be sufficient to do these things.

And then similarly, we would make the

allowance to, you know, allow an intended corollary to be used for initial licensing of folks in a cold license environment.

If we could move on to slide 44, please. Okay. F would allow the facility licensee to waive examination requirements in accordance with their approved training and qualification program.

And so when we talk about licensed operators, we talk about, you know, what happens if someone if licensed on a reactor, and they want to license on a very similar reactor. You know, what is the process there? And we talked about the waiver ability.

Here, as part of, you know, within the confines of the overall training program that we'd be reviewing and approving, what we do is, you know, provide an allowance to still have that type of waiver of the examination requirements so that a certification could be extended to a similar facility.

However, because we're not licensing, you know, the individuals, this would be embedded in the approved program that the facility would be using. But they would have that ability to justify waivers of examination requirements as part of the certification.

G would require that facilities establish

a program for maintaining certified operator proficiency as well as for re-establishing proficiency when needed. A notable difference from the licensed operator program though is that that proficiency program would not require Commission approval here. So again, that would be a relaxation that we would have.

So they would have to have a program, you know, to accomplish that. And that would be a regulatory requirement that you would not need to approve that program on the front end.

Section 53 774 addresses requirements for the issuance of certificates by facilities for certified operators and requires that facility licensees ensure that individuals meet the following requirements prior to being issued operator certifications. So these are the requirements that would need to be met to receive a certification.

First, someone would have to have at least a high school diploma or a GD. And again, that's consistent with, you know, what we see if we look at the existing framework for people that are getting licensed as reactor operators, or licensing at research, and test reactors, and so forth, that there is a minimum educational level involved there.

Additionally, they were able to satisfactorily complete the initial training program that was approved by the agency. They will have to pass an initial operator certification examination. They would have to demonstrate confidence in conducting control manipulations, again because control manipulations would be part of the allowed job scope for the certified operators, and they would also have to meet medical condition requirements.

So they would have to meet those requirements in order to be issued a certificate by the facility. And again, that would all be, you know, those would all be items that would be enforceable on our part.

Could we move on to Slide 45, please? Section 53 775 addresses conditions of operator certificates and establishes requirements that facility licensees must meet for each certificate that it issues.

And again, this is a difference. We spoke earlier about how, for licensed operators, there is individual accountability so that, if the condition of license is not met, the agency takes enforcement action directly against the individual.

Here, because of the nature of the

certified operator, even though there are conditions associated with those certificates, the enforcement action will be directed against the facility licensees. So that's, you know, the target of these regulatory requirements here.

But again, key things I would just point out, you know, the individuals would have to complete continuing training programs including periodic re-qualification exams. They would have to be able to pass those to maintain their certificates. They would have to, you know, have a biannual medical examination. They would have to maintain their proficiency. They would have to comply with fitness for duty requirements.

And we would also retain, you know, the existing hook that we have in Part 55 for licensed operators that if there's a felony conviction we would, you know, be notified of that. So that would still be a requirement. Seeing as the individuals would not be licensed, they would be certified by the facility, we would still, you know, require notification if their certified operators were being convicted of felonies.

MEMBER HALNON: It might be good to, I'm not sure if you put it in the regulation, but at least

reference the other personal accountability regulations like 50.9, 50.5.7, that they would be subject to just --- I know that when I was in training, the first thing I did was memorize the applicable regulations that applied. So it certainly would raise the accountability just to at least mention them.

MR. SEYMOUR: I appreciate that. Something that I've been working, you know, with Bill closely on for the past few months is trying to --- you know, as we craft Part 53, one of the complexities is, because we're dealing with facility licensing and individual licensing within the same part which is different than the status quo, because Part 50 and 55 are separate parts.

And in terms of, you know, crafting the language so that requirements apply at the facility and the individual level if they need to is still something that we're navigating in areas like that.

So in terms of having, you know, the requirements for deliberate misconduct, for completeness in accuracy of information, if we look at Part 50 and Part 55, they both contain similar requirements just with different, you know, different types of licensees that are on the receiving end.

So something that Bill and I will need to continue to work with is ensuring that, you know, the high level structure of Part 53 still accomplishes that for both classes of licensed individuals. So, Bill, I don't know if you had anything you wanted to say on that.

MR. RECKLEY: No. I just, as we put the things together, that'll be one of our missions and challenges. So thanks for the observation, and we'll consider that as we tie all these things together.

MR. SEYMOUR: Okay. So 53 776 would require that operator certifications be terminated at the end of employment, again, because these individuals aren't licensed, so there wouldn't be any renewal associated with that.

So as long as these requirements were being met, a person could, you know, extend the same certification. But again, there had to be an end point somewhere. So even if all the requirements are being met, if someone leaves that facility, ostensibly they would no longer be able to fulfill those requirements. So at that point, they'd have to terminate the certification.

If we could move on to Slide 46, please? Okay. So now we're going to move into the last

section here. And so the section ---

MEMBER HALNON: Hey, Jesse, before you get off of certified operators, just one last consideration to think of.

There's a lot of times in nuclear plants that you have to do, because of equipment malfunctions or other conditions of the plant, you assign operators to perform defense-in-depth actions and other things that you do to help the mitigation of things. So you don't typically put them in place with tech spec actions, but you do in defense-in-depth.

I would be interested in your thoughts on a facility that's got certified operators that suddenly says in order for us to be able to be safe we have to have two operators on staff all the time on top of this control just in case, as a defense-in-depth because of a malfunction.

That would, in essence, disqualify them from having certified operators. What would you do in that situation, because licensed operators, you just can't pop them out over night.

MR. SEYMOUR: So this is an interesting question. We've asked a similar one internally. And what I won't do is say that we have a perfect answer to that at this point because, again, the framework

that we've discussed so far, it kind of assumes that things move smoothly through that process of the plant demonstrating how they meet these criteria.

They implement the certified operator program, or the licensed operator program. And you don't regress and have to move backwards along that timeline.

So this question, and again, if I'm characterizing it right, we're really talking about the nature of the human role in safety changes because you discover something, whether it's a failure that happens in the plant or some deficiency in the original analysis of the plant.

MEMBER HALNON: Or operating experience.

MR. SEYMOUR: Yes. Yes, so operating experience shows that your stamping model is now inadequate.

And if we look at what would happen there in terms of, you know, action that could be taken, as the regulator, and again, I don't want to go too far out on a limb in this area.

But if we were to determine that a condition had to be placed upon the facility to license in order to protect the public health and safety, that there was actually a safety driver that

was there, like, we should, under our existing processes and so forth, have recourse to impose a license condition, whether it be in the form of an order or whatnot, to remedy that.

Again, if we're talking about purely, this facility is posing a hazard so, and, Bill, I don't know if you want to speak more to how Part 53 structurally accommodates that, but I'm just speaking in a general sense. If we're talking about things that don't elevate to that level, again, it does get murkier.

One of the discussions that we've had is that the certified operator is still qualified to a high level, like, compared to what we would see with a equipment operator, for example.

An equipment operator, and again, these requirements here, what we have pulled up, show you what's envisioned there. And actually, I think we should have Slide 46 pulled up right now. If we could go ahead and get on to Slide 46. There we go.

And they would have to stop this training program, right. And there wouldn't be too much that's required from a regulatory standpoint beyond that.

For the certified operator though, we see that there are requirements that tend to parallel, in

many regards, the licensed operator training. So if we look at what the capabilities of the certified operator are, and again I'm speaking in hypotheticals right now, but I think what we would have to do is to assess whether that certified operator degree of qualification, right, which is reasonably robust, could still provide assurance for whatever that area would be.

And I think that if it didn't, and, Bill, if you have thoughts please interject, that if it didn't, then I think what that would elevate to is the fact that, you know, we'll no longer have that reasonable assurance of safety and that we would have to -- that it wouldn't be justified at that point in imposing a condition upon that plant, right.

And again, you know, I talked before about what it would look like if a plant in the application process was going through and didn't quite meet the criteria to have licensed operators. But it isn't a gigantic delta in the big picture, right, going over to a licensed operative program.

What I can't speak to is whether that would be feasible or some other process would have to be there. So, again, Bill, I just want to give you an opportunity to speak if you wanted to.

MR. RECKLEY: Sure. And what you said is right. I mean, what would get you into such a circumstance is some combination of a design deficiency, or a performance issue, along with the perceived, or what had been justified as the human role, that they may want to say, given the design problem or the inside from operating experience, we need to increase the role of the operator or the human.

But, you know, we'd have all of the regulatory systems that we have now in order to say, well, how can that be addressed maybe for the short-term, how could that be addressed for the long-term? Would they want to do a design change? Would they want to change the role of the operator, potentially, from certified to licensed? All of those things would kind of come into play.

In the extreme, the plant might have to shutdown, just like in the past design deficiencies would warrant a plant to shutdown while those things got worked out. More normally, you can work out maybe temporary provisions to address it while a long-term fix is made.

But it's possible. And I think we would have the tools to do it. It's kind of hard to say,

for the hypothetical, how it would work.

MEMBER HALNON: Yes. And I don't want to force you to give me an answer, I think it's to think through it. It sounds messy at best.

And there is probably going to be a situation where I have 25 days left in my cycle, or whatever, and found out that this plant over in Europe said this. In order for us to have assurance of safety, we're going to put an operator on shift to watch this indicator.

And that may be one thing, but then actually having a mitigative action may be another. So there's a, probably a range of actions that you'd have to consider, but I think it's just some, it's a good discussion to have because it is probably more of a legal discussion, the capability discussion. So, we won't necessarily have to have it here, but think through that.

MR. SEYMOUR: I appreciate that. Again, in our internal discussions we had kind of gone around an idea of what that would look like.

But I appreciate that perspective because it's definitely an area that we need to think further through. Because, again, it's easy to think about if everything goes swimmingly, going through the

application process and you never have to think in the opposite direction. You know, back of the truck because there is something that wasn't analyzed or wasn't considered.

And when you thought that the plant met those criteria, they really didn't. In terms of what you have to do. But that's definitely an area that we need to place focus on going forward to make sure that we get it right.

So, Section 53.780 through 789 covers training qualification requirements for commercial nuclear plant personnel under Part 53. And what this means is, when we're not talking about license for certified individuals this is, for lack of a better word, for everybody else.

These sections address personnel training requirements. And basically, to fill a role that is comparable to the training rule of 50.120. So, again, when we think about what's embedded in that training rule, what we're going to see is really just a variation on that with a few specific items that we've modified for, in this context. And so, 53.780 simply describes the applicability of those requirements.

53.781 covers specific training qualification requirements. And what these include

are requiring training programs for these various categories of personnel, to be established with sufficient time to align trained and qualified personnel to operate the facility prior to fuel load.

And that's a difference compared to what we currently do in 51.20 because in 51.20 we impose an 18 month prior to requirement.

So, again, recognizing that, especially for modular designs, things that are construct in factories, you know, if that's micro reactors that are being transported out to a site and require minimal site setup and so forth, perhaps 18 months isn't quite reasonable. So what we did is we looked at, what are we really trying to accomplish with this requirement.

Do you want people to be trained and qualified by the time that they're needed. So what we do is build that into this requirement.

We still require the use of a systems approach training, which is consistent with existing requirements. And we discussed that.

And additionally, if we're going to make a change is this. So we require the training qualification of the following categories of personnel, supervisors, technicians and other appropriate operating personnel, so why do we use that

wording. Because if you're familiar with 51.20 it goes through and it categorically talks about, and I have to look back, but I think it's on the order of about ten different categories of people.

And what we do here is we take those categories of people and we condense them back into higher level categories of really, what those more specific categories consist of. And the reason why we do this is to allow for flexibilities, when you start dealing with advance reactors that use concepts of operations that were different from what we're used to.

And I think a good example would be, a facility that has a very small staffing compliment. Let's say that you only have a handful of personnel actually running the site and people wearing multiple hats. And we agreed to this earlier.

But someone is an operator, they're a maintenance technician, they're a radiation technician. And they're responsible for all of that.

What does their job title actually look like. What if you don't have a shift technical advisor, right, because the shift technical advisor is one of the categories that's in 51.20.

So what we did is we condensed those more

specific categories, and a higher level categories, to allow for those flexibilities with requiring exemptions. And then what we do in the actual preliminary rule language, we still put examples of personnel that would fall under each category. Again, just to allow for greater flexibility. Consistent with operating models that could change from what we're used to.

And then lastly, we still require record retention to allow for inspection of these training programs. And again, none of this precludes the ability of a plant to receive INPO accreditation. In which case much of what we're discussing here would actually fall under that accreditation.

However, we always have to be prepared for the possibility of an applicant that chooses not to pursue accreditation. Or alternatively, even with accredited programs we always do have to account for the fact that if accreditation worked for people withdrawn, the NRC has to directly determine whether or not regulations are being complied with.

So, if we can move on to the next slide please, 47. So Slides 47 and 48 go over feedback we've received during our recent stakeholder meeting with the public.

And so, in general I'll just say that I've concluded my overview of the preliminary post rule language, but I did just want to talk through, briefly, what feedback we received. Because I know there were questions earlier about what types of things we'll be hearing back from, from the public.

And just at a very high level, the stakeholder feedback we received at our October 26th public meeting included comments that we should clarify the operator licensing processes independent from Part 55. We received a comment that Part 53 requirements are, in general, more complex than Part 55 requirements.

There was questioning of why there is a expansion of human factors scope. To also include a response to facilities just beyond control rooms.

There was question of whether the criteria for not having licensed operators was set to high. That that was, you know, too high of an obstacle for plants to get over.

There was a comment that we also consider autonomist operations for Part 53. And I will say that then we were receptive of the feedback but, again, we do account for autonomist operations. The possibility that they will appear in Part 53. For

Subpart F, at least.

If we can move on to the next slide, Slide 48 please. Okay. And again, this just continues those comments.

There was a comment that we should clarify the criteria for not having licensed operators. Again, accepting that the wording of the options on the criteria could be better stated.

There was a comment that we should clarify the extent of human factors engineering requirements in plant designs. There was a comment that we should ensure that requirements to Subpart F are consistent with other requirements for security as well.

There was a perspective that was expressed that safety functions are not all equal in terms of risk and that our requirements should reflect this instead of treating safety functions with equal and poor, as we do.

And then lastly, there was a concern expressed that the scope of licensed and certified operator requirements are being extended to general plant operations versus just those areas connected to nuclear safety.

And so, in presenting this feedback what I want to do is not necessarily go through and, I

guess speak to all these points, but rather just to show what those perspectives are and to point out that we're receptive to our stakeholder feedback. We want to get that feedback.

And we also want to get the feedback from this body as well so that we can incorporate that and consider it. And ultimately have the best possible rule at the end of this process. So, again, I just wanted to share what we received.

And so that completes my presentation. So if there is any questions or general discussion I just wanted to pause at this point for that.

(Simultaneously speaking.)

MEMBER HALNON: Yes, I'll just kind of summarize a little bit. I think that a lot more discussion, obviously, of certified operators, STAs, simulator, limited simulator stuff kind of stuff.

And just in general I think Bill said earlier that it would be good to maybe agree to address these things in another subcommittee meeting. I think, Dave, I'm not sure what you want to do from here on out, but I think that we, at least as a committee, should serve up some specific, either some concerns or additional topics that we'd like to have a deeper dive in to discuss where the Staff might be

going.

CHAIR PETTI: Yes, I think that's a good idea because we're talking about the December meeting so we need to turn that around. So if you wanted to leave that in a little email to members --

MEMBER HALNON: Yes.

CHAIR PETTI: -- and then we can pass that on to Derek, and he can pass that on to Bill and the team.

MEMBER HALNON: Yes. I'll pull the members and then correlate that into a, something and give it to you and Derek.

CHAIR PETTI: Okay. Given the lateness of the hour I don't think I want to pole the committee because, right, we are certainly going to continue discussions here. But I really wanted to get to the public comments. I feel bad because we're two hours behind the original agenda.

Is the MIT representative still on?

MR. DRAFFIN: Yes, I am.

CHAIR PETTI: Okay, thanks. Go ahead.

MR. DRAFFIN: Okay, thanks. My name is Cyril Draffin, the senior fellow for the U.S. Nuclear District Counsel.

And two weeks ago Nick and the nuclear

energy institute submitted comprehensive industry comments on Part 53 to the NRC. And some of you may have seen those comments from November 5th.

But I wanted to touch on them a little bit. Much thought and diligent effort have gone into those comments. NRC has asked for feedback, and so we got together.

Nuclear industry experts have engaged for decades in the design, licensing regulation, management operation of nuclear facilities. And they prepared these detail comments.

And we continued to believe that the NRC should enable the deployment of advance nuclear systems by crafting a streamlined risk informed and less burdensome regulatory approach that addresses safety and the current and future needs for advance nuclear deployment.

The industry letter provides detailed input on NRC's Part 53 preliminary language. Includes topics you've discussed today. And the stakeholder comments, where I've highlighted, appropriate features the staff has incorporated in Part 53 should be retained.

As well as suggested changes to a Part 53 rule that meets the statutory requirements of NEMA and

conforms to the NRC Commission direction in their staff memorandum.

We believe the changes proposed will achieve the goal where the final rule is used and useful. As described in the unified industry position letter dated July 14th. By being available for use of all technologies and risk informed licensing approaches, by being less burdensome over the lifecycle activities, rather than Part 50.52, and by being built upon performance related requirements define clear and objective acceptance criteria.

We believe that the NRCs current preliminary 53 rule language requires substantive change. Like you, for over a year we've actively participated in NRC public meetings, promptly identify concerns and provided robust recommendations to the staff to try to make Part 53 workable.

In our 112th page unified submission, Attachment A provides comments by specific topical areas addressing appropriate features and significant issues.

Attachment B provides detailed comments and proposed changes to former rule language.

Attachment C lists more than 20 USNIC submissions to the NRC regarding Part 53 from October

of 2019 until now. And the approximately 20 NEI submissions.

My second topic is the NRC presentation today on Part 5X. We believe the NRC does not need to pursue two parallel regulatory frameworks.

In fact, neither USNIC or NEI ever requested two frameworks. We have long recommended to the NRC they modify Part 53 to accommodate all risk informed approaches.

But we do not know why the NRC continues to frequently characterize as Part 5X as deterministic when in fact it's risk informed. And why the NRC does not state that including them, and QHOs in the rule language, creates a safety-based safety criteria.

In the NRC public meeting on this topic on October 28th the NRC Staff stated the original Part 53 rule language is not about P.A., but is about performance-based design criteria. And we agree.

But we ask why Part 53 must describe an LMP approach to P.A., the NRC responded, it's because the QHOs are in the rule. However, the NRC Staff has not justified why the QHOs should be in the rule and why the 30 years of president implementing the QHOs through policy statement is not viable for Part 53.

For considerable disadvantages to have the

QHOs in the rule language, and the few benefits. We hope the Staff's visions on QHOs in the rule is not related to a zeal to utilize LMP for all future licensing activities.

In our proposed changes, obviate the need for development of a Part 5X as a parallel regulatory framework, which we're discussing today. By making the current Part 53 language more flexible and inclusive, enjoying the need for excessive resources and time developing parallel networks.

As discussed this morning, we think Part 53 should be methodology neutral. And the P.A. language should be modified as one ACRS member called a linguistic change, to allow the P.A. in a supporting role, as well as a leading role, in Part 53.

The NRC Staff is aware that we do not want two parallel frameworks, and we'd encourage them not to use the stakeholder feedback as the justification for Part 5X. What we do want is the NRC to remove the unnecessary prescriptions to use P.A. according to LMP in Part 53.

Regarding staffing, since that was mentioned today, USNIC is supportive of flexibility and training requirements, and as I guess Jordan discussed, but we cannot yet be supportive of the

certification path until the guidance detail is available on how and whether the criteria for certification can actually be met.

For background, as my last point, the US in the 2021, this year, USNIC advance nuclear survey indicated 90 percent of advance nuclear developers think the useable Part 53 is important. The majority of developers were dissatisfied, or very dissatisfied, with the usefulness of the preliminary, this is the June Part 53 language.

And the results of our survey and the recently submission consolidated comments are available in our USNIC website, and on the NRC website. And certainly, I can provide you the ML numbers if you wish. So thanks for considering our comments.

CHAIR PETTI: Thank you. Any other public comments?

If you wish to make a comment, *6, to get your microphone on. State your name and your comments.

Okay, not hearing any I guess we're done. I don't want to hold people later than we have to. I just want to remind people that tomorrow's subcommittee meeting starts at 9:00 a.m. 7:00 a.m.

for those of us in the mountain time zone. For Kairos, 6:00 a.m. tomorrow morning. If you're on the west coast.

With that, let me thank the presenters, Bill and Boyce and Jesse. It was a very stimulating day of discussions. We look forward to continued discussions in the December meeting. And with that, let's adjourn the subcommittee meeting for today then. Everyone have a good evening.

(Whereupon, the above-entitled matter went off the record at 5:44 p.m.)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Advisory Committee on Reactor Safeguards (ACRS)
Future Plant Designs Subcommittee

10 CFR Part 53
"Licensing and Regulation of Advanced Nuclear Reactors"

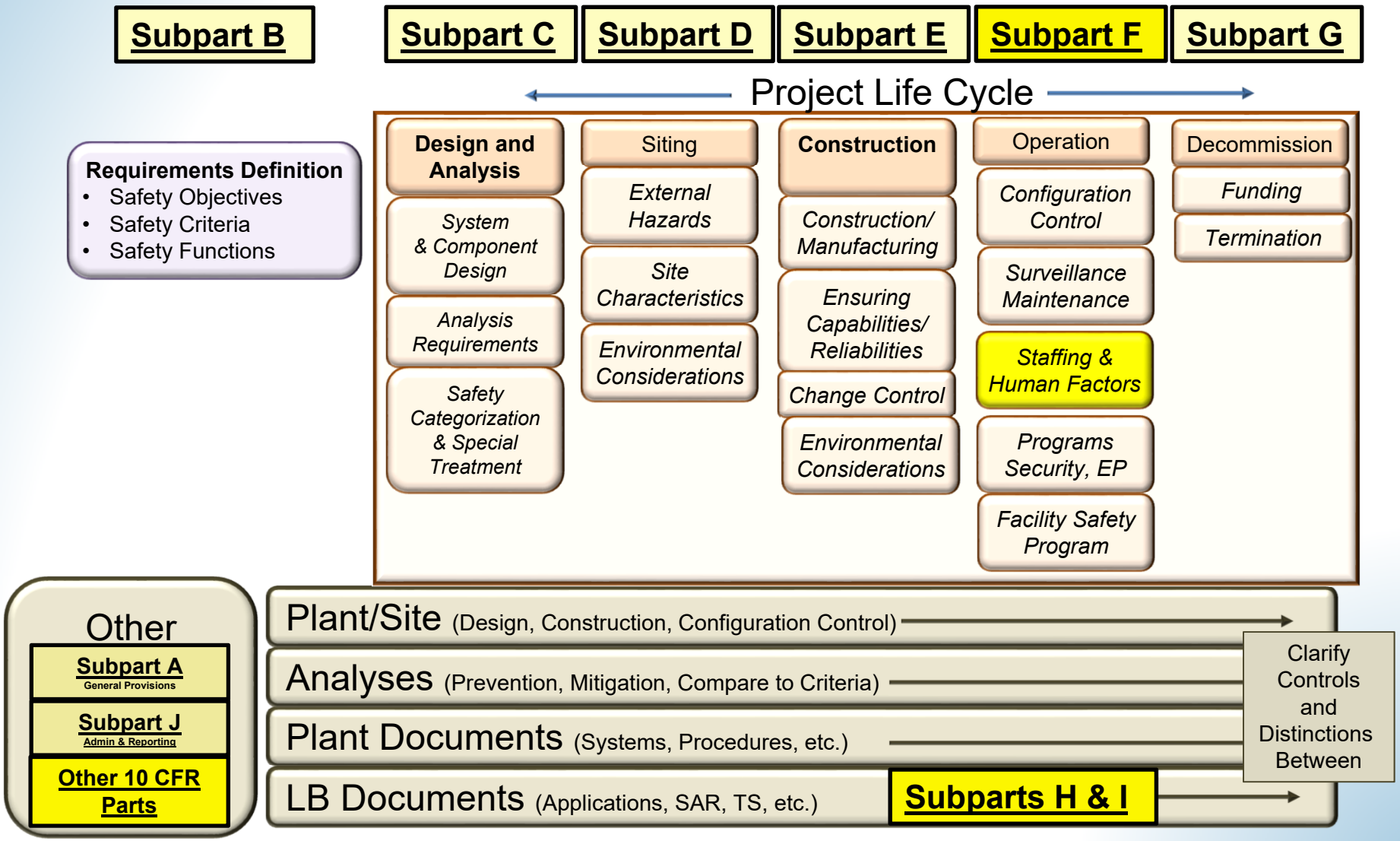
November 18, 2021

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Agenda

9:30am – 9:40am	Opening Remarks & Staff Introductions
9:40am – 1:00pm	Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"
1:00pm – 2:00pm	Lunch Break
2:00pm – 4:00pm	Subpart F, "Requirements for Operations," Sections related to staffing, training, personnel qualifications, and human factors
4:00pm – 5:15pm	Subpart H, "Licenses, Certifications, and Approvals," Sections related to Manufacturing Licenses, Construction Permits, Operating Licenses, and Combined Licenses
5:15pm – 5:30pm	Adjorn

NRC Staff Plan to Develop Part 53



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Current Status

Subpart	Subpart Description	Status
A	General Requirements	Released **1st** iteration, including initial definitions (April 2021)
B	Safety Criteria	Released **3rd** iteration (August 2021)
C	Design and Analysis	Released **3rd** iteration (August 2021)
D	Siting	Released **1st** iteration (April 2021)
E	Construction	Released **1st** iteration (April 2021)
	Manufacturing	Released **1st** iteration (April 2021)
F	SSCs	Released **1st** iteration (April 2021)
	Personnel	Released **1st** iteration (October 2021)
	Programs	Released **1st** iteration (April 2021)
G	Decommissioning	Under development (Planned release **December 2021**)
H	Licensing (LWA, ESP, SDA, DC)	Released **1st** iteration (August 2021)
	Licensing (ML, CP/OL, COL)	Released **1st** iteration (October 2021)
I	Maintaining Licensing Basis	Released **1st** iteration (August 2021)
J	Reporting & Financial	Released **1st** iteration (August 2021)
Part 5X	Deterministic Alternative	Released **1st** iteration (October 2021)
Part 73	Physical Security	**2nd** iteration planned release **November 2021**
	Cyber Security	**2nd** iteration planned release **November 2021**
	Access Authorization	Released **2nd** iteration (November 2021)
Part 26	Fitness-for-duty	Under development (Planned release **December 2021**)
Other	Conforming Changes	Under development
	SOC	Under development
	Regulatory Analysis	Under development

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Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

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Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

- NRC staff have received comments from stakeholders suggesting that a probabilistic risk assessment (PRA) should not be required in a leading role for licensing.
- Some stakeholders have also expressed a desire for a streamlined application for US/international designs.
- As a result, the staff have developed initial rule language for deterministic licensing framework for advanced reactors.
- This framework aims to be technology-inclusive with PRA used in a supporting role, and leverage Parts 50 and 52 regulations while aligning with IAEA standards.

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Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

- Including a traditional, deterministic option for advanced reactors includes:
  - Plan to leverage flexibility by considering dose-oriented emergency preparedness/siting/security (similar to ongoing rulemakings and what is being considered in Part 53)
  - Shared Parts 50 and 53 aspects: enable flexibility in meeting codes and standards (including those related to quality assurance requirements); addition of functional containment concept to make technology inclusive

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Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

- General Layout:
  - § 5X.210 Applicability
  - § 5X.220 Definitions
  - § 5X.230 Requirements
  - § 5X.240 Principal design criteria
  - § 5X.250 Anticipated Operational Occurrences and Design Basis Accidents
  - § 5X.260 Beyond design basis event sequences
  - § 5X.270 Severe accidents
  - § 5X.280 Functional containment
  - § 5X.290 Design requirements
- Staff is seeking feedback from stakeholders on the appropriate location for this preliminary proposed rule language (e.g., Part 50, Part 53, new Part).

Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

- § 5X.210 Applicability
- § 5X.220 Definitions
  - New definition of "reactor coolant pressure boundary"; alternative definition of "safety related" for non-light water reactors (non-LWRs)
- § 5X.230 Requirements
  - Overarching elements in line with existing requirements, identified separately in this section due to conflicts with existing language or for emphasis.
  - Consistent with the Commission policy, it is expected that the any plant under this section will reflect through its design, construction, and operation an extremely low probability for accidents that could result in the release of significant quantities of radioactive fission products.

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- § 5X.240 Principal design criteria
  - This section more directly calls out principal design criteria and their role. Use of a deterministic approach is likely to rely more on top level design goals in the form of design criteria as opposed to a more integrated assessment.
  - This language would allow for the use of the criteria in IAEA SSR 2/1 - the applicable standards envisioned for use include but are not limited to: the existing general design criteria, Regulatory Guide 1.232, and IAEA SSR 2/1.
  - Staff is still evaluating how to include light water reactors (LWRs) in applying this section

Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

- § 5X.250 Anticipated Operational Occurrences and Design Basis Accidents
  - (b)(1): These requirements are consistent in concept with existing regulations and international standards for these classes of events. Applicants should provide analysis for anticipated operational occurrences (AOOs) and design basis accidents (DBAs), and features used to mitigate and prevent these events should be safety related.
  - (b)(5)-(7) The requirements provide an avenue for an applicant to provide bounding analyses for some or all of the analytical requirements for this part.
    - To some extent, this is consistent with existing practice – a single analysis to cover a category of event (e.g., overcooling) is often provided as part of a safety analysis. This would go a step further and allow for bounding analyses (potentially involving non-realistic assumptions) to be provided to cover larger portions of the AOO and DBA analytical space, provided the analysis envelopes the full range of conditions it is stated to bound.
    - This section incorporates requirements adapted from § 50.46 - applicants are required to identify surrogate safety acceptance criteria, akin to peak cladding temperature for LWRs, and track and report errors in the analysis for these acceptance criteria. For LWRs, staff expects § 50.46 criteria will be the ones chosen.

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- § 5X.260 Beyond design basis events
  - This section replaces station blackout and anticipated transient without scram regulations with a broader category of events and draws on the international concept of defense-in-depth (DID) level 3b or 4a.
  - Requires applicants to evaluate and provide prevention/mitigation features (non-safety related) against events more severe than DBAs based on operating experience, engineering judgement, and sequence-based assessment. These structures, systems and components (SSCs) that are credited should have quality treatments in accordance with their function.
  - (c): The bounding analyses that may be used for AOO or DBA requirements may be expanded for use by applicants here.

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- § 5X.270 Severe accidents
  - These requirements replace existing severe accident requirements. This section borrows from the international concept of DID level 4 or 4b.
  - Severe accidents for non-LWRs are not defined to the same degree as LWRs; events evaluated in this section should involve some level of fuel or core damage, based on the event criteria outlined in this section.
  - (b): Requires applicants consider DID (no reliance on a single SSC/barrier) and mitigate against more severe potential scenarios. Provides avenues for crediting barrier mitigation and excluding some events. Staff expects there would be a frequency threshold for this exclusion for applicants leveraging a PRA. The "residual risk" portion is subject to change.

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- § 5X.280 Functional containment
  - These requirements replace containment-related regulatory requirements. They establish what constitutes a functional containment and makes functional containment SSC qualification commensurate with the purpose of the component (safety related for AOOs/DBAs, special treatment for beyond design basis events (BDBEs))
- § 5X.290 Design requirements
  - Limiting condition for operation (LCO) criteria (A) relates to the reactor coolant pressure boundary; LCO criteria (D) is based on PRA and operating experience. This provision would drop those, provided barrier requirements are captured.
  - (b) – This serves to catch additional Part 50 regulations that conflict with this section and could change as the Part 53 provisions are added.

Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

Additional areas being explored for use from Part 53:

- Special treatment – In addressing the requirements associated with paragraph (e) of this section, applicants are required to identify appropriate treatments for SSCs relied on to mitigate these events. In identifying these treatments, applicants may use the framework set forth in § 53.YYY.
- Siting considerations – In lieu of (*identify full set of 50/52 siting requirements*), applicants may apply § 53.5XX to determine site boundary areas and populations considerations.
- Emergency preparedness (EP) requirements – In lieu of §§ 50.54(q), 50.54(t) (*identify full set of 50/52 EP requirements*), applicants may apply § 53.5XX to determine EP requirements.
- Security requirements – As an alternative to the requirements set forth in §§ 50.34(c), 52.79(a)(35), and *(identify other appropriate requirements here*), applicants may apply § 73.YY in lieu of the requirements necessary to satisfy the cited physical security requirements.

Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

Major themes from the feedback received during the October 28th public meeting with stakeholders:

- Part 5X scopes in applicants and licensees beyond just advanced reactors, which goes beyond the intent of NEIMA and Commission direction for the Part 53 rulemaking.
- The term "PRA" encompasses a lot of elements: PRA tools vs. PRA insights vs. a full PRA. All parties need to be more precise when referring to this term to avoid misunderstandings.
- Instead of "parallel paths" for Part 5X and Part 53, Part 53 should be modified to allow for Part 5X approaches.

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Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

Major themes from the feedback received during the October 28th public meeting with stakeholders:

- The NRC has created a binary choice for how PRA is used, when in reality designers are using PRA and deterministic tools in a more collaborative fashion.
- The NRC should set boundaries and standards and leave decisions about the approach to meet those boundaries and standards up to the applicant and licensee.
- The preliminary proposed rule language reads as if the NRC is over-regulating the design of reactors when the agency's focus should be on evaluating the safety case.
- Part 5X brings BDBEs into the design basis when it could be treated as a licensing basis issue with mitigation.

Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

- Next steps on the preliminary proposed deterministic option include:
  - Evaluate feedback from stakeholders and continue to iterate on the proposed rule language in order to produce a high quality, usable option.
  - Assessing the placement of the traditional, deterministic option within the NRC's regulations.

Part 5X Supplement, "Technology-inclusive alternative requirements for commercial nuclear plants"

Discussion

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MEETING BREAK

Meeting to resume in 1 hour

Part 53 General Layout

- Subpart A, General Provisions
- Subpart B, Technology-Inclusive Safety Objectives
- Subpart C, Design and Analysis
- Subpart D, Siting Requirements
- Subpart E, Construction and Manufacturing Requirements
- Subpart F, Requirements for Operation
  - Staffing, Training, Personnel Qualifications, and Human Factors Requirements
- Subpart G, Decommissioning Requirements
- Subpart H, Applications for Licenses, Certifications and Approvals
- Subpart I, Maintaining and Revising Licensing Basis Information
- Subpart J, Reporting and Administrative Requirements

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

Overview of §§ 53.750-799 Structure and Key Content

- §§ 53.750-759: General Requirements
  - § 53.753: Technical Requirements for operating license (OL) and combined license (COL) Applicants
    - Human Factors Engineering (HFE) design requirements
    - Human-System Interface (HSI) design requirements
    - Concept of Operations (ConOps), Functional Requirements Analysis (FRA), and Function Allocation (FA) requirements
    - Staffing Plan requirements
    - Licensed & Certified Operator program requirements
  - § 53.755: Conditions of Licenses for OL and COL Holders
    - Provisions for not using licensed operators and criteria
    - Provisions for load-following
- §§ 53.760-769: Operator Licensing Requirements.
  - Training, examination, requalification, and simulator requirements.
- §§ 53.770-779: Operator Certification Requirements.
- §§ 53.780-789: General Training and Qualification Requirements.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.750-759: "General Staffing, Training, Personnel Qualifications, and Human Factors Requirements"

- This section fulfils a role similar to certain aspects of the § 50.34(f) post-Three Mile Island requirements, § 50.54 conditions of facility licenses requirements, and Part 55 operator licensing requirements.
- A major difference is that the requirements established in areas of HFE, staffing, and operator qualification are directly linked to design-specific safety functions and their fulfillment.
  - HFE is required where needed to support safety functions, versus being generically applied to a control room.
  - Operator staffing is required to the extent necessary to support design-specific needs for safety function fulfilment, versus relying upon a prescribed number of reactor operators (RO) and senior reactor operators (SRO).
  - The fundamental role of the licensed operator centers around the management and fulfilment of safety functions, in addition to the manipulation of facility controls.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.750, "General Staffing, Training, Personnel Qualifications, and Human Factors Requirements"
  - Contains applicability and definitions
- § 53.751, "Communications," and § 53.752, "Information Collection"
- § 53.753, "Defining, fulfilling, and maintaining the role of personnel in ensuring safe operations"
  - Requires OL and COL applicants to develop, implement, and maintain specific measures (covered by §§ 53.753(a)–(g)) to ensure that human actions needed to fulfil safety functions, prevent or mitigate licensing basis events (LBE), or otherwise meet safety criteria are satisfied.
  - § 53.753(a) is the HFE design requirement (serving a similar role to that of § 50.34(f)(2)(iii)) and is performance-based. Facility designs must reflect state-of-the-art human factors principles for safe and reliable performance in all settings that human activities are expected for performing or supporting the continued availability of plant safety or emergency response functions.
    - Guidance for reviewing this performance-based HFE requirement in a scalable manner is being developed by the staff via an Interim Staff Guidance (ISG).

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- § 53.753, "Defining, fulfilling, and maintaining the role of personnel in ensuring safe operations" (continued)
  - § 53.753(b) contains HSI design requirements (similar to elements of § 50.34(f)) and requires facility designs to provide for the following to support operators in monitoring plant conditions and responding to plant events:
    - features for displaying to operators a minimum set of parameters that define the safety status of the plant,
    - automatic indication of bypassed and operable safety system status,
    - direct indication of SSC status that relates to the ability of the SSC to perform its safety function,
    - instrumentation to measure, record, and readout key plant parameters related to the performance of SSCs and the integrity of barriers important to fulfilling safety functions,
    - leakage control and detection in the design of systems that pass-through barriers to the release of radionuclides, and
    - monitoring of in-plant radiation and airborne radioactivity as appropriate for a broad range of routine and accident conditions.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.753, "Defining, fulfilling, and maintaining the role of personnel in ensuring safe operations" (continued)
  - § 53.753(c) requires an applicant to provide a ConOps.
  - The ConOps must address the following:
    - facility goals,
    - the roles and responsibilities of personnel and automation that are responsible for completing plant functions,
    - staffing, qualifications, and training,
    - the management of normal operations,
    - the management of off-normal conditions and emergencies,
    - the management of maintenance and modifications, and
    - the management of tests, inspections, and surveillance tasks.
  - § 53.753(d) requires FRA & FA
    - FRA must address how safety functions are satisfied.
    - FA must describe how safety functions will be assigned to human action, automation, active safety features, passive safety features, or inherent safety characteristics.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.753, "Defining, fulfilling, and maintaining the role of personnel in ensuring safe operations" (continued)
  - § 53.753(e) requires a description of the program for evaluating/applying operating experience.
  - § 53.753(f) requires a staffing plan that describes the numbers, positions, and qualifications of licensed operators and senior licensed operators or, if applicable, certified operators across all modes of plant operations.
    - The staffing plan must also describe personnel providing support in areas such as plant operations, equipment surveillance and maintenance, radiological protection, chemistry control, fire brigades, engineering, security, and emergency response.
    - Plants that require licensed operators must also describe how the proposed licensed operator staffing will be sufficient to provide assurance that plant safety functions can be maintained; this must be supported by HFE analyses and assessments.
      - This provision for flexible licensed operator staffing is a significant change from current § 50.54(m) control room staffing requirements.
      - Guidance for evaluating these staffing plans is being developed by the staff in the form of an ISG to be used in conjunction with NUREG-1791

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- § 53.753, "Defining, fulfilling, and maintaining the role of personnel in ensuring safe operations" (continued)
  - While not addressed by the staffing plan requirements of § 53.753(f), it is important to note that, at present, the staff preliminarily do not intend to require the Shift Technical Advisor (STA) position for Part 53 applicants.
    - 1985 Policy Statement on engineering expertise on shift (50 FR 43621) stated that the STA requirement was an interim measure until goals that included upgrading HSIs and operator training were achieved.
      - Current staff perspective is that the upgrades to HSIs and operator training envisioned within this Policy Statement will be the norm under Part 53 and driven by multiple regulatory requirements.
      - This represents a policy issue and the staff intend to use the Part 53 rulemaking process as a vehicle for Commission engagement.
  - § 53.753(g) requires applicants to describe their programs for the operator licensing initial training program, the operator licensing examination program, and the operator licensing requalification program.
    - Facilities using certified operators (a new, non-licensed role) must instead submit the corresponding programs for operator certification.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.754, "General Exemptions"
- § 53.755, "Conditions for Operations Staffing for OLs and COLs"
  - § 53.755(a) requires facility licensees to have licensed operators unless they can meet criteria contained in § 53.755(b) to use certified operators.
  - § 53.755(b) contains the requirements that must be met in order to justify not using any licensed operators as a part of facility staffing.
    - There are presently two different staff proposals for these criteria.
    - The first proposal would require the following:
      - No human actions for event mitigation required to meet safety criteria, achieve safety functions, or provide DID.
      - PRA demonstrating the evaluation criteria for each event sequence can be met without human action for mitigation;
      - LBE response not needing human action for SSCs to perform.
    - The second proposal would require the design-basis accident safety criteria to be met without mitigation by human actions, active engineered features, or passive design features (except passive features that can survive LBEs and not be defeated by credible human errors).

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.755, "Conditions for Operations Staffing for Operating or Combined Licenses under this Part" (continued)
  - § 53.755(c) restricts control manipulations to licensed or certified operators.
  - § 53.755(d) requires operator requalification training programs to commence concurrent with when licensing or certification exams are first administered.
  - § 53.755(e) requires that operations (other than control manipulations) affecting reactor power level only occur while plant conditions are being monitored by a licensed or certified operator.
    - However, load-following is permitted if one of the following can immediately refuse demands from the grid operator when they could challenge safe operation or if precluded by equipment conditions:
      - the actuation of an automatic protection system,
      - an automated control system; or
      - a licensed or certified operator.
  - § 53.755(f) requires plants with licensed operators to include SROs.
  - § 53.755(g) requires that the facility licensee must maintain the staffing complement described under their approved facility staffing plan.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.755, "Conditions for Operations Staffing for Operating or Combined Licenses under this Part" (continued)
  - § 53.755(h) requires SRO supervision of core alterations (e.g., refueling).
    - Those facilities that do not require any licensed operator staffing are instead required to use a certified operator in an equivalent manner.
    - This does not apply to facilities capable of refueling online/at power.
  - § 53.755(i) contains specific requirements for plants using certified operators
    - Certified operator are responsible for specified administrative functions.
    - Certified operator staffing must provide for continuity of responsibility for facility operations at all times during the operating phase.
    - Continuous monitoring of fueled units with the following capabilities:
      - receiving plant operating data and parameters
      - the ability to immediately initiate a reactor shutdown
      - the ability to promptly dispatch ops and maintenance personnel
      - the ability to implement any emergency plan responsibilities
      - conducting reactivity manipulations that require human action

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.755, "Conditions for Operations Staffing for Operating or Combined Licenses under this Part" (continued)
  - Allowing non-licensed, certified operators to manipulate plant controls and conduct reactivity changes represents a policy issue; the staff intend to use the rulemaking process as a vehicle for Commission engagement.
  - § 53.755(j) allows facility licensees to take reasonable actions that depart from license conditions and technical specifications (TS) in emergency situations when the action is immediately needed to protect the public health and safety.
    - This is comparable to the provision of § 50.54(x)
  - § 53.755(k) limits the authority to invoke (j) above to an SRO, a certified operator, or at those plants which have permanently ceased operations, to a senior licensed operator, a certified operator, or a certified fuel handler, as applicable.
    - This is comparable to the requirement of § 50.54(y).

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.756, “Medical Requirements”
  - § 53.756(a) requires that applicants for RO and SRO licenses must have medical examinations by a physician; licensed ROs and SROs must have ongoing medical examinations by a physician every two years.
    - In a comparable manner, certified operators must have a medical examination prior to certification and every two years thereafter.
    - The physician must determine that the individual’s medical condition and general health will not adversely affect the performance of assigned operator job duties or cause operational errors endangering public health and safety.
  - § 53.756(b) requires facility licensees to submit the medical certifications that are required for licensed operators to the Commission.
    - These submittals are not required for certified operators.
  - § 53.756(c) requires facility licensees to retain the results of medical examinations for both licensed and certified operators and to provide the documentation to the Commission upon request.
- § 53.757, “Violations,” and § 53.758, “Criminal Penalties”

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.760-769: Operator Licensing Requirements (for Part 53 facilities)

- § 53.760, "Operator Licensing"
  - Describes applicability of the requirements in §§ 53.760-769.
- § 53.761, "License Requirements"
  - Requires facility licensees to authorize SROs and ROs to perform roles.
- § 53.762, "Completeness and Accuracy of Information "
- § 53.763, "Incapacitation Because of Disability or Illness"
  - Requires Commission notification for permanent medical conditions.
- § 53.764, "Applications for licensed operators"
  - § 53.764(a) describes how to apply and what must be included:
    - NRC Form 398 (the staff intend to provide guidance on content)
    - Evidence of competence in control manipulations (no prescribed number) via either the facility or a simulation facility.
    - Medical certification
  - § 53.764(b) describes the disposition of applications.
  - § 53.764(c) describes the re-application process (no waiting periods)

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.760-769: Operator Licensing Requirements (continued)

- § 53.765, "Training Program" (for Licensed Operators)
  - § 53.765(a) requires initial licensed operator training programs to:
    - Be based upon a systems approach to training
    - Ensure that license applicants at the facility will possess the knowledge, skills, and abilities necessary to:
      - protect the public health, and
      - maintain design-specific plant safety functions
    - Be approved by the Commission prior to use for license training
  - § 53.765(b) requires facilities to establish a licensing examination program to test the knowledge, skills, and abilities for ROs and SROs.
    - This must include the exam methods and criteria used to assess passing performance and have Commission approval before use.
    - Guidance for reviewing these facility-developed operator licensing exam programs is being developed by the staff via an ISG.
    - Facility licensees will be allowed to administer licensing exams; however, the Commission will reserve the ability to do so also.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.765, "Training Program" (for Licensed Operators) (continued)
  - § 53.765(c) requires facilities to establish requalification training programs for licensed operators. These programs must:
    - Be based on a systems approach to training
    - Ensure that ROs and SROs maintain the knowledge, skills, and abilities necessary to protect the public health and maintain those plant safety functions specific to the facility design.
    - Be conducted for a continuous period not to exceed 24 months.
    - Be approved of by the Commission.
  - Facilities must propose a biennial requalification exam program for testing topics from the requalification training program, including both the exam methods and criteria to be used to assess passing performance. This program must be approved by the Commission and exams must be administered biennially.
    - Guidance for reviewing these facility-developed, licensed operator requalification exam programs is being developed by the staff via an ISG.
  - § 53.765(d) requires examination integrity (similar to § 55.49)

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

- § 53.765, "Training Program" (for Licensed Operators) (continued)
  - § 53.765(e) establishes simulation facility requirements for plants required to have licensed operator staffing (separate, less stringent, simulation facility requirements are provided for plants with certified operators). Key aspects are:
    - Full-scope simulators are not mandated; partial scope simulators may be acceptable provided that the scope is adequate to meet intended usage.
    - Simulation facilities must be approved by the Commission if the facility licensee will rely upon them for training purposes, meeting experience requirements (e.g., reactivity changes), or for initial or requalification examinations.
    - Use of a simulation facility for conducting HFE analyses or assessments requires demonstrating that adequate simulator scope is provided as well.
    - Prior to initial fuel load, simulator models are allowed to replicate intended initial core loads; this supports operator licensing during construction.
  - § 53.765(f) establishes requirements for waivers of exam requirements, including those instances when additional units are constructed at multi-unit sites.
  - § 53.765(g) requires that facilities establish Commission-approved programs for both maintaining and re-establishing licensed operator proficiency.
    - This is a different that the prescriptive approach of Part 55 for proficiency.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.760-769: Operator Licensing Requirements (continued)

- § 53.766, "Conditions of Licensed Operator and Senior Licensed Operator Licenses"
  - Comparable to the corresponding requirements of Part 55
- § 53.767, "Expiration and Renewal of Licenses"
- § 53.768, "Issuance, Modification, and Revocation of Licenses"
- In general, it should be noted that §§ 53.760-769 propose a framework for an operator licensing pathway independent of that contained within Part 55. However, the extent to which this operator licensing pathway will remain independent from Part 55 is an area of ongoing work by the staff and is subject to change under future iterations of the preliminary rule language.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.770-779: Operator Certification Requirements

- Certified operators (defined under Part 53) are individuals certified to manipulate facility controls but not licensed by the Commission.
  - Certified operators are not credited for fulfilling safety functions.
- § 53.770, "Operator Certification"
  - Describes applicability of §§ 53.770-779.
- § 53.771, "Certification Requirements"
  - Requires individuals to hold a certification issued by the facility licensee (not the Commission) to perform the function of a certified operator.
  - Requires the processes used by facilities to establish, administer, and maintain their certified operator programs to comply with Part 53.
- § 53.772, "Incapacitation Because of Disability or Illness "
  - Requires facility licensees to immediately remove individuals from the performance of certified operator duties in that event that medical requirements are not met due to permanent physical or mental conditions.
    - Allows for medical restrictions if they can accommodate the medical issue, provided that compliance with restrictions are maintained.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.770-779: Operator Certification Requirements (continued)

- § 53.773, "Training Program" (for Certified Operators)
  - § 53.773(a) requires initial operator certification training programs to:
    - Be based upon a systems approach to training
    - Ensure that certified operator trainees will possess the knowledge, skills, and abilities necessary to protect the public health.
    - Be approved by the Commission prior to use.
  - § 53.773(b) requires facilities to establish an examination program to test the knowledge, skills, and abilities for certified operators.
    - This must include the exam methods and criteria used to assess passing performance and have Commission approval before use.
    - Guidance for reviewing these facility-developed, certified operator exam programs is being developed by the staff via an ISG.
    - Facilities would develop, administer, and grade certification exams.
    - Facilities would also issue operator certifications (not the NRC).
    - The Commission would reserve the ability to observe the process.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.770-779: Operator Certification Requirements (continued)

- § 53.773(c), requires facilities to establish continuing training programs for certified operators. These programs must:
  - Be based upon a systems approach to training
  - Ensure that certified operators maintain the knowledge, skills, and abilities necessary to protect the public health
  - Be approved by the Commission prior to use.
- Facility licensees must also propose a requalification exam program for testing continuing training topics. This program must include the examination methods and criteria to be used to assess passing performance.
  - Facilities must also propose the periodicity for requalification exam administration (a difference from licensed operator requalification exam periodicity).
  - This program must be approved by the Commission prior to its use.
  - Guidance for reviewing these facility-developed, certified operator requalification exam programs is being developed by the staff via an ISG.
  - As operator certifications do not have renewal requirements, continuing training program records are instead retained while operators remain certified at the facility (different from licensed operator requalification programs).

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.770-779: Operator Certification Requirements (continued)

- § 53.773(d), requires examination integrity (similar to § 55.49)
- § 53.773(e), establishes simulation facility requirements for plants with certified operators (separate simulation facility requirements are provided for plants with licensed operators). Key aspects are:
  - Full-scope simulators are not mandated; partial scope simulators may be acceptable provided that the scope is adequate for intended usage.
  - The simulation facilities at those facilities using certified operators do not require Commission approval. However, certain requirements apply if the facility will use them for training, meeting experience requirements (e.g., reactivity changes), or for initial/requalification exams.
  - Using a simulation facility for conducting HFE analyses or assessments requires demonstrating that adequate simulator scope is provided.
  - Prior to initial fuel load, simulator models are allowed to replicate the intended initial core load; this supports operator certification during construction.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.770-779: Operator Certification Requirements (continued)

- § 53.773(f), allows the facility licensee to waive examination requirements in accordance with their approved training and qualification program.
- § 53.765(g) requires that facilities establish a program for maintaining certified operator proficiency on position functions and plant status, as well as for re-establishing certified operator proficiency when needed.
  - This program does not require Commission approval (different from the requirement for facilities with licensed operators).
- § 53.774, “Issuance of Certificates” (for Certified Operators)
  - Requires that facility licensees ensure that individuals meet the following requirements prior to being issued operator certifications:
    - completion of either a high school diploma or GED
    - satisfactory completion of the approved initial training program
    - passing of an initial operator certification examination
    - demonstration of competence in conducting control manipulations
    - meeting medical condition requirements (restrictions allowed)

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.770-779: Operator Certification Requirements (continued)

- § 53.775, "Conditions of Certificates"
  - Establishes requirements that facility licensee must ensure are met for each certificate it issues to certified operators. These include:
    - Limiting certifications to the facility specified in the certificate (but no limit is placed on how many facilities individuals can certify at).
    - Completion of the continuing training program.
    - Passing of the periodic continuing training examination.
    - Biennial medical examination.
    - Maintaining proficiency in accordance with the facility program.
    - Fitness for Duty requirements regarding drug and alcohol usage.
    - Commission notification for felony convictions.
- § 53.776, "Expiration"
  - Operator certifications must be terminated at the end of employment or upon determination by that the individual no longer needs certification.
  - Commission renewal and revocation are not applicable to certifications.

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Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

§§ 53.780-789 Training and Qualification of Commercial Nuclear Plant Personnel

- Addresses personnel training requirements other than those directly associated with the training of licensed and certified operators.
- This section fulfils a role similar to that of the § 50.120 training rule.
- § 53.780, “Operator Certification”
  - Describes applicability of §§ 53.780-789.
- § 53.781, “Training and Qualification Requirements”
  - Requires training programs to be established with sufficient time to provide trained and qualified personnel to operate the facility prior to fuel load (a difference compared to 18-month requirement of § 50.120).
  - Requires use of a systems approach to training.
  - Requires the training and qualification of supervisors, technicians, and other appropriate operating personnel to be provided for.
    - Categories of personnel are more generic than § 50.120 to accommodate greater flexibilities in roles and responsibilities.
  - Requires record retention to allow for NRC inspection of programs.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

Major themes from the feedback received during the October 26th public meeting with stakeholders:

- Clarify independence from Part 55 – identify areas of needed distinction between Part 55 and Part 53, and potential changes resulting from them.
- Part 53 requirements are more complex than Part 55 requirements.
- Why is there an expansion of human factors to response facilities/offsite included in the rule?
- Do the criteria for not having licensed operators set too high of a bar?
- Consider autonomous operations for Part 53.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

Major themes from the feedback received during the October 26th public meeting with stakeholders:

- Clarify criteria for no licensed operators (e.g., clarify human actions).
- Clarify extent of HFE requirement in plant designs.
- Ensure that these requirements are consistent with security requirements.
- Safety functions are not all equal in terms of risk (e.g., AOO vs. DBA), but the NRC does not seem to be appropriately distinguishing as it creates requirements.
- Concern that licensed/certified operator requirements extend to general plant operations, not just areas connected to nuclear safety.

Subpart F – Staffing, Training, Personnel Qualifications, and Human Factors Requirements

Discussion

Part 53 General Layout

- Subpart A, General Provisions
- Subpart B, Technology-Inclusive Safety Objectives
- Subpart C, Design and Analysis
- Subpart D, Siting Requirements
- Subpart E, Construction and Manufacturing Requirements
- Subpart F, Requirements for Operation
- Subpart G, Decommissioning Requirements
- Subpart H, Licenses, Certifications and Approvals
  - Manufacturing Licenses, Construction Permits, Operating Licenses, and Combined Licenses
- Subpart I, Maintaining and Revising Licensing Basis Information
- Subpart J, Reporting and Administrative Requirements

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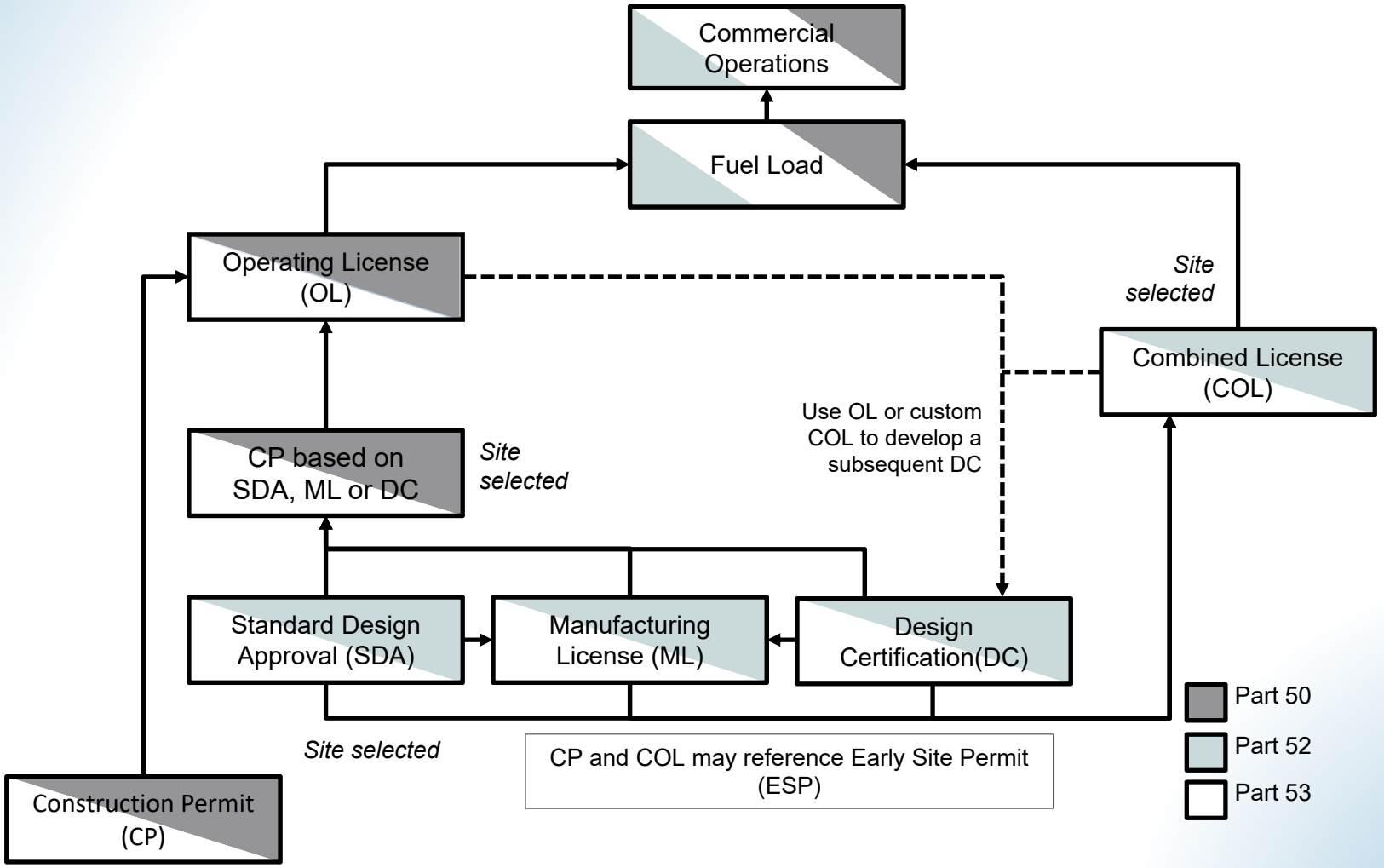
Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

Leveraging and Combining Existing Licensing Processes



Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- As noted in the Subpart H Part 1 discussion, several issues relate to items being addressed in the ongoing lessons learned rulemaking for Parts 50 and 52 and reconciliation will occur later.
  - The first iteration of Subpart H largely reflects the current version of Parts 50 and 52.
- Application requirements tailored to match Part 53 technical requirements.
  - Goal is to not have technical requirements only contained in Subpart H content of application sections
- Guidance for the technology inclusive content of application project (TICAP) and advanced reactor content of application project (ARCAP) will support Part 53.

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

General format for contents of applications sections for each permit / license type:

- Section for general information
  - Supplement the information required by § 53.1130 Contents of applications; general information—Provides the equivalent of § 50.33 for general content information applicable to all applications or a subset of applications.
- Section for technical information in the safety analysis report (SAR)
  - Site information—equivalent to that required for an ESP as base-line
  - Design information—equivalent to that required for a DC as base-line
    - Staff is considering how to address the role of CP in Part 53, especially with respect to application aspects that are not yet fully developed
- Section for other application content
  - Examples: environmental report; TS; availability controls; inspections, tests, analyses, and acceptance criteria (ITAAC) (for COLs)

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- § 53.1162 Relationship between sections
  - This is a new section that will be updated to include text from other Part 52 sections on "Relation to other subparts," as well as explain relationships with Part 50 licensing processes.
    - Discussions on the interrelationships for MLs and CPs is warranted
    - Addressing references in an OL application (e.g., ESP) that were not included at the CP stage
  - Staff is considering incorporating concept of referencing an ESP and/or DC generically upfront in this section (§ 53.1162, Relationship between sections)

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1240-53.1249 Manufacturing Licenses
  - Using term “reactor module”—part of the plant that is subject to ML
  - Accommodates factory installation of fuel
    - Appropriate licenses must be issued (e.g., Part 70)
  - § 53.1245 Contents of Applications; Technical Information in Final Safety Analysis Report
    - (b)(3)(i) Interface requirements
      - Guidance will be needed to address how to make the construct of interface requirements workable for an ML that is referenced in a CP/OL (normally addressed through ITAAC).
    - (d) Deployment of the completed nuclear reactor module
      - Designer, manufacturer, and applicant for a facility could all be separate entities—interface requirements will be important based on different deployment strategies
    - (e) Special considerations for factory fueling

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1240-53.1249 Manufacturing Licenses
  - § 53.1245 Contents of Applications; other application content
    - Application that includes the installation of fuel at the factory
      - Must discuss severe accident mitigation design alternatives for the reactor module while at the factory
      - Must discuss severe accident mitigation alternatives for the facility itself
  - § 53.1247 Standards for Review of Applications, Referral to ACRS, and Issuance of a Manufacturing License
    - This section does not address the potential removal of the manufactured reactor module from the operating site.
    - Interface requirements important for manufacture, transport, storage (at site), installation, operation, removal, storage (at site), transport, refurbishment, and disposal of a reactor module.
    - Part 53 may not address the back end of this cycle.

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1240-53.1249 Manufacturing Licenses
  - § 53.1249 Duration, transfer, and renewal of manufacturing licenses
    - Based on Part 52 requirements
    - (c)(iii) prohibits beginning manufacture of a reactor module less than 6 months before the expiration of the license (revised from 3 years in Part 52)

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1260-1269.1 Construction Permits
  - § 53.1265 Contents of applications; technical information in preliminary safety analysis report
    - (a) Site information—equivalent to that required for an ESP as base-line
    - (b) Design information—equivalent to that required for a DC as base-line
      - May include aspects of the design that are not fully developed—completed design described in the final safety analysis report (FSAR) that supports the OL application
      - Plan for future analysis, research and development, test programs, and/or experience that required demonstration for design features that fulfill functional design criteria—available for the OL application
    - PRA and its results required by § 53.450(a) for plants prior to construction based on the design and information available at the time of the application.
    - PRAs inherently less detailed and supported by a list of assumptions that will be subsequently verified or revised when the plant is built.
    - The updated information and results will be described in the FSAR.

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1260-1269.1 Construction Permits
  - § 53.1265 Contents of applications; technical information in preliminary safety analysis report.
  - As previously noted, staff is considering how to address the role of the CP in Part 53, including interfaces with other licensing processes
  - Some expected changes to DC application requirements include:
    - Adding provisions to address design requirements in § 53.440 such as fire protection, degradation mechanisms, and minimization of contamination (§ 20.1406)
    - Adding a provision for designs needing to periodically replace major components to describe design elements and associated programmatic controls needed to support the removal, replacement, and storage of the subject components.
    - A description of the assessment related to the role of personnel in ensuring safe operations considering the analyses required by § 53.753. This preliminary assessment for a CP will include initial estimates of staffing plans and the anticipated operations staffing using the criteria in § 53.755.

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1270-1279 Operating Licenses
  - § 53.1275 Contents of applications; technical information in final safety analysis report
    - Revised like other sections to reference ESPs and DCs as baseline and supplement for content of application.
    - The FSAR will include and, as needed, update information provided in the preliminary safety analysis report which was submitted and reviewed to support the CP.
  - As previously noted, staff considering how to address references in an OL application (e.g., ESP) that were not included at the CP stage

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Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

- §§ 53.1280-1310 Combined Licenses
  - § 53.1289 Contents of applications for combined licenses; technical information in final safety analysis report
    - (a)(1) and (a)(2) reference DC for design information and ESP for site information, respectively, as baseline
    - (d), (e), (f), and (g) provide requirements that apply if the COL application references an ESP, SDA, DC, and/or ML, respectively
      - Considering if this can be done generically upfront for all license types
  - § 53.1304 Finality of combined licenses; information requests
    - Paragraphs (b), (c)(2) and (d)(2) may need to be updated if all applicable change processes are not captured in Subpart I.
- § 53.1400 Standardization of Nuclear Power Plant Designs: Licenses To Construct and Operate Nuclear Power Reactors of Identical Design at Multiple Sites

Subpart H – Licenses, Certifications, and Approvals Part 2: MLs, CPs, OLs, and COLs

Discussion

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Final Discussion and Questions

Acronyms and Abbreviations

ACRS	Advisory Committee on Reactor Safeguards
AOO	Anticipated operational occurrence
ARCAP	Advanced reactor content of application project
BDBE	Beyond design basis event
CFR	Code of Federal Regulations
COL	Combined license
ConOps	Concept of operations
CP	Construction permit
DBA	Design basis accident
DC	Design certification
DID	Defense-in-depth
EP	Emergency preparedness
ESP	Early site permit
FA	Function allocation
FRA	Functional requirements analysis
FSAR	Final safety analysis report
HFE	Human factors engineering
HSI	Human-system interface
IAEA	International Atomic Energy Agency
ISG	Interim staff guidance
ITAAC	Inspections, tests, analyses, and acceptance criteria
LB	Licensing basis
LBE	Licensing basis event
LCO	Limiting condition for operation

Acronyms and Abbreviations

LWR	Light water reactor
ML	Manufacturing license
NEIMA	Nuclear Energy Innovation and Modernization Act
non-LWR	Non-light water reactor
NRC	U.S. Nuclear Regulatory Commission
NUREG	U.S. Nuclear Regulatory Commission technical report designation
OL	Operating license

PRA	Probabilistic risk assessment
RO	Reactor operator
SAR	Safety analysis report
SDA	Standard design approval
SRO	Senior reactor operator
SSCs	Structures, systems, and components
STA	Shift technical advisor
TICAP	Technology inclusive content of application project
TS	Technical specifications

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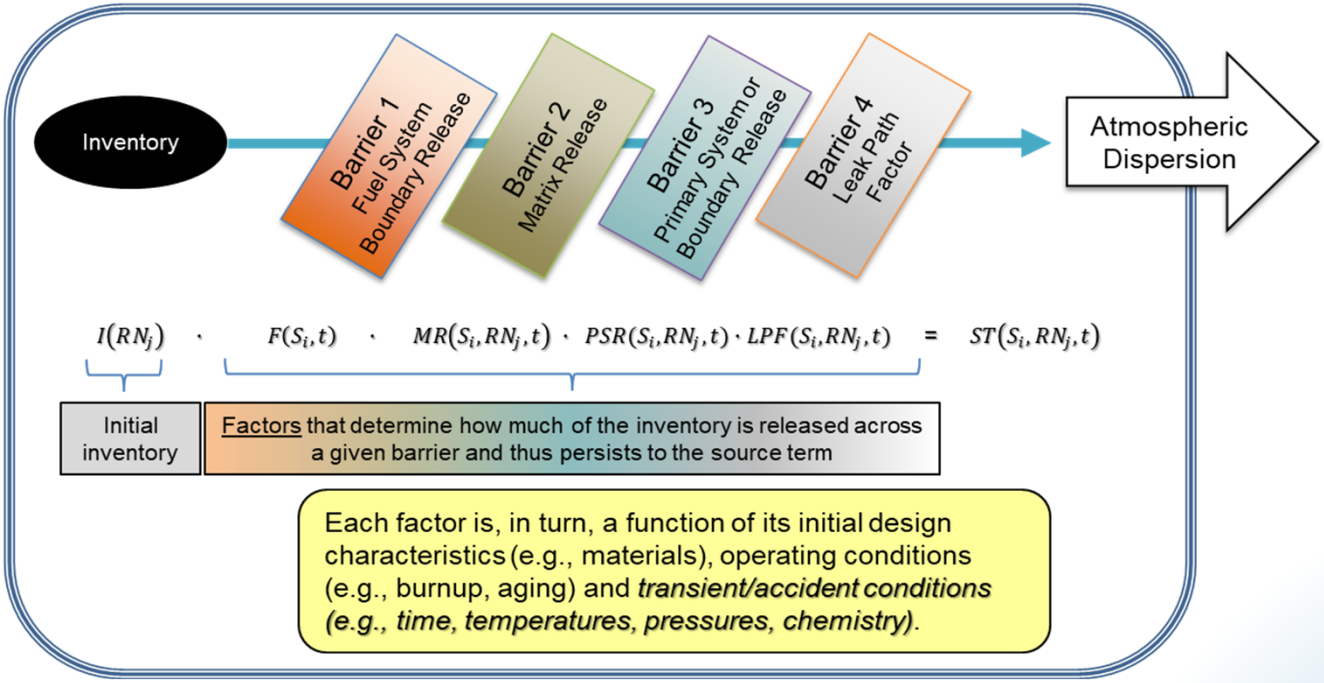
Background Slides

First Principles

Recent NRC activities related to advanced reactors (e.g., functional containment performance criteria, possible changes to emergency planning & security, and DG-1353) recognize the limitations of existing LWR-related guidance, which requires a return to first principles such as fundamental safety functions supporting the retention of radionuclides



See: SECY-18-0096, "Functional Containment Performance Criteria for Non-Light-Water-Reactors," and INL/EXT-20-58717, "Technology-Inclusive Determination of Mechanistic Source Terms for Offsite Dose-Related Assessments for Advanced Nuclear Reactor Facilities"

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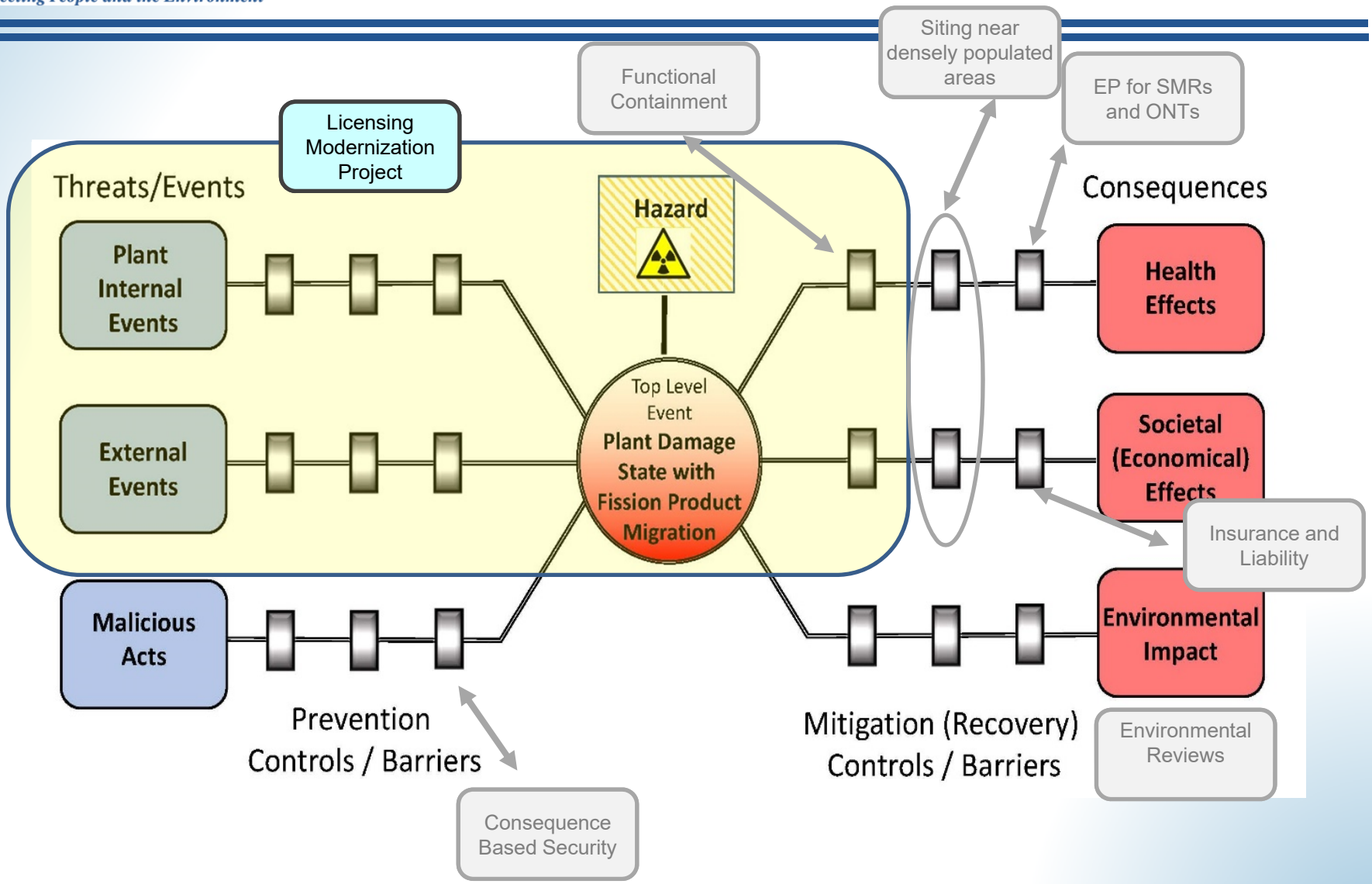
Integrated Approach



Background

- Nuclear Energy Innovation and Modernization Act (NEIMA; Public Law 115-439) signed into law in January 2019 requires the NRC to complete a rulemaking to establish a technology-inclusive, regulatory framework for optional use for commercial advanced nuclear reactors no later than December 2027
  - (1) ADVANCED NUCLEAR REACTOR—The term "advanced nuclear reactor" means a nuclear fission or fusion reactor, including a prototype plant… with significant improvements compared to commercial nuclear reactors under construction as of the date of enactment of this Act, …

Severe Accidents

- Severe Accident Policy Statement
  - Although in the licensing of existing plants the Commission has determined that these plants pose no undue risk to public health and safety, this should not be viewed as implying a Commission policy that safety improvements in new plant designs should not be actively sought. The Commission fully expects that vendors engaged in designing new standard (or custom) plants will achieve a higher standard of severe accident safety performance than their prior designs.
- 10 CFR 52.47(a)(23)
  - For light-water reactor designs, a description and analysis of design features for the prevention and mitigation of severe accidents, e.g., challenges to containment integrity caused by core-concrete interaction, steam explosion, high-pressure core melt ejection, hydrogen combustion, and containment bypass
- NUREG-1226 (Development and Utilization of the NRC Policy Statement on the Regulation of Advanced Nuclear Power Plants; Executive Summary)
  - (4) While the Final Policy Statement encourages innovative reactor designs and safety criteria, the review of advanced reactor designs will still require satisfactory consideration of the Commission's regulations, regulatory guides and other guidelines, such established and developing criteria as the defense-in-depth philosophy, standardization, the Commission's safety goal and severe accident policies, and applicable industry codes and standards.