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UNITED STATES NUCLEAR REGULATORY COMMISSION'S  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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700TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

WEDNESDAY

NOVEMBER 2, 2022

+ + + + +

The Advisory Committee met via teleconference at 8:30 a.m., Joy L. Rempe, Chairman, presiding.

COMMITTEE MEMBERS:

- JOY L. REMPE, Chairman
- WALTER L. KIRCHNER, Vice Chairman
- DAVID A. PETTI, Member-at-Large
- RONALD G. BALLINGER, Member
- VICKI M. BIER, Member
- CHARLES H. BROWN, JR., Member
- VESNA B. DIMITRIJEVIC, Member
- GREGORY H. HALNON, Member
- JOSE A. MARCH-LEUBA, Member
- MATTHEW W. SUNSERI, Member

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DESIGNATED FEDERAL OFFICIAL:

DEREK WIDMAYER

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

8:30 a.m.

CHAIRMAN REMPE: Good morning. The meeting will now come to order. This is the second day of the 700th meeting of the Advisory Committee on Reactor Safeguards.

I'm Joy Rempe, Chairman of the ACRS. Other members in attendance are Ron Ballinger, Vicki Bier, Charles Brown, Vesna Dimitrijevic, Greg Halnon, Walt Kirchner, Jose March-Leuba, Dave Petti. And we expect Matt Sunseri to join us soon.

I note, though, we do have a quorum at this time. And similar to yesterday, the Committee is meeting in person and virtually. The communications channel has been opened to allow members of the public to monitor the committee discussion, and Mr. Derek Widmayer is the Designated Federal Officer for today's meeting.

During today's meeting, the Committee will consider the following topic: 10 CFR Part 53, risk-informed, technology-inclusive regulatory framework for commercial nuclear power plants, the proposed rulemaking language. The transcript of the open portions of the meeting is being kept.

It's requested that speakers identify

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1 themselves and speak with sufficient clarity and  
2 volume so that they can be readily heard.  
3 Additionally, participants should mute themselves when  
4 they're not speaking.

5 At this time, I'd like to ask any other  
6 members if they have any opening remarks. Not hearing  
7 anyone speak up, I'd like to ask Dave Petti to lead us  
8 in our first topic for today's meeting.

9 Dave?

10 MEMBER PETTI: Thank you. Good morning,  
11 everyone. We had a full two days' subcommittee on  
12 details in the language, and I think all members  
13 attended, almost all members attended. So this is  
14 obviously going to be a much higher level given the  
15 time constraints. I don't have anything more except  
16 this is draft the final language that's about to be  
17 issued. It's a fairly big milestone, I guess, let's  
18 say.

19 I guess John Segala, you up to kick us  
20 off?

21 MR. SEGALA: Yes, thank you. Again, I'm  
22 John Segala. I'm a special assistant in the Division  
23 of Advanced Reactors and Non-Power Production and  
24 Utilization Facilities in the Office of Nuclear  
25 Reactor Regulation. Glad to be here today to discuss

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1 the 10 CFR Part 53, which would be a new alternative  
2 risk-informed, performance-based and technology-  
3 inclusive framework for the licensing and regulation  
4 of commercial nuclear power plants.

5 The objective of Part 53 is to continue to  
6 provide reasonable assurance of adequate protection of  
7 public health and safety and the common defense and  
8 security to promote regulatory stability,  
9 predictability and clarity to reduce request for  
10 exemptions from the current requirements in 10 CFR  
11 Parts 50 and 52 to establish new requirements to  
12 address non-light-water reactor technologies to  
13 recognize technological advancements in reactor design  
14 and credit the possible response of some designs of  
15 commercial nuclear plants to postulate the accidents  
16 including slower transient response times and  
17 relatively small and slow release of fission products.

18 The NRC staff previously briefed the ACRS  
19 Full Committee on Part 53 in July and responded to the  
20 recommendations in the ACRS's fourth interim letter on  
21 September 30th. Since the July ACRS Full Committee  
22 meeting, the NRC staff has continued to engage  
23 extensively with stakeholders, and this had the  
24 opportunity to consider verbal and written feedback  
25 from the stakeholders as part of the staff's ongoing

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1 efforts to enhance the proposed rule package.

2 On October 18th, the NRC staff briefed the  
3 ACRS subcommittee on the draft proposed Part 53  
4 rulemaking package that the staff released on  
5 September 30th, which includes the draft proposed rule  
6 language for Framework A and Framework B, the  
7 accompanying preamble, which we used to call the  
8 statements of consideration, and five draft guidance  
9 documents supporting the draft proposed rule language.

10 Today, the NRC staff plans to provide the  
11 ACRS Full Committee a high level overview of the draft  
12 proposed Part 53 rulemaking package, including follow-  
13 on discussions on topics such as the generally-  
14 licensed reactor operator, or GLRO, and recent  
15 revisions made to the alternate evaluation for risk  
16 insights or AERI entry conditions.

17 We're looking forward to have discussions  
18 today and hearing any ACRS members' thoughts and  
19 feedbacks. That completes my opening remarks. I can  
20 turn it over maybe to Bob Beall?

21 MR. BEALL: Okay. Thanks, John. Our  
22 first presenter today is Jordan Hoellman. He's going  
23 to kick it off with a review of the Part 53 rule.

24 MR. HOELLMAN: Okay. Thanks, Bob.  
25 Thanks, John. Good morning, everyone. This is Jordan

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1 Hoellman, I'm a project manager in the Advanced  
2 Reactor Policy Branch in NRR.

3 We can move to the next slide. This is  
4 just the agenda slide for today. I'll kick it off  
5 with an overview of the rulemaking schedule, the  
6 frameworks within Part 53 proposed rule language, then  
7 I'll turn it over to Bill Reckley to discuss the use  
8 of the quantitative health objectives in Framework A  
9 and fueled modules in Subparts E and O.

10 Marty Stutzke will talk about the AERI  
11 entry conditions. Boyce Travis will talk about the  
12 present standards in Framework B. And then Jesse  
13 Seymour will talk about the generally-licensed reactor  
14 operators and the human factors in other operator  
15 licensing guidance documents as part of the rulemaking  
16 package.

17 And then we'll wrap it up with just an  
18 overview of the guidance that we've developed over  
19 time to prepare for the review and licensing of  
20 advanced reactors and non-light-water reactor  
21 technologies.

22 Liz, you want to move to the next slide,  
23 please?

24 Okay, so this slide just represents the  
25 sort of schedule we've been on during the development

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1 of Part 53. Over the past two and a half years or so,  
2 we've briefed the ACRS over 15 times. We didn't  
3 really feel it necessary to recap the entirety of the  
4 Nuclear Energy Innovation and Modernization Act, or  
5 NEIMA, and all the work that we've done previously.

6 As you may recall in the 2016-2017 time  
7 period, the staff developed the vision and strategy  
8 and implementation action plans for the licensing and  
9 review of non-light-water reactor technologies,  
10 focusing on our readiness within the existing  
11 regulations due to increased interest from reactor  
12 developers and Congress.

13 At the time, we focused on resolving key  
14 policy issues and closing gaps within the existing  
15 regulations. The enactment of NEIMA in 2019 required  
16 the development of a new regulatory framework by 2027.  
17 So that was kind of the rulemaking triggers there in  
18 the start period.

19 The rulemaking plan described developing  
20 a new 10 CFR Part that could, in a technology-  
21 inclusive way, address performance requirements,  
22 design features and programmatic controls for a wide  
23 variety of future reactors throughout the life of the  
24 facility.

25 The rulemaking plan described focusing the

1 rulemaking on risk-informed functional requirements,  
2 building on existing NRC requirements, mission policy  
3 statements and recent and ongoing activities. And the  
4 rulemaking plan also describes seeking extensive  
5 stakeholder engagement, including with this committee,  
6 on the content of the rule.

7 In October of 2020, the Commission  
8 approved the rulemaking plan in its SRM and directed  
9 the staff to accelerate the schedule to complete the  
10 rulemaking by 2024 to identify key uncertainties  
11 impacting the publication of the final rule, and to  
12 develop and release preliminary proposed rule language  
13 intermittently followed by extensive stakeholder  
14 outreach and dialogue.

15 In November of last year, the Commission  
16 approved its schedule extension to provide additional  
17 time for the staff to continue its efforts to reach  
18 alignment and discuss with external stakeholders on  
19 the scope of the rulemaking and further develop the  
20 rule language to allow additional time for external  
21 stakeholders to participate constructively and to  
22 ensure better coordination with a number of other  
23 advanced reactor activities.

24 The public comment period on the  
25 preliminary proposed rule language closed on August

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1 31st of 2022. So that takes us to where we are now,  
2 on the right side of the slide, the October-November  
3 Subcommittee and Full Committee meetings, as we work  
4 to provide the proposed rulemaking package to the  
5 Commission in February of 2023.

6 So there were some questions during the  
7 subcommittee meeting on whether we'd have additional  
8 ACRS interactions during the rulemaking process, and  
9 of course we will. That's sort of indicated in the  
10 2023-2024 timeline of the left side of the screen  
11 where we'll continue to have interactions with  
12 external stakeholders as we work to resolve comments  
13 and provide additional discussions on the rulemaking  
14 package after the rule is released for public comment.

15 CHAIRMAN REMPE: Before you leave that  
16 slide, I just want to try and understand the schedule.  
17 As you can imagine, the ACRS letter usually has some  
18 suggestions for improvements.

19 What will happen if there's some easy  
20 fixes in our letter, can you make some changes and  
21 still get the draft text to the commissioners by  
22 February 2023 is what you're shooting for, or is it  
23 just too late with the process? Maybe, we'd have a  
24 range of comment; some easy fixes, and some that we'll  
25 think about in the future if it's too hard to fix.

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1 MR. HOELLMAN: Yes, thanks, Dr. Rempe. We  
2 do envision making or continue to make adjustments as  
3 the rulemaking package moves through concurrence of  
4 course. We value the Committee's input and plan to  
5 respond to the letters.

6 In our response, I think we will provide  
7 our thoughts on your recommendations and conclusions,  
8 any changes we would make in response, and that will  
9 be documented in our response.

10 CHAIRMAN REMPE: Thank you.

11 MEMBER DIMITRIJEVIC: I have a question of  
12 the same thing because that is in your preamble. In  
13 the Part 7, you have a specific request for comments  
14 where you requested comments in 20 different areas.  
15 So what is your position of that? You requested those  
16 comments, and when do you expect to receive them,  
17 address them or anything?

18 MR. HOELLMAN: Thanks, Vesna. I think we  
19 expect -- and part of our overall strategy and  
20 extensive stakeholder engagement is in getting the  
21 proposed rulemaking package available. What we  
22 released in September of this year was to sort of give  
23 some early indication of areas where we're interested  
24 in continued interactions with stakeholder and  
25 thoughts on specific language.

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1           We've got similar questions in our  
2 advanced reactor stakeholder meetings on how can we  
3 continue to interact with the staff on these areas  
4 given that we're not in a formal comment period right  
5 now.

6           The way we've kind of responded to that is  
7 we aren't in a formal comment period because we're  
8 trying to get the package complete and work through  
9 all the internal reviews to get it to the Commission  
10 by February 2027. But we do recognize that there  
11 areas folks may want to interact with us on between  
12 now and when the proposed rule goes out for public  
13 comment.

14           And if there's a specific area within  
15 those questions that stakeholders want to engage on,  
16 we're open to adding it in as a topic for one our  
17 future stakeholder meetings and continue to gather  
18 input.

19           One of the key uncertainties and  
20 challenges I think we identified in our response to  
21 the SRM was that there's only a planned 60-day public  
22 comment period, and I think some of the members have  
23 recognized that that's rather short for a rulemaking  
24 of such complexity.

25           Some of the questions are specifically

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1 targeted to areas where we continue to receive  
2 comments and questions, so we continue to seek input  
3 on those to refine the rule to get us to a place where  
4 we want to be. But on the schedule we're on, it's  
5 just -- we're trying to strike the right balance, I  
6 guess, in interacting and getting the rulemaking  
7 package complete.

8 (Simultaneous speaking.)

9 MEMBER DIMITRIJEVIC: In light of your --  
10 let's say the first one, you're seeking comments of  
11 proposed organization and possibly improvements and  
12 blah, blah. So this is just sort of theoretical  
13 seeking because you will not have the time to do  
14 anything about that before February, right?

15 MR. HOELLMAN: Yes, so the --

16 (Simultaneous speaking.)

17 MEMBER DIMITRIJEVIC: -- you have a very  
18 nice organization of the things you're interested in  
19 the comments. My question is that, are you really  
20 interested in these comments?

21 MR. BEALL: Yes. Hi, this is Bob Beall.  
22 I'm the project manager for Part 53 rulemaking. Those  
23 questions in the draft proposed rule right now will be  
24 going out hopefully with the proposed rule for public  
25 comment. And so they will be addressed with all the

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1 other comments we get on the proposed rule when issue  
2 the final rule in the 2024 timeframe. If the ACRS has  
3 some comments on those proposed questions, feel free  
4 to put that in the letter.

5 MEMBER PETTI: We will.

6 MR. BEALL: Like Jordan said, we'll see if  
7 we have time to address them in our response, or we  
8 will then address them --- any early comments, I will  
9 be addressing them in the follow-up.

10 MEMBER PETTI: Right. I didn't expect  
11 that you'd address all of our comments by the end of  
12 the year.

13 MR. BEALL: Right.

14 MEMBER PETTI: Some of them -- make sure  
15 we don't forget about them.

16 MEMBER DIMITRIJEVIC: Dave, my question is  
17 this has been indicated that they're open to change  
18 organization, but they obviously -- I don't believe  
19 that's true. There's many of these -- the requests  
20 for comments that I don't believe they're opened for  
21 those changes but asking for comments. That's my  
22 take.

23 It says that -- that's my question.  
24 Because if you are putting draft now, you're not going  
25 to change organization after that. That's my comment.

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1 I understand that some of those questions are sort of  
2 nice they're there, but that is -- are you open to  
3 change the organization after the -- in the final?

4 MR. BEALL: I don't think we would ask the  
5 question if we weren't totally against the possibility  
6 of changing the organization. I think part of the  
7 reason we landed where we landed on the draft proposed  
8 rule language is we started down a path -- we've  
9 gotten multiple letters from ACRS saying this is a  
10 viable approach.

11 And then we started getting comments from  
12 stakeholders that mentioned things like, well, this  
13 doesn't quite align with international communities,  
14 guidance and rules. What if a developer would pursue  
15 international licensing before NRC licensing, and how  
16 would that work. Would we have to change our whole  
17 design or analysis to then fit within what we were  
18 proposing in Part 53 at the time?

19 And so that's sort of why -- or a reason  
20 why we took on the development of Framework B, which  
21 originally started as, if you recall, Part 50x, which  
22 tried to align or develop technology-inclusive  
23 requirements, tried to revise the existing  
24 requirements that were light-water reactor-focused to  
25 be more technology-inclusive.

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1           We've been working, and I mentioned in the  
2 beginning in 2016, 2017, that was our initial focus in  
3 our implementation action plans was in recognition  
4 that early movers would -- Part 53 would not be  
5 available for them. They would need to come under  
6 Parts 50 and 52. So we started initially developing  
7 that.

8           And at the end of the slide, you'll see  
9 what the guidance development, what we've done over  
10 the years. A lot of it and still most of it is  
11 focused on Parts 50 and 52 because from a  
12 predictability and clarity standpoint, we want to have  
13 guidance available to support early movers. And we'll  
14 continue to learn and revise those guidance documents  
15 to support the final Part 53 rule as we move forward.

16           I don't think we're not looking for or not  
17 open to better suggestions on how to improve the rule.  
18 It's just sort of the timelines we're on, and how we  
19 sort of got here. I know we've talked about it a  
20 number of times. I know there's still external  
21 stakeholder concerns on some of it.

22           Okay, let's keep moving, Liz.

23           Here's kind of what we were just talking  
24 about, how we've got to Framework A and Framework B  
25 within the draft proposed rule language. As we've

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1 mentioned before, Subpart A is our one subpart that's  
2 entirely common to both frameworks.

3 That has the general provisions, common  
4 definitions, and also framework-specific definitions  
5 for areas that just are -- the definition is specific  
6 to the methodology within the frameworks.

7 As we've noted before and in the  
8 rulemaking plan, Framework A was intended to align  
9 with the licensing modernization project, the PRA-led  
10 approach, following the DOE cost-shared, industry-led  
11 efforts.

12 Framework B, Subparts N through U, are the  
13 technical and application requirements for Framework  
14 B. As I mentioned, they were -- we initially  
15 developed them in response to stakeholder feedback  
16 requesting a technology-inclusive traditional  
17 licensing option that aligns more with international  
18 guidance and approaches.

19 It uses traditional uses of risk insights  
20 and design-specific rules. It requires applicants to  
21 develop principal design criteria. It also includes  
22 the alternative evaluation of risk insights, which  
23 Marty will discuss later.

24 The draft proposed rulemaking package  
25 consists of four enclosures that make up the federal

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1 register notice, which is intended to help readers  
2 digest the numerous pages and be able to review the  
3 preamble along with the rule text without scrolling up  
4 and down a page or flipping back and forth.

5 We'll talk more about guidance later on  
6 this morning. Are there any questions on this slide  
7 or just keep moving?

8 Liz, next slide.

9 Okay, the front matter material in  
10 Sections 53000 and 53010 are relatively new. They  
11 weren't released publically until the draft proposed  
12 rulemaking package was released in September, but  
13 we've been discussing these over the last several  
14 months.

15 We hope that these sections provide some  
16 additional clarity on how the proposed rule is set up  
17 that each framework is stamped with their own set of  
18 consolidated requirements.

19 As Vesna mentioned, we know that we  
20 reached -- a major comment we've been receiving is  
21 that the rule should only consist of one framework,  
22 and that's what that specific request for comment in  
23 the federal register notice is sort of targeting.

24 I think we've noted in past meetings that  
25 we've tried to acknowledge this comment in the

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1 preamble where we included a comment preamble  
2 discussion or subparts within the two frameworks that  
3 are similar or have requirements that essentially  
4 reproduce themselves. An example of that is Subparts  
5 G and Q on decommissioning.

6 I already mentioned, but the purpose of  
7 these sections up front is to really direct readers to  
8 understand that the frameworks are meant to be viewed  
9 independently with some exceptions, and Jesse will  
10 discuss some of them in Subpart F later on.

11 We think that it provides some additional  
12 clarity instead of having internal cross references  
13 within each subpart that might get confusing to the  
14 reader, applicant or the staff.

15 Liz, next slide.

16 This is Subpart A. This is the general  
17 provisions. I'll focus largely on the definitions.  
18 So 53020 is the common definitions. Most of the terms  
19 here are technically equivalent to the corresponding  
20 terms defined in Part 52 and intended to be consistent  
21 with other regulatory definitions or would be  
22 consistent with how the terms are used in existing  
23 regulations.

24 Commercial nuclear plan is one that we've  
25 talked about in the past. We started with the

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1 definition that was intended to capture the NEIMA  
2 definition of advanced nuclear reactor. That caused  
3 some challenges with our stakeholders, and we didn't  
4 necessarily think it provided anything additional than  
5 what we would define as a commercial nuclear plant.

6 We do use plant more often in Part 53 than  
7 reactor because with some advanced technologies,  
8 radionuclide sources can be more prevalent in areas  
9 outside of the actual reactor vessel. So as a  
10 holistic look at the plant design, we want to make  
11 sure that all radionuclide sources are considered and  
12 identified and protected.

13 Manufactured reactor and manufactured  
14 reactor module, we tried to address some of our  
15 external stakeholders and potential vendors that are  
16 interested in manufactured reactor and using a  
17 manufacturing license.

18 And so we included the ability to load  
19 fuel at a manufactured reactor or manufacturing  
20 facility with proper mechanisms that prevent  
21 criticality while it's been transported to its final  
22 destination at a commercial nuclear plant.

23 As I mentioned before, some of the  
24 Framework A, Framework B definitions that are unique  
25 to the frameworks have to do with licensing basis

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1 events and structure system component classifications.  
2 A lot of these in Framework A were derived from what  
3 was doing in the licensing modernization project as  
4 endorsed in Regulatory Guide 1.233.

5 I think generally that's all I wanted to  
6 cover on this slide. We did add the definition of  
7 safety function in response to some of the members'  
8 comments in their letter from August.

9 CHAIRMAN REMPE: I appreciate the changes  
10 you made as we indicated in the subcommittee meeting  
11 on the definition of safety function. But when I keep  
12 looking at this slide that you presented during the  
13 subcommittee meeting, I guess the thought comes to my  
14 mind still why couldn't you just use the one  
15 definition for Framework A to B.

16 Why is it you can't use that definition  
17 and apply it to both A and B? Because I know we  
18 heard, well, we want to do a bottoms-up approach and  
19 have the design criteria before we identify the safety  
20 functions, but I would never know if my design  
21 criteria were complete unless I had thought at the  
22 beginning what safety functions were.

23 I know there's still this reluctance to  
24 jump in and do something that would be generally  
25 applicable to both frameworks. Is there something I'm

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1 missing? Give me an example of why you couldn't have  
2 use this for Framework B?

3 MR. HOELLMAN: I'll start. I'll let Boyce  
4 maybe chime in or Bill. I think in general, we tried  
5 to capture the general piece you're talking about in  
6 the definition, but then we've included the Framework  
7 A and Framework B -- like how it would be implemented  
8 within the individual frameworks as sort of a subset  
9 of the definition.

10 Essentially, it comes from sort of how the  
11 safety functions are addressed by either design  
12 features and functional design criteria in Framework  
13 A.

14 So the safety functions play a distinct  
15 role in doing that using the specific design rules in  
16 Framework B and saying the principal design criteria  
17 essentially capture the same things, but we weren't  
18 sure what how would we implement that -- it's already  
19 implemented within the principal design criteria.

20 We thought just including it as a  
21 requirement in Framework B, we weren't sure how  
22 exactly to implement it. I don't know if Bill, Boyce  
23 --

24 CHAIRMAN REMPE: Give me an example on why  
25 you can't use it for Framework B --

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1 MR. RECKLEY: This is Bill Reckley. As  
2 Jordan mentioned, the first part of the definition is  
3 basically common, and that is almost plain English,  
4 safety function.

5 The reason we felt compelled to  
6 distinguish how they're used within the two frameworks  
7 is Framework A, if I could remember, basically you  
8 derive your safety functions from what is needed to  
9 meet the high level of performance.

10 Whereas in Framework B, and largely  
11 existing in Parts 50 and 52, those functions are  
12 reflected through the general design criteria.  
13 They're going to be basically the same. This is  
14 engineering. They're basically going to be the same.  
15 Control heat level, control heat removal, contain the  
16 radionuclides.

17 So it's not surprising that in the end  
18 they look the same, but how they're used in the  
19 language is in Framework B, they're basically assumed  
20 from the beginning, these are your safety functions.

21 Whereas in Framework A, a slight  
22 difference. Instead of relying on the experience and  
23 the existing construct of the GDC, we say derive. I  
24 know that's a subtle difference.

25 CHAIRMAN REMPE: I'm still struggling

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1 because, again, you may have a chemical hazard or  
2 something that is not embedded in the existing  
3 regulation and the general design criteria. And so to  
4 me, to know what the principal design criteria are for  
5 these non-LWRs, you should start thinking about what  
6 are the hazards first.

7 I appreciate what you did. You got closer  
8 to where you are, but I just don't know why you didn't  
9 take the next step and say, okay, identify what the  
10 hazards are and then see if all your design criteria  
11 and address those hazards. To me, it's just a logical  
12 approach.

13 MR. TRAVIS: Yes, and this is Boyce Travis  
14 from the staff. I think the disconnect is in  
15 Framework B, if we said define the safety functions,  
16 that's -- so ultimately in Framework B, the staff is  
17 making review findings against the principal design  
18 criteria that are utilized by the designer. The staff  
19 has to say, yes, these PDC are okay.

20 And in the review that the staff makes the  
21 findings against in Framework B, similar to how it's  
22 done in 50 and 52. The staff makes findings against  
23 those principal design criteria, which are more  
24 specific and cover the full spectrum of design -- a  
25 subset of what constitutes the safety functions for

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1 the design as opposed to the top-down holistic  
2 approach in Framework A.

3 And so adding a requirement to define  
4 safety functions, in our view in Framework B, is  
5 adding another requirement that it's not clear how the  
6 staff aids. It's an additional burden on top of the  
7 principal design criteria, which we think cover it.  
8 But B, it differs from how the staff is making their  
9 review findings of Framework B coming from the bottom-  
10 up versus the top-down approach that's in Framework A.

11 CHAIRMAN REMPE: How will the staff know  
12 that the identified principal design criteria are  
13 complete unless everyone agrees on what the safety  
14 functions are? Anyway, I've made my point.

15 That's why I just wanted to bring it up  
16 because we were too nice, I thought, in the  
17 subcommittee meeting and I didn't harass you, but I  
18 kept thinking I must be missing something. I thought  
19 about it some more, and I don't get what I'm missing.  
20 But anyway, go ahead. I've belabored this point  
21 enough.

22 (Laughter.)

23 MR. HOELLMAN: Okay, so I think we can  
24 move to the next slide unless there's any other  
25 questions on Part A.

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1           Okay, so this is just another overview of  
2 Framework A with some of the specific topics we plan  
3 to cover today. We're going to cover the QHOs in  
4 Subpart B, fueled modules in Subpart E and O. And  
5 then in Subpart F, the generally-licensed reactor  
6 operators, human factors and the associated ISGs that  
7 are part of the proposed rulemaking package.

8           So with that, I think I'm turning it over  
9 to Bill on the next slide.

10           MR. RECKLEY: Liz, just keep this slide  
11 here for a second.

12           Again, this is Bill Reckley. Just as a  
13 summary of Framework A, I know we've talked about it  
14 in numerous meetings. We tried to organize it  
15 somewhat like a systems engineering approach or  
16 sometimes we've talked about this as a top-down  
17 approach where we put the high level requirements in  
18 Subpart B and then follow that through the  
19 organization that set up like the life cycle of a  
20 facility to say what needs to be done within those  
21 stages of the life cycle to meet those high level  
22 criteria.

23           As Jordan mentioned, you go down through  
24 the subparts and the life cycle of site, being  
25 construction, operation and decommissioning with a few

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1 licensing and general matters like quality assurance  
2 in the latter Subparts I, J and K.

3           Again, the important part of this, and  
4 we'll get into it on the next slide, is the  
5 establishment of the high level criteria, Subpart B.  
6 As Jordan mentioned, we'll talk about that. Jesse  
7 will talk about the generally-licensed reactor  
8 operators and other human factor issues later in the  
9 presentation.

10           So, Liz, if you can go to the next slide.

11           This is one we used during the  
12 subcommittee meeting to basically try to summarize an  
13 integrated approach that we try to reflect in  
14 Framework A. The first -- and we used the model  
15 that's been around since the 1990s in Regulatory Guide  
16 1.174, risk-informed decisionmaking, to try make sure  
17 that we had captured things.

18           And also to try to make sure that  
19 Framework A would provide a comparable level of safety  
20 as is provided in Parts 50 and 52 for the operating  
21 fleet. So just going around clockwise really quickly,  
22 one of the first step there -- again, we had to tailor  
23 this somewhat because 1.174 is written to address  
24 changes to existing licensing basis whereas in Part 53  
25 we're talking about basically starting from scratch

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1 and forming the licensing basis. And nevertheless,  
2 works pretty well, we think.

3 And so the first step in that, in 1.174,  
4 is to make sure you're meeting the purpose of the  
5 existing regs. We tried to do is -- we were doing  
6 crosswalks and looking and through interactions.

7 One example, I think of this first box and  
8 just the exercises we went through is if you remember  
9 very early on in the process, as Jordan mentioned  
10 maybe two years ago, a lot of the discussion with the  
11 ACRS was on you have to have a requirement that the  
12 facility will be subcritical in the long term.

13 And we had not had that provision in the  
14 first draft. And so we added a requirement, a  
15 specific requirement, under the design requirements in  
16 53 440 to require -- so through those internal  
17 interactions and interactions with stakeholders,  
18 interactions with the ACRS, we think we addressed all  
19 the topics that are addressed in 50 and 52.

20 The next one going, again, clockwise is  
21 defense in-depth. As we talked many times, there's  
22 specific provisions to assess defense in-depth. This,  
23 again, it's an area that's different in that in 50 and  
24 52, defense in-depth is already built into the general  
25 design criteria and other requirements. It's a core

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1 philosophy, but it's built in.

2 In Framework A, applicants are required to  
3 do an assessment to make sure we end up in a  
4 comparable place. Design requirements and margin,  
5 engineering margins, that is addressed in, again, the  
6 design requirements in 53 440 as well as in some of  
7 the other higher level requirements in Subpart B.

8 Going around again, the next step we've  
9 talked about, we'll talk about a little more I  
10 suspect, is a comparison to the safety goals.  
11 Remember, 1.174 was developed as a primary tool for  
12 risk-informed decisionmaking. So what did it bring  
13 into play that wasn't there, let's say, in the 70s or  
14 early 80s? That was risk insights from PRAs.

15 And so this step is to make sure that a  
16 facility meets the NRC safety goals. We're using the  
17 quantitative health objectives, the QHOs, as a  
18 technology-inclusive metric. And then lastly, the  
19 process requires that whatever you do, you monitor  
20 performance.

21 MEMBER DIMITRIJEVIC: Okay, this is Vesna.  
22 So there is a couple -- you took this straight from  
23 the Reg Guide 1.174. This is a good demonstration on  
24 the integration of the existing regulation in that  
25 time and the new one in the sense of defense in-depth

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1 and safety margins and everything.

2 I mean, number one, I don't even know how  
3 that applies to here. You want to consider the new  
4 regulation as a change? You have a very little  
5 meeting performance in this. But the bad thing which  
6 I want to -- so this, how it is built, it was -- the  
7 data applied to core damage frequency and large early  
8 release frequency because all the criteria are based  
9 on that.

10 So because we don't really know are the  
11 new design going to have mounts and large releases to  
12 be introduced to HO on your Part 4. You proposed to  
13 replace that with QHOs. So let's say the plan comes,  
14 which really have a core damage frequency and large  
15 release frequency, and you want to use QHOs.

16 What's going to happen based on the  
17 current experience with Level 3, if you look in that  
18 NRC project, the Level 3, you will see that plans with  
19 core damage frequency of ten to minus two will satisfy  
20 the QHOs. So that doesn't really meet what you just  
21 said that you have to have a comparable level of  
22 safety.

23 That's one of my additional comments of  
24 QHOs. Because as it's shown in the Level 3 results,  
25 the US Level 3 -- so this is a couple orders of

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1 magnitude different than what it was when they tried  
2 to connect core damage frequencies to the constant  
3 facilities and everything. So this is one of my  
4 comments that if you started QHOs and then try to come  
5 back to substitute measures, you will have a totally  
6 different safety goal.

7 MR. RECKLEY: Yes, I think we would  
8 acknowledge that with different technologies, you  
9 might have different constructs of what you're  
10 depending on in order to meet the QHOs.

11 And, again, to try to develop a  
12 technology-inclusive approach, we just didn't see how  
13 we could stick with the use of core damage frequency  
14 and containment failure given that some designs may  
15 not be built that way.

16 We did try in the preamble to reinforce  
17 that for those that want to develop surrogates or if  
18 we have light-water reactors under Part 53 that want  
19 to use existing surrogates, CDF and large release  
20 frequency, that that would be okay.

21 MEMBER BIER: I don't want to harp on this  
22 because I think it's a bit beyond the scope of Part 53  
23 to address it, but I would also note, which I think I  
24 commented before, that at some level the current  
25 safety goals are kind of inherently not technology

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1 neutral or at least size neutral because they were  
2 kind of gear around you have a 1000 megawatt plant and  
3 you're comparing it against coal generation.

4 You have, say, a five megawatt plant and  
5 the alternative is not coal generation, then sort of  
6 the whole rationale for those safety goals is not  
7 really strong anymore.

8 MR. RECKLEY: Right. I think that's  
9 actually a good point. I think we addressed it in the  
10 letter. It's kind of beyond the scope. We were  
11 sticking with established, recognizing that some of  
12 that, when did that, that means we were established  
13 forty years ago, but the Commission has, over the  
14 years, reinforced that it's okay to continue to use.

15 So that's probably about as far as we can  
16 go on this project. But we had recognized that a lot  
17 of what we're trying to do -- you cannot escape that  
18 it was developed in a light-water reactor world. In  
19 severe accident space, for example, you look at the  
20 severe accident policy statement, it's full of light-  
21 water reactors and maybe one or two lines that say,  
22 yeah, we'll take this concept to other technologies.  
23 But it was light-water focused.

24 But the concept we tried to capture,  
25 because it builds, again, an adverse aspect -- usually

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1 a defense in-depth aspect when you get into severe  
2 accidents. So, point taken.

3 MEMBER DIMITRIJEVIC: My main point here  
4 was, because you quote them here, that is Reg Guide  
5 1.174 on this slide. If you're using QHO, Reg Guide  
6 1.174 is not anymore applicable. That's my main  
7 point.

8 MR. RECKLEY: Right. I'll acknowledge  
9 that, Vesna, that we took the concept from 1.174 and  
10 tried to use it. 1.174, like we just said, almost  
11 everything is light-water reactor-specific, so it's  
12 built for light-water reactor technologies in terms of  
13 what we're looking at, the prevalence of using Level  
14 1 and Level 2 PRAs, CDF and large release frequencies.  
15 So, yes.

16 Dave.

17 MEMBER PETTI: Bill, I just want to just  
18 come at it. I love this slide. This is a critical  
19 point we'll see in the letter because I like it so  
20 much. But there are stakeholders who are making  
21 claims that Framework A is a higher safety bar, but it  
22 really isn't.

23 And this is what the staff has done to  
24 convince themselves that it is an equivalent level of  
25 safety. That's an incredibly important thing. It's

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1 in the preamble. I know we've talked through in our  
2 meetings, but if you just read the rule alone, this  
3 doesn't come out easily.

4 Members, you'll see it. There's a whole  
5 couple paragraphs on this. I think this is fairly  
6 important because it anchors Framework A. It is a  
7 complete and different thought process, and that's why  
8 it was so important in the preamble, in my opinion, to  
9 help people understand how different it really is than  
10 Framework B.

11 And I don't think you get that sense when  
12 you just read the rule itself. You really got to look  
13 at the preamble. In some ways, I wish we had had the  
14 preamble before we had Framework A and B because it  
15 really helped a lot of things. So you'll see if it  
16 survives in that letter writing, but -- this is very  
17 important.

18 MR. RECKLEY: Liz, if we can go to the  
19 next slide. And I'll acknowledge, Dr. Petti, that the  
20 ACRS was asking for that explanation from the very  
21 beginning, and we kept, due to various reasons, saying  
22 we will get there.

23 We tried in the discussion tables and some  
24 of the things that we released in real-time to provide  
25 some of the explanation, but -- undoubtedly, it fell

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1 short. So to that point, the primary thing that we  
2 needed to do was prove to ourselves a comparable or  
3 equivalent level of safety.

4 That might sound straightforward, but keep  
5 in mind that for the existing fleet, the confidence  
6 that there's an adequate level of safety is provided  
7 by them complying with the rules that were developed  
8 initially and as they've evolved over decades.

9 So there is no specific measure. Adequate  
10 protection is provided by meeting the rules, so it's  
11 a somewhat circular argument. When you bring in a new  
12 effort and say, we're actually going to use measures,  
13 but you can't really have it in numerical terms. That  
14 was the challenge.

15 We did go through -- some of this touches  
16 on what Joy was mentioning. Even under a traditional  
17 approach if you go back to the 1960s, they were doing  
18 things like this. That's why you get the same -- you  
19 end up largely in similar places is because this isn't  
20 a new concept.

21 But in any case, if you start on the  
22 right, we've used this echelon or hierarchy many  
23 times, safety criteria, then you use those to define  
24 safety functions. From safety functions, what are the  
25 design features I'm going to use provide those

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1 functions. And then ultimately, how does that  
2 equipment need to perform to provide the function.

3 Now, I think one interesting thing, and  
4 Jesse's going to get to it later on, is under this  
5 Framework, you're allowed to use the same similar  
6 logic for people. And so that is, to me, one of the  
7 more interesting things is that we're looking, again,  
8 trying to take an integrated approach.

9 What's the role of the equipment, what's  
10 the role of the people, what's the role of operating  
11 programs in order to meet those things. So it does  
12 help to kind of have this structure throughout. The  
13 middle just repeats; I won't do that. Again, we've  
14 talked about it many times. The safety criterion in  
15 Subpart B.

16 And then just the caution, because we  
17 heard this from some, that we don't equate the QHOs to  
18 adequate protection. It's one of multiple  
19 considerations in our development and ultimately in  
20 the finding that we would make.

21 Liz, if we can go to the next slide that  
22 talks really about Framework B and the construct. I  
23 did want to mention just because it's another area  
24 that I think is a significant change and it affects  
25 both Frameworks A and B. And that is to include

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1 provisions for the loading of fuel in a factory.

2 In order to do that and make it work, it's  
3 both a technical and somewhat legal consideration. We  
4 came up with the technical criterion in order to  
5 prevent criticality and work with our office of  
6 general counsel to say if that's met, you can do this  
7 activity and the thing that you have, which is  
8 basically a manufactured reactor module loaded with  
9 fuel, may not considered a utilization facility.

10 Because under the Atomic Energy Act, if we  
11 were to put it in that bin, then it would trigger a  
12 whole bunch of ramifications. Anyway, I just wanted  
13 to mention that.

14 Liz, I think if you go to the next slide,  
15 we can get into Framework B, and I'll turn it over to  
16 Boyce.

17 MR. TRAVIS: Yes, so thanks, Bill.

18 This is Boyce Travis from the staff. This  
19 slide --

20 MEMBER PETTI: Boyce, before you --

21 MR. TRAVIS: Yes, go ahead.

22 MEMBER PETTI: A time check, we're about  
23 halfway. We have one hour left. Thanks.

24 MR. TRAVIS: Yes, no problem.

25 I will be briefly, thankfully. This slide

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1 provides a summary of Framework B as it's currently  
2 laid out in the rule. We had some extensive  
3 discussion in the subcommittee meeting to touch on  
4 various parts of Framework B.

5 I'll note most of them are similar or in  
6 some cases basically identical to Framework A with the  
7 exceptions that are in P and R that we discussed.  
8 Over the next few slides, the staff is going to  
9 revisit a couple of topics in Framework B.

10 One of which is codes of standards,  
11 another which is AERI that Marty is going to discuss.  
12 Aside from that, I'm not going to go into a lot of  
13 detail on Framework B. I'll use this opportunity, if  
14 anyone has any questions about other areas in this  
15 framework, I'll be happy to talk about them here.

16 (No response.)

17 MR. TRAVIS: Hearing none, I'm going to  
18 move onto Slide 12. The staff provided Slide 12 to  
19 kind of revisit and provide some clarification on the  
20 top of the codes and standards because this garnered  
21 a fair amount of discussion during the subcommittee.

22 A lot of that discussion was focused on  
23 the draft requirements related to codes and standards  
24 in Framework A versus what's in Framework B. I kind  
25 of want to step back and highlight what the role of

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1 codes and standards in Framework B is.

2 With regards to non-LWRs, we think  
3 Framework A and Framework B are fairly consistent in  
4 that -- there's a provision in Framework B  
5 specifically that requested description and  
6 justification for codes and standards not previously  
7 endorsed or accepted by the NRCD (phonetic) for those  
8 to be used in the design.

9 Because we recognize that non-LWRs are  
10 probably going to be use codes and standards in order  
11 to justify how their components meet various design  
12 requirements. And those design requirements, we  
13 didn't want to be prescriptive, and we wanted to allow  
14 for commensurate qualification of those components  
15 with their safety significance.

16 And so in that sense, Framework B and A  
17 are consistent for non-LWRs. For LWRs, Framework B  
18 has some specific requirements for what light-water  
19 reactor codes and standards are applied because our  
20 target an equivalent level of safety with the existing  
21 requirements.

22 And as Bill has noted earlier, the  
23 existing requirements for light-water reactors have  
24 been developed with extensive operating, decades of  
25 operating experience, and an adherence to a certain

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1 set of codes and standards that have been used.

2 And so currently, those codes and  
3 standards are reflected as requirements in Framework  
4 B specifically for light-water reactors. The  
5 specifics of that are detailed in the requirements.  
6 It does create, I'll say, a difference in how codes  
7 and standards are applied for LWRs in Framework A and  
8 Framework B.

9 Part of that is derived from the  
10 difference in philosophy that's used in the two  
11 frameworks. Framework A, as Bill noted, an integrated  
12 approach that involves the comprehensive, detailed  
13 consideration of the full spectrum of event sequences.

14 Whereas Framework B is the more  
15 traditional, stylized deterministic analysis with  
16 simplifications and conservatism that's coupled with  
17 some checks on defense in-depth effectively. I sense  
18 we're going to have a discussion here, so I'll open it  
19 up --

20 MEMBER BROWN: Yes, this is Charlie Brown.  
21 I had a question.

22 MR. TRAVIS: Go for it.

23 MEMBER BROWN: I have asked in previous  
24 meetings about general design criteria as opposed to  
25 kind of more amorphous claims (audio interference).

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1                   No, I've got it on. I just didn't bother  
2 to talk into it. Thank you. I'm sorry.

3                   John, I have some interest in humor here.  
4 I need more wire.

5                   So I raised that point before, and I think  
6 others have pointed out that Framework B has the old  
7 framework of 10 CFR 55(a)(h). I'm interested in H in  
8 many circumstances. You talked about proposed changes  
9 in 55a. I didn't get that out of the previous  
10 meetings (audio interference).

11                  Right now, there's general design  
12 requirements, GDCs, there's specific things in that  
13 area that I use frequently because guidance -- not  
14 guidance, specific, we got to go by this, this and  
15 this, although they're general principles.

16                  Are you going to change that? You talked  
17 about making changes. Why do we have to change  
18 55(a)(h) if it's going to be light-water reactors.  
19 You're going to turn those into jelly beans as well?

20                  (Audio interference.)

21                  MR. TRAVIS: Yes, so let's see if I can  
22 address this appropriately. So setting aside the PDC  
23 and GDC for the moment. 5055a as it stands in the  
24 proposed rule right now is going to continue to apply  
25 to light-water reactor designs that are 5052 in

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1 Framework B.

2 There are conforming changes as part of  
3 this rule package to ensure that they fall within the  
4 umbrella requirements of 5055a. Right now, there's no  
5 proposal to include non-light-water reactors under the  
6 umbrella 5055a.

7 They would have to propose appropriate  
8 codes and standards for whatever equipment needs to be  
9 qualified up to the safety level they're proposing --

10 MEMBER BROWN: That's for advanced  
11 reactors?

12 MR. TRAVIS: Correct, yes. For non-light-  
13 water reactors.

14 MEMBER BROWN: I got that, but --

15 MR. TRAVIS: Light-water under Framework  
16 B, which under the proposed rule, would still be  
17 required to meet these.

18 (Simultaneous speaking.)

19 MEMBER BROWN: -- doesn't -- it would fall  
20 under that same category?

21 MR. TRAVIS: That's correct.

22 MEMBER BROWN: I call of those light-water  
23 --

24 MR. TRAVIS: That is currently what is  
25 being proposed, and I think we're going to continue to

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1       iterate internally to figure out what the best path  
2       forward is.

3               MEMBER BROWN:  Is there going to be any  
4       effort to try to -- you talked about now the non-  
5       light-waters.  Is there going to be any attempt to try  
6       to take or utilize what we know?  If you look at the  
7       GDCs and a few things like that, a lot of them,  
8       they're very, very generalized.

9               They would apply, theoretically, to any  
10       type of reactor, not specific to whether it's sodium  
11       or lead-bismuth or whatever would be or whatever the  
12       other coolants are, et cetera.

13              Is there going to be any effort to try to  
14       tailor so that the non-light-water reactors that fall  
15       under the Part B as well?  Is that what you're talking  
16       about?  Somebody wanted to do a non-light-water and  
17       advanced reactor under Framework B, could they do  
18       that?

19              MR. TRAVIS:  Yes.  Framework B is tailored  
20       to be technology-inclusive.  It could be a light-water  
21       reactor or non-light-water reactor.

22              MEMBER BROWN:  So when you said on your  
23       initial statement, you said this doesn't apply to non-  
24       light-water --

25              MR. TRAVIS:  Sorry, there's a bifurcation

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1 in Framework B for codes and standards in that it does  
2 prescriptively say there are certain codes and  
3 standards that LWRs, whether it's a BWR or PWR, are  
4 going to have to apply. It isn't that prescriptive  
5 for non-light-water reactors.

6 MEMBER BROWN: Okay, I got it. That's  
7 fine. Now, I understand a little bit. That's all --

8 MR. TRAVIS: Okay. Happy to provide the  
9 clarification.

10 MEMBER KIRCHNER: In practice, Boyce, what  
11 would your expectation be under this language? For  
12 example, say in this non-LWR advanced reactor design,  
13 you identified a fission product barrier.

14 Typically, most reactors are going to have  
15 some kind of primary system. Is the expectation that  
16 that primary system would be made into an equivalent  
17 standard as the ASME Boiler and Pressure Vessel Code,  
18 and how do you signal that to the applicants?

19 MR. TRAVIS: I think this is a really good  
20 question. I'm going to maybe speak a little  
21 philosophically for a moment, so I apologize. I will  
22 try to get to an example at the end that may make it  
23 a little a bit more concrete.

24 But I think given the broad spectrum of  
25 the designs that are being considered, we didn't want

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1 to go down the path of actually saying, yes, your  
2 primary system, for instance, has to meet this level  
3 of standard.

4 Because there are different safety  
5 implications for the integrity of the primary system  
6 among the advanced reactor designs. For instance,  
7 there might be reactor designs where only a very small  
8 portion of the primary system, because let's say it's  
9 a low pressure, needs to be qualified for integrity.

10 For instance, the vessel and some  
11 connections below or above a certain height to prevent  
12 a siphon effect or a leakage effect. We would expect  
13 then there would be an as-we-like standard applied to  
14 that vessel and those connections because that  
15 integrity is sufficiently important that it's serving  
16 as a fission product boundary.

17 I say as-we-like. As-we-like is the one  
18 I'm aware of, we think there might be others that  
19 could do that role for certain reactor designs. And  
20 so yes, the expectation is for SSCs, they are being  
21 relied on for a level of safety as a fission product  
22 barrier.

23 There would be an appropriate standard or  
24 code of standard or mechanism that we can point to and  
25 say, yes, that level of functional performance by that

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1 component is going to be assured by this code or this  
2 standard.

3 And for many applications, I think there  
4 are cases where these materials and what's being done  
5 is new enough that that standard may not be  
6 sufficiently developed yet.

7 I think as we license these reactor  
8 designs, we're going to learn some things and probably  
9 but some of this into guidance, for instance. So I  
10 don't think we wanted to do the same thing we did with  
11 5055a and say, and here's the list of codes and  
12 standards that are going to apply.

13 Sorry, I'm not really answering the  
14 question of how do I signal that. I think eventually  
15 it will be signaled through guidance, but there's  
16 still an expectation that whatever you are relying to  
17 have your safety performance for your SSCs is going to  
18 be qualified in some ways. And one of the best ways  
19 to do is an appropriate code and standard.

20 MEMBER KIRCHNER: Yes, that's a reasonable  
21 way to address the question. I'm just looking at it  
22 from the perspective, one is engineering, two from the  
23 eyes of the public.

24 Because you've gone through significant  
25 effort, as Bill outlined earlier, to demonstrate that

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1 you're going to achieve an equivalent level of  
2 adequate protection or however you want phrase it,  
3 level of safety.

4 And I've heard the arguments from some of  
5 the proponents for advanced designs that were low  
6 pressure, so the primary system isn't as important as  
7 in an LWR. It depends on the design, of course,  
8 especially if you're reliant on the coolant that's in  
9 the primary system no matter what the pressure is.

10 I appreciate your challenge here because  
11 you don't want to be overly prescriptive not knowing  
12 what the design might be like. But it's just in my  
13 mind, the expectation would be that if it provides one  
14 of those critical safety functions, then the integrity  
15 -- one of the ways ensuring the integrity of the  
16 function is through going through an ASME code by  
17 case. Or if it's in the reactor protection system,  
18 IEEE equivalent and so on. Well, I made my point.

19 MR. TRAVIS: I agree with you 100 percent.  
20 Our expectation is that for applications that are  
21 similar to what's being seen in the industry today,  
22 for instance, RCS boundary, a reactor protection  
23 system, there's going to be a code and standard  
24 employed. And of those codes and standards, we know  
25 which one currently is used to make that

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1 justification.

2 But given, again, given the just huge  
3 spectrum and variety of things that are coming in, it  
4 doesn't -- it's both a challenging task, and it  
5 doesn't necessarily benefit us to start prescribing  
6 them in the regulation itself. If we have to go down  
7 that road, I think guidance would be the way we would  
8 go.

9 MEMBER KIRCHNER: Thank you.

10 MEMBER BROWN: This is me again, Charlie.  
11 I just want to amplify the -- if you look at the  
12 standards -- can you hear me okay?

13 On the technology neutral side. It's  
14 interesting to go back and reflect on even how we've  
15 been using the current standards the 93 -- 603-1991  
16 IEEE standard. It's got all the architectural stuff  
17 in it.

18 Control of access is really the only one  
19 because there was only physical access at that point,  
20 not electronic access, which we're struggling with and  
21 figuring out how to deal with now. But that's a  
22 remarkably technology neutral -- it doesn't tell you  
23 to use vacuum tubes, or mag amps or transistors or any  
24 -- it doesn't tell you. It just says, hey, you need  
25 these overall architectural standards functionally.

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1           And that's kind of the bulwark of what you  
2 put together. So having that be amorphous, there's  
3 going to be, even in the non-light-water reactors, you  
4 got to generate steam somehow. People are going to  
5 say, oh, we're going to have thermal -- I don't know,  
6 some kind of heat transfer into these magic  
7 thermoelectric conversion devices with tons of powered  
8 electronics.

9           I'll believe that when I see it since I've  
10 dealt with it for 20 years, 30 years. That's not  
11 easy. Steam drives the big generators. So if the  
12 stuff you look at, you're going to have steam  
13 somewhere more than likely.

14           There's high pressure somewhere in that  
15 system, and it's connected directly to the primary  
16 systems. So you're going to have some reasonable  
17 standards of that interface. You just can't leave it  
18 -- we know how to deal with that interface on the  
19 secondary sides, but I just think we need some thought  
20 going forward as to how you do this into going  
21 forward.

22           There's some areas where it's transparent.  
23 You're going to have some type of reactor monitoring  
24 systems, some type of safety systems, whatever they  
25 are, the old standards really would apply. So I'm

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1 just encouraging you to think broadly.

2 Don't throw the baby out with the  
3 bathwater because we know how to do that, and we see  
4 the systems we're developing today, and the new  
5 applications would work just as well. We still got to  
6 monitor the plant whatever the pressures and  
7 temperatures and neutron configuration they have.

8 MR. TRAVIS: Fully agree. I think this is  
9 just another -- it's a challenging task for the staff.  
10 There's flexibility and certainty are, in a lot of  
11 cases, on the same axis. By affording that  
12 flexibility, there's -- it is going to make their view  
13 a little more challenging in some cases. And it's not  
14 as easy as checking the box. But we have been  
15 considering it, and we'll continue to consider going  
16 forward.

17 MEMBER BROWN: Thanks.

18 MEMBER PETTI: Let's keep moving.

19 MR. TRAVIS: Sorry, Dave.

20 MEMBER BROWN: Sorry about that, Dave.

21 MR. TRAVIS: Sorry, this is my last slide.  
22 I'm going to pass it over to Marty Stutzke.

23 MR. STUTZKE: Good morning, I'm Marty  
24 Stutzke from the staff. I wanted to talk to you about  
25 the evolution of the alternative evaluation risk

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1 insights approach, emphasizing the AERI approach that  
2 has been developed. The underlying purpose is the  
3 various Commission policies.

4 Second, and I guess probably most  
5 important thing for this presentation, is we have the  
6 AERI entry conditions since the subcommittee meeting  
7 a couple of weeks ago in order to address various  
8 stakeholders' comments and further consideration of  
9 the insights we got from the MACCS calculations. I'll  
10 explain that in some detail.

11 As a result of changing the entry  
12 conditions, we went back and made sure that we didn't  
13 deter perhaps some unintended consequence. The AERI  
14 referenced elsewhere in the regulations. Notably, the  
15 determination that a facility is a self-reliant  
16 mitigation facility, which enables the use of  
17 generally-licensed reactor operators. And last but  
18 not least, we're continuing to develop our draft  
19 regulatory guides DG-1413 and 1414 that enables and  
20 support the AERI approach, like that. It's been an  
21 exciting week.

22 Next slide.

23 I had presented this slide at the  
24 subcommittee meeting that lays out how the various  
25 policy statements from the Commission have informed

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1 the development of the AERI process.

2 I point you to the upper left box that  
3 talks about the advanced reactor policy statement that  
4 says we expect advanced designers to comply with the  
5 safety goal policy statement. Like that.

6 Later on, goes down and says, well, we  
7 expect you to comply with the severe accident policy  
8 statement and to use PRA as the design tool. When you  
9 read the PRA policy statement as shown on the lower  
10 left corner, it recognizes that not everything needs  
11 to be a full fault tree, event tree, type of approach.

12 There's other ways to do risk assessments  
13 like that. What's challenging here is indicates  
14 broadly in a fault tree should apply to complex  
15 systems. This is a big challenge to define. What is  
16 a complex system?

17 So we need some way when we write a  
18 regulation that translates those subjective terms into  
19 something like that's a more crisp sort of yes or no.  
20 If you meet this criteria, you're allowed to do AERI.  
21 If not, something else. That's been a big challenge  
22 for us.

23 But anyway, that enables the use of the  
24 AERI process in lieu of a PRA if the entry conditions  
25 are met. (Audio interference.)

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1           With that, next slide.   Why did we  
2 actually revise the entry conditions?   Well, some  
3 stakeholders commented that the current ones, the ones  
4 that we presented at the subcommittee meeting, were  
5 overly conservative.

6           And by that, what seems to be meant is  
7 that we were screening out plants that should be  
8 allowed to perform an AERI in lieu of a PRA.   Of  
9 course, the way that the entry conditions are  
10 structured is anybody can perform a PRA.   That's  
11 always the option.

12           AERI would only be needed if they met the  
13 certain conditions and didn't want to invest in doing  
14 the PRA.   I fully recognize PRAs can be enormously  
15 time-consuming and resource-intensive.   I personally  
16 done about 40 in my career.

17           On top of what we have in the various  
18 industry consensus standards that tell us how to  
19 review PRAs, it's quite laborious at times.   The  
20 intent behind AERI is necessarily don't need to bring  
21 all of that mechanism into play.

22           Second thing is that we re-examine the  
23 scoping calculations that Keith Compton presented to  
24 you at the subcommittee meeting.   And I came to  
25 realize, remember those earlier AERI entry conditions

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1 were fixated on trying to dose at a 100 meters met  
2 certain criteria.

3 And I looked at it and began to realize  
4 that was probably an inadequate predictor of the  
5 overall risk. Specifically, if you've got elevated  
6 plans or buoyant releases.

7 And with the result that even though you  
8 could have met the entry conditions, you can be --  
9 sometimes the conditional risk would be well above the  
10 QHOs, could be well below the QHOs. So we're trying  
11 to reduce the variability. Last and not least --

12 MEMBER KIRCHNER: If I might add too, we  
13 recently renewed methodology for EPZ sizing and we  
14 came to the same -- not the exact same conclusion, but  
15 you could have situations where a close in dose at 100  
16 meters just like this entry level condition might not  
17 be the best metric of evaluating EPZs, sizing.

18 MR. STUTZKE: Yes, I appreciate that. I  
19 realize the AERI entry conditions are dependent on the  
20 sizing of the EPZ or other aspects. But yes, it's a  
21 technical problem, and I'll show you a slide in just  
22 a minute. Last but not least, just the desire to  
23 provide increased flexibility and how you demonstrate  
24 the AERI entry conditions are met.

25 Next slide.

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1           These are the revised AERI entry  
2 conditions. You'll notice in Paragraph A in this  
3 language, we have eliminated this notion of dose at  
4 100 meters and replaced it with the notion of  
5 consequence evaluated anywhere in the area between the  
6 EAB or within ten miles of the EAB meets this 2.5 rem  
7 criteria.

8           We replaced the language in Paragraph B to  
9 specify how to identify the postulated boundaries as  
10 they were found. So you'll notice the notion that you  
11 need to search for all radiological sources, you need  
12 to consider internal/external hazards, focus on the  
13 combination, failures to get you into the bounding  
14 event.

15           Last but not least, consideration of  
16 various commission of various commission and omission,  
17 like that. Realize in order to -- you have the  
18 bounding event, one of the more of the plant's safety  
19 functions have failed, had a major release going on  
20 beyond the DBA like that.

21           So the intent here was to reword the entry  
22 conditions being more -- I'll characterize it as  
23 possibly other than do this and this and this rather  
24 than, well, don't do that in the analysis. So we  
25 think that it should be more effective.

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1 Next slide.

2 MEMBER PETTI: I'm a little confused. I  
3 also thought there was language in that about you  
4 could take credit for some inherent safety functions.  
5 And there was also discussion of the self-reliant  
6 mitigating facility as an entry requirement. That's  
7 all gone now?

8 MR. STUTZKE: Well, the self-reliant  
9 mitigation facility that enables the use of GLROs,  
10 that was really never in the original condition. What  
11 we said was if you met the original AERI entry  
12 condition plus other criteria, then you would be  
13 deemed a self-reliant facility.

14 MEMBER HALNON: It's the other way around,  
15 Dave.

16 MEMBER PETTI: It's the other way around.

17 MR. STUTZKE: Yes, it's the other way  
18 around.

19 MR. SEYMOUR: This is Jesse Seymour. On  
20 the last slides, I'm not sure how it plugs in, but the  
21 actual self-reliant mitigation designation happens  
22 over in 53.800 --

23 MEMBER PETTI: Okay, because I could  
24 imagine there's a plant -- this is a hazard-based  
25 criteria if I understood that.

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1 MR. SEYMOUR: Correct.

2 MEMBER PETTI: But I can imagine there are  
3 some designs that are not necessarily fully meet the  
4 self-reliant definition but clearly would meet the  
5 AERI. That's still a lot.

6 MR. SEYMOUR: Yes. When we get to my  
7 slides, I'll explore how that works. But one thing  
8 that's important to remember is even a plant that  
9 meets AERI when it enters into those criteria, it  
10 still has other criteria that have to be met.  
11 Specifically, for defense in-depth, that's not tied to  
12 credited human action. Again, there's more to being  
13 a GLRO self-reliant mitigation facility than just  
14 meeting AERI by itself.

15 MEMBER PETTI: Yes, I understood that.  
16 I'm talking -- I'm looking at the exact opposite. I  
17 don't want to do a GLRO, but I want to do AERI. I  
18 have a plant that I'm pretty sure can get into these  
19 entry conditions.

20 But because of the restrictive nature of  
21 the definition of self-reliant mitigating facility,  
22 it's very gray whether or not I need human action  
23 based on some aspects of the design. But they're  
24 still allowed to do a more streamlined AERI approach.  
25 I've seen some microreactor designs that may actually

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1 be in that campus.

2 MR. STUTZKE: Next slide, Liz.

3 MEMBER KIRCHNER: Dave, may I make an  
4 observation. That last slide, Marty, this is very  
5 good to hear. I'm making a mental note that you're --  
6 sorry, I can't read with or without glasses. When you  
7 have A and B for -- in terms of guidance for  
8 evaluating EPZ sizes. This is a very good, distinct  
9 way to go about evaluating a proposed EPZ. Just  
10 making an observation, thank you. Keep going.

11 MR. STUTZKE: Next slide, please. This  
12 points to the results of the MACCS calculations. I  
13 drew this cartoon to explain things to my managers  
14 like this. The idea is simple. Hot air rises. But  
15 we get some energy into the plume even though it's at  
16 a ground release that actually rises up over the 100-  
17 meter reference point with the -- what MACCS was  
18 telling us was that the major event of the largest  
19 dose in the ten-mile area was around four to five to  
20 six miles depending on how much energy you put in the  
21 plume.

22 And of course, the area is bigger, so more  
23 people are exposed to that higher dose, it was raising  
24 the conditional risk, like that. It's obvious in  
25 retrospect, but being said, the presumption that I had

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1 used before with my back-of-the-envelope type of  
2 calculation was, well, obviously the further away you  
3 move from the reactor, the dose should go down, right?  
4 But that's not necessarily the case.

5 We found that it can -- varying answers by  
6 an order or two of magnitude. So the intent was, as  
7 shown in the graphic on the left-hand side, it was to  
8 limit the maximum dose anywhere within the annuals.  
9 And that should work. But we're in the process of  
10 doing a bit more confirmatory counts and things like  
11 that.

12 Next slide.

13 So what MACCS scoping calculations were  
14 telling us was if you get a 25 rem lifetime dose,  
15 nominally 50 years, then the conditional individual  
16 early fatality risk over that ten-mile region from the  
17 EAB outward generally would meet  $2 \times 10^{-6}$  per event.  
18 And assuming one of them appeared, then you've  
19 demonstrated at least the QHOs.

20 Moreover, the MACCS scoping calculations  
21 were telling us the first year dose seemed to be the  
22 controlling or the limiting dose. In other words, you  
23 meet 2.5 rem the first year, you're going to meet 25  
24 rem over the lifetime due to various reasons.  
25 Radioactive decay, weathering, groundshine, stuff like

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1 that.

2 The second point here is 2.5 rem, let's  
3 say, almost coincidentally is a small fraction, 10  
4 percent, of the traditional dose limits that have been  
5 used in Part 100 and over in 5034.

6 What we're trying to say here is if you  
7 meet the AERI entry conditions, 2.5 rem over the first  
8 year, you've met the 25 rem, at the worst two-hour  
9 interval at the EAB, and you've met the 25 rem over  
10 the duration of a (audio interference).

11 Converse is not true, however. So this is  
12 an indication of how the AERI conditions restricts  
13 itself. In other words, not every plant would be  
14 eligible to perform an AERI.

15 MEMBER HALNON: Marty, this is Greg. The  
16 ten miles, is that intended to have any similarity to  
17 the ten-mile EPZ issues in Part 150?

18 MR. STUTZKE: The answer is no. It's  
19 purely coincidental.

20 MEMBER HALNON: Okay. I would hope that  
21 in the guidance you would make sure that people don't  
22 confuse the two, especially with the new --

23 MR. STUTZKE: You're not the first one to  
24 point this out. Actually, when the safety goals were  
25 first formulated, it was a 50-mile radius. There was

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1 big debate that your average (audio interference)  
2 people closer would get more dose than --

3 MEMBER HALNON: It's a nominal issue --  
4 (Simultaneous speaking.)

5 MEMBER HALNON: -- based on counties and  
6 jurisdictions.

7 MR. STUTZKE: Right.

8 MEMBER HALNON: So just make sure that  
9 that's clear in your guidance.

10 MR. STUTZKE: Will do. Next slide. As  
11 I mentioned before, the AERI entry conditions not only  
12 used to determine when an AERI can be performed in  
13 lieu of a PRA. They're also used to consider when you  
14 need to meet requirements for the mitigation beyond  
15 design-basis event and combustible gas control.

16 As Jesse just commented, and certain  
17 people will elaborate further, in combination with  
18 other conditions the AERI entry conditions are used to  
19 define when a plant is a self-reliant mitigation  
20 facility.

21 But one of those things that I would  
22 emphasize here that actually seemed to be confusing  
23 among the staff is just because you perform an AERI,  
24 you're not relieved from meeting all the other  
25 requirements in Framework B. It is not like a maximum

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1 hypothetical accident. Everything still applies to  
2 you.

3 In other words, you need to have a bunch  
4 of design criteria, et cetera, et cetera, like this.  
5 And as I mentioned before on the second bullet there,  
6 some applicants may elect to perform a PRA even if  
7 they meet the AERI entry.

8 MEMBER HALNON: This is Greg again. The  
9 question comes in if they decide to do a PRA right  
10 after an AERI, they still must have GLROs, even though  
11 they meet the AERI condition. And maybe that's a  
12 question for Jesse later on.

13 MR. SEYMOUR: When I display The  
14 comparison of Framework B and the criteria that are  
15 there, it will show the comparison between non-AERI  
16 and AERI facilities. I think that will make it more  
17 clear than if someone were to come in and all that,  
18 simply to do a PRA. There should be a reasonable  
19 pathway for them --

20 MEMBER KIRCHNER: The sub-bullet there  
21 strikes me as a little bit -- I get the point you're  
22 making, but what if a self -- a facility, a commercial  
23 nuclear power plant, let me use the right terminology,  
24 comes into you and meets the self-reliant mitigation  
25 facility criteria but opts to have a senior reactor

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1 operator and licensed reactor operators?

2 Why couldn't they do that? Because they  
3 feel that your process for SROs and ROs is a higher  
4 level of reliability in terms of protecting their  
5 investment. This sub-bullet seems to say you must  
6 have GLROs because you're a self-reliant facility.  
7 Why would you ever turn anyone down and say, we want  
8 a senior reactor operator and licensed reactor  
9 operators --

10 MR. SEYMOUR: This is Jesse Seymour again.  
11 It's a good question. What I can say is that in  
12 earlier versions of the language, it was structured as  
13 an alternative, that a facility that met those  
14 requirements had the alternative using generally-  
15 licensed operators, meaning specifically licensed SROs  
16 and ROs.

17 We did make a change later on based upon  
18 some internal reviews for the work that we did to make  
19 a clean demarcation between the two types of  
20 facilities. And some of the language has been adapted  
21 over time has attempted to make a more clear class  
22 distinction between the facilities that fall on one  
23 side of the line and the other.

24 A big driver for that in the nature of the  
25 Atomic Energy Act and the language that's used in the

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1 Atomic Energy Act regarding the prescribing of  
2 uniformed conditions for operator licensing for  
3 various classes of reactors.

4 So in order to provide an alternative to  
5 have this new generally-licensed operator, we had to  
6 define a class to maintain uniformity. It becomes  
7 problematic to try to allow multiple types of  
8 operators fall within the same class of facility. So  
9 again, there had to be a clear demarcation.

10 Something that, and I think Bill Reckley  
11 had said this well before. In order to meet the  
12 criteria to be deemed a self-reliant mitigation  
13 facility, it is the designer that's going to have to  
14 make the case for that.

15 Whether or not they elect to put the time  
16 and effort into fully fleshing out that case to  
17 achieve that designation is going to be something that  
18 falls upon them. Again, I think I'll just leave that  
19 right there. But there is time and legwork that will  
20 have to come in to achieving that bar.

21 MR. STUTZKE: Okay. Next slide, please.

22 You had seen this before at the  
23 subcommittee about the generally organization of DG-14  
24 and 13, which is the identification of the licensing  
25 events. I would just point out again, it applies not

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1 only to Part 53 but also apply to Parts 50 and 52 like  
2 that.

3 So it's a general purpose methodology like  
4 this, which continued to make informing changes and  
5 editorial changes to both these DGs based on comments  
6 we've received during the subcommittee like this. We  
7 will be hanging on every word that goes on this  
8 afternoon to try to get a leg up.

9 As she had pointed it out, there's not a  
10 lot of time, and the holidays are approaching. My  
11 characterization of the situation, at least my team  
12 that's developing this, is like right standard rudder,  
13 all engine flank. We're moving fast, trying to be  
14 responsible, but it is challenging.

15 Next slide.

16 Final one, again on DG-14 for the actual  
17 AERI methodology guidance like that. Nothing new here  
18 again. We're continuing to refine it like this.  
19 Pointing out we changed the title from framework to  
20 methodology because we'll be using the key language.  
21 We tried Framework A and Framework B, and then we had  
22 an AERI framework. And it's like, man, this is --  
23 it's confusing.

24 Did that, and again the box down at the  
25 bottom, it's like, well, you may always decide to

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1 develop a PRA and it's my plug for my 40-some odd year  
2 career of doing PRAs. Great. And further provides a  
3 way to take advantage of risk-informed initiatives,  
4 this manages completion times, risk-informed  
5 categorizations, things like that. Anyway, hope I  
6 left you enough time, Jesse.

7 MEMBER HALNON: Okay. Thanks, Marty. I  
8 appreciate it.

9 Liz, can we move to the next slide,  
10 please.

11 Okay, so as mentioned before, my name is  
12 Jesse Seymour. I'm an operator licensing examiner and  
13 human factors technical reviewer in NRR.

14 I'll be providing a follow-up on a recent  
15 subcommittee presentation which both myself and other  
16 technical staff from NRR and DRO provided an update on  
17 rule language and overview of key guidance.

18 We intend to support the overall Part 53  
19 framework within the specific areas of operating  
20 licensing. Human factors, engineering, and operator  
21 staffing.

22 Our updates on the status of Part 53 rule  
23 language that we covered at the October 19th meeting  
24 included how we consolidated our Framework A and B  
25 requirements using a common sublanguage for Subpart F,

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1 and how we had expanded the provisions for generally-  
2 licensed reactor operator staffing to include pathways  
3 under both Frameworks A and B for both AERI and non-  
4 AERI facilities as well.

5 We also discussed how we had elected to  
6 retain the same provisions for on-shift engineering  
7 expertise, namely in the form of to grade individuals  
8 possessing plant familiarity.

9 Additionally, my colleagues and I provided  
10 overviews or draft guidance documents covering the  
11 review of operator licensing examination programs, the  
12 review of staffing plans, and for developing scalable  
13 human factors engineering review plans.

14 Today, I'd like to provide some additional  
15 discussion regarding a number of points that have been  
16 raised by the Committee members at that meeting.

17 Liz, we can move to the next slide,  
18 please.

19 So within the general topic of operator  
20 licensing, the numbers raised several points that I  
21 would like to speak to here. It was asked that we  
22 give further consideration to some form of regulatory  
23 approval that would precede the licensing of  
24 generally-licensed reactor operators.

25 This is a general matter that has been

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1 carefully considered during the overall development of  
2 that particular licensing framework. In considering  
3 those, we've taken into account the programs used to  
4 train and examine. Generally-licensed reactor  
5 operators would need to go undergo NRC approval and  
6 are intended to be subject to ongoing inspection  
7 thereafter.

8 Additionally, facilities will be required  
9 to maintain and administer the processes associated  
10 with generally-licensed operator training and  
11 qualifications as an enforceable condition of their  
12 facility license.

13 Under 53805, GLROs will also be subject to  
14 relevant requirements of Part 26 and Part 73 as they  
15 relate in part to matters of behavioral observation  
16 and site access.

17 Importantly while the nature of general  
18 licensing would make certain features of individual  
19 licensing problematic, such as would be the case if we  
20 would attempt to incorporate a mechanism to approve  
21 each individual becoming a GLRO, there is no  
22 comparable difficulty to taking enforcement action  
23 against individual GLROs once they're in the position.

24 And the necessary mechanisms for taking  
25 that enforcement action on an individual basis have

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1       been incorporated into the revisions of 53810.

2                   MEMBER HALNON:   Jesse, this is Greg.  In  
3       the interest of time, I'll just go through what the  
4       concern is and try to state it clearly.  When we went  
5       to the certified operator program, we lowered the bar  
6       pretty far, in our opinion, on the pedigree of the  
7       individual.

8                   Not necessarily the training, but we  
9       agreed that the training and everything was going to  
10      be okay with the pedigree of the individual.  So you  
11      brought in a GLRO which answered the accountability  
12      issues and the enforcement issues and the authority of  
13      the federal licensing issues.

14                   But I still think the bar is low when you  
15      allow a licensee to train somebody, put them on a list  
16      say, you're       now   licensed, without any NRC  
17      verification -- at least the paperwork is all it said.  
18      The medical is all done.  Everything else is done.

19                   So that's why we've made the comment that  
20      at least get a verification that before a person  
21      starts licensed duties that there is a federal  
22      acknowledgment and verification that that person has  
23      completed the necessary stuff.

24                   Obviously not to the level of an SRO and  
25      RO licensed person, but at least a verification by the

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1 federal government. So that's the point that we were  
2 trying to make is -- and out of all the people on the  
3 Committee, you would expect me to say, give the  
4 industry maximum flexibility since that's where I came  
5 from. So take note. I think that that's too low  
6 still.

7 MR. SEYMOUR: I appreciate the comments.  
8 Something that I would speak to, and I understand that  
9 perception on this is probably going to be -- that's  
10 a reactive after-the-fact thing is that the mechanisms  
11 that are being deployed at the level of facility to  
12 ensure that people are suitable to be placed on that  
13 list are going to be subject to ongoing inspection  
14 enforcement.

15 Again, if it's in inappropriately, that  
16 will be something that's enforceable against the  
17 facility licensee. Again, does that alleviate your  
18 dominant concern there, which I understand people get  
19 onto that list in the first place absent of that  
20 check.

21 What I can say is that that's something  
22 that we've considered pretty carefully. Something  
23 that I would offer too is your concern, and I guess  
24 just to kind of parse that out a little bit more, is  
25 your concern primarily that there's going to be some

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1 type of malfeasance on the part of the plants or just  
2 an oversight?

3 MEMBER HALNON: Yes. There may be other  
4 pressures, commercial pressures, other things that are  
5 driving an increased union pressures, other things  
6 that might be driving a more robust list than what  
7 could be done.

8 Tell me that you've never had any operator  
9 training malfeasance in the present system, and I  
10 would say, don't worry about it. Clearly, we have.  
11 Especially with new licensees coming in, some of the  
12 folks that may not have a lot of experience operating  
13 in the nuclear regulatory world.

14 MEMBER BALLINGER: This is Ron Ballinger.  
15 I've not read the enforcement part of (audio  
16 interference) but what does enforcement mean? What do  
17 you do? As part of enforcement, could you take over  
18 the process of certifying the GLROs, for example.  
19 Could that be one of the enforcement actions which  
20 would basically take care of that problem?

21 MEMBER HALNON: I think we were talking,  
22 Ron, of individual enforcement and the accountability  
23 of the individual.

24 MEMBER BALLINGER: Oh, okay. Sorry.

25 MEMBER HALNON: The overall enforcement is

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1 always there with the inspection for the licensee but  
2 the individual is what we were talking about.

3 MEMBER BIER: The other thing is my sense,  
4 and this is something I haven't looked at for a really  
5 long time, but if lines haven't been updated, they may  
6 be by now kind of negligible and cost of doing  
7 business.

8 MR. SEYMOUR: With regards to the overall  
9 enforcement, again just to clarify. The mechanisms  
10 are there to take enforcement action against both the  
11 facility licensee and against individuals who are  
12 covered under that general license.

13 If you go into the actual language that we  
14 use under 53810, one of the provisions that's built in  
15 there is to actually suspend the ability of  
16 individuals to be covered under the general license.

17 Again, we apply comparable conditions of  
18 license to those individuals in many regards is what  
19 we will see with senior reactor operators and reactor  
20 operators. And we retain that capability to disallow  
21 any given individual on top of anything else in terms  
22 of individual enforcement to disallow any given any  
23 individual to be recovered by the general license.

24 MEMBER HALNON: This is Greg. Just one  
25 last point is I would think that many, not all, of the

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1 enforcement actions taken against individuals are  
2 post-event issues, in a reactionary -- you might have  
3 some with medical paperwork and other things that are  
4 caused, but it's going to be post-event. So the  
5 reactionary piece should be in quotes.

6 MR. SEYMOUR: There's a point that I would  
7 like to make. Again, this is Jesse. I understand the  
8 need for time. I will definitely move on. What I  
9 want to point out too is that when we look at things  
10 that we do that are proactive vs reactive.

11 I don't know if this is necessarily  
12 articulated anywhere. Something that's been a factor  
13 that should anchor thinking is what is the scale of  
14 the safety impact that's associated. And in the case  
15 of the senior reactor operators and reactor operators,  
16 the staff facilities that aren't meeting this bar to  
17 be considered a self-reliant mitigation facility.

18 We see their role as being one where they  
19 could be called upon to substantially influence the  
20 safety outcome of the public. So in that case, we  
21 don't see a reactive only approach as being sufficient  
22 to provide public confidence.

23 In the case of generally-licensed reactor  
24 operators, we're talking about facilities that have  
25 entered into a different class by meeting more

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1 stringent safety criteria. And because of that,  
2 again, adopting a primarily reactive stance is  
3 something that we feel would be justifiable based  
4 upon, again, that comparative safety context.

5 MEMBER HALNON: Okay, and I think there's  
6 room in between. I think maybe you should look at  
7 even a -- much like what we do when we send a package  
8 to the NRC and hear nothing in 90 days, you're on the  
9 list or something to that effect. So there's room in  
10 between, however, some of that oversight (audio  
11 interference.)

12 MR. SEYMOUR: Thank you, and I captured  
13 your comment.

14 MEMBER PETTI: Matt, did you have a  
15 comment?

16 MEMBER SUNSERI: I did, but it was  
17 addressed. I was going to bring us to the point of  
18 the enforcement is reactive. What we're talking about  
19 is proactively reviewing the candidates before they  
20 assume duty, so I think it's been covered. Thanks.

21 MR. SEYMOUR: Okay.

22 So another area that we were asked to  
23 further discuss was how changes to the licensed  
24 operator tasks stemming from plant modifications that  
25 translate into adjustments to the examination (audio

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1 interference) appropriate modifications to the  
2 facilities. Kind of a two-edged comment there that  
3 raised some really interesting points.

4 So first, I would like to say that our  
5 overall approach, which spans everything going from  
6 the original systems approach to training-based  
7 operator training program all the way through the tail  
8 end of the process of licensing examination itself has  
9 to be constructed so as to balance the flexibility and  
10 inherent adaptability of the (audio interference)  
11 process with a need for holding the standard of a  
12 comprehensive and rigorous examination process.

13 In that regard, it's important to point  
14 out that we make a distinction between the complete  
15 body of mass an operator needs to know, which is  
16 addressed more flexibly. And specifically, that's  
17 something that we cover under guidance that has not  
18 gone before the Committee up to this point. That is  
19 training program review guidance. That addresses that  
20 broader body of knowledge.

21 Again, that's something that we see the  
22 SAP (phonetic) process that's adapting as the needs of  
23 the facility and of the operators change. That is  
24 distinct from our body with specific knowledge and  
25 abilities that have significant importance of

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1 fulfillments of duties that having nexus to safety or  
2 an important administrative nature. So again, a  
3 smaller subset.

4 Tighter controls are imposed upon changes  
5 to that latter pool of material because of the need to  
6 ensure the content domain for the licensing  
7 examination is neither permitted to exclude essential  
8 material nor to become too dilute and thus fail to  
9 examine important topics.

10 MEMBER HALNON: This is Greg. I think the  
11 design control process adequately (audio interference)  
12 next to the training program given in today's world,  
13 you go through a checklist, you make sure that there's  
14 no changes to the program. If there is, you establish  
15 a rapport with the training staff who will fix it.

16 I think the plan was is that there's a  
17 breakpoint where you do a modification where you cease  
18 to be a self-reliant mitigation facility. What is the  
19 check and balance to ensure that going forward, the  
20 training is within the regulatory framework?

21 Because if you can't say that you're a  
22 self-reliant mitigation facility, you can't have  
23 GLROs. You have to have SROs and ROs. Is that a  
24 concern, that breakpoint? Or are you going to  
25 continue to -- once you, at the beginning of design,

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1 you establish GLROs and you're there forever  
2 regardless?

3 MR. SEYMOUR: This is something we've come  
4 around to a few times in the past. It is complicated,  
5 right, because it raises issues of finality and some  
6 other aspects as well, too. The first aspect that I  
7 would like to point out is that when that issue  
8 arises, there is a change to an analysis.

9 And Bill Reckley has made good points on  
10 this on the past, too. A change to analysis, plant  
11 modification or something that shifts that nature of  
12 the operator with respect to ensuring acceptable  
13 safety outcomes.

14 The owner-operator, the designer, whoever  
15 that party may be, they're going to have to make a  
16 decision in terms of how do you address that. Do you  
17 address it via a system, or do you address it via  
18 person, right?

19 You go ahead and take a design approach  
20 that keeps the person in that role that they  
21 previously were. Or do you take the approach of now  
22 relying upon human action to mitigate the event that  
23 now needs to be mitigated. So again, there's going to  
24 be that initial decision point that's built in there.

25 Another factor that comes into play too,

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1 and again this does not directly address the question.  
2 By design, the senior reactor operator training and  
3 licensing requirements as the Committee has now seen  
4 in the guidance and the general license reactor  
5 operator guidance is driven by similar methods.

6 Very, very similar in terms of finding  
7 what that testable content domain is, making sure that  
8 important knowledge and abilities are tested to  
9 identify the competence of the individuals there.  
10 There's other things that are different in terms of  
11 assuming that those are there. I should say ensuring,  
12 not assuming that similar mechanisms.

13 So at the end of the day, things that are  
14 determined to be significant for either sets of  
15 operators to do will fall within that domain to be  
16 tested and examined on.

17 The final part is ultimately that the  
18 Commission does retain a broad authority to impose  
19 conditions on the facility licensee that are necessary  
20 to provide an adequate assurance of public health and  
21 safety.

22 Again, if the need arises that we have to  
23 take action via issuing an order or something to that  
24 effect to modify the facility license that requires  
25 something different, that is a possibility. Now, we

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1 thought through that contingency.

2 One thing that we think is a very nice  
3 feature is the general similarity construct of the  
4 GLRO training examination programs and the SRO  
5 programs. So while there may be a need in the  
6 aftermath of that to shift to an individual licensing  
7 operator. Fundamental pieces of the parts of those  
8 programs shouldn't be -- they shouldn't be  
9 dramatically removed from one another. Again, it  
10 would be a transition to an individual license --

11 MEMBER HALNON: Yes, I would agree, Jesse.  
12 It's incremental. However, there's other things  
13 besides operator actions that drag you out of the  
14 self-reliant mitigation facility. It could be the  
15 level of passivity in the system, it could be a  
16 barrier that you're eliminating, adding to or  
17 changing.

18 So there's other things that may -- it's  
19 probably more of a legal question than it is an actual  
20 capability question. So the mechanism of how that  
21 gets caught and how it's looked at again looks  
22 reactionary and then scrambling with exemptions and  
23 other mechanisms to allow an interim period to the  
24 license operators or continue with some kind of  
25 exemption process.

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1           You're right. It's complicated, and it  
2 may be one of those things that we have to have happen  
3 first before we actually figure out how to deal with  
4 it.

5           MEMBER BIER: If I can follow up briefly.  
6 I'm less concerned about the reactive nature. Maybe  
7 it's a problem, but as Greg said, sometimes you have  
8 to experience it to learn from it. But more concerned  
9 about just what the transition would be if, for  
10 example, we discover a situation where operator  
11 actions are necessary.

12           Are they then no longer considered self-  
13 mitigating? What's the process by which they would  
14 come under the new licensing regulations? Would be  
15 there a waiver, would there be a possibility of  
16 saying, you can still have the GLRO with some  
17 additional criteria.

18           I just want to make sure that's kind of  
19 being kind of thought through in an organized manner  
20 and not ad hoc panic the first time we're in that  
21 situation.

22           MR. SEYMOUR: It's a good comment. I can  
23 say that that's nothing that currently exists in terms  
24 of a written product at this point. It's something  
25 that we've had the debates about going through that

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1 thought exercise to make sure the mechanisms are  
2 there.

3 And some of what happens in the aftermath  
4 with that type of thing, again, because you're getting  
5 into enforcement. It becomes a legal matter. What I  
6 can say is I have been involved in escalated  
7 enforcement actions in the past. Not as a licensee,  
8 as the regulator.

9 What has transpired in the orders that  
10 I've been involved with is for certain actions  
11 articulated within the order, there was a time to  
12 comply with each item that was within those orders.  
13 Again, that was a carefully developed product. Again,  
14 to make sure that there was a reasonable to come into  
15 compliance that was commensurate with the nature of  
16 what was going on.

17 Again, the Commission can issue a shutdown  
18 order. Again, if there's something that's completely  
19 unacceptable. We could do that. In other contexts,  
20 we allow a timeframe to come into compliance. But  
21 again, that's nothing that I can say that we've gone  
22 through and specifically penned a paper on.

23 CHAIRMAN REMPE: Members, we've got five  
24 minutes left. We still have slides, and we have  
25 public comments today. We're supposed to be done at

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1 10:30, so quick answers to understand things and quick  
2 responses, please. Thank you.

3 MR. SEYMOUR: Okay. Yes.

4 So a further topic of discussion was how  
5 the GLRO criteria interrelate with the AERI criteria.  
6 And as Marty Stutzke has already provided an overview  
7 of AERI, I'd like to illustrate on the next slide how  
8 those criteria fit into determining which plants would  
9 and would not be staffed by generally-licensed reactor  
10 operators.

11 Liz, if we could move to the next slide,  
12 please.

13 So this slide summarizes the GLRO  
14 criteria. So again, the criteria that determine  
15 whether or not a plant is a self-reliant mitigation  
16 facility as they apply across Part 53 in its entirety.

17 The gray column on the left lists certain  
18 principles that we identify as being appropriate to  
19 inform this operator licensing staffing related  
20 threshold during our earlier work that preceded us  
21 actually sitting down and drafting the Part 53  
22 requirements.

23 These principles should be viewed as  
24 initial guidelines for the development of the  
25 associated criteria that ultimately needed to be

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1 balanced against matters, practicality and certain  
2 pragmatic considerations such as the overall magnitude  
3 of radiological hazard and other factors.

4 The second column in pink summarizes the  
5 criteria and how they were applied within Framework A.  
6 So again, the Framework A criteria are in the pink  
7 column. These criteria are heavily intertwined with  
8 revisions of Subparts B and C. Another key point is  
9 that they also incorporate the insights gained via a  
10 PRA.

11 The third column in green shows the  
12 criteria for Framework B facilities that do not meet  
13 the criteria for an AERI and instead a conduct PRA.  
14 So again, I think this speaks to an earlier question  
15 here. So if we just follow that green column all the  
16 way to the bottom, that illustrates that.

17 As can be seen while there aren't  
18 differences in what certain requirements are mapped to  
19 and how certain criteria are structured, the overall  
20 requirements between the pink and green columns, so  
21 again Framework A and the non-AERI PRA-based Framework  
22 B, generally mapped to one another.

23 Again, we had to adapt where things point  
24 to in some cases. We had to align other requirements  
25 to achieve the same thing. In the case of defense in-

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1 depth, we actually had to craft a standalone defense  
2 in-depth requirement because we didn't have an  
3 equivalent to Framework A's provisional Framework B.  
4 But again, in general, the two mirror each other from  
5 a philosophic approach.

6 MEMBER HALNON: Jesse, let me help you  
7 just move along here. Let me just very briefly  
8 summarize our comment, and we can probably move on.

9 We just wanted to make sure that you walk  
10 through each of the criteria and make consistent the  
11 terms that you're using. Sometimes we'll use  
12 credibly, reliable, sometimes we use human actions  
13 credited, sometimes we use interface -- you know,  
14 introduce the passive with caveats, sometimes single  
15 barriers, and AERI brings in those criteria.

16 So just walk through that language and  
17 make sure that it's the way you want it and it's  
18 consistent. It feels like different people wrote  
19 different portions of it. That's really the only  
20 comment. We don't have any issues with the criteria.

21 MR. SEYMOUR: Okay.

22 MEMBER PETTI: I'm still confused a little  
23 bit. You can meet the GLRO criteria under AERI  
24 without this human action. There's no words in 34II  
25 that says that you have to do stuff without credited

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1 human action. Is that correct?

2 MR. SEYMOUR: So under the modified AERI  
3 criteria, it is true that the way you meet the  
4 qualification has changed. Again, I offer that I  
5 don't want to infringe on Marty's wording that's  
6 there. But an important point to keep in mind is  
7 this.

8 In identifying that bounding event, one of  
9 the things that has to be considered are the influence  
10 of credible human errors commission and omission. In  
11 doing that, and also looking at combinations of system  
12 failures and so forth, you have to show that bounding  
13 events, and again, Marty, please interrupt if I  
14 misspeak.

15 But that, quote-unquote, kind of worse  
16 case event that drives everything still falls under a  
17 very conservative radiological dose criteria. Again,  
18 set at 2.5 rem. So in that case, what we had to do  
19 was take a bit more of a open-minded stance in looking  
20 at what is it reasonable to draw the line at here.

21 What I will say is the new AERI criteria,  
22 that's something that's very fresh to us. Again, just  
23 last week we started looking at that. And we are  
24 still digesting that and considering its  
25 appropriateness.

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1 As can be seen here, we already stack an  
2 additional defense in-depth criteria on top of the  
3 AERI qualification. And we certainly can add  
4 additional provisions to the GLRO criteria that are  
5 added on top of just meeting AERI.

6 So again, as we go through and we further  
7 evaluate that, we do basically preserve that ongoing  
8 work that's still there that we may opt to say we need  
9 to put a restriction against crediting human action in  
10 any way, shape or form or something to that effect.

11 MEMBER HALNON: So Dave, in 34AA IIE  
12 connects to, and says you can't use operator action to  
13 meet the dose criteria --

14 MEMBER PETTI: So, I'm confused. I'm  
15 going by his latest language he showed us today. The  
16 stuff that we got, the subcommittee has changed. That  
17 language isn't --

18 MEMBER HALNON: That wasn't the dose  
19 criteria. Not on the B side which says you have to go  
20 and meet that without human action.

21 MEMBER PETTI: In the table, does it --  
22 doesn't incline enough for me. There's still a  
23 requirement of meeting stuff without human action.

24 MEMBER HALNON: In bigger letter B, this  
25 is big letter A. The only language had dose criteria

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1 and then the criteria how you had to make that dose  
2 criteria, which was part of it was passive and other  
3 things with no credit or human action. So they  
4 changed the dose criteria, but you guys didn't change  
5 big letter B.

6 (Simultaneous speaking.)

7 MR. STUTZKE: Yes, in fact we did. What  
8 we said was --

9 MEMBER HALNON: Now, I'm confused.

10 MR. STUTZKE: What it now says that you  
11 have to consider them when you're defining the  
12 bounding events.

13 MEMBER HALNON: You have to consider the  
14 human actions --

15 MR. STUTZKE: Yes, the human actions while  
16 you're defining that bounding event. Not that you're  
17 prohibited from having --

18 MEMBER HALNON: So it just amplifies my  
19 comment. Walk through that and make sure that you got  
20 some consistent language requirements.

21 MR. STUTZKE: Absolutely.

22 MEMBER HALNON: And that's something that  
23 we continue to look at. Something that I do want to  
24 put out there that gives us a reason to think through  
25 this very carefully is this. Fundamentals in the AERI

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1 qualification. Drawing a very conservative line for  
2 the radiological hazard.

3 Again, set at 2.5 rem, which to keep it in  
4 perspective is half of the occupational dose limit  
5 that we established. So again, just keeping it in the  
6 30,000-foot view.

7 And the other thing that we do is we say  
8 for that event that caused that limiting radiological  
9 dose, again, you have to show that you considered how  
10 those human errors of doing things you shouldn't do or  
11 not doing things that you're required to do  
12 contributed into that and taking it into consideration  
13 and so forth.

14 The last piece of it, and again is that we  
15 still retain the defense in-depth requirement. What  
16 we say is irrespective of that, you still have to  
17 provide for a layered defense in-depth scheme that  
18 doesn't have dependence on any single barrier or any  
19 reliance on credited human action right there.

20 Again, that helps us to account for things  
21 like uncertainties in the analysis. And again, the  
22 potential that via reliance on this AERI approach that  
23 perhaps there is human action embedded in there  
24 somewhere. So again, an outside barrier.

25 MEMBER PETTI: I'm just looking at the new

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1 criteria. That opens up the door a lot. MHTGI  
2 (phonetic) would meet that criteria in spades. That  
3 PRA claim one rem at the site boundary, which is like  
4 300 meters.

5 I always thought AERI as sort of  
6 microreactors, but that dose criteria is going to open  
7 it up a little bit. So now you're going to have  
8 larger systems that have grown more complex that can  
9 meet the dose criteria potentially. You have to think  
10 about this a little bit. I always envisioned it as  
11 the smaller micros not these bigger sort of  
12 intermediate-sized things that could be the case.

13 MR. SEYMOUR: Again, just going through  
14 and making sure we covered everything here. I think  
15 we have covered what we needed to talk about. Again,  
16 I do appreciate the comments. But I'd like to go  
17 ahead, for the sake of time, and just to move to onto  
18 the slide.

19 (Pause.)

20 MR. SEYMOUR: I just want to silence this  
21 alarm so it doesn't go off again. My apologies for  
22 that.

23 So now, this is my final slide, what I'd  
24 like to do is finally I'd like to address several  
25 points that were raised regarding operational staffing

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1 by the members.

2 First, a concern was raised that the  
3 preliminary proposed framework would potentially for  
4 allow for plants with no operators at all. So I want  
5 to reiterate a point that I made in the past that  
6 there is no allowance for zero-operator staffing  
7 within this framework.

8 And that even in the least restrictive  
9 conceivable iteration of where this would pan out, the  
10 staffing requirements would still place a licensed  
11 individual in a position of cognizance of a plant  
12 operations at all times during the operating phase  
13 while the reactor is fueling.

14 Another point that was raised that asked  
15 us to give further consideration to the engineering  
16 expertise degree requirement and whether factors like  
17 experience would serve as a surrogate for that  
18 educational requirement.

19 This is a point that we in NRR DRO have  
20 given deep consideration to. And as the members will  
21 recall back a year ago, we actually began our Part 53  
22 work from a standpoint of looking to not carry forward  
23 the role that was akin to a traditional shift  
24 technical advisor.

25 However in the course of our work,

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1 including our consideration of the Committee's past  
2 letters, we ultimately settled upon the stance that an  
3 appropriately-degreed individual can complement and  
4 augment the plant operation's experience of an  
5 operating crew in a way that helps serve as a counter  
6 to the uncertainties that may accompany the  
7 introduction of new reactor technologies.

8 Building upon that perspective, we sought  
9 to temper this requirement with new flexibility in how  
10 it's met, and we feel that the end result represents  
11 something that is both modern and relevant.

12 Another facet of the engineering expertise  
13 role that we were asked to consider was the adequacy  
14 of the training requirements provided for under our  
15 framework. As noted in the prior meeting, this is  
16 achieved in a manner that is twofold.

17 First, personnel requirements of 53830  
18 would include individuals fulfilling the engineering  
19 expertise role as an example of who would be covered  
20 by a systems approach training-based training process.

21 Again, building upon that further, our  
22 staffing plan review guidance then lists specific  
23 topical content for the reviewer to check within such  
24 programs, including areas like reactive theory plant  
25 systems, accident analysis and mitigating core damage,

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1 again, specific to individuals in that engineering  
2 expertise role.

3 A separate concern that was raised was  
4 related to the possibility for engineering expertise  
5 that is being provided remotely to be rendered  
6 unavailable by way of disruption of communications.  
7 On this point, I want to reinforce that making sure of  
8 the engineering expertise role is supportive in an  
9 advisory nature that is neither directive or  
10 mitigative.

11 Thus, the unavailability of the  
12 engineering expertise role should have no direct  
13 bearing on whether or not any given plan event could  
14 be successfully mitigated from a standpoint of  
15 credited response.

16 The final point that I would like to  
17 address is the concern of the requirements within the  
18 portions of Subpart F of the consideration here might  
19 allow for remote operations.

20 Here, I want to be clear in our intention  
21 that we only intend that the framework that we've  
22 established for staffing and human factors engineering  
23 operator license training is capable of adaptation in  
24 the future concepts of operations without the need for  
25 subsequent modification via rulemaking.

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1           To that end, we have merely crafted  
2 requirements that are capable of addressing a wide  
3 spectrum of operational approaches. Whether or not  
4 remote operations will be one of them remains a  
5 broader issue that is simply beyond the scope of this  
6 limited subset of Subpart F to enable or otherwise  
7 address with sufficiency. That's my final slide, so  
8 turning it over to Jordan unless there's any  
9 questions.

10           CHAIRMAN REMPE: So autonomous operation  
11 is brought up in the past. There were documents that  
12 are regulatory documents that basically said we don't  
13 have to deal with this now because there's other  
14 documents that say you can't do it. Now you're saying  
15 the rule language is going to allow this? And are  
16 those other documents not going to hold?

17           And I didn't bring the references with me.  
18 I know, Matt, you came up with some that you sent out  
19 and I found some others. What's the story here? Are  
20 those documents still valid or not?

21           MR. SEYMOUR: The point that I was simply  
22 trying to make is that just from the Subpart F  
23 operational requirements that we talked about, they're  
24 built to be adaptable to a wide range of --

25           CHAIRMAN REMPE: Right now, those others

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1 documents hold autonomous operation is not allowed?

2 MR. SEYMOUR: So I would say is that you  
3 could build a reactor that was autonomous, our  
4 requirements are still going to say have at least a  
5 generally-licensed reactor operator in a position of  
6 oversight with certain indications, the ability to  
7 shut down the reactor, all the things that we  
8 articulate. We don't allow for any reactor to be  
9 unattended and unsupervised, if that makes sense.

10 CHAIRMAN REMPE: I think what your answer  
11 is, is yes, we don't allow autonomous operation at  
12 this time. I can't get a yes or no.

13 (Laughter.)

14 MR. SEYMOUR: It's not trying to give an  
15 opaque answer. What it is is the ability for a  
16 reactor to operate itself autonomously is independent  
17 from its ability to be allowed to do that in a  
18 completely unsupervised way.

19 Again, if the reactor runs itself, what it  
20 does it takes the operator from being a hands-on role  
21 and shifts them, in a human factors engineering  
22 perspective, what we consider to be a position of  
23 supervisory control.

24 Again, it moves the role of the operator  
25 to oversight. But again, the two are -- again, I know

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1 it's kind of mincing words and so forth. There's  
2 nothing that would preclude you from building a  
3 reactor that could operate itself. Our rules say  
4 that's nice, but someone will always be in a position  
5 of oversight having cognizance over that reactor --

6 MEMBER BROWN: That means on-site as  
7 opposed to be in New York City while the city is  
8 operating in North Alaska?

9 MR. SEYMOUR: So our requirements, and  
10 again I'm just talking about our limited subset  
11 Subpart F, is neutral on the location of those  
12 individuals. Again, that's by design so we can adapt  
13 to future concepts --

14 MEMBER BALLINGER: What you're saying is  
15 --

16 MEMBER BROWN: My brain is fried.

17 MEMBER BALLINGER: -- you're basically  
18 taking the NASA approach? The satellite that's  
19 humming along out there with the reactor operating.  
20 Nobody riding in that satellite, but the reactor is  
21 capable of notifying somebody who is a supervisor to  
22 take action remotely.

23 MR. SEYMOUR: I think a better way to  
24 frame this discussion is that so you get to that point  
25 of remote operation, there's other considerations that

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1 would need to be addressed there simply beyond the  
2 scope of this work.

3 A key issue, and we've talked about this  
4 before, is cybersecurity. Again, that's beyond the  
5 scope of our work here. I think we have Ishmael  
6 Garcia (phonetic) available on the call today. If we  
7 want to talk about what impediments there are there  
8 and the current state of that work, that's something  
9 we can pull him in on.

10 But that's not something that our  
11 requirements here in Subpart F don't get over that  
12 hurdle for you. So again, if someone wanted to come  
13 in and do that in a way that's remote, there's other  
14 things that they would have to address before they  
15 could even get to where our flexibility is in that  
16 regard.

17 MR. RECKLEY: Jesse, this is Bill. If I  
18 can, because we talked about this a number of times.  
19 Whereas the rule doesn't specifically preclude it and  
20 say this is not allowed, neither does it build in how  
21 we would do that review in any proposal that would  
22 say, well, we're going to have remote operation, would  
23 have to be reviewed, approved, go through this  
24 Committee.

25 And we would have to address some of the

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1 things that, Joy, you mentioned. We are just now  
2 studying how we would approach that to do the review  
3 of a proposal should it ever come. But the wording in  
4 the rule language does not say, this is not allowed.

5 MEMBER BALLINGER: So again, what you're  
6 saying is -- fission battery. I'm using another one  
7 of these microreactor examples. Someone wants to put  
8 a fission battery in a steel mill, could they do it?

9 MR. SEYMOUR: So what would happen is, and  
10 we're just going to say for the sake of discussion,  
11 this was an inherently safe fission battery.

12 MEMBER BALLINGER: Yes, all the lying that  
13 they do about it. Yes.

14 (Laughter.)

15 MR. SEYMOUR: So this hypothetical, right.  
16 We'll say that this would go in, that it would satisfy  
17 the criteria to be a self-reliant mitigation facility  
18 by virtue of its inherent safety characteristics.

19 At that point, what we would say is, okay.  
20 We would then establish that somewhere. Again, we're  
21 going to use leave that open to the broader  
22 discussion, you have a generally-licensed reactor  
23 operator. They could have oversight of more than one,  
24 because we say facilities. We use the term plural; we  
25 leave that open.

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1           A generally-licensed reactor operator  
2 would have to have cognizance over that thing for its  
3 entire operating phase. So again, there would have to  
4 be someone that was in a position of oversight in a  
5 continuity of responsibilities between individuals.  
6 So they would be responsible for technical  
7 specifications for that.

8           They would have to have indications.  
9 Again, we articulate certain proposed TMI requirements  
10 we've adapted what type of indication they have to  
11 have. They have to get capability of shutting down  
12 that fission battery from their location. They would  
13 have the capability of dispatching operation and  
14 maintenance personnel to that facility.

15           They would retain the administrative  
16 responsibility for any notifications associated with  
17 it. Maintenance controls, things of that nature. So  
18 again, we're very prescriptive about the capabilities  
19 that that individual would have to have. But that  
20 would represent kind of the basement level.

21           Now in terms of is that practical for a  
22 fission battery. What I would say is we temper that  
23 by not limiting how many of those fission batteries  
24 this operator might have cognizance over.

25           So it could be that, again, if you were

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1 able to come in and make that case down the road,  
2 again, if we resolve all the other issues, you know,  
3 road ops (phonetic), could someone remotely be  
4 monitoring a dozen of these things? That case could  
5 be made.

6 Again, we leave our requirements open to  
7 do that so that in the future if things to that point,  
8 our requirements could adapt to that. But again, what  
9 we have is just by itself insufficient on its own to  
10 address the full question (audio interference.)

11 What we do is we make sure that we're  
12 adaptable from a staffing standpoint, licensing  
13 standpoint, from a human factors engineering  
14 standpoint, to be able to scale up and scale down and  
15 to look at things differently.

16 Again, a key point. We don't focus our  
17 human factors engineering requirement on the control  
18 room anymore. We focus on specific locations where  
19 humans fulfill plant safety functions (audio  
20 interference) safety functions. Again, that's one of  
21 those key things is how do you address this concept of  
22 operations that a future plant might not have a  
23 traditional control room.

24 We don't want to have a regulation that  
25 doesn't work because they don't have a, quote-unquote,

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1 control room. So what we do is we disassociate that  
2 and say what were we trying to achieve, we want the  
3 human being to have the capabilities to maintain the  
4 plant's safety.

5 So again, it's just the type of thing that  
6 we do there. We simply try to make something that's  
7 adaptable, that's broadly technology-inclusive. When  
8 the other factors align, we should be able to adapt  
9 our requirements in a way that supports safety.

10 MEMBER SUNSERI: This is Matt. I have a  
11 comment.

12 I think this is all very reminiscent of  
13 what we discussed in the subcommittee meeting the  
14 other day. It seemed to me that the conclusion that  
15 we walked away with and we'll likely discuss in our  
16 letter report, at least discuss the potential for it  
17 to be in the letter report, is if a remote operator  
18 exists that meets all these criterias you're  
19 describing, our recommendation is however that  
20 operator provides the oversight of the facility,  
21 should there be an impairment that requires that  
22 operator to intervene that that same impairment does  
23 not also prevent the operator from intervening. If  
24 you understand what I'm saying. That's all I wanted  
25 to comment on.

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1 MR. SEYMOUR: Yes, I appreciate the  
2 comment. Thank you. Again, it's a valid point.  
3 Again, I understand that it's something that may be in  
4 the letter, and we will definitely consider that.

5 Liz, if we can move to the next slide,  
6 please. I think Jordan's up.

7 MR. HOELLMAN: Yes. Hi, everyone. This  
8 is Jordan Hoellman again. I'm not going to touch too  
9 much on this, but I'd like to just open it up if  
10 there's any questions. I know we kind of talked about  
11 a number of these guidance documents in detail at the  
12 subcommittee meeting.

13 The focus should be on the Part 53 column  
14 there with the specific italicized documents that we  
15 presented in subcommittee last month and then some  
16 additional guidance documents being developed for the  
17 security side in Part 26. If anyone has any questions  
18 about any guidance.

19 (Pause.)

20 MEMBER PETTI: Okay, thank you.

21 Before we go to public comments, I just  
22 want to thank the staff. This has be a monumental  
23 effort. You step back at this stage and look at  
24 what's behind us. It was a tremendous amount of  
25 effort to get here. I appreciate all of the good

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1 discussions we've had.

2 With that, we are 20 minutes behind. We  
3 do have some hard stops, so I don't know how it's all  
4 going to work in terms of whether we'll get the letter  
5 read in before the hard start. We might not. We  
6 might have to do --

7 (Simultaneous speaking.)

8 MEMBER PETTI: So, yes, let's start with  
9 public comments. Please identify yourself in your  
10 comment. I guess we have someone from the  
11 Breakthrough Institute, so they should go first  
12 because they notified us.

13 MS. FRANOVICH: Thank you. This is Rani  
14 Franovich. Can you hear me?

15 MEMBER PETTI: Yes.

16 MS. FRANOVICH: Okay, thank you. Dr.  
17 Rempe and ACRS members, I speak on behalf of the  
18 Breakthrough Institute. It's an independent global  
19 research center that identifies and promotes  
20 technological solutions to environmental and human  
21 development challenges.

22 The Breakthrough Institute does not  
23 receive funding from industry. We believe new and  
24 advanced reactors offer critical pathways to deep  
25 decarbonization, and we advocate for appropriate

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1 regulation in the licensing and oversight of reactors.

2 Nuclear power advances clean energy goals,  
3 enhances environmental quality and supplies reliable  
4 electricity to the transmission grid. As such, timely  
5 deployment of safe, innovative and economically viable  
6 designs is an urgent public interest.

7 The Breakthrough Institute has closely  
8 followed the development of Part 53 and express  
9 concerns and comments. The ACRS has independently  
10 identified many of the same issues. Numerous concerns  
11 remain unresolved and alignment with stakeholders has  
12 not been achieved.

13 The ACRS plays an important role in  
14 ensuring the NRC staff delivers a usable rule that  
15 satisfies NEIMA. We strongly urge the ACRS to  
16 recommend the Commission redirect the staff to, one,  
17 expeditiously work with external stakeholders in a  
18 more open, collaborative manner.

19 Two, come to agreement on unresolved  
20 issues like what should be governed by regulation  
21 versus guidance. And three, significantly streamline  
22 the rule to be more performance-based and  
23 appropriately risk-informed.

24 Timely agreement on these matters can be  
25 reached if the NRC staff changes its regulatory

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1 posture, adopts a customer service ethic, and is open  
2 and receptive to relocating detailed, prescriptive  
3 requirements to guidance.

4 We appreciate this opportunity to express  
5 the public's interest in this crucial rule and its as  
6 yet unrealized potential to enable the rapid  
7 deployment of new and advanced reactors. Thank you.

8 MEMBER PETTI: Thank you. Other comments  
9 from the public? Identify yourself in your comment.

10 (Pause.)

11 MEMBER PETTI: Okay, not hearing any, I  
12 turn it back over to the chair.

13 CHAIRMAN REMPE: Okay, so at this time,  
14 we're going to go off the record.

15 (Whereupon, the above-entitled matter went  
16 off the record at 10:53 a.m.)

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# Advisory Committee on Reactor Safeguards (ACRS)

**10 CFR Part 53 “Licensing and Regulation  
of Advanced Nuclear Reactors”**

**November 2, 2022**

# Agenda

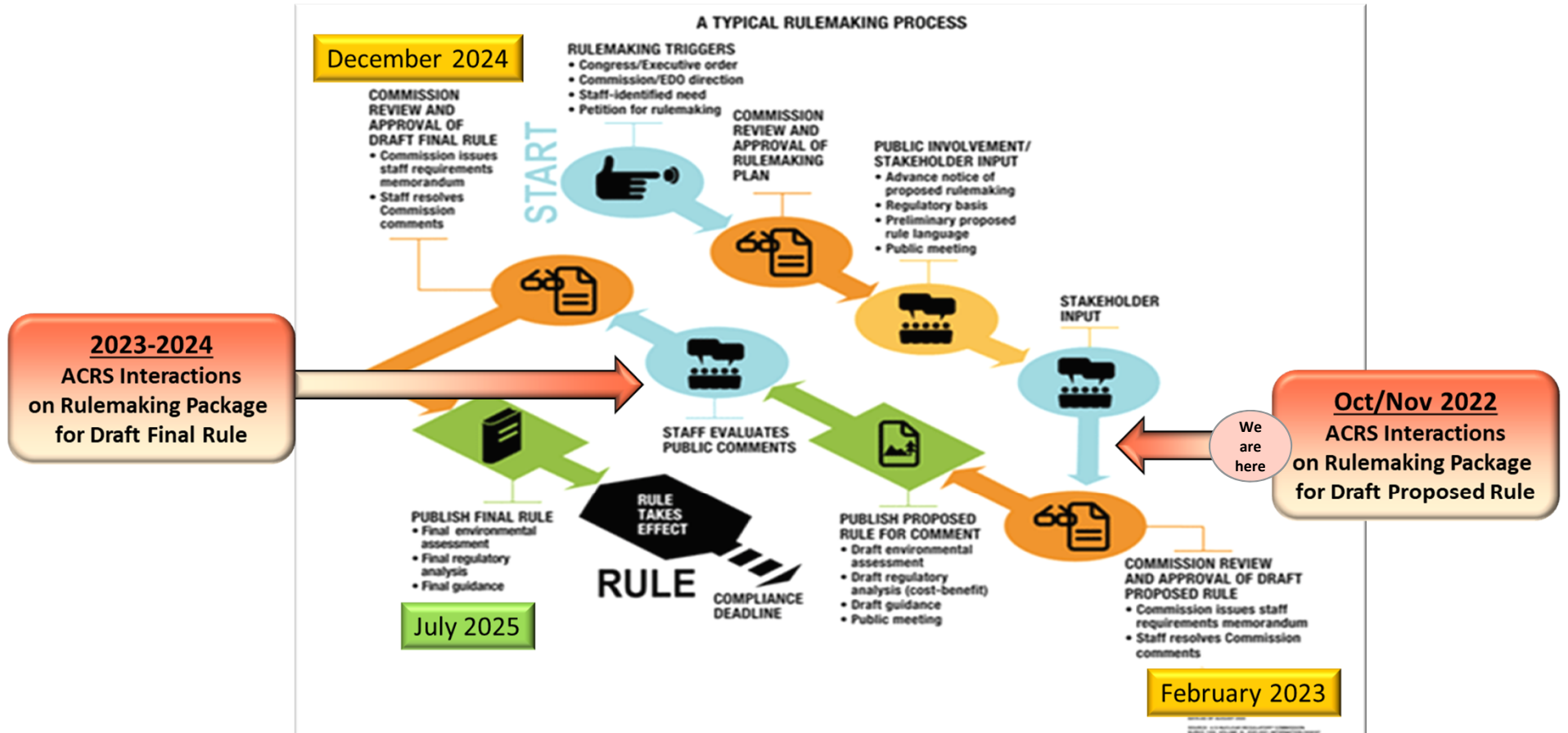


**8:35 am – 10:30 am**

Staff presentation on 10 CFR Part 53, “Risk-Informed, Technology-Inclusive Regulatory Framework for Commercial Nuclear Plants,” Proposed Rulemaking Language

- Rulemaking Schedule
- Part 53 Licensing Frameworks
- Risk Insights/Quantitative Health Objectives (QHOs)
- Fueled Modules
- Codes and Standards
- Alternative evaluation for risk insights (AERI)
- Generally licensed reactor operators (GLROs), Human Factors, Engineering Expertise
- Guidance

# Rulemaking Schedule



# Part 53 Licensing Frameworks

Subpart A - General Provisions

**Rule Package  
(ML22272A034)**

Subpart B - Safety Requirements  
Subpart C - Design Requirements  
Subpart D - Siting  
Subpart E - Construction/Manufacturing  
Subpart F - Operations  
Subpart G - Decommissioning  
Subpart H - Application Requirements  
Subpart I - License Maintenance  
Subpart J - Reporting  
Subpart K - Quality Assurance

Subpart N - Siting  
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Subpart S - License Maintenance  
Subpart T - Reporting  
Subpart U - Quality Assurance

## Framework A

- Probabilistic Risk Assessment (PRA)-led approach
- Functional design criteria

## Framework B

- Traditional use of risk insights
- Principal design criteria
- Includes an AERI approach

Sections  
53.000  
and  
53.010

- Purpose
  - Provide optional frameworks for the issuance, amendment, renewal, and termination of licenses, permits, certifications, and approvals for commercial nuclear plants
- Frameworks
  - Framework A and Framework B are distinct
  - Applicants and licensees subject to the rules in this part must only use the subparts applicable to one framework

# Subpart A – General Provisions (Definitions)

- Common Definitions
  - Commercial Nuclear Plant
  - Manufactured reactor
  - Manufactured reactor module
  - ***Safety function***
- Framework A Definitions
  - Construction, Licensing basis events (LBEs), structure, system, and component (SSC) classifications
- Framework B Definitions
  - Construction, Design basis, Functional containment, Safety-related SSCs, Severe nuclear accident



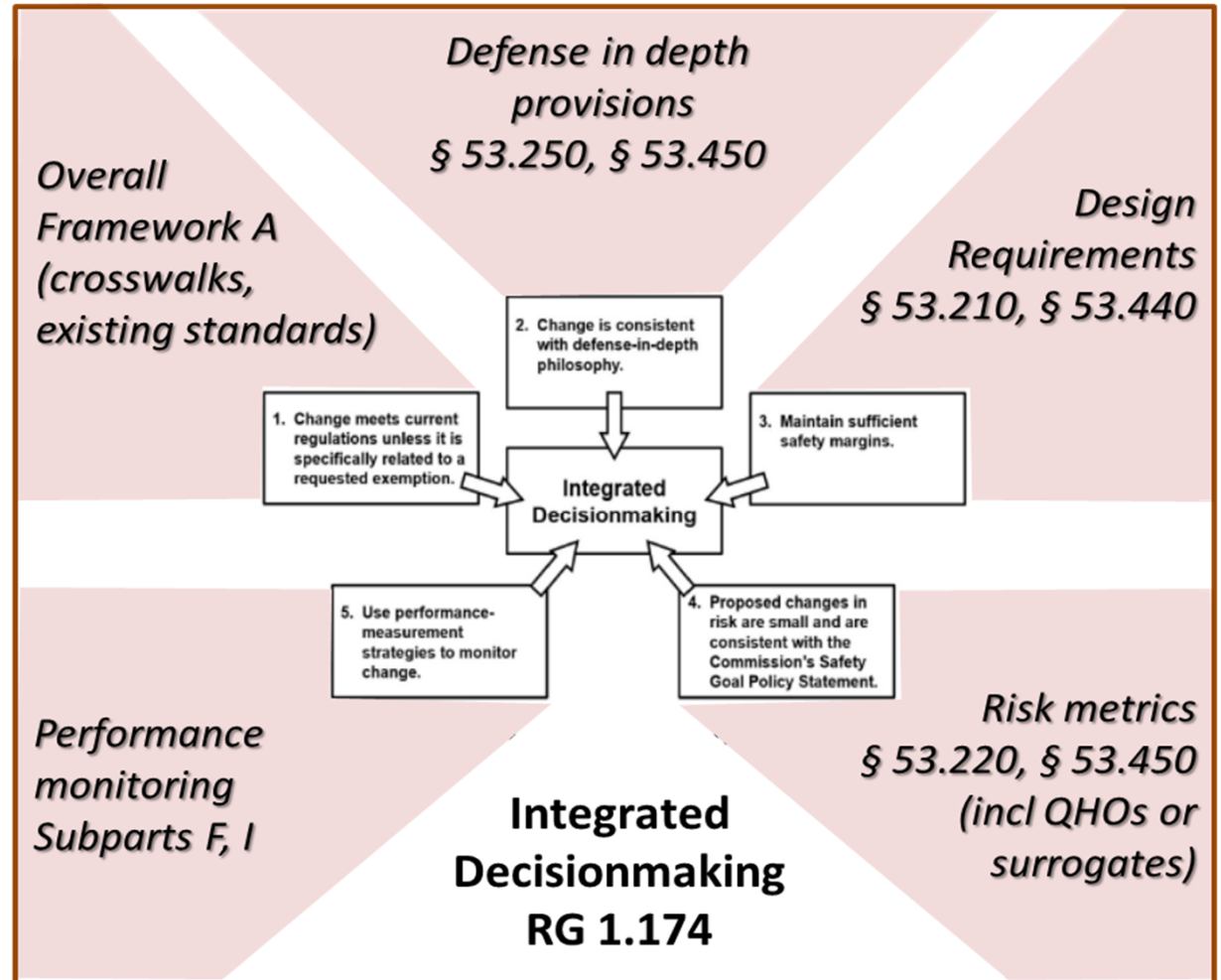
## Framework A

<i>Subpart</i>	<i>Title</i>	<i>Topics</i>
Subpart B	Technology-Inclusive Safety Requirements	Risk Insights (QHOs)
Subpart C	Design and Analysis Requirements	
Subpart D	Siting Requirements	
Subpart E	Construction and Manufacturing Requirements	Fueled Modules
Subpart F	Requirements for Operation	GLROs, Human Factors
Subpart G	Decommissioning Requirements	
Subpart H	Licenses, Certifications and Approvals	
Subpart I	Maintaining and Revising Licensing Basis Information	
Subpart J	Reporting and Other Administrative Requirements	
Subpart K	Quality Assurance Criteria for Commercial Nuclear Plants	

## Framework A

Ensuring  
Comparable  
Level of Safety

Additional discussion in Preamble on how an integrated assessment like that in Regulatory Guide (RG) 1.174 can be used to support the comparisons to existing requirements and related regulatory findings.



## Framework A

QHOs as one of several performance standards for LBEs

Additional discussion in Preamble on how QHOs are considered as one of several performance measures within Framework A. **Including the QHOs as one of several performance measures does not equate to the QHOs defining adequate protection of public health and safety.\***

### \*Existing Paradigm

- Does not specifically define “adequate protection” but compliance with NRC regulations and guidance may be presumed to assure adequate protection at a minimum
- Additional requirements as necessary or desirable to protect health or to minimize danger to life or property

### Safety Objectives & Criteria

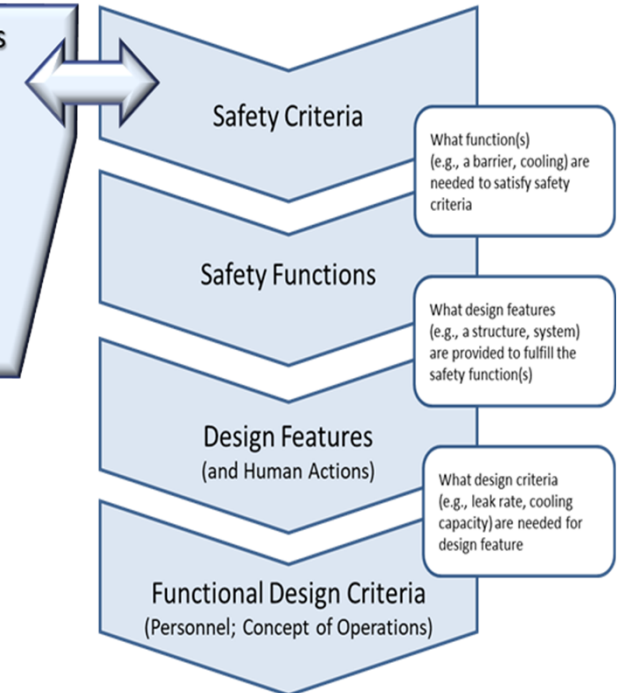
No immediate threat & consider potential risks

§ 53.210 Safety criteria for DBAs

§ 53.220 Safety criteria for other LBEs

- Address LBEs and provide defense in depth
- Cumulative risks (QHOs)

§ 53.450(e) Evaluation criteria for each LBE or event category



### Example § 53.450(e) evaluation criteria

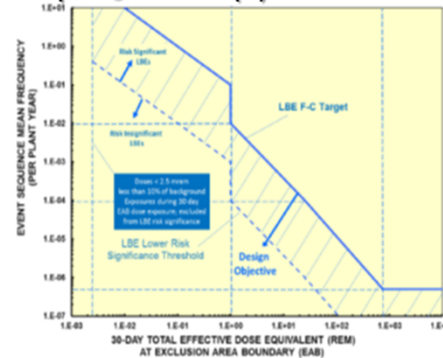


Figure 3-4. Use of the F-C Target to Define Risk-Significant LBEs  
Licensing Modernization Project (LMP)

## Subparts E & O

### Fuel loading for manufactured reactor modules

#### § 53.620(d) / § 53.4120(d) Fuel loading

- A manufacturing license may include authorizing the loading of fuel into a manufactured reactor module
- Specify required protections to prevent criticality
  - At least two independent mechanisms that can prevent criticality should conditions result in the maximum reactivity being attained for the fissile material
- Commission finding that a manufactured reactor module in required configuration is not a utilization facility as defined in the Atomic Energy Act
- Manufactured reactor module becomes a utilization facility in its final place of use after the Commission makes required findings on inspections, tests, analyses and acceptance criteria

<b>Framework B</b>		
<i>Subpart</i>	<i>Title</i>	<i>Topics</i>
Subpart N	Siting	
Subpart O	Construction and Manufacturing Requirements	
Subpart P	Requirements for Operation	Codes and Standards
Subpart Q	Decommissioning	
Subpart R	Licenses, Certifications and Approvals	Codes and Standards AERI
Subpart S	Maintaining and Revising Licensing Basis Information	
Subpart T	Reporting and Other Administrative Requirements	
Subpart U	Quality Assurance	

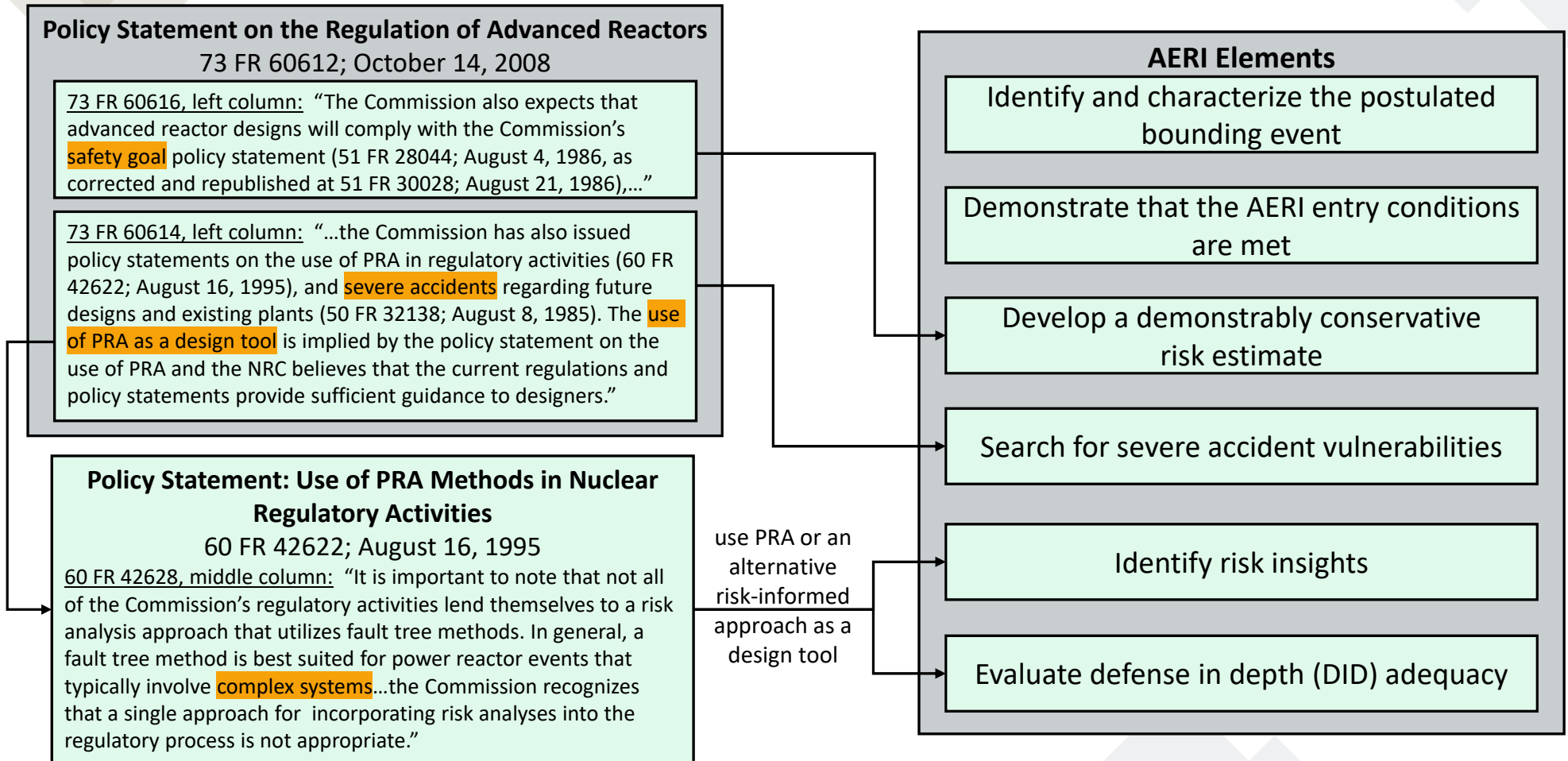
## Codes and Standards (Clarification)

- **10 CFR 53.4730(a)(2)(ii)(A) would require applicants to provide a description and justification (for codes or standards not previously endorsed or accepted by the NRC) of the codes and standards to be used in the design**
- **Other Framework B requirements related to codes and standards are similar to those in the existing regulations**
  - **10 CFR 53.4360(a) would require boiling-water reactor (BWR) and pressurized-water reactor (PWR) licensees to meet requirements in 10 CFR 50.55a for inservice inspection and inservice testing programs**
  - **10 CFR 53.4730(a)(37)(ii) would require applicants for BWRs and PWRs to describe how they will comply with ASME Boiler and Pressure Vessel Code and ASME Operation and Maintenance Code requirements in 10 CFR 50.55a**
  - **Conforming changes proposed for 10 CFR 50.55a would support use of existing requirements by applicants and licensees with BWRs or PWRs under Framework B**

## Subpart R – AERI

- **The AERI approach is consistent with Commission policy.**
- **The AERI entry conditions in § 53.4730(a)(34)(ii) were revised after the ACRS Part 53 subcommittee meeting (October 18-19, 2022) to address stakeholder comments and reflect insights from the scoping MELCOR Accident Consequence Calculation System (MACCS) calculations.**
- **Other provisions in Part 53 reference make use of the AERI entry conditions.**
- **Two draft regulatory guides (DGs) developed:**
  - **DG-1413: Technology-Inclusive Identification of Licensing Events for Commercial Nuclear Plants (proposed new RG 1.254)**
  - **DG-1414: Alternative Evaluation for Risk Insights Methodology (proposed new RG 1.255)**

# Regulatory Basis for the AERI Approach





## Why Revise the AERI Entry Conditions?

- Some stakeholders have commented that the current proposed AERI entry conditions are overly conservative.
- MACCS scoping calculations indicate that dose at 100 meters is an inadequate predictor of conditional risk. Depending on the assumptions (e.g., plume elevation or buoyancy), some conditional risks may be below the QHOs while others may be above the QHOs even though the current AERI entry condition is met.
- Provide increased flexibility when determining if the AERI entry conditions are met.

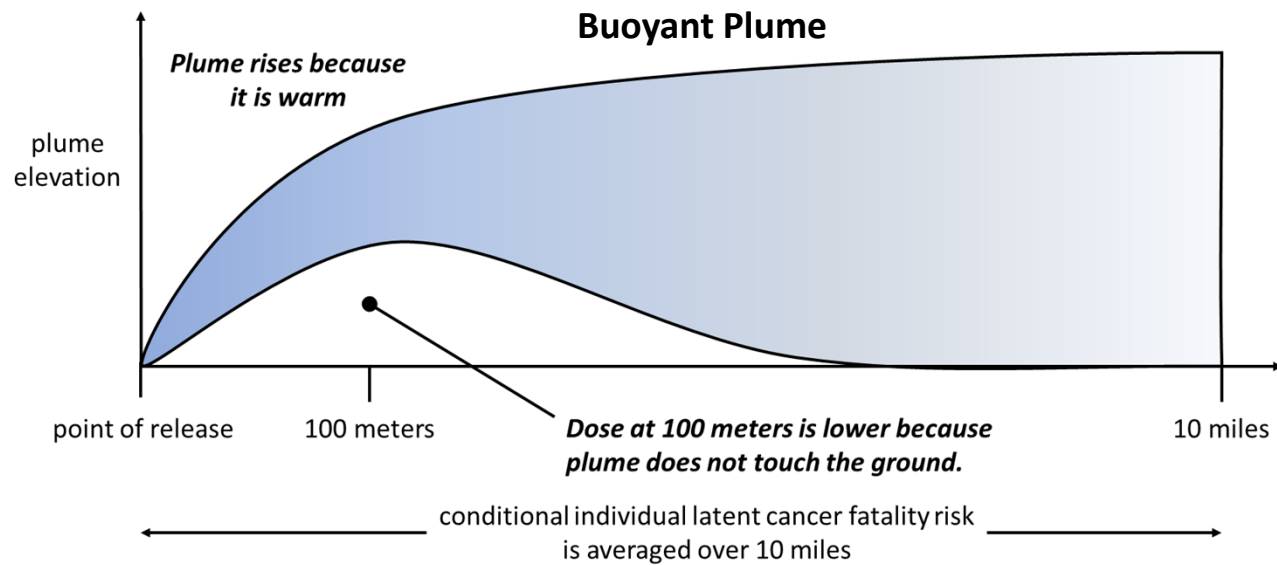
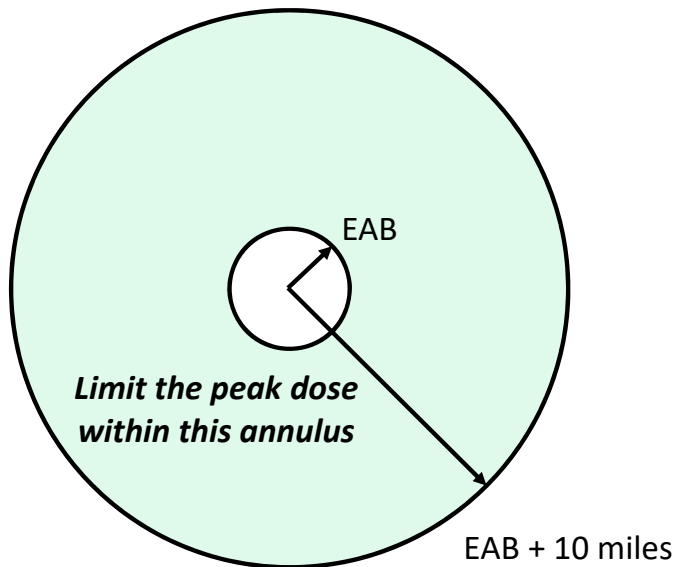
## Revised AERI Entry Conditions

§ 53.4730(a)(34) *Description of risk evaluation.* A description of the risk evaluation developed for the commercial nuclear plant and its results. The risk evaluation must be based on:

- i. A probabilistic risk assessment (PRA); or
- ii. An alternative evaluation for risk insights (AERI), provided that:
  - (A) The analysis of a postulated bounding event demonstrates that the consequence evaluated within the area between the commercial nuclear plant's exclusion area boundary (EAB) and 16.1 kilometers (10 miles) from the EAB is less than 25 mSv (2.5 rem) TEDE in the first year; and
  - (B) The identification of the postulated bounding event is informed by a systematic and comprehensive search for severe nuclear accident scenarios that considers:
    - (1) All radiological sources at the commercial nuclear plant;
    - (2) Relevant internal and external hazards;
    - (3) Combinations of plant equipment failures including common-cause failures, hazard-induced equipment failures, and equipment failures caused by severe nuclear accident phenomena; and
    - (4) Credible human errors of commission and omission.

# Rationale for the Revised AERI Entry Conditions

- The change from dose at 100 meters to the peak dose within the 10-mile annulus addresses concerns about elevated releases and plume buoyancy.



## Rationale for the Revised AERI Entry Conditions (Con't.)

- The 2.5-rem criterion is consistent with MACCS scoping calculations:
  - A 25-rem lifetime (50-year) dose generally corresponds to a 10-mile population-weighted lifetime individual latent cancer fatality risk less than  $2E-6$  per event.
  - A first-year dose of 2.5 rem generally corresponds to a 50-year dose less than 25 rem, probably due to radioactive decay and the effect of weathering on groundshine and resuspension.
- The 2.5-rem criterion is a small fraction (10%) of the traditional reference value (25 rem) used in Part 100 and § 50.34.
  - For example, see the Standard Review Plan (NUREG-0800), Section 15.0.3, Rev. 0: “A small fraction is defined as less than 10% of the 10 CFR 50.34(a)(1) reference values, or 2.5 rem TEDE.”

# Proposed Uses of the AERI Entry Conditions

- Would be used to determine:
  - Which applicants could develop an AERI in lieu of a PRA to demonstrate compliance with the proposed risk evaluation requirement in § 53.4730(a)(34)
  - When the requirements to address the mitigation of beyond-design-basis events in § 53.4420 must be met
  - When the requirements to address combustible gas control in § 53.4730(a)(7) must be met
- In addition, the proposed AERI entry conditions would be used in combination with other conditions to determine when a commercial nuclear plant is a self-reliant mitigation facility, as provided in § 53.800(a)(2)
  - A self-reliant mitigation facility must have GLROs in lieu of senior reactor operators and reactor operators
    - **All other applicable Framework B requirements must be met (AERI or PRA).**
    - **Applicants may elect to develop a PRA even if the AERI entry conditions are met.**

# DG-1413: Technology-Inclusive Identification of Licensing Events for Commercial Nuclear Plants (proposed new RG 1.254)

- Section A: Applies to light-water reactors (LWRs) and non-LWRs licensed under Parts 50, 52, and 53 (Frameworks A and B)
- Section B (Discussion):
  - Identifies licensing events for each licensing framework
  - Provides historical perspectives (early licensing, development of the standard review plan)
  - Addresses ACRS recommendations to “start with a blank sheet of paper” (10/7/2019, 10/21/2020, 5/30/2021, and 10/26/2021)
- Section C (Staff Guidance) provides an integrated approach for:
  - Conducting a systematic and comprehensive search for initiating events
  - Delineating a systematic and comprehensive sets of event sequences
  - Grouping the lists of initiating events and event sequences into licensing events
- Appendix A (Comprehensive Search for Initiating Events):
  - Reviews techniques for searching for initiating events and points the user to helpful references
  - Does not endorse or recommend any specific technique

# DG-1414: Alternative Evaluation for Risk Insights Methodology (proposed new RG 1.255)

- This RG provides the NRC staff's guidance on the use of an AERI methodology to inform the content of applications and licensing basis for LWRs and non-LWRs.
- 10 CFR 53.4730(a)(34)(ii) establishes AERI as an alternative to a PRA for a risk evaluation if the entry conditions A and B for an AERI are met.
- The title of this DG-1414 is now "AERI Methodology," to distinguish it from Part 53 Frameworks A and B. This new title does not signal any change in approach.

Applicants who meet the AERI entry conditions may elect to develop an AERI in lieu of a PRA.

However, PRA confers additional benefits such as:

- A means to optimize the design, and
- The ability to take advantage of various risk-informed initiatives, for example risk-informed completion times, risk-informed categorization of SSCs.

## Subparts F and P Staffing, HFE, Operator Licensing, and Training

- During the 10/19/22 subcommittee meeting, the staff provided an update on the rule language, as well an overview of key guidance
- Updates on the rule language status had included:
  - Consolidating Frameworks A & B requirements using a common set of language under Subpart F
  - Extending provisions for GLROs to Framework B, to include facilities using an AERI approach
  - Retaining previous engineering expertise provisions (i.e., degreed individuals with plant familiarity)
- Important points of ISG presentations included:
  - Review guidance for tailored exam programs
  - Staffing review guidance for custom staffing plans
  - Guidance for conducting scalable human factors engineering (HFE) reviews



# Follow-on Discussion of Operator Licensing Topics

- Regarding Operator Licensing, the members asked that the staff discuss several areas further, including:
  - Lack of approval preceding licensing of GLROs
    - NRC approved program with inspections
  - How changes to operator tasks from plant mods translate into adjustments to exam program knowledge and abilities lists and change control process burdens
    - Balances adaptability and program assurance
  - How the GLRO criteria interrelate with the AERI criteria and whether AERI is too restrictive
    - The following slide provides an overview that builds on earlier AERI discussions...

# Follow-on Discussion of GLRO Criteria

Underlying Principle from Paper	GLRO Criteria for Framework A	GLRO Criteria for Framework B (PRA)	GLRO Criteria for Framework B (AERI)
Radiological consequence criteria met without human action	Safety criteria (53.210 and 53.220 or 53.470) met without human actions for credited event mitigation	Safety assessment (53.4730(a)(1)(vi)) demonstrates requirements met without credited human action	Qualification for AERI (53.4730(a)(34)(ii)) must be demonstrated to be met
Licensing basis events addressed without human action	Analysis of LBEs and DBAs (53.450(e & f)) demonstrates criteria met without human actions for credited mitigation	PRA (53.4730(a)(34)) demonstrates event sequences met without human actions for credited mitigation	
Safety functions not allocated to human action	Safety functions (53.230) achieved without reliance on human actions for credited event mitigation	FRA/FA (53.730(d)) demonstrates functions required for safety do not rely on credited human action	
Reliance on inherent or robust passive features	Plant response to licensing basis events does not credibly rely on human actions to assure the performance of SSCs (e.g., SSCs function through inherent characteristics or have engineered protections against human failures)		
Adequate DID without human action	DID requirements (53.250) met without human actions for the purposes of credited DID	Plant design must provide for layered DID without dependence upon any single barrier or reliance upon credited human action.	

## Follow-on Discussion of Staffing Topics

- Regarding operational staffing, the members asked that the staff discuss several areas further, including:
  - Potential for allowing plants with no operators
    - There is no allowance for zero operator staffing
  - Engineering expertise degree requirement
    - Complements/augments plant ops experience
  - Training requirements for engineering expertise role
    - Systems approach to training required by § 53.830; topics covered by ISG
  - Availability of remote engineering expertise
    - Not credited in event mitigation; supports crew
  - Requirements might allow remote operation
    - Framework for staffing, HFE, operator licensing, and training is designed to adapt to future concept of operations; remote operations is a broader issue

# Key Guidance Development

## Under Development

### Existing

- LMP (RG 1.233)
- Siting Criteria (RG 4.7)
- Fuel Qualification Framework (NUREG-2246)
- Developing Principal Design Criteria for Non-LWR (RG 1.232)

### Near-Term

- TICAP (NEI 21-07) / ARCAP ISGs
- ASME/ANS Non-LWR PRA Standard
- Non-LWR PRA Standard Applicability ISG
- High Temp Materials (ASME III-5)
- Reliability & Integrity Mgt (ASME XI-2)
- Molten Salt Reactor Fuel Qualification
- Seismic Design / Isolators
- Emergency Planning (50.160)
- Change Evaluation (SNC-led)
- QA Alternatives (NEI-led)
- Facility Training Programs ISG
- Materials Compatibility ISG
- Treatment of Consequence Uncertainty

### Part 53

- *DG-1413, Identification of Licensing Events*
- *DG-1414, AERI Methodology*
- *DRO-ISG-2023-01, Operator Licensing Program Review ISG*
- *DRO-ISG-2023-02, Staffing Plan Review ISG Augmenting NUREG-1791*
- *DRO-ISG-2023-03, Scalable Human Factors Engineering Review ISG*
- Part 26, Fitness for Duty
- Part 26, Fatigue Management
- Part 73, Access Authorization
- Part 73, Cyber Security

### Future

- Analytical Margin
- Chemical Hazards
- Manufacturing
- Technical Specifications
- Facility Safety Program
- Framework B Content of Applications

# Discussion

## Additional Information

Additional information on the 10 CFR Part 53 rulemaking is available at

➤ <https://www.nrc.gov/reactors/new-reactors/advanced/rulemaking-and-guidance/part-53.html>

➤ For information on how to submit comments go to <https://www.regulations.gov> and search for Docket ID NRC-2019-0062

➤ For further information, contact Robert Beall, Office of Nuclear Material Safety and Safeguards, telephone: 301-415-3874; email: [Robert.Beall@nrc.gov](mailto:Robert.Beall@nrc.gov)

# Acronyms

ACRS	Advisory Committee on Reactor Safeguards	EDO	Executive Director for Operations
AERI	Alternative evaluation for risk insights	FA	function allocation
ANS	American Nuclear Society	FR	<i>Federal Register</i>
ARCAP	Advanced Reactor Content of Application Project	FRA	functional requirements analysis
ASME	American Society of Mechanical Engineers	GLRO	generally licensed reactor operator
BWR	boiling-water reactor	HFE	human factors engineering
CFR	Code of Federal Regulations	ISG	interim staff guidance
DBA	design-basis accident	LBE	licensing basis events
DG	draft regulatory guidance	LMP	Licensing Modernization Project
DID	defense-in-depth	LWR	light-water reactor
DRO	Division of Reactor Oversight		MELCOR accident consequence code system
EAB	exclusion area boundary	MACCS	
		mSv	millisievert

# Acronyms

NEI	Nuclear Energy Institute	QHO	quantitative health objective
non-LWR	non-light-water reactor	rem	Roentgen equivalent man
NRC	U.S. Nuclear Regulatory Commission	RG	regulatory guide
	U.S. Nuclear Regulatory Commission	SNC	Southern Nuclear Operating Company
NUREG	technical report designation	SSCs	structures, systems, and components
PRA	probabilistic risk assessment	TEDE	total effective dose equivalent
PWR	pressurized-water reactor		Technology Inclusive Content of
QA	quality assurance	TICAP	Application Project