

UNITED STATES  
NUCLEAR REGULATORY COMMISSION

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BRIEFING ON 10 CFR PART 53 LICENSING AND  
REGULATIONS OF ADVANCED NUCLEAR REACTORS

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THURSDAY,  
DECEMBER 9, 2021

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The Commission met via Video Teleconference, at 9:00  
a.m. EST, Christopher T. Hanson, Chairman, presiding.

COMMISSION MEMBERS:

CHRISTOPHER T. HANSON, Chairman

JEFF BARAN, Commissioner

DAVID A. WRIGHT, Commissioner

ALSO PRESENT:

ANNETTE VIETTI-COOK, Secretary of the Commission

MARIAN ZOBLER, General Counsel

EXTERNAL PANEL:

RITA BARANWAL, Vice President of Nuclear Energy and

Chief Nuclear Officer, Electric Power Research  
Institute (EPRI)

ALICE CAPONITI, Deputy Assistant Secretary for

Reactor Fleet and Advanced Deployment, Office of Nuclear

Energy, Department of Energy (DOE)

SARAH FIELDS, Program Director, Uranium Watch

ED LYMAN, Director of Nuclear Power Safety, Union of  
Concerned Scientist (UCS)

CHRIS NOLAN, Vice President of Regulatory Affairs,  
Policy, and Emergency Preparedness, Duke  
Energy

DOUG TRUE, Senior Vice President & Chief Nuclear  
Officer of Generation and Suppliers Division,  
Nuclear Institute Energy (NEI)

PATRICK WHITE, Project Manager, Nuclear Innovation  
Alliance (NIA)

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

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9:09 a.m.

CHAIRMAN HANSON: All right. Good morning, everyone. Appreciate everyone's patience and forbearance while we took the time to get assembled this morning.

I'm convening the Commission's public meeting on 10 CFR Part 53, Licensing and Regulation of Advanced Reactors. And thank you to our panelists, who have come from far and wide to join us this morning, as well as the folks that are going to be joining us online. So, in the spirit of reentry over the last couple of months, this is going to be another hybrid Commission meeting, and we're happy to continue to do it that way.

I understand there have been some agreements among the panelists to yield time in various directions. I want to say up front that in the spirit of developing a flexible and useful advanced reactor rule, that those principles will apply to the presentations this morning as well.

And so let's continue. It goes without saying that Part 53 is one of the highest-priority activities for the Agency. As we heard from our Senate Oversight Committee last week, interest in the development of Part 53 is high and I commend the staff for continuing to provide multiple chances for early stakeholder engagement and feedback. It's crucial that we take every opportunity to assure that this rulemaking fulfills the promise of a technology-inclusive, risk-informed framework for advanced reactors.

And I look forward to engaging in a fruitful dialogue and receiving feedback on the rulemaking effort this morning and going forward. We'll hear first from our External Panel. Following that, we'll have a short break, and then we'll hear from the NRC staff.

1                   Before we get started, I wanted to ask my colleagues if  
2 they have any remarks they'd like to make.

3                   Okay. So, with that, we'll begin with our External Panel.  
4 We begin with Ms. Alice Caponiti, Deputy Assistant Secretary for Reactor  
5 and Advanced Deployment for the Office of Nuclear Energy of the  
6 Department of Energy.

7                   Ms. Caponiti, the floor is yours.

8                   MS. CAPONITI: Thank you, and good morning, esteemed  
9 Commissioners, as well as my fellow panelists and interested stakeholders  
10 here today in person and virtually.

11                   So I'm going to be covering an overview of the activities  
12 that the Department is doing to support the demonstration of advanced  
13 reactors. And while I will not be addressing Part 53 directly, much of what I  
14 will cover today informs the development of the Part 53 rule.

15                   So great. If we can hit the slide that covers these -- sorry,  
16 the previous slide -- I'm going to cover the work that we're doing specifically  
17 in support of demonstrations.

18                   Recognizing the importance of advanced reactors to  
19 meeting the nation's aggressive carbon reduction goals, the Office of  
20 Nuclear Energy has shifted focus over the last decade toward private-public  
21 partnerships to develop and ultimately deploy domestic advanced reactor  
22 designs. So I'm going to cover briefly a number of these partnerships in  
23 support of a diverse set of advanced reactor designs.

24                   And so, beginning in the upper left, looking at the NuScale  
25 technology, in 2012, DOE established a small modular reactor licensing  
26 technical support program to support design and licensing of advanced

1 reactors of light-water SMR designs. And since then, we have been  
2 working with NuScale through a private-public partnership to complete the  
3 licensing of their SMR technology and develop the supply chain needed to  
4 bring it to commercialization.

5 With the Department's support, NuScale submitted the  
6 design certification application to the NRC in January 2017, a safety  
7 evaluation report was issued in 2020, and the rulemaking is currently in  
8 progress.

9 NuScale intends to submit a standard design approval  
10 application to NRC in December 2022. The Carbon Free Power Project,  
11 which we are supporting, is planning to construct the first NuScale  
12 commercial demonstration plant in Idaho and remains on track for the first  
13 operation in 2029.

14 Now I'm going to move to our Advanced Reactor  
15 Demonstration Program, which was initiated by Congress in 2020. And as  
16 we look at the designs, and in looking at the bottom designs, we issued a  
17 funding opportunity in 2020 to support the most promising domestic  
18 advanced reactor designs across the technology spectrum. And this  
19 covered two pathways: the advanced reactor demonstration pathway and  
20 the risk reduction for future demonstration pathways.

21 The goal of the advanced reactor demonstration pathway  
22 and that funding opportunity is to realize the construction, NRC licensing,  
23 and operation in the United States of two innovative reactor designs within  
24 seven years of award, which we understand/fully recognize is a very  
25 ambitious time frame.

26 In October of 2020, we announced the selection of two

1 projects to be supported through the demonstration pathway: the X-energy  
2 Xe-100 project and the TerraPower Natrium project. The Natrium project --  
3 in the lower left of that image, that's a 345-megawatt electric sodium-cooled  
4 fast reactor that leverages decades of development and design undertaken  
5 by TerraPower and its partner, General Electric Hitachi.

6           The high operating temperature of a Natrium reactor  
7 coupled with a molten-salt thermal energy storage system will allow the plant  
8 to provide flexible electricity output that can complement variable renewable  
9 generation technologies, such as wind and solar. The two Natrium plants to  
10 pursue a Part 50 licensing process with a construction permit application to  
11 be submitted in the early summer of 2023 -- and you're going to be hearing  
12 more about that approach from my fellow panelist this morning.

13           Our other demonstration project is X-energy's Xe-100.  
14 This is a pebble-bed, high-temperature gas-cooled reactor that is ideally  
15 suited to provide flexible electricity output, as well as heat for a wide range of  
16 high-temperature industrial applications, such as desalination and hydrogen  
17 production.

18           This reactor design will be fueled using TRISO fuel, and  
19 the project also includes a TRISO fuel fabrication facility that is being  
20 planned for a private site in Oak Ridge, Tennessee, that will be able to  
21 provide core loads required for the demonstration in the near-term and  
22 long-term supply for these and other Xe-100 reactors and potentially other  
23 designs that require TRISO fuel.

24           The Xe-100 demonstration reactor is planned to be sited at  
25 the Hanford, Washington, reservation on land leased to the utility partner  
26 Energy Northwest. And X-energy also plans to use a Part 50 licensing

1 process with a construction permit application submittal, planned for late  
2 June 2022.

3                   Although both of the demonstration projects plan to use a  
4 Part 50 licensing process, they will provide insights that will pave the way for  
5 other advanced reactor deployments that could potentially use the Part 53  
6 licensing process. And these demonstration projects represent a total  
7 federal investment of 3.2 billion dollars over seven years, with our industry  
8 partners providing matching funds.

9                   I'm going to switch to the concepts in the upper right hand  
10 of the slide. These represent our risk reduction pathway awards. These  
11 were awards to address the highest regulatory and technical risks  
12 associated with getting these designs to a demonstration phase.

13                   In December of 2020, we announced the selection of five  
14 projects; three the risk reduction pathway, and two of these projects entail  
15 operational test reactors to inform their commercial design. The first project  
16 is led by Kairos Power, which will design, construct, and operate their  
17 Hermes test reactor, which is based on the fluoride high-temperature reactor  
18 technology.

19                   This test reactor is planned to be NRC licensed, and  
20 Kairos recently submitted, and NRC accepted, their construction permit  
21 application for review. The planned location for the Hermes reactor is in the  
22 East Tennessee Technology Park in Oak Ridge, Tennessee.

23                   We also have a project led by Southern Company to  
24 design, construct, and build a Molten Chloride Reactor Experiment, or  
25 MCRE. This is a test reactor that will provide crucial operational data for  
26 fast-spectrum salt reactors. MCRE will be sited at Idaho National Lab and

1 will not be NRC licensed, but will be authorized by DOE.

2 We also awarded two microreactor projects led by  
3 Westinghouse and BWXT, as well as a project with Holtec to support  
4 early-stage design and licensing activities to accelerate development of their  
5 light-water-cooled SMR design.

6 So I'm going to switch next to talk about the National  
7 Reactor Innovation Center, if you could move to this slide. Thank you.

8 The National Reactor Innovation Center, or NRIC, was  
9 also established to support advanced reactor demonstrations. And this is a  
10 relatively new program that was authorized in the Nuclear Energy Innovation  
11 and Capabilities Act of 2017. It was formally established in 2019.

12 The mission of NRIC is to enable and accelerate the  
13 development and demonstration of advanced reactors and their supporting  
14 technologies. NRIC is a national DOE program, which is led by the Idaho  
15 National Laboratory, and allows collaborators to harness the world-class  
16 capabilities of the U.S. National Laboratories System.

17 One key activity of NRIC is to support advanced reactor  
18 deployment is with the establishment of demonstration test beds. These  
19 test beds will provide the infrastructure where industry or other users can  
20 demonstrate and test their technologies and obtain the data that they need  
21 to support their designs and licensing applications.

22 NRIC supports activities to help reduce the regulatory risks  
23 for advanced reactors and has been interacting with the NRC staff on  
24 several activities that will help inform the licensing of advanced reactors  
25 going forward.

26 So next slide. Now I'm going to turn to our Advanced



1 Reactor Regulatory Development Program. This is funded as part of the  
2 broader Advanced Reactor Demonstration Program. With this program,  
3 DOE has been supporting an industry-led project to develop proposed  
4 guidance for an NRC license application through the Technology-Inclusive  
5 Content of Applications Project, referred to as TICAP.

6 Building on the outcomes of the NRC-endorsed Licensing  
7 Modernization Project's risk-informed and performance-based approach, the  
8 TICAP project proposes to structure a right-sized license application content  
9 through guidance that is flexible, clear, and appropriate for industry  
10 applicants planning to use that approach. The TICAP document was  
11 submitted by the Nuclear Energy Institute to NRC for review in August of this  
12 year, and NRC has engaged with industry on this topic through a series of  
13 public meetings.

14 Next, I'm going to cover our research and development  
15 efforts. A key portion of the Office of Nuclear Energy's R&D portfolio is  
16 focused on developing the necessary data and experimental results that  
17 form the bases for establishment of various advanced reactor licensing  
18 technical requirements.

19 Work in this area generally addresses topics that are  
20 beyond private sector capabilities or can be significantly accelerated using  
21 National Laboratory resources. These regulatory R&D efforts are identified  
22 and prioritized through our ongoing and focused interactions with industry  
23 stakeholders, and further informed by insights from the technology experts  
24 within the DOE National Laboratory Complex.

25 The results of these efforts are critical to addressing the  
26 safety-focused foundations of Part 53, in particular safety requirements of

1 Subpart B, design and analysis in Subpart C, and siting in Subpart D.  
2 Some examples from this area include advanced reactor fuel and radiation  
3 experiments, testing and modeling of passive safety systems, and  
4 qualification of advanced materials.

5 DOE has also been supporting the development of  
6 modeling and simulation tools that can be used for the flexible analysis of a  
7 range of advanced reactors. Modeling and simulation can't replace  
8 experimental validation, but it can greatly reduce the number of experiments  
9 required if the models are more physics-based and less empirical.

10 And so, through our Nuclear Energy Advanced Modeling  
11 and Simulation program, we're developing the modeling and simulation tools  
12 that are allowing industry to evaluate design options, NRC to prepare and  
13 receive and review license applications, and researchers to get more out of  
14 limited and focused experiments.

15 And so next, I would like to cover the ways that we have  
16 expanded our cooperation with NRC. I want to highlight the fact that NE  
17 continues to work closely with the NRC to help address and resolve key  
18 regulatory framework issues through a number of cooperative efforts.

19 Consistent with the Nuclear Energy Innovation and  
20 Capabilities Act, DOE and NRC entered into an MOU to coordinate on  
21 technical readiness and the sharing of technical expertise and knowledge on  
22 advanced nuclear reactor technologies, including reactor concept  
23 demonstrations.

24 This MOU on nuclear energy innovation was signed in  
25 October of 2019 and was structured to allow tiered addenda on specific  
26 topics. In April of 2020, an MOU addendum was put in place to obtain

1 NRC's technical and regulatory feedback on our development of the  
2 advanced reactor demonstration funding opportunity announcement, to  
3 ensure that we were seeking appropriate information to assess the  
4 applicant's plans for licensing their designs.

5 In February of '21, a second addendum was signed to  
6 provide NRC access to infrastructure and capabilities and to observe and  
7 learn about the technologies developed through NRIC. And most recently,  
8 in April of 2021, a third addendum was put in place to facilitate the use of  
9 modeling and simulation in a regulatory environment.

10 DOE and NRC have also entered into an MOU on the  
11 Department's Versatile Test Reactor project. This would be a  
12 sodium-cooled fast reactor test reactor to support research. This MOU is  
13 intended to provide the NRC with opportunities to benefit from the  
14 development of the VTR to enhance NRC understanding of advanced  
15 technology and inform approaches to licensing advanced reactors. And  
16 although the VTR will be a DOE-authorized facility, the project team is  
17 piloting the use of Licensing Modernization Project's risk-informed  
18 approaches in the development of VTR's design and associated safety  
19 basis. Members of the NRC staff have been observing this process to  
20 support future application of this approach, which given the synergies  
21 between the Versatile Test Reactor and the Sodium reactor, can offer  
22 significant benefits. These collective interactions and insights are very  
23 useful for advanced reactor developers as they move through the NRC  
24 license application development portion of their demonstration projects.

25 And so, to summarize -- next slide -- our Office of Nuclear  
26 Energy programs have expanded to support a broad diversity of U.S.

1 advanced reactor designs for near-, mid-, and long-term commercial  
2 demonstration. We target research and development to reduce the  
3 technical and regulatory risks associated with advanced reactor designs,  
4 and we will continue to support industry-led initiatives to inform regulatory  
5 frameworks for advanced reactors, including efforts to inform the Part 53  
6 rulemaking process.

7 So thank you.

8 CHAIRMAN HANSON: Thank you very much. Next,  
9 we'll hear from Doug True, Senior Vice President and Chief Nuclear Officer  
10 of the Nuclear Energy Institute.

11 MR. TRUE: Thank you, Mr. Chairman, and thank you,  
12 Commissioners, for inviting me here today to talk about this important  
13 rulemaking.

14 I think I was here almost two years ago, right before the  
15 pandemic, to talk about advanced reactors. And in that time, I took the time  
16 to talk about what we saw as the emerging need for advanced reactors to  
17 meet decarbonization goals and assume what that might mean to the  
18 Nuclear Regulatory Commission. This rulemaking is an essential and very  
19 important part of that future that we see, and in fact, if anything, it's gotten  
20 more important over that two-year period.

21 Go to the next slide, please. What I mean by that is the  
22 U.S. has embarked on an unprecedented effort to try to decarbonize both  
23 the electricity sector and our economy generally to meet the climate needs of  
24 the world. Those are our utilities. All of our utility members and others are  
25 being driven by both federal and local interests to decarbonize and, at the  
26 same time, maintain a reliable grid. Nuclear plays an important part in the

1 second half of that in providing that reliability and stability of the grid so that  
2 customers are assured they have power 24/7, much like our current fleet has  
3 been for the last 50 years. As we move to a higher proportion of  
4 renewables, which no doubt we will do, there's going to be a need for  
5 additional advanced nuclear to support that reliability of the grid.

6 Our federal policies, as we've seen over the last eight  
7 months or ten months, have definitely encouraged the movement towards  
8 advanced reactors. And if the Build Back Better Act that's sitting in the  
9 Senate passes, that could be a significant sea change in the support for  
10 nuclear, both the current fleet and advanced nuclear going forward.

11 So this urgency is accelerating, and accelerating in a way  
12 that we're going to go from a mode of onesie/twosies of some  
13 demonstrations, which we need to have to demonstrate technologies, to a  
14 broad need, and Part 53 is the enabler for that pathway.

15 Having an efficient and inclusive regulatory framework is  
16 the key enabler to that decarbonization, and we think by the mid-2020s there  
17 could be multiple applications per year coming to the NRC under this  
18 regulatory framework, if it makes it through. And if we do this right, we can  
19 avoid bottlenecks of resources and the timing of the reviews in order to be  
20 able to accelerate that deployment to meet those goals. So this is our  
21 opportunity to enable a safe and reliable advanced nuclear technology as we  
22 go forward.

23 Next slide, please. Having an efficient and effective Part  
24 53 means two things. It means ensuring that we can license these new  
25 technologies safely -- that's a prerequisite -- but get them through efficiently,  
26 and as Congress pointed out in NEIMA, having a risk-informed

1 performance-based approach seems to be the best way to do that.

2 But we also need at the end of the day, to be able to  
3 deploy these and operate them. And we believe that with higher inherent  
4 safety should come more flexibility, more efficient licensing reviews, and a  
5 long-term regulatory stability that enables these plants to run for long-term.

6 So both utilities and developers have interest in seeing  
7 Part 53 move forward, and we've provided through our interactions with the  
8 NRC staff, comments that reflect both parts of that consideration.

9 Next slide, please. We've made great progress over the  
10 last year. The Commission decided in late 2020 to begin this process of  
11 Part 53, and the staff deserves great commendation for the amount of work  
12 they've done to put together a preliminary framework that can lay out the  
13 requirements for a new regulatory approach.

14 NRC staff has been very timely and transparent in  
15 releasing the rule languages, and industry has been highly engaged in that.  
16 And there have been at least monthly public meetings that have involved  
17 various industry stakeholders. We've tried to provide timely, clear, and  
18 extensive feedback on the pieces as they've come out. And the staff has  
19 moved forward through this process and now has largely a complete  
20 framework on the table.

21 I think the place that the industry has struggled is, the pace  
22 of this has limited the amount of interaction and dialogue on a lot of these  
23 topics. So what we're hoping is that we can move into a phase where  
24 there's more engagement on some of the key issues.

25 A November 5th letter that NEI submitted, cosigned by  
26 USNIC, compiles that feedback that the industry had provided previously

1 and provides additional detail and clarity on what we believe are the key  
2 areas.

3 We do think that Part 53 draft or preliminary material  
4 provides a good foundation for addressing this, and we look forward to  
5 taking advantage of the nine-month delay that this Commission has granted  
6 to have that engagement to work through and understand the various  
7 perspectives on the requirements.

8 Next slide, please. The comment letter is fairly  
9 voluminous. I'm not going to attempt to go through all of those, but we tried  
10 to break it into a handful of key issues here on this slide to talk about,  
11 making sure that we could have this framework work for all reactors, be  
12 technology inclusive and performance-based in the requirements, and we  
13 shouldn't lose sight of that. I think the staff has tried to accommodate that.

14 We also do, though, see there are some areas where we  
15 think there's undue regulatory burden without commensurate in safety. We  
16 lifted some of those here in the interest of time. I'm not going to get into  
17 them. If there are specific areas we want to talk about in the Q&A, we can  
18 do that.

19 And then one of the other pieces that we've commented on  
20 extensively is accommodating different licensing approaches and not tying  
21 Part 53 to strictly the Licensing Modernization Project approach and finding  
22 the flexibility to allow previously used risk-informed approaches and methods  
23 that we know we've used in the past to be deployed, as well as a spectrum  
24 of other approaches for the broad spectrum of technologies we expect to  
25 use this as part of Part 53.

26 And we do believe it should be all incorporated into Part

1 53, not pushed back into Part 50 or 52. And I think we need a period of  
2 productive engagement in order to get through these issues. We've tried to  
3 lay out not just what our concerns are at a high level but provide background  
4 and even, in many cases, suggested changes to the regulatory language in  
5 order to enable that.

6           Next slide, please. So, with the preliminary language  
7 available and some more time, we think it's time to look at the comments  
8 that the industry has provided, engage in that conversation about those  
9 comments, and build off the foundation that the staff has worked so hard to  
10 develop to date.

11           On our side, we have initiated some work in order to be  
12 able to support some of these alternatives that we think would be valuable,  
13 and that work is underway and will be available for NRC review in the  
14 coming months. Because we understand we all need to work together to  
15 find the pathways, we think if we can bring constructive approaches to the  
16 NRC, this time frame allows the time for them to be understood and  
17 incorporated as the staff sees fit into the regulation.

18           And there are other areas if the staff needs assistance that  
19 we believe we could help with guidance, if that's necessary to support a  
20 timely rulemaking. We all have a common goal at the end of the day. Part  
21 53 needs to be both used and useful. And I think that the industry is here to  
22 engage in order to move in that direction.

23           We look forward to a productive engagement as we move  
24 forward.

25           CHAIRMAN HANSON: Thank you, Mr. True, for that.

26           Next, we'll hear from Ms. Tara Neider, Senior Vice



1 President and Project Director for TerraPower.

2 Ms. Neider?

3 MS. NEIDER: Good morning. I appreciate being invited  
4 to participate in this meeting. The industry concerns are well documented in  
5 the letters that were submitted by NEI, so I'm going to particularly focus on  
6 TerraPower's perspective.

7 As you're probably aware, TerraPower is leading a  
8 multi-company team to develop the Sodium advanced reactor in cooperation  
9 with the U.S. Department of Energy. Our primary design partners are GE  
10 Hitachi on the nuclear island and Bechtel for the balance of plant, but we are  
11 reaching out to many organizations to support this critical mission and have  
12 significant engagement with the National Labs.

13 The first reactor will be built near the Naughton Coal Plant,  
14 which is scheduled to be shut down in 2025. PacifiCorp is the proposed  
15 owner-operator. Because of the time frame for the demonstration program,  
16 we do not plan to license the Sodium demo reactor under 10 CFR 53, but  
17 we hope to be able to utilize some of the key aspects of the regulation in our  
18 operating license application.

19 Our current licensing plans are to submit the PSAR and  
20 construction application in August of 2023 and the FSAR and operating  
21 license in March of 2026.

22 The Sodium reactor has many inherently safe features that  
23 will benefit from a risk-informed approach to licensing, including a reactor  
24 vessel with no penetrations except through the cover, passive decay heat  
25 removal, large margin to boiling, low pressure, and safe shutdown without  
26 operator action. We have significantly less safety-related equipment, and

1 they're addressing all the possible events that could occur and focusing our  
2 licensing effort on what is important to protect public safety.

3           Next slide. This is a view of a single-unit Sodium plant.  
4 The nuclear island, which includes the reactor building and the fuel building  
5 and storage facilities, are separated physically from the energy island, which  
6 converts the heat from the reactor into electricity. So, primarily, the safety  
7 systems are kept on the nuclear island side, and the energy island is not  
8 safety related.

9           Next slide. TerraPower plans to license the Sodium  
10 reactor under 10 CFR 50, primarily due to the timing limitations on the  
11 demonstration project. However, we will be performing a complete  
12 probabilistic risk assessment.

13           Next slide. The NRC has taken on a monumental task in  
14 responding to the Nuclear Energy Innovation and Modernization Act. Other  
15 regulations were written with a pretty clear understanding of the technology  
16 to be licensed and were intended for light-water reactors only. 10 CFR 53  
17 needs to be applicable for many different reactor technologies, so what  
18 works for one design may not always work for another design.

19           Next slide. I want to thank the NRC for the good progress  
20 that has been made, particularly in the area of generic environmental  
21 impacts, physical security, in-service inspections, human factors  
22 engineering, operator staffing, and licensed operator qualifications.

23           Next slide. For TerraPower, we believe that Part 53 is a  
24 big step forward. However, we need to see the complete picture to  
25 determine whether there is consistency between the subparts. For the  
26 Sodium reactor, it made sense for us to do full-scope PRA, but that may not

1 be true of all applications, depending on the type of the reactor and the  
2 licensing approach. QHOs make sense for our application, but it may not  
3 make sense if a full-scope PRA is not planned. There is no increase in  
4 safety achieved by including the QHOs in the rule and no need to do so in  
5 order to accommodate a particular licensing approach.

6           However, including the QHO in the rule text could  
7 introduce unforeseen licensing complications, particularly since the NRC's  
8 proposed requirement for the QHOs does not include the dose limits  
9 associated with early fatalities or latent cancer fatalities.

10           If the QHOs are in the rules, they must be met for legal  
11 compliance. And since the PRA is the basis for needing the QHOs, more, if  
12 not all of the PRA will need to be submitted on the docket and would be  
13 subject to contention.

14           So, even though TerraPower is utilizing a PRA approach to  
15 the licensing the Sodium plant, in part due to the established PRAs that  
16 were developed for the PRISM and Traveling Wave reactors, we do fully  
17 support the overall industry need for flexibility on the role of PRA for  
18 licensing advanced reactor designs.

19           The process should allow for both the leading and  
20 confirmatory PRA roles with a range of -- a mix of deterministic and PRA  
21 approaches. The key for whichever approach is to be used just needs to  
22 ensure that the plant meets the established limits for the adequate protection  
23 of the public health and safety, the safety functions, design features, and  
24 functional design criteria relied upon to meet the safety criteria are  
25 established, the selected LBEs adequately cover the range of hazards that a  
26 specific design is exposed to, the SSCs are categorized according to their

1 safety significance, and the design reflects the application of an appropriate  
2 philosophy of defense-in-depth.

3                   Next slide. 10 CFR 53 was intended to reduce or  
4 eliminate the need for exemptions. I don't think this is going to be true if we  
5 have such prescriptive requirements in the regulations as it's written now.  
6 Due to the wide variety of applications and that prescriptive nature of the  
7 regulations, there will probably still need to be some exemptions, and it's  
8 recommended that the exemption process be made simpler so that it does  
9 not hold up the licensing process for advanced reactors, particularly where  
10 the exemption is clear that it should not apply to that design.

11                   Next slide. I've spoken about TerraPower's views on 10  
12 CFR 53, but we don't represent the entire industry. We have looked at it  
13 from our particular perspective and our particular needs. I encourage you to  
14 look very closely at all the comments provided in the responses from NEI  
15 and USNIC because it's important that the regulations are  
16 technology-inclusive, flexible, and practicable.

17                   Industry has spent considerable time and effort putting  
18 together a detailed list of comments, and there is a strong rationale behind  
19 each of these comments. I look forward to seeing the NRC and industry  
20 working together to establish the new regulations and ensure that the public  
21 safety is met and the regulations are usable.

22                   Thank you.

23                   CHAIRMAN HANSON: Thank you, Ms. Neider.

24                   Next, we'll hear from Chris Nolan, Vice President of  
25 Regulatory Affairs, Policy, and Emergency Preparedness at Duke Energy.

26                   Mr. Nolan?

1 MR. NOLAN: Good morning, Chairman Hanson,  
2 Commissioner Baran, Commissioner Wright. It's good to be here in person  
3 again. Appreciate the opportunity to come and present Duke Energy's  
4 interest with regards to advanced reactors and how they solve the climate  
5 change challenge that's in front of us.

6 I wanted to start off by introducing Duke Energy. We  
7 serve our electric customers in six states: Indiana, Ohio, Kentucky, Florida,  
8 and the Carolinas. In North and South Carolina, we have 11 units at 6 sites.  
9 They produce more than 50 percent of the electricity used in the Carolinas  
10 and over 83 percent of the carbon-free energy produced by our six-state  
11 franchise.

12 It's even more dramatic when you consider Florida and  
13 North Carolina are the number-three and number-four solar-producing  
14 states. So nuclear will carry the lion's share of the carbon-free generation  
15 we see in the future.

16 When you go to the next slide, our -- or the slide after that.  
17 Sorry. I'll be more conscious. Our customers care about the environment,  
18 but they're focused on cost. And in meeting that agenda, our fleet capacity  
19 factor was 94 percent in 2020, and that marks 22 straight years where we  
20 were above 90 percent. We avoided 50 million tons of CO2 emissions, we  
21 served over eight million homes, and we provided a substantial employment  
22 and tax base for the communities that we serve.

23 Next slide. We have set aggressive climate-change  
24 goals: 50 percent reduction by 2030 and net zero by 2050. This pie chart  
25 shows how we plan to achieve those goals.

26 So the first step is the continued strong operation of our

1 nuclear fleet. The second is the early retirement of coal, and that would be  
2 supplemented by expansion in the areas of renewables like solar and also  
3 natural gas.

4 We plan to achieve our 2030 goal early, sometime in 2028.  
5 And natural gas has provided a great value for our customers. It's reduced  
6 our carbon footprint. It's also provided at a competitive price.

7 When you get to net zero 2050, the challenge becomes a  
8 little steeper. If you look at the 2040 pie chart, it shows a term called a  
9 ZELFR, a zero-emitting load-following resource. That's a term we came up  
10 with to kind of describe the dynamic of how do you integrate solar, which is a  
11 variable power source, with nuclear, which is a base-load power source.

12 So, on a typical day like today, we'll see a morning peak, a  
13 dip in midday, and then a higher afternoon and evening peak. So, as solar  
14 comes on, our load is decreasing, and as solar goes away, our load is  
15 increasing. And we see that natural gas and coal carry that difference.

16 There are days this year that nuclear and solar will be the  
17 only generation source on the grid at times during the day. And so that  
18 creates a significant challenge because cycling a nuclear unit doesn't best  
19 utilize that resource. So units that can do dual output -- either produce  
20 electricity or store thermal energy, or produce electricity or produce  
21 hydrogen -- become very important.

22 Next slide. When I look at the road ahead, today we  
23 focus on operational excellence and the safe operation of our fleet.  
24 Tomorrow we look at subsequent license renewal. There's no way for us to  
25 get to net zero without the continued operation of the existing fleet. That  
26 buys us the time for these advanced technologies to develop.

1                   And when I look at the future, advanced reactors has an  
2 opportunity to fit the ZELFR role very perfectly, but there are other  
3 technologies that are looking for that piece as well. And in 2050, the role  
4 that ZELFRs have to support is equal to our existing fleet.

5                   So we talked about storage. It can be batteries. It can  
6 be thermal. It could be pump storage. We're increasing the capacity of our  
7 pump-storage facilities to handle the challenges today.

8                   When you look at the key enablers, one of the key  
9 enablers is technology. And I think DOE is doing a great job of de-risking  
10 and accelerating the initial demonstration projects. So we appreciate that.

11                  The next is carbon policy. We talked about our  
12 customers' focus on cost. An energy mix for net-zero carbon will be more  
13 expensive than the mix we have today. And since policy will be a factor, it  
14 could cause many utilities to make similar decisions at the same time, which  
15 could put a stress on the supply chain. And I'll talk about that later.

16                  The last one is regulatory risk. So the staff's application of  
17 the backfit rule today, how the subsequent license renewal processes go  
18 forward, will be key indicators that utilities use on whether or not we want to  
19 take the risk to deploy advanced reactors in the future.

20                  Want to go to the next slide. We talked about supply  
21 chain. The NRC is an important part of that supply chain when it comes to  
22 licensing, and having a framework that is scalable is important. One  
23 outcome could be a very robust process that can prove a single application,  
24 but how does that process scale to prove many, and some different?

25                  I see some utilities wanting to move earlier with greater  
26 certainty and focus on light water. I see other utilities looking at the greater

1 opportunities that come with advanced reactors, but the greater technical  
2 challenges. And so the industry is sorting out where the right answer is  
3 going to be.

4 Early site permits, we don't talk a lot about them. I think  
5 they're important. The schedule of the ARDP has influenced the Part 50  
6 process, but taking site safety and environmental risks off the table before  
7 you commit resources is still an important factor to us.

8 When I look at Part 50 versus Part 52, finality is still  
9 important to us as well. And what you see between those two rules is an  
10 inherent risk balancing between vendors and owner-operators, and I think  
11 that will come up in Part 53, and you'll probably get a varied feedback and  
12 comments because the rule will kind of dictate that split.

13 Risk-informed framework for licensing inspection  
14 enforcement -- we want the NRC to focus on what's important. I think a  
15 strong independent regulator is essential for industry. We've implemented  
16 risk in our operating plants, and it has made our decisions better, our plants  
17 safer, and our operations more reliable.

18 And so inspection and enforcement -- during the  
19 construction phase, we want the NRC to focus on what's important and our  
20 licensee change process to focus on the details that are not. Flexibility --  
21 designing a rule for the next-of-a-kind applicant, to be able to leverage a Part  
22 50 approval and a Part 52 or Part 53 process, I think is important for us.

23 And then climate change -- is it a health emergency? So  
24 COVID-19 certainly is, and the FDA did a great job in terms of accelerating  
25 the vaccine approval process. This is an opportunity for the staff to  
26 innovate.



1 I think if we use past precedent and project it forward, we'll  
2 get a very structured outcome. But there may be some lessons learned that  
3 we can use to focus on the important parts of the process, and then in every  
4 regulatory decision, there's three outcomes: yes, no, and delay. So creating  
5 a culture where the staff is biased to making a regulatory decision and  
6 creating a process that doesn't impose unnecessary delays, I think, will be a  
7 key success factor.

8 I appreciate your time. Look forward to your questions  
9 when we get to that part of the meeting.

10 CHAIRMAN HANSON: Thank you, Mr. Nolan.

11 Next, we'll hear from Dr. Rita Baranwal, Vice President of  
12 Nuclear Energy and Chief Nuclear Officer for the Electric Power Research  
13 Institute.

14 Dr. Baranwal?

15 DR. BARANWAL: Thank you, Chairman Hanson,  
16 Commissioner Wright, Commissioner Baran. Very, very good to see you  
17 again in person. Thank you for the opportunity to talk to you today about  
18 EPRI's perspective on Part 53.

19 As we know, the advanced reactor landscape is changing.  
20 The future of nuclear looks very different than the nuclear of today, and we  
21 need to think very differently as a result.

22 New reactor technologies, many of which Alice Caponiti  
23 described earlier, enable many different deployment models. And these  
24 models enable things like reduced cost, reduced time to market, factory  
25 fabrication, flexibility during construction, and non-electric emissions.

26 It's imperative that we create an environment that

1 maintains the focus on safety, reliability, and risk to the public in a framework  
2 that allows us to realize the benefits that are offered by these new designs.  
3 The myriad of different reactor technologies and deployment models means  
4 that it has never been more important to have options in how you license  
5 these plants.

6 Part 50 and Part 52 will continue to be viable licensing  
7 methodologies for some of these designs, and Part 53 will need to provide  
8 another important option in providing a technology-inclusive framework  
9 needed to support the deployment of different deployment scenarios. The  
10 licensing framework of the future needs to reduce the regulatory uncertainty  
11 of deploying these new technologies.

12 Today, developers and potential end users are relying on  
13 the existing licensing pathways to move their projects forward. We need to  
14 reduce regulatory uncertainty to enable the pathway to these new reactor  
15 technologies while maintaining safety and reliability. Thank you.

16 CHAIRMAN HANSON: Thank you, Dr. Baranwal.

17 Next, we'll hear from Dr. Ed Lyman, Director of Nuclear  
18 Power Safety at the Union of Concerned Scientists. I believe he's joining us  
19 online.

20 Dr. Lyman?

21 DR. LYMAN: Yes, I'm here, hopefully. And, Chairman  
22 Hanson and Commissioners, I appreciate the opportunity to provide the  
23 views of UCS on this very important topic. May I have the next slide,  
24 please?

25 So we don't oppose a new approach to licensing that will  
26 address some of the issues and problems that have arisen over the past

1 many decades, but I don't see what's going on now as meeting our  
2 fundamental requirements. And these include a need to clearly provide for  
3 levels of safety, security, and environmental protection that are at least  
4 equivalent to the operating fleet.

5           Now, I've often argued that the NRC is missing the  
6 opportunity to promote innovation and improve safety by requiring greater  
7 levels in the operating fleet, but the Commission policy is not adjusting to  
8 that. But we need clarity so that what you're doing now shows the public  
9 that the plants that are going to be built in the future will be at least as safe  
10 as the ones that are now, and that requires clear requirements in the rule  
11 that are inspectable and enforceable. That is key. You shouldn't put so  
12 much detail into the guidance and leave the rules so vague that the public  
13 just does not understand how these plants are meeting those regulations.

14           Risk-informed provisions should only be included to the  
15 extent that a state-of-the-art risk assessment is allowed. Don't get ahead of  
16 what a risk can actually tell you and the precision accuracy of those  
17 analyses. Defense-in-depth has to be maintained at a very robust level  
18 because the uncertainties and the risk assessments are never going to be  
19 small enough to obviate the need for robust defense-in-depth.

20           The rules should have clear requirements and milestones  
21 for prototype testing so that applicants know early in the process if they're  
22 going to need a prototype or not to meet the requirements of the licensee --  
23 of the safety requirements.

24           And, finally, rules should not have any provisions that  
25 could potentially result in disproportionate health outcomes to disadvantaged  
26 communities.

1 Next slide, please. Sorry. Next slide, please. Did I lose  
2 you?

3 CHAIRMAN HANSON: We're here.

4 DR. LYMAN: Okay. Sorry. My slide hasn't advanced.

5 CHAIRMAN HANSON: Okay. We can go back to --

6 (Simultaneous speaking.)

7 CHAIRMAN HANSON: Okay.

8 DR. LYMAN: Do you see Part 53 process is broken?

9 CHAIRMAN HANSON: Yes.

10 DR. LYMAN: Yeah. Okay. Sorry. Right. So the Part  
11 53 process is broken. I guess so is my internet connection.

12 So UCS appreciates that there's a greater degree of public  
13 engagement for developing draft rule language, but we feel that the interim  
14 process has been ineffective and inefficient, and it allows a degree of  
15 industry involvement in rule development that we believe could compromise  
16 the NRC's regulatory independence in developing the rule.

17 And you see that what was originally intended to be a  
18 unified, flexible, technology-inclusive rule is now potentially trifurcating into  
19 three different options, and I think that shows that maybe the goal is too  
20 ambitious to try to do it all in one framework.

21 So we do believe that rather than having this drawn-out  
22 interim process that perhaps the Commission should go to a more standard  
23 notice and comment rulemaking process where the opportunities for industry  
24 input are limited and structured.

25 Next slide, please. So, in that vein, actually, and thinking  
26 about what's going on over the past year, I'm coming to the conclusion that

1 Part 53 should possibly be scrapped. Maybe we don't need to start from  
2 scratch to develop this technology-inclusive rule and rewrite the whole rule  
3 book.

4 And, frankly, the need for such general  
5 technology-inclusive language is oversold or overemphasized because the  
6 actual population of plants is not really that diverse. There's a fairly discrete  
7 subset of designs that the NRC is going to expect to see in the foreseeable  
8 future, and those can be categorized pretty well.

9 And the accident spectrum for most of those is also fairly  
10 well characterized given most of those designs have a long history of  
11 research and development and analysis already.

12 Next slide, please. So, instead of having a new Part 53, I  
13 think perhaps it can be done more simply by just having series of  
14 appendices to Parts 50 and 52 that would address design-specific aspects,  
15 specifying in each case those regulations that are not applicable to a  
16 particular design, for instance a non-light-water reactor with different coolant  
17 and those function requirements that are designed specific, let's say 50.46,  
18 an analog that would be clearly understood as fulfilling the same function.  
19 For instance, what happens if you lose cooling? What happens to the fuel?

20 So it seems like there is a simpler approach that can be  
21 taken here. And in each case, I believe it's the staff's responsibility, really,  
22 to develop a set of licensing basis events using structured process like  
23 licensing modernization, as long as sufficient attention is paid to  
24 uncertainties, and that the analog to design-basis events and  
25 beyond-design-basis events should be specified in the rule as a set of  
26 specific requirements for each design.

1                   And don't leave it up to the applicant to not only meet the  
2 standard but come up with their own spectrum of accidents, because I do  
3 believe for these designs they're really -- that kind of leeway isn't really  
4 necessary.

5                   And, in addition, you need to have a requirement to keep  
6 looking because you're not going to have all the answers at the beginning,  
7 and as you know, new safety insights, new accident scenarios will arise.  
8 And as the ACRS recommended, there should be this vigorous search, and  
9 that should be ongoing. And there should be provisions so that as new  
10 information and new safety hazards occur not only during the licensing  
11 process but after the facility is licensed, it should be an easy process for  
12 accommodating new requirements based on new safety risks and not as  
13 burdensome as the backfit rule in trying to address outstanding or emerging  
14 safety issues.

15                  Next slide, please. So there needs to be a core safety  
16 approach, again, to show that consistency with the existing fleet maintaining  
17 the same defense-in-depth concepts, including safety-related SSCs for  
18 design-basis accidents and single-failure criterion. And severe accident  
19 risks should certainly not be allowed to be greater than those for the  
20 operating fleet.

21                  Next slide, please. And so, in this case, there is a  
22 potential now for Part 53 to duplicate or potentially even conflict with the  
23 limited-scope rulemakings that are going on in other areas.

24                  So I think, really, risk-informed licensing should focus  
25 fundamentally on the design, and that's really the core function of this new  
26 rulemaking approach, and that these other programs -- once the design is

1 established and the -- what's called the -- you know, if there is analytical  
2 safety margin, how that's applied to operating flexibilities needs to be -- there  
3 needs to be a structure to that so that you maintain adequate  
4 defense-in-depth.

5           Next slide, please. I don't believe that there's really a  
6 credible way to risk-inform licensing without a PRA. That, to me, just means  
7 going back to deterministic and qualitative defense-in-depth measures,  
8 which is okay. But let's not pretend that there's going to be some magical  
9 way to address risk in a qualitative sense that's meaningful and  
10 comprehensible. And I don't think there's a plausible way to define a  
11 maximum credible accident without a PRA because the meaning maximum  
12 credible implies a likelihood threshold.

13           Next slide, please. And so, with regard to how you  
14 regulate severe accidents, I don't believe that the QHOs as currently  
15 formulated are adequate metrics for incorporating regulatory requirements.  
16 For one thing, their magnitude is too high, and they could actually allow core  
17 damage frequencies of up to anywhere –  $4 \times 10^{-2}$  and still be consistent with  
18 the QHOs. That would be far higher than the average core damage  
19 frequency for the operating fleet.

20           They don't include societal risks, which are key  
21 consequences of a large radiological release. And, also, they're based on  
22 population-averaged radiological risks, which I believe aren't sensitive to  
23 disproportionate impacts of radiation on disadvantaged groups such as  
24 Black people.

25           Next slide, please. And so I do believe the extension  
26 should provide room for the NRC to reconsider the direction of rulemaking

1 and that we recommend a more modest approach that, again, preserves  
2 those foundational principles while providing for design-specific  
3 requirements.

4 Thank you.

5 CHAIRMAN HANSON: Thank you, Dr. Lyman.

6 Next, we'll hear from Dr. Patrick White, Project Manager with the Nuclear  
7 Innovation Alliance.

8 Dr. White?

9 DR. WHITE: Great, thanks so much, Chairman Hanson  
10 and the rest of the Commission, for the opportunity to come today and speak  
11 about Nuclear Innovation Alliance. So next slide, please. So for a little bit  
12 of background, the Nuclear Innovation Alliance is a think-and-do tank  
13 focused on achieving the conditions for success for advanced reactors so  
14 that they can be part of our climate solution. And so when you look at NIA  
15 compared to other organizations, our focus is really on clear energy and how  
16 can we enable nuclear energy to fill that role. And specifically when we look  
17 at the NRC and the NRC's activities, how can we help improve licensing  
18 modernization to make sure that we have a predictable and effective  
19 process. And so one of the things that's unique about NIA, we're funded by  
20 private climate philanthropists, and our focus is really on achieving these  
21 final outcomes.

22 So, next slide. Before I get into NIA's specific thoughts on  
23 the Part 53 regulatory process, I just want to highlight that we're just one  
24 climate-focused NGO that's really in this space and is interested in improving  
25 the processes of the NRC working collaboratively.

26 In addition to us, we have groups shown on this slide,



1 including the Breakthrough Institute, ClearPath, the Good Energy Collective,  
2 Third Way. I'd also like to add a couple of organizations that were missed  
3 on this slide, including the Atlantic Council and Clear Air Task Force.

4           These are all organizations that are really interested in  
5 nuclear as a solution to climate change and trying to figure out how can we  
6 set the processes ready for that. And so when we're speaking about this,  
7 it's improving the processes and it's improving the frameworks to really  
8 accelerate the development in a safe and effective way.

9           Next slide. So when we talk about regulation, when I  
10 think about regulation, I think it's important to reflect on it that it's an  
11 inherently iterative process of developing a new regulatory framework. If we  
12 think about the early regulation under the Atomic Energy Commission, we  
13 started out with very simply analysis, maximum credible accidents, maximum  
14 hypothetical accidents.

15           And then over the past 70 years of nuclear regulation,  
16 we've grown on that. We've developed new siting requirements, general  
17 design criteria, new analysis methods, and new insights related to  
18 operational safety or from major events, such as the Fukushima nuclear  
19 accident, highlighting the importance of things like beyond-design-basis  
20 safety.

21           This is all really a growth of where we are and what we  
22 think of as the optimal nuclear regulatory framework. And it really leads us  
23 to where we are today, this idea of the risk-informed, performance-based,  
24 and now technology-inclusive regulation. And so this is really effective, but  
25 ultimately it does reflect the history of where we've come as a society and as  
26 a regulator.

1                   And so we move to the next slide. One thing that NIA  
2 really sees is that Part 53 is an opportunity to both enable evolutionary  
3 regulatory processes and innovative approaches to regulation. So again,  
4 when I speak about this long history of developing regulation over time, we  
5 can really see it reflected almost in the regulations that we're using for  
6 something like the AP1000. It's a large, light water reactor, and the  
7 methods and the process that we use really reflect that history.

8                   And so there are a bunch of things that are included in the  
9 regulatory paradigm when we think about the framework. It's the  
10 requirements we have, it's the regulatory methods, what we consider state of  
11 the art. What are some of the regulatory assumptions that we're using.  
12 There are a lot of things that are baked into our assumptions on how we  
13 should build a regulatory system that largely reflect the technology that got  
14 us there.

15                   I think as we look forward towards innovative advanced  
16 reactor designs, it might completely flip the idea of what is a nuclear power  
17 plant. Instead of having a large light water reactor, we might be looking at  
18 very, very small reactors that use different approaches to cooling or different  
19 fuel forms. And this might allow different regulatory methods that might  
20 challenge some of the assumptions or have a more efficient pathway  
21 towards regulation.

22                   So, next slide. So when we think about Part 53  
23 regulations and how to potentially design new regulatory frameworks, the  
24 way we view it is that it's really a balance between certainty and flexibility  
25 across a wide variety of characteristics. Oftentimes we can frame this as is  
26 it technology inclusive or not? Is it performance-based or not? Is it

1 risk-informed or not?

2                   And while these are very important things to consider and  
3 include in the rule, it maybe doesn't get down to the full scope of what a  
4 regulatory framework might look like. And so I suggest there may be three  
5 alternative ways to think about a regulatory framework. Might be how we  
6 address technology, how we address requirements, and how we address  
7 methods.

8                   When we talk about technology, is the regulatory  
9 framework designed to really support the licensing of a single technology, or  
10 any technology? When we look at requirements, are they prescriptive or  
11 performance-based?

12                   And this is not only the actual maybe health standards, do  
13 you have the safety or not. But really are there programmatic requirements  
14 that are prescriptive or performance-based?

15                   And finally, when we speak about methods, are the rules  
16 prescribing specific methods that we should be using, or is any method  
17 acceptable, assuming that the applicant can demonstrate that it meets the  
18 underlying regulatory requirements? At the end of the day, regulation is  
19 about demonstrating compliance with the safety standards we have set up.

20                   And so when NIA went ahead and took a look at kind of  
21 the existing light water regulation, I think everyone would agree, and a lot of  
22 the panelists have highlighted this already, it's very much a prescriptive,  
23 prescribed method for the regulation of large light water reactors.

24                   And through the exemption process, we hope that we're  
25 going to be able to effectively regulate some of these advanced reactor  
26 technology. And I think the early indications from the NRC staff show this is

1 possible.

2                   But the question is, how can we potentially move to a  
3 regulatory framework that allows us to really meet the goal of NEIMA and the  
4 idea of this risk-informed, performance-based, technology-inclusive  
5 regulatory framework?

6                   When we took a look at the NRC Part 53 draft text that was  
7 released by the staff, we saw a rule that was really -- could license any  
8 technology. There were no technology-specific requirements. But when  
9 we took a look at the actual requirements in the draft text, we saw that they  
10 actually fell, or we felt that they fell, somewhere between prescriptive and  
11 performance-based.

12                   While the actual safety requirements themselves and the  
13 dose limits, for example, are very performance-based, the -- perhaps the  
14 way to demonstrate compliance with those might be a little bit prescriptive.  
15 Some of the organizational requirements that some of the earlier panelists  
16 have spoken about I think is a really good example.

17                   And finally, when we think about methods, that's where we  
18 start to see something where we felt the current Part 53 rule text was a little  
19 bit more prescriptive. The idea of having to have a PRA to demonstrate  
20 compliance, some of the more explicit ways on how demonstrate safety.  
21 While it allows to kind of balance out this idea of predictability and flexibility  
22 for the wide suite of reactors that we're interested in, it still is kind of  
23 prescribing a specific method.

24                   And what we were interested in is how can we try to  
25 develop or rethink a Part 53 rule that provided essentially the applicability of  
26 any method depending on what's most appropriate for the applicant,

1 recognizing the wide variety of technologies that we're interested in  
2 developing.

3           So, next slide. So what NIA has proposed in our  
4 comments, and I will just stress while we do work with a lot of other NGO  
5 stakeholders, these comments are really kind of reflecting of NIA's position,  
6 and I encourage the Commission and the staff to look at the comments that  
7 have been submitted by other organizations.

8           But we believe that we can set up a, almost a dual  
9 pathway system that could enable the selection of regulatory pathways that  
10 meet facility or project-specific goals. Really the basis for all regulation in  
11 our minds should be this idea of uniform performance requirements for  
12 nuclear safety. There is a set of fundamental safety requirements that all  
13 nuclear systems should be able to fulfill. Whether these are dose  
14 requirements or other safety requirements, they'll be uniform no matter the  
15 technology.

16           We then see the option for an evolutionary pathway, really  
17 looking at the continued development of these missing regulatory paradigms.

18       In our mind, this is what we see in the current Part 53 rule text. This is  
19 something where it is the natural evolution of how can we take our regulatory  
20 assumptions and all the regulatory thinking that's been done in the last 60  
21 years and apply it to the next generation of advanced reactors.

22           And for some developers, that's going to line up really well.

23       The methods that they're using, the approach that they're taking are very  
24 well aligned with this evolutionary history in terms of regulation.

25           And so for some of the developers, that's going to provide  
26 them the predictable regulatory processes they seek and that they think is

1 going to be necessary to support the development and deployment of their  
2 technologies.

3           And so that path should be open, and we really kind of  
4 commend the NRC staff on the work that they've done to try to incorporate a  
5 lot of the work that's been done historically into this new rule.

6           We also see the opportunity to set up an innovative  
7 regulatory pathway. And really provide applicants the opportunity to  
8 develop new regulatory paradigms that both satisfy these uniform  
9 performance requirements, but also make sense and better reflect the actual  
10 characteristics of their technology.

11           And we believe that by setting up this kind of more of a  
12 generic project safety case approach, that the applicant would be able to  
13 work with the Commission and work with the staff to determine what are the  
14 specific methods or the specific options that make sense and demonstrate  
15 compliance with the regulatory requirements.

16           And so this could encompass a wide variety of activities.  
17 It could be working to develop new regulatory guidance for specific  
18 technologies or specific projects. The approval of topical reports for new  
19 methods that would provide higher certainty in the license application  
20 process.

21           New Commission policy decisions or the establishment of  
22 new regulatory precedent could be a really interesting way to really zoom in  
23 on the characteristics of advanced reactors and determine what type of  
24 regulation makes the most sense.

25           And so in our mind, this is an interesting way to bridge  
26 from the regulation we currently have and is appropriate to potential

1 innovative approaches to regulation in the future.

2           And so this provides both the consistency that we want to  
3 see in our nuclear regulation, the flexibility that is really reflected across a  
4 wide variety of advanced reactors, and the predictability that's going to be  
5 needed to support the economic and financial development or really the  
6 deployment models for these reactors.

7           Like I said earlier in my comments, NIA is really focused  
8 on climate change. We want to make it possible for advanced nuclear  
9 technology to be a solution to the climate issues. And unless we have a  
10 consistent, flexible, and predictable regulatory framework, we don't see this  
11 as necessarily possible.

12           Next slide. So just kind of wrapping up. The Part 53  
13 regulatory framework we believe could be really reimaged to facilitate both  
14 these evolutionary and innovative approaches to regulation. In yellow, you  
15 kind of lay out, or we lay out what we think the regulatory rules contents  
16 could be.

17           The idea of a clear regulatory purpose statement. The  
18 uniform performance requirements and the ability for applicants to define  
19 self-consistent performance requirements that make sense for their specific  
20 project. Then a general process for a safety case, and maybe optional  
21 prescriptive methods.

22           And all these would be supported by different activities,  
23 maybe application-specific regulatory decisions or general regulatory  
24 guidance and approvals. And as a complete set, we believe that this  
25 process could allow us to meet the underlying goals of the Part 53 regulatory  
26 framework and leverage the work that's already been done to date.

1 Thank you.

2 CHAIRMAN HANSON: Thank you, Dr. White. Next we'll  
3 hear from Ms. Sarah Fields, Program Director with Uranium Watch. Ms.  
4 Fields.

5 MS. FIELDS: Yes, thank you for the opportunity to appear  
6 before the Commission.

7 There's a general concern that the NRC will be  
8 compromising its health and safety regulations in order to promote the  
9 deployment of new reactor designs at the behest of the nuclear industry. I  
10 want to comment on one particular section of the proposed Part 53 and  
11 that's Subpart A definition, the advanced nuclear plant.

12 The Nuclear Regulatory Commission must clearly specify  
13 the types of light water and non-light water reactor designs that the new  
14 regulation will apply to and how the NRC will determine that applicability.  
15 The NRC must clearly state the types of facilities that can use Part 53 as a  
16 basis for a license or design certification.

17 Currently, the proposed rule appears to apply to so-called  
18 advanced nuclear reactors or an advanced nuclear plant without providing a  
19 basis for constituting an advanced reactor or how such a determination will  
20 be made. Further, it now appears that NRC staff intends to consider an  
21 application for any type of nuclear reactor under Part 53.

22 Subpart A relies on the definition of advanced nuclear  
23 reactor in the Nuclear Energy Innovation and Modernization Act. That  
24 definition states that an advanced nuclear reactor and nuclear fission or  
25 fusion reactor with significant improvements compared to commercial  
26 nuclear reactors.



1                   And it lists several types of improvements, including  
2 additional inherent safety features, significantly lower levelized cost of  
3 energy, lower waste yield, greater fuel utilization, enhanced reliability,  
4 increase proliferation resistance, increased thermal efficiency, and the ability  
5 to integrate into electric and non-electric applications.

6                   So this definition, however, has no real factual basis. I  
7 consider the term advanced and advanced nuclear reactor to be a public  
8 relations -- public relations terms. Whether it's significantly lower levelized  
9 cost of electricity, lower waste yields, greater fuel utilization, enhanced  
10 reliability, NEIMA does not provide any basis for determining whether a  
11 proposed reactor meets any of those definitions. There's no baseline  
12 information, there's no methodology for determining whether a proposed  
13 reactor has increased reliability or lower waste yields.

14                   There does not appear to be any rational basis for  
15 determining whether a new reactor design can be considered advanced  
16 under the Part 53 guidance. If the NRC wants to apply new Part 53  
17 regulations and regulatory guidance to new reactor designs, the NRC must  
18 accurately specify the types of reactor designs that the new regulations will  
19 apply to and how the NRC will determine that applicability.

20                   If the NRC is going to rely on the NEIMA definition to  
21 determine whether an application can be submitted pursuant to Part 53, it  
22 must provide a meaningful basis and process to determine how a new  
23 designs meets or does not meet any of these new improvement criteria.

24                   As currently proposed, the Part 53 definition of advanced  
25 nuclear power plant is irrational and has no factual or regulatory basis. The  
26 NRC cannot develop a regulatory framework unless it has identified with

1 specificity and particularity the types of facilities and operations that the  
2 regulations will apply to.

3 I have a few comments regarding public participation.  
4 The new -- there are numerous new reactor licensing documents that are  
5 being submitted to the NRC relevant to specific dockets. Whether it's a Part  
6 52 or Part 50 application docket, or pre-application dockets, it turns out that  
7 there are a significant number of pre-application and license application  
8 documents for new reactor designs that have not been accessioned to the  
9 proper or docket or any docket at all.

Therefore, it's difficult for a member of the public to access all of the relevant application documents. This is based on a review of the Oklo Aurora, the TerraPower Sodium, and the NuScale small modular reactor documents on ADAMS.

I'm familiar with ADAMS, I'm familiar with how to access NRC records and the various types of searches I might do to capture all of the relevant records. But since the NRC staff is not properly accessioning documents to the proper dockets, it's difficult for someone who is not really familiar with ADAMS to access all of these records. I contacted NRC staff and hope to meet with them and have further discussion to correct this very serious problem.

Another issue is the docketing of applications and a hearing notice. It is the intent of the nuclear industry to site new reactors in communities that have never had any NRC licensed facility or any experience with or knowledge of NRC regulations and licensing and decisionmaking processes.

Therefore, it's important that the NRC not docket an

application and provide an opportunity to intervene in the licensing process before the NRC receives a complete application, makes a complete review of the application and supporting documentation, makes a determination that the application is complete, and documents that decision and establishes applicable review standards and procedures. The NRC staff guides this process, not the applicant.

Recently, the NRC staff issued a docketing statement and hearing notice for the Oklo first of a kind reactor Part 52 application before the staff determined that the application was complete and where there were glaring gaps in the application, NRC review of that application, and the NRC's own regulatory framework.

The docketing of an application and hearing notice before the NRC has made an application completeness determination or developed review procedures and standards and requirements on a range of important safety issues, and the applicant and the NRC staff are still arguing about which NRC regulations apply is dangerous and unacceptable.

The NRC staff cannot review an already docketed license application for compliance with NRC regulations at the same time it is negotiating with the applicant over questions of the applicability of NRC regulations and standards. The premature docketing of an incomplete application and a premature hearing opportunity set unfair precedents for future new reactor licensing proceedings.

This will adversely affect the safety of new reactors and the rights of community members and potential petitioners. The NRC must not sacrifice objectivity in licensing proceedings. The NRC must not abandon its existing docketing and hearing frameworks and commitment to a

fair hearing process.

Thank you.

CHAIRMAN HANSON: Thank you, Ms. Fields. And thanks to all the panelists for their presentations. We'll begin the Q&A this morning with Commissioner Wright.

COMMISSIONER WRIGHT: Thank you, Mr. Chairman, and good morning to each of you. Thank you for your presentations, both live and in person and virtually as well.

I got a lot of questions. I don't know that I'm going to get to all of them, but I -- so we're going to dive right in because this is really important.

So Patrick, I'm going to come to you first. Good morning. I appreciate you being here today. And I know that the Nuclear Innovation Alliance is relatively new on the scene. But you have been, your organization has been very active, very engaged on Part 53, and you've offered a lot of helpful input on the rule, including the letter of November 5.

It seems to me that one of the challenges of this rule is that there are many competing visions of what success looks like. A used and useful Part 53 is going to look different to a large reactor than it would be a small micro reactor, for example.

Can you talk to me a little bit more about your thoughts on a successful Part 53 and how you see your role as it relates to industry and the staff?

DR. WHITE: Yeah, thanks so much for that question, Commissioner Wright. I think really what NIA sees its role as is an ability to meet with stakeholders from across the spectrum and try to determine where

is there consensus and how can we leverage the relationships to try to build new ideas and try to build better ideas.

I think it can be sometimes really, really difficult for organizations that are constrained either by business constraints or by political constraints to have frank and open conversations. There are just natural limitations that need to exist sometimes.

But an organization like NIA, we can meet with lots of different stakeholders to try to say, okay, where is there consensus across a broad variety of different groups, or maybe where are there conflicts, where are there differences and how can -- how can we try to resolve those?

And I think that's the way that we've kind of approached the Part 53 rule is trying to say okay, with reactor developers that vary from one megawatt reactor to 1000 megawatt reactors and from a variety of different business cases, including maybe looking at large scale, grid scale, energy storage and production versus remote applications in nuclear reactors. How can we develop a rule that meets all of those?

So I think when we take a look at NIA and really all the other NGOs in the space, it's trying to work on how can we try to build consensus and kind of work with all the different groups to try to make proposals that help NRC staff ultimately.

I think one thing that we're always interested in seeing is how can we really help the NRC and help this process forward. Is it letters, is it meetings, is it reports? And so we're always looking to get better feedback from the Commission on how can we try to help contribute to a successful process.

COMMISSIONER WRIGHT: And I do appreciate the way

that you all are trying to think outside the box and do things in a new way, but still within that safety envelope. So I thank you for that.

So, so far, can you tell me a little bit about your experience engaging with the NRC? Have you had any challenging -- or challenges receiving feedback on your organization's input?

DR. WHITE: So we haven't necessarily had challenges in receiving feedback, but I think it's one of these things where it's trying to determine what is the appropriate role for the NGO community and now can we best interact with staff? Is it only through public meetings, is it trying to solicit specific feedback from staff on proposals, and try to determine what is essentially the appropriate and most effective ways to try to engage?

And so one thing that we're always interested in is any guidance from the Commissioners or from anyone else to really kind of say what are the ways to best help out this process. What is going to be most effective to the NRC staff and the Commission in helping to kind of inform a more effective Part 53 rule?

Is it just submitting comments through the official portal and meeting through public meetings, or are there other opportunities or other documents that would be helpful your staff? And I think that, any of kind of that is what would be helpful for us, just really trying to maximize the effectiveness of engagements.

COMMISSIONER WRIGHT: Thank you so much. I'd like to continue on the staff feedback theme for a second then delve a little bit more, because I really do believe the communication part of this is critical. So -- Doug True, good morning.

MR. TRUE: Good morning.

COMMISSIONER WRIGHT: Appreciate your candor in sharing that today you don't believe stakeholder engagement maybe has been as effective, you know, as you would like sometimes. And I appreciate your discussions and the input that you've given through the letters and all that.

So while the NRC may not ultimately agree with NEI's maybe take on a topic, maybe a particular topic, I mean, it really it is important that we understand each other's views and have a reasoned basis for why we're going a certain way or not going a certain way, right.

So you mentioned in your presentation in one of the slides that Part 53 includes things that maybe are beyond-design-basis. And I, personally I don't believe that we ought to go, be including things that go beyond a reasonable assurance. I'm thinking that that's our mission right there.

And are there are particular areas where you believe Part 53 goes beyond reasonable assurance and more to absolute assurance?

MR. TRUE: So I think that -- I don't think the issue is as much reasonable assurance because you're redefining it for this new framework, as it is having additional requirements that we don't think have a commensurate safety benefit. So I guess in that sense it would -- it does tie back in some ways beyond reasonable.

And maybe the best example is ALARA. There's a requirement which we have voiced concerns about to use ALARA concepts in design. ALARA today is used in plants, and we would expect would be used in future plants as an operational program to minimize exposure. But designing to ALARA is fundamentally -- it comes down to what do you mean

by R, where do you stop there?

We can design to a criteria, and then we can operate and minimize effectiveness. But if I've designed a plant that has four feet of -- two feet of concrete for shielding, why not four, why not six, why not eight? How do I do that? I can't -- the designer can't deal with that. They have to understand what they're designing to and not some, well, we could do a little more here, a little more there. So that's an example of a place where I think we have a view that it goes beyond what is needed. There are a handful of others.

I want to put this all back in context to the way that slide is structured. The staff has taken on a monumental task here, and they deserve to be commended for the amount of what they've put into this and the transparency that they've gone forward with this.

Our concern is that pathway was a fast path. And while they may understand our comments, we don't know that they understand them. We don't know that they fully accounted for what we intended, and that's why we provided so much detail. And we'd like to just make sure there's a clear understanding. We may be missing something, there may be something we're missing.

But the path has been moving at a rate that hasn't really allowed that real back and forth. And I don't need -- we don't need things in writing, we don't need letters back. We need to have a, just a productive engagement on this, right.

COMMISSIONER WRIGHT: So, on those points, and I really appreciate you pointing out ALARA. And I know we've also got the QHO and stuff like that that's involved in these things. So Chris, and I'm



going to give you an opportunity as well as Tara from TerraPower, to maybe comment on this as well.

MR. NOLAN: So we participated in some of the calls with TerraPower on the nature and design of the NRC, and I thought all of the calls that I've been on have been fair and balanced. I failed to mention in the presentation, we are a team member on their ARDP project, and it's the storage aspect of that, really.

I think the NRC is its best when it's balancing competing viewpoints. And I think that's where you're going to be on Part 53. When I look at our plants and how they operate today and how they were originally licensed, the changes that the NRC has made over the years in the area of risk have made a huge path, right.

The maintenance rule changes how we operate the plant and the decisions that we make. Risk-informed completion times allows us to do a better job of maintaining critical equipment by allowing us to have the time to do the maintenance that we need to do while enhancing safety. 50.69 is a tremendous opportunity.

And so how do all those learnings get built into the new rule so that we get that out of the -- out of the start? We spent a significant amount of money developing those over time.

At the same time, how does the regulatory approval process change and learn from those insights as well? You know, we when we merged with Synergy brought into our history Marble Hill and Zimmer, which are two failed nuclear sites. We had Cherokee on our own. So that's three under Part 50. We also had three applications for AP1000. If you look at the disparity and how much money our ratepayers paid for the

three plants that didn't finally get licensed under Part 50, the numbers are staggering, right. So there's an inherent importance in how we make those decisions. And delays during the construction phase have a significant impact.

So by focusing on what the decisions that are important and not on detail that has a rigorous change process I think is important. And I'm confident that the staff will get there. I think you've got great people and they're getting conflicting inputs. But I think -- I think that's where the NRC's at its best.

COMMISSIONER WRIGHT: Thank you, and Mr. True, and my fellow colleagues if you would indulge me, I called Tara from TerraPower out as well. I want to give her an opportunity if I could.

So Tara also, while you're -- if you want to comment on this. You also mentioned about the possibility of exemptions in Part 53, that we need to recognize that possibly. And even that maybe the NRC needs to recognize that. Can you speak to that as well in your response? Thank you.

COMMISSIONER WRIGHT: You there? You're on mute.

MS. NEIDER: Thank you. So I'll first talk about the first part. One of the concerns we do have on Part 53 is the beyond design basis accidents. Those are -- and I think there's some circular logic in that there's supposed to be beyond design basis accidents, but they wanted to be included in the design basis, so I think that that will be worked out as we move forward. You know, we do want to consider what the implications of those are, but not have them as design rules.

With regard to exemptions, I don't have any particular examples in there. I did get information from my licensing director that the way that it's written right now we would still probably end up with some exemptions and that's because it's prescriptive. So I can reach back and get some specific examples at a later date if you'd like.

COMMISSIONER WRIGHT: Thank you so much.

CHAIRMAN HANSON: Thank you, Commissioner Wright.

Thanks, everybody, for your presentations. I think the discussion this morning kind of highlights the complexity and I think Mr. True, you said it right, the monumental task before the staff. Luckily, it also provides a target-rich environment for commissioner questions.

So let me start a discussion and let me continue a discussion that I think I heard in some of the presentations and that's around qualitative -- quantitative health objectives. And I guess my understanding of the introduction of quantitative health objectives into the regulatory framework was really an effort on the part of staff to get to this performance-based aspect of the regulation, right, and to provide some flexibility in approaches in achieving those objectives.

Now, we heard, I think, some comments from Ms. Neider, some concerns about -- both substantive, about QHOs and about process on that. And then we heard from Dr. Lyman on overall concern about QHOs as well. But given the legislative mandate that the staff has to develop a performance-based rule, I guess I just want to put it to first Dr. Lyman and Ms. Neider together, but also potentially for the bigger group. And I'll just put it directly, if not QHOs, then what?

So whichever -- whoever, Dr. Lyman or Ms. Neider,

whoever wants to start with that question, feel free.

DR. LYMAN: Yes, I can start. So as I did say -- I mean I think it makes sense to have a regulatory standard for the consequences of these beyond design basis accidents and I don't agree that it's inconsistent to include requirements for those as long as they're graded appropriately, but you do need to think about what the consequences of those accidents are and metrics that fully reflect those consequences.

I think one of the key challenges is that they only address individual risks and not collective risks or land contamination that have the obvious impacts like Fukushima. And if you look back at the original safety goal policy statement, and I think it was Commissioner Bernthal's dissent, where he pointed out that you could cite a reactor in Central Park and it would still meet the QHOs because -- with regard to individual risk, but it doesn't look at the obvious impacts of land contamination that would impact Manhattan. So you need to think harder about those metrics.

And with respect to the numerical values, as I pointed out, they were never set that restrictive. They were set to encompass the population of plants at the time in the 1980s with sufficient margin so that -- so I don't think that they're conservative enough. So I think you need to start with a clean sheet of paper and think about what are appropriate both quantitative and qualitative aspects of those safety goals that you would want to make sure you're capturing in putting appropriate restrictions on the frequency of beyond design basis accidents.

CHAIRMAN HANSON: Thank you. Ms. Neider.

MS. NEIDER: First of all, we will be developing qualitative health objectives for Sodium. So that is the path that we are following.

Our concern really is that it's -- does that need to be in the rule or can that be outside the rule? The concern that has been brought up to me is that some of those QHOs would apply to our PRA, but not necessarily all of them would. I don't have a real alternative other than we continue using the QHOs, but not have that prescribed in the rule.

CHAIRMAN HANSON: Okay. Thanks. Other perspectives on QHOs? Dr. White?

DR. WHITE: Great. Thank you. So I think when we talk about QHOs, it's really important to go back to kind of the regulatory first principles on what they're actually trying to do. We can talk about them as model, but ultimately to try to characterize what is the intersection between the consequence and the probability of different types of accidents that we're interested in.

And so we can argue a lot about maybe specific numbers or specific methods, but I think ultimately it's going to be a staff determination on what is meeting the underlying regulatory objectives and what the NRC is trying to do in terms of a reasonable assurance of adequate protection.

And so I think when we look at kind of a Part 53 rule moving forward, for some developers, demonstration of compliance with a quantitative QHO may be appropriate. Other times, really demonstrating compliance with surrogates might be more appropriate. And I think this is something that we saw the use of the large early release frequency or the core damage frequency as surrogate metrics.

And so I think one thing we can think about for a Part 53 rule is encouraging applicants who essentially define their own metrics that

really try to evaluate the safety of their facility and demonstrate this acceptableness of the consequence and the probability of different types of events.

I think this is something that's going to differ dramatically, potentially, between reactor designs in terms of what types of scenarios are considering, but it's really thinking that we're not really arguing necessarily about the specific numbers, but what the numbers are representing and how to meet the kind of overall regulatory approach and regulatory principles.

CHAIRMAN HANSON: Okay. Thank you. Anyone else? Sure, Mr. True.

MR. TRUE: I think our points are outlined in our comments, but I think that one of the – to your point of what else can we do? I think that having an end guidance is a better place to put it to be more holistic in looking at it. We have to be -- let's understand that a PRA gives you a portion of the input to what the risk to the public is, but it doesn't cover everything. There are limitations to the scope of the PRA. There are limitations to the scenarios that were considered in the PRA. And so tying them one-to-one back to a PRA is not exactly the right way. And I think the Commission needs to be able to account for the fact there are other considerations beyond what's captured just in that theory.

CHAIRMAN HANSON: Thank you. Okay. I'm very interested in the use of PRA in advanced reactor licensing and how that feeds a more structured approach. And while you see in the conversation today and also I think in the products that the staff has developed trying to establish a balance between structure and flexibility in this. And that -- getting the right balance there is important not just for licensees, but also for

the public, right, so that people can actually see into this. I think we heard some of that and understand the process. And I think we saw some of that.

But critical, I think, to establishing PRAs is the generation of data. And I get this question a lot. And I want to put this -- I want to give Dr. Baranwal an opportunity to talk here about what you see are the key data gaps in technology development, how -- where should the NRC be focused? Where should DOE be focused? And kind of what role is EPRI playing in closing some of those data gaps as we proceed with licensing, generally, but also specific designs.

DR. BARANWAL: All right, thank you. I'll start with where EPRI is kind of working to address some of those challenges. So we have two specific programs, advanced nuclear technology and risk and safety management, where we're working with our members to evaluate what their needs are in addressing those gaps and we're actually working on it as we speak and are starting substantial work in this area starting next year. So I can certainly follow up with you and your staff as we get sort of the framework laid out for that. And it's so important to EPRI that we are actually hiring an advanced reactor risk expert to help us lead this effort for our members and for EPRI.

With respect to the gaps in technology, I think -- I don't want to give you sort of a blanket statement, but there are testing capabilities around the country that do exist, but frankly, the Versatile Test Reactor was really launched to address many of those gaps that we foresaw and that still exist and may exist into the future. So a facility like the Versatile Test Reactors, so pulling in DOE back into the conversation, could certainly help with generating the data that is needed to fill those gaps, especially when it

comes to new materials, different fuel forms, addressing the impacts of coolants on materials using modeling and simulation tools. But there is a solution that's out there. It certainly needs, I think, sounds like a bit more support if you will, to say it -- I'll say it lightly. But I think -- I do want to be clear that I do not feel this -- as a personal thing, the technology gaps are what are a huge barrier to deployment of new reactor technologies. Some of that certainly needs to be tested out, but then there's the other pieces of deployment that's required, the regulatory piece, the financing piece.

CHAIRMAN HANSON: Thank you. With that, Commissioner Baran.

COMMISSIONER BARAN: Well, thank you all for your presentations. I think it's been a good discussion so far.

I had on my list these meetings that the staff has been doing every month, they often go like eight hours, obviously, there's a lot to cover and there have been many of them. But I also was interested in this QHO question because it seems kind of like one of these core, basic questions and maybe step back and ask a follow up on that.

The staff's current thinking is that the rule would have a pathway for applications where probabilistic risk assessment takes a leading role and then a separate, more deterministic pathway. For the PRA focus pathway, the rule will presumably need, as the Chairman was talking about, like a basic safety criterion that must be met for licensing. And the staff has talked about using the QHOs to fill that role. It seems like there's a range of opinion about that.

I was intrigued about some of the comments about well, maybe we don't need that in the rule at all. Maybe that's in guidance.



Can folks talk a little bit more about that? I mean it seems like if we're going to have a performance-based approach for at least the PRA focused pathway, don't you need like basic safety criteria, the acceptance criteria, for whether something is safe or not?

I kind of went in with that assumption and it sounds like maybe there's even disagreement about that. One question is well, what should that criterion be, QHOs or something else? But do we have even agreement that you need such a quantitative criterion for the PRA side of the rule? Do folks have a thought about that?

MR. TRUE: So I think that ultimately you're going to need some quantitative criteria. Whether it belongs in the rule or not is one of the key questions. And I think it needs to be structured in a way that sort of accounts for the fact that what the PRA does and doesn't do to support that, as I said before.

So I think that one of the concerns about the QHOs being the rule is, as Tara mentioned in her opening remarks, that pulls in the PRA and all the bases into a place we've never tried to look at that before and could open it up to challenges and questions about its limitations, assumptions, and things in ways that we've never had to deal with before.

As a policy statement, QHOs have served the NRC and the industry well as a marker to move forward. You put it into the regulations. Now those plants have got to demonstrate every hour of operation that they're meeting those numbers. That takes it to a whole new level of regulatory engagement that we just haven't done before and I don't think we know and understand all of the sets of ramifications of that. Not the numbers necessarily that we're concerned about. It's the way it gets

implemented.

COMMISSIONER BARAN: I see. So it's not the concept of having a performance target. It's more of either unintended consequences of picking that particular target and kind of the regulatory footprint than on PRA. Okay.

MR. TRUE: In that leading role, yes.

MR. NOLAN: So if I could draw an analogy that might be helpful. Sometimes the criticisms is about what it could be or what it could lead to, not what it is. And if I make an analogy to the deterministic role, when the plants were originally licensed, what the NRC licensed for the systems was the performance objectives. It was in the written text.

We put drawings in to our license as well to describe what that written text was. And over time, we realized that that was too much detail and we took that, those drawings out. We replaced them with high level flow schematics, but they were just a pictorial description of the performance objectives that the staff approved.

So the reason we did that is those drawings were living and breathing with the plant. They were being continuously changed and each change had to be compared against 50.59 for details that were not relevant to what the staff approved in the system description.

So the PRA is kind of analogous, too. The PRA is a living, breathing document. There's a change process. Every time we change the plant, we update the PRA. So approving the PRA would be a flawed concept and it would be analogous to approving drawings for the plant.

What you need to approve is a methodology on how the PRA is developed so that you can inspect it while the plant is being

constructed and while the plant is operating. And when you look at NFP 805, and I'm not an NFP 805 expert, the staff approved the method, licensees implemented the program, and then NRC inspected. And so it could be clarity on how that would be used, that we really need to get to those conversations to get past, because I think if the staff was reviewing PRA that would be analogous to reviewing lines of code in a digital licensing, right? That's not where the staff's value is. The staff's value is in identifying what the PRA has to address and the methods it's used and then a confirming inspection that says the licensees did it correctly.

COMMISSIONER BARAN: Okay. Thanks. There's kind of another -- oh, do we have someone else who wants to weigh in?

DR. LYMAN: Yes, actually, if I may.

COMMISSIONER BARAN: Go ahead, sure.

DR. LYMAN: The short answer to the question is yes, I do believe that the rule has to have a clear standard as I said before so that at least the public understands what that fundamental safety criterion is. Now the problem is with a quantitative standard that's based on the quantitative assessment. Again, the problem is when you're licensing on something, a first of a kind, or immature design, the PRA is going to have large uncertainties. And so you're going to have to address that. So maybe just a quantitative standard is necessary, but not sufficient. You may also need also some qualitative defense-in-depth criteria.

And I don't agree that the PRA needs to be inspectable because it is going to be outdated from the approach and it's not just the QHOs, but also all the other applications that the PRA would be used for were getting regulatory relief from current requirements, from the EPZ size to

special treatment. All those are ultimately based on risk calculations. And so those risk calculations have to be provided to the staff and to the extent that they can be validated and that needs to be again inspectable and enforceable if they're going to be fundamental contributions to relieving or relaxing these other regulatory requirements for the current fleet.

COMMISSIONER BARAN: Okay, thanks. Another kind of foundational question that I think the staff has been grappling with recently and maybe throughout is who should Part 53 apply to? What's the scope of the rule in that regard? And from the beginning it's been an advanced reactor rulemaking, but the question folks are challenging because the NEIMA definition is very broad and it doesn't completely line up with the Commission's advanced reactor policy statement.

For those of you who have been actively participating in the Part 53 meetings, what do you think about this question of kind of which applicants should Part 53 be set up for? Who should be using this? I know there have been some suggestions recently maybe any reactor can apply. It may be not even something that meets any particular definition of advanced reactor.

What's the thinking about that? Are there entry criteria for this rule? Is it for any reactor or some subset of reactors?

MR. TRUE: I think our belief is it should be as inclusive as possible and that may mean that many reactors in the future would be able to apply to that. I'm not sure you can predefine today that entry criteria, but if you can meet that performance criteria and the performance basis that it lays out, you should be able to use it.

COMMISSIONER BARAN: Other thoughts on that

question?

DR. WHITE: Yes, I think I would agree. If we're actually coming up with a technology-inclusive, risk informed performance based regulatory framework that maintains an equal level of safety with existing reactors, I can't see any reason why it shouldn't be applicable to any type of reactor design. If anything, it's almost just representing a different way to think about demonstration of compliance with the regulatory requirements. And so the underlying regulatory requirements will be consistent across all reactors.

COMMISSIONER BARAN: Any other thoughts on that question? Anyone who's virtual?

DR. LYMAN: Just quickly to weigh in, I think the original intent of NEIMA was that this rule should really be promoting development of the advanced reactors needed in those NEIMA requirements that we heard from Sara. And so to the extent that the rule would have provisions which would be essentially relaxations of the requirements for current plants under Parts 50 and 52, I think that plants really need a test to qualify, that if they're going to claim from the outset that they have safety features that mean they should be treated differently than the large light water reactor fleet, those safety features -- you know, you can't just take them on faith. They have to be demonstrated.

But again, if that's the argument that they're using for qualifying for a new set of rules, then I believe that they need to meet that standard of demonstrating at the outset that there's a reasonable belief they will achieve enhanced safety and therefore, you don't need to examine that in the same level of detail some of the prescriptive requirements.

On the other hand, I can see the argument that for anything other than large light water reactor, if they can make the safety case through the new rules, then they should be able to do that. But again, as long as it meets the same -- as long as you can demonstrate to the public that it is an equivalent level of safety to the current fleet and that's a challenge.

COMMISSIONER BARAN: Okay, thanks, Ed. It does seem like it starts to get a little tricky once you start thinking about large light water reactor applicants under Part 53, especially if we're thinking about like at a deterministic pathway. That's been the last half century of licensing, so now do we have competing deterministic pathways for large light water reactors? And it's hard to really wrap my head around that if that's where we would be going with it. But thanks for the perspective. I think that's very interesting. Thank you, Chairman.

CHAIRMAN HANSON: Thank you, Commissioner Baran.

Thanks again to all of our guests.

As I mentioned earlier, we had a -- there are a lot of things we could cover. We barely scratched the surface on L&P and ALARA and a whole host of other things, but in the interest of expediency and hopefully public clarity and everything else, I want to thank you all very, very much for your presentations, for being here this morning, for all of our participants online. Your comments and thoughtful contributions to this process are very much appreciated.

With that, we're going to take a five-minute break and we will reconvene at 11:05 for the staff presentation. Thank you.

(Whereupon, the above-entitled matter went off the record

at 11:01 a.m. and resumed at 11:05 a.m.)

CHAIRMAN HANSON: All right, I want to reconvene for the second part of our discussion this morning on the Part 53 rulemaking for advanced reactors. We're going to have the staff presentations.

Before we do, I wanted to lighten the mood a little bit. It's been a subject of ongoing conversation in my office that today is the last in a string of palindrome days, it is 12/9/21. Apparently, there were 22 palindrome dates in 2021. Andrea Veil is nodding at me so apparently, it's not the only place in the NRC where we are focused on such light topics.

And apparently, that's not going to happen. We've had a string, I think 10 of them, just in December alone, we've got 2 more to go, so it may be the 12 days of palindromes in this holiday season. And apparently, a year with so many palindrome dates won't happen again until 2111. So, another 90 years. Anyway, on that light-hearted note I'll hand it over to Dan Dorman and let him try and follow up on that.

MR. DORMAN: I don't know where to go from there. Thank you, Chairman, and good morning, Chairman Hanson, Commissioner Baran, Commissioner Wright.

The Staff are pleased to be here today to provide an update on the Agency's activities to support the development of Part 53, as well as the licensing and regulation of advanced nuclear reactors.

Part 53 establishes a transformative regulatory framework to provide at least the same degree of protection of public health and safety in the common defense and security as required for current-generation Light Water Reactors under Part 50 and 52.

It moves away from the prescriptive nature of the current

requirements and instead uses a technology-inclusive and performance-based framework. In addition, Part 53 provides for the next step forward in realizing the Commission's policy that the use of PRA technology should be increased in all regulatory matters to the extent supported by the state of the art, and in a manner that complements the NRC's deterministic approach and supports the NRC's traditional defense-in-depth philosophy.

The NRC views Part 53 as the next logical step in the evolution of risk-informed performance-based regulation that began as far back as the 1970s and this evolution was described in the Staff's Vision and Strategy for Non-light Water Reactors Readiness that we issued in 2016.

Next slide, please. I'd like to now introduce the panelists who will talk about the Agency's activities to support Part 53 and the licensing and regulation of advanced reactors.

Our first speaker during this panel to my right, Andrea Veil, the Director of the Office of Nuclear Reactor Regulation or NRR will talk about our Part 53 vision.

After Andrea, Mo Shams, the Director of the Division of Advanced Reactors and Non-Power Production and Utilization Facilities in NRR will discuss the transformative attributes of Part 53 and will walk us through a licensing framework comparison between Parts 50 and 52, and Part 53.

Following Mo, you will hear from Nannette Valliere, a Senior Project Manager in NRR, who will provide an overview of Part 53 and how the NRC is taking into consideration stakeholder comments.

Then you'll hear from Michele Samson, the Deputy



Director of the Division of Physical and Cybersecurity Policy in the Office of Nuclear Security and Incident Response, or NSIR. Michele will discuss NRC's performance-based security and EP or emergency preparedness provisions for advanced reactors.

And then finally, Ilka Berrios, the Chief of Reactor Rulemaking and Project Management Branch in the Office of Nuclear Material Safety and Safeguards, or NMSS, will discuss the rulemaking process and NRC's outreach activities in support of Part 53.

So, this concludes my opening remarks and without further ado, I'll turn the presentation over to Andrea.

MS. VEIL: Thank you for the introduction, Dan, and good morning, Chairman and Commissioners. Next slide, please.

The NRC Staff is committed to our vision of developing an innovative, predictable, and appropriately flexible framework to enable an efficient licensing process for advanced reactors. We continue to make substantial progress in implementing this vision by executing our implementation action plans to establish a regulatory framework for non-light water reactors. These action plans identified a potential rulemaking to establish a regulatory framework for advanced nuclear reactor licensing that would be risk-informed, performance-based and technology-inclusive.

The enactment of the Nuclear Energy Innovation and Modernization Act, or NEMA, reinforced the need to develop this new regulatory framework. As Dan previously noted, Part 53 provides an equivalent level of safety as provided under Parts 50 and 52.

In addition to achieving an equivalent level of safety, we look to achieve operational flexibility. For example, introduction of the

performance-based framework in Part 53 will allow for flexible and scalable plan staffing requirements.

To ensure stakeholder engagement and our efforts to establish this new regulatory framework, the NRC staff is engaging in very extensive stakeholder outreach during the rulemaking process, and has received diverse and significant input.

Nan, Michele, and Ilka will provide more details on these interactions. Next slide, please. The staff has pursued developing Part 53 as it was described in the rulemaking plan approved by the Commission.

This includes leveraging the risk-informed approaches to designing and licensing advanced reactors developed through the joint industry Department of Energy and NRC activities, such as those used for the next-generation nuclear plant and the subsequent licensing modernization project. The staff has, however, also considered stakeholder requests to develop a more traditional deterministic licensing framework for advanced reactors.

In addition, the Staff recognized that more time was needed to further engage stakeholders, including the Advisory Committee on Reactor Safeguards. Several organizations also noted support for a schedule extension as you heard in the last panel for the rule during our various public interactions. To this end, in October the staff requested a nine-month extension to the Commission-directed schedule for Part 53 and the Commission has approved the staff's request to fully develop the licensing alternative.

The staff is committed to developing an effective rule and following the NRC's principles of good regulation.

Because NEMA defines advanced nuclear reactor as a nuclear fission or fusion reactor, the Commission also directed the NRC to develop options in the appropriate treatment of fusion technologies within the NRC's regulatory structure.

The NRC is considering several alternatives as part of its efforts to prepare a Commission paper with options on the licensing and regulating commercial fusion power plants. The staff's work on developing a framework for fusion regulation is on a separate schedule from the schedule to develop Part 53.

As a result, should the NRC develop a rulemaking to address fusion facilities, the schedule could extend beyond the Commission-approved due date for Part 53, but the rulemaking would be completed before the NEMA-directed due date of 2027.

We need to develop the Part 53 rule as soon as possible but must have the right amount of time to ensure it is a viable rule and that we have adequate engagement with stakeholders, again, as you heard in the last panel.

Next slide, please. I will now turn the presentation over to Mo Shams.

MR. SHAMS: Thanks, Andrea. Good morning, Chairman and Commissioners.

It is my pleasure to be here today to share with you some insights on the Part 53 rulemaking and the staff's efforts to develop this modern risk-informed regulatory framework.

In my remarks, I will highlight the staff's proposal to develop a transformed rule that meets the Commission policy of providing at

least the same level of safety as the existing regulations while establishing an efficient, predictable path away for licensing and advanced reactor design. I will also contrast Part 53 and Part 50 and 52, while highlighting the role both approaches can play in licensing future reactor designs safely and securely. Next slide, please.

As I shared with you in September, the NRC is transforming the regulatory framework for advanced reactors into a modern risk-informed approach. And Part 53 is central to that effort.

Diligently, the development of Part 53 has been carried forward through an incredible effort by an extraordinary group of staff from around the Agency, who continues to double their efforts to evolve the rule in a way that is innovative, responsive to stakeholder feedback, and continues to meet the Commission direction.

The team has also committed to developing the rule in a manner that is consistent with the NRC's principles of good regulation. Over the past year, the staff has benefitted greatly from extensive engagement with stakeholders, who provided diverse and wide-ranging views.

The staff is actively considering and incorporating stakeholder comments as appropriate; however, as an independent regulator, we may not agree with all the comments we received.

At this point, the staff is nearing completion of the first draft of preliminary rule language for the entire scope of the rule, further enabling integrated discussions with our stakeholders.

Turning to the rule itself, Part 53 builds on a strong foundation of Commission rules, policies, and decisions on

performance-based and risk-informed regulations. It incorporates lessons learned and draws on rich stakeholder input that staff continues to consider as it develops the rule. The rule embodies a risk-informed framework that capitalizes on the progress in the state of the art in probabilistic risk assessment, or PRA.

This framework evolves the use of risk for identifying licensing basis events and classifying plant equipment. It also leverages performance-based approaches to enhance staffing flexibility and ensure defense-in-depth.

Additionally, the rule modernizes the licensing basis change process into a risk-informed approach that leverages the design margin to afford operators greater flexibility.

Moreover, Part 53 features a consequence-oriented regulatory framework by leveraging alternative graded emergency preparedness and security requirements that reflect a facility's potential risk to public health and safety.

Principally, Part 53 affords designers and operators enhanced flexibility by enabling reactor design with demonstrated safety attributes to leverage the safety margin in gaining operational flexibility. Additional flexibility will be offered in the Part 53 rulemaking by including alternative approaches to establishing the safety case of a design.

Overall, Part 53 strives to strike an optimal balance between flexibility and predictability by providing clear and specific performance-based requirements to ensure an efficient and effective licensing process for advanced reactor design.

Next slide, please. Part 53 and Parts 50 and 52 take

philosophically different approaches in implementing safety requirements.

The Part 50/52 safety paradigm is established through a set of requirements developed and focused on a specific technology and augmented over time to address operating experience. Design basis accidents and specific beyond design basis events are addressed directly with prescriptive requirements.

Part 53 on the other hand leverages a set of high-level analytical requirements correlated to certain frequency and consequence thresholds. These requirements are technology-inclusive and their associated analytical requirements are performance-based with no prescribed design solutions. Design basis accidents are addressed using event frequency and crediting only an essential step of safety-related equipment.

Similarly, beyond-design-basis events are addressed using an event-frequency-oriented approach with explicit consideration of uncertainty.

While the two frameworks have different starting points, they often meet at similar design endpoints, as both frameworks leverage the same top-level safety criteria.

One example of a top-level safety criterion is the quantitative health objectives, or QHOs, from the Commission's safety goal policy statement.

They are included in the rule language in Part 53 to provide a quantitative, technology-inclusive risk metric that underpins miscorrelated requirements.

Conversely, the QHOs are used in guidance under Parts

50 and 52 to support deterministic requirements and defense-in-depth.

Leveraging the QHOs and the PRA in Part 53 provides a holistic approach and is a logical next step in implementing the Commission's policy on the use of PRA methods in nuclear regulatory activities.

Defense-in-depth is also treated differently in both paradigms. It is addressed largely through conservative assumptions and analyses in individual regulations in Part 50 and 52, while Part 53 explicitly requires consideration of defense-in-depth in a holistic manner.

Additionally, the use of graded equipment performance requirements plays a limited role in the Part 50 paradigm, while it is systematically applied and innovatively used in Part 53 on a design-specific basis to ensure the safety criteria are reliably met.

In aggregate, Part 53 maintains an equivalent level of safety to that provided by Parts 50 and 52, while leveraging a more flexible, risk-informed approach to meeting the requirements.

Next slide, please.

It is important to highlight that Part 53 is not a relaxation in safety standards. No matter the regulatory framework, reasonable assurance of adequate protection is the minimum level of safety required.

Appropriate margin is afforded in the regulations to provide confidence that adequate protection can be achieved and is achievable by a diverse set of technologies.

One method to achieve this margin is a deterministic framework like Part 50, which is structured around compliance with a specific set of prescriptive requirements that defines the design capabilities

required.

Conversely, the risk-informed, performance-based approach in Part 53 enables a vendor to optimize the design and associated level of conservatism by leveraging a comprehensive design-specific assessment to develop a safety case and demonstrate its viability with a high degree of confidence against the safety criteria.

Ultimately, both approaches are equally viable in providing reasonable assurance of adequate protection of public health and safety. Next slide, please.

This concludes my remarks, I will now turn the presentation over to Nan Valliere.

MS. VALLIERE: Thank you, Mo, and good morning, Chairman and Commissioners. Next slide, please. Here I will continue our overview of Part 53.

Part 53 relies on established principles of nuclear safety and builds on them to demonstrate how a reactor designer or plant operator can meet these principles in a different way, leveraging the best of the past and developing new tools for the future.

The Part 53 framework recognizes technological advancement in reactor design and allows credit in the form of operational flexibilities when a reactor design can show increased margins of safety, including slower transient response times and relatively small and slow release of fission products.

Part 53 will accommodate various advanced reactor technologies, prioritizing risk-informed and performance-based licensing approaches to protect public health and safety throughout the life of a



facility.

Next slide, please. In accordance with Commission direction, Part 53 relies on the Agency's existing safety goals, safety performance expectations and associated guidance, such as the Commission's advanced reactor policy statement.

Consistent with the NRC Vision and Strategy for Non-Light Water Reactors Readiness that Dan mentioned earlier, guidance being developed to support Part 53 will provide a framework that is risk-informed, performance-based and that features staff review efforts commensurate with the risk posed by the reactor design being considered.

As others have noted, Part 53 leverages the transformative methodology for licensing novel, non-light water reactor technologies from the licensing modernization project guidance and NEI-1804 that was approved by the Commission and endorsed by the NRC as one acceptable way to implement the rule.

As Andrea noted, this project was funded by the Department of Energy and developed by the U.S. nuclear industry. The NRC staff has been effectively coordinating with the industry project leaders in our review of the licensing modernization project and related follow-on projects for five years to support development of this novel regulatory framework.

Next slide, please. The NRC has hosted frequent public workshops on Part 53 and briefed the Advisory Committee on Reactor Safeguards numerous times since September of 2020, and will continue to meet with external stakeholders and the ACRS going forward.

As Ilka will discuss in more detail, we have received

significant and diverse stakeholder feedback that is being considered in development of the proposed rule. While some stakeholders are supportive of the general direction of the rule, others believe the rule language is overly complex and would increase burden and have expressed desire to see more changes.

The staff is listening to all stakeholders and has made several changes in response to external stakeholder and ACRS feedback. Some representative examples are included on this slide. They include elimination of the two-tier structure of the safety criteria, based on feedback received from both external stakeholders and the ACRS and development of a traditional deterministic option. This framework would be technology-inclusive with PRA used in a traditional role and would level Parts 50 and 52 regulations, while aligning more closely with international standards.

In addition, the staff has decoupled the requirements for normal operation from the requirements to address accidents and transients and formulated quality assurance requirements to allow use of a broader set of codes and standards. We also plan to consolidate the quality assurance requirements in one section of the rule, rather than leave them spread throughout the rule as they currently are.

The staff is proposing to expand the activities that could be pursued under a manufacturing license to potentially address factory-manufactured reactors that would be fueled at the manufacturing facility and transported to the reactor site, to support the plants of some micro-reactor designers.

In response to feedback from the ACRS, the staff has

added requirements that safety analyses must demonstrate that design basis accidents achieve and maintain a safe, stable end state, and that all reactors be able to achieve a sub-critical condition during normal operations and following a licensing basis event.

The staff has included a licensing pathway that utilizes prototype testing as one option in Part 53. And finally, the staff plans to include a detailed explanation of the integrated intent of the rule in the Federal Register notice for the proposed rule.

We believe that the changes to the preliminary rule language resulting from stakeholder feedback will help to improve the quality and clarity of the rule, something the staff is continually striving to do.

Next slide, please. And with that, I'd like to turn the staff's presentation over to Michele.

MS. SAMPSON: Thank you, Nan. Good morning, Chairman and Commissioners. Next slide, please. NSIR is supporting the Agency's efforts by creating an innovative security framework that provides the same degree of protection of public health and safety and the common defense and security for advanced reactors as is required for current-generation light water reactors security program.

We are building on the staff's years of experience with security programs and research and test reactors, fuel facilities, and large light water reactors, and the talent and expertise from across the Agency to create a technology-inclusive, cost-based regulatory framework for security and emergency preparedness.

We are providing appropriate flexibility through a performance-based security framework via a graded approach for licensing

of advanced reactors that demonstrate enhanced safety and security features. Because of the variety of potential reactor designs, radiological consequences provide the benchmark underlying this graded approach, considering the impact of potential safety and security events at the facility.

With this more performance-based regulatory framework, we recognize the importance of developing effective guidance to provide a balance between flexibility and predictability. We'll issue companion security guidance for public comment with the proposed rule. We are also leveraging the work from the Emergency Preparedness for Small Modular Reactors and Other New Technologies rulemaking and plan to incorporate the outcome of this rulemaking into the regulatory framework for Part 53.

Developing a performance-based approach to emergency preparedness has been an extensive multi-year effort. In May of 2020, the proposed rule was published for comment and we have benefitted from over 2000 public comments, which have been considered during development of the final rule proposal. The staff anticipates providing the final rule package to the Commission for consideration at the end of this calendar year. Next slide, please.

For Part 53, NSIR is developing a technology-inclusive security framework that applies a graded approach for a comprehensive range of security areas, including physical security, fitness for duty, and access authorization.

The preliminary proposed rule language consistent with the advanced reactor policy statement incorporates security by design moves away from prescriptive requirements, instead using performance-based requirements and provides flexibility for protective

strategy design by applicants that demonstrate enhanced safety and security features.

Future applicants are expected to consider safety and security requirements together in the design process, such that security can be effectively addressed through facility design and engineered security features, formulation of mitigation measures, and reduced reliance on human actions.

For example, design attributes of a physical protection system could rely on engineered systems and automation to justify less reliance on human actions such as those provided by armed responders to defend against radiological sabotage. Where an applicant can demonstrate by design that consequences resulting from a bounding security-initiated event do not endanger the public health and safety or the environment, the applicant would not be required to defend against the threat of radiological sabotage.

The applicant would still protect any special nuclear material in accordance with this classification and appropriately protect against theft and diversion of that material. For these demonstrated designs, the requirements for access authorization and fitness for duty programs will be similarly scaled, commensurate with the reduced risk to public health and safety.

Where human actions are required to defend against the threat of radiological sabotage, the regulatory framework will require that the capabilities to detect, assess, interdict and neutralize threats up to an including the design basis threat of radiological sabotage are maintained at all times.

The regulatory framework provides flexibility for these future reactor applicants to utilize the known security provisions under the existing Part 73 security regulation or the more performance-based provisions being developed for the Part 53 rulemaking.

Next slide, please. The proposed new rule will also implement a graded approach to determine the level of cybersecurity protection required for digital computer and communication systems and networks with defense-in-depth protective strategies to ensure the capability to detect, delay, respond to, and recover from cyber attacks. A graded approach based on potential consequences is intended to facilitate risk-informed approaches, results and insights with a wide range of future reactor technologies.

This proposed cybersecurity framework leverages the operating experience and lessons learned over the past 12 years from the power reactor's implementation of the current cybersecurity regulations.

The resulting proposal recognizes the more significant role that may be played by those digital computer and communication systems for future reactor design and incorporates flexibility for future applicants to appropriately identify and protect digital assets.

Thank you for the opportunity to share the security and emergency preparedness provisions of the Part 53 rulemaking. This concludes my remarks and I will now turn the presentation over to Ilka.

MS. BERRIOS: Thank you, Michele, and good morning to the Chairman and Commissioners.

Today I will be discussing the rulemaking process and schedule, the extensive stakeholder engagement, and the risks and

certainties to the development of the Part 52 rule.

Next slide, please. The first topic is the rulemaking process and schedule. The staff is working to develop the Part 53 rulemaking consistent with the Commission direction in a way that is creative, open, and responsive to our stakeholders.

The diagram in the slide shows the rulemaking process. At this point, we're developing the preliminary proposed rule language and extensively engaging with external stakeholders. The staff is currently near completion of the first draft of the preliminary proposed rule language. Next slide, please.

The graph in the slide shows the estimated dates to complete the proposed rule and final rule. These are the new dates based on the 9-month extension requested by the staff and approved by the Commission. The staff is currently working towards this new schedule.

As of now, we are in a public outreach step and developing the proposed rule. We are expecting to complete these steps by January 2023 and provide a proposed rule to the Commission by February 2023. After we get Commission's approval, the proposed rule will be published for a 60-day public comment period. After the public comment period, the staff will review the comments and take them into consideration while developing the final rule. Based on the current schedule, the staff is expecting to publish a final rule by July 2025.

Next slide, please. Rulemaking stakeholder engagement.

Over the last 15 months, we have had extensive external engagement. Stakeholder interactions have evolved and emphasized broadening engagement and bolstering progress by focusing on the following activities.

We are optimizing public and ACRS meetings to be more topic-specific to enable further dialog of specific issues and engagement with our stakeholders.

This allows for everyone to discuss in detail one or two issues, while an all-day meeting with multiple topics sometimes lead to less detailed discussions.

We are releasing initial and revised preliminary proposed rule language for the Part 53 Subparts to enable stakeholder comments on an integrated rule. We are further continuing stakeholder comments previously released preliminary proposed rule language. And we're releasing new iterations of previously released preliminary proposed rule language as soon as it becomes available. Next slide, please.

Public meetings. Over the past year we have held numerous public meetings, including over 80 hours spent in 12 public meetings. An average to 100 to 120 people, including NRC staff and external stakeholders attend these meetings.

Our next public meeting is scheduled for January 6, 2020. We have also spent over 80 hours and 13 meetings with the Advisory Committee on Reactor Safeguards, ACRS, including the full Committee and the Future Plant Designs Subcommittee. Our next ACRS meeting is scheduled for December 16 and 17.

As part of the stakeholder engagement, over 170 public comments have been received in response to the preliminary proposed rule language. The staff has and will continue to accept comments on the preliminary proposed rule language via regulations.gov. The staff is taking these comments into consideration in the development of the proposed rule.



But the staff is not responding in writing to comments on the preliminary proposed rule language. In contrast, the staff will respond in writing to public comments on the proposed rule.

This new approach of external stakeholder engagement has engendered a rich dialog and have led to a wide range of comments expressing diverse and sometimes competing views. Such extensive engagement prior to issuing a proposed rule has been an incredibly valuable process in obtaining and assessing stakeholder views. But we're also facing some challenges with this approach.

The stakeholders are challenged with the timeline and their ability to provide substantive feedback during public meetings and to submit comments. In addition, while the release of the preliminary proposed rule language has resulted in several comments for the staff to review, only a handful of stakeholders provided most of the comments. We would like to see an increase in the diversity of the external stakeholders involved in both attending the public meetings and providing comments. The staff hopes to improve this by holding a public meeting with non-governmental organizations in early February to encourage the involvement of other stakeholders. Next slide, please.

Key risks and uncertainties. As discussed earlier, the staff requested and the Commission approved a nine-month extension for the development of the Part 53 rule.

This extension has reduced the risk of some of the challenges in the development of the proposed rule identified by the staff in the November 2020 Commission memo. The first challenge is reaching alignment on the scope of the rulemaking with external stakeholders. This

extension is providing additional time to develop the Part 53 proposed rule and is enabling additional time for communication with stakeholders, including ACRS and non-governmental organizations.

The second challenge is engagement on key issues within the NRC. The preliminary proposed rule language for Part 53 is related to, and in some cases, incorporates aspects of other significant ongoing rulemaking and guidance activities.

Some of these activities include Part 50/52 lessons learned, emergency preparedness for small modular reactors and other new technologies, and physical security for advanced reactors, among others. This extension is providing additional time to develop the Part 53 proposed rule and is enabling better internal coordination and alignment.

The third challenge is the development of guidance documents to support the Part 53 rulemaking. The Part 53 rulemaking requires focusing resources within the NRC, industry organizations, and standard development organizations on developing the proposed rule language. The timing of these activities will also coincide with interactions between the staff and developers of advanced reactor designs and possible applications. To mitigate this risk, the staff plans to engage external stakeholders to ensure current prioritization of guidance documents that must be developed. The staff will also work diligently on the guidance documents that I alluded to earlier to support the rulemaking and early applications. What we have gotten from the advanced reactor demonstration program being sponsored by the Department of Energy.

The staff also identified risks that are not reduced by the extension, which is the ability of the public to review the proposed rule using

the 60-day public comment period. A public comment period for rulemaking of this size and complexity normally will be 120 to 180 days. There is a high likelihood that the NRC will receive requests for an extension of the proposed 60-day public comment period. To mitigate this potential risk, the staff is having extensive stakeholder engagement during the development of the proposed rule, including frequent release of preliminary proposed rule language and public meetings, as discussed in the previous slides.

Next slide, please.

To conclude the presentation, I would like to emphasize that the staff will continue frequent engagement with all stakeholders, including industry, trade groups, non-governmental organizations, the public, and ACRS. The staff will also continue to revise preliminary proposed rule language, as appropriate, based on engagement with all stakeholders. This concludes my presentation and I will now turn it over to Dan Dorman.

MR. DORMAN: Thank you, Ilka.

In conclusion, I want to again thank our staff who supported the development of this presentation and also all of the staff who continue to demonstrate the NRC's commitment to supporting the advanced reactor program.

The staff is committed to openness, transparency, and clarity in the development of a technology-inclusive Part 53 rulemaking on the Commission-approved schedule and within the framework of the Commission's advanced reactor policy statement.

The Agency's priority and focus remain on safe and secure licensing of advanced reactors to support our national energy needs. We have now completed our presentation and look forward to answering your

questions.

Thank you.

CHAIRMAN HANSON: Thank you, Dan, we'll start again this morning with Commissioner Wright.

COMMISSIONER WRIGHT: Thank you, Mr. Chairman. So, Andrea to you your team, thank you for the presentations and the preparation, and also thank you, I'm sure on behalf of my colleagues here.

The interaction they've had with our staff all the way through to this point has been a very open and transparent process. It's new in the way that you've tried to attack it and as you heard from the first panel, they gave you a big kudos to you and your team so thank you for that.

So, I want to return if we could to some of the discussion on the previous panel and I'll get your opinions on what you heard on some of this, and that's whether the current Part 53 is drafted to the adequate protection standard or beyond that.

The idea of equivalent safety was touched on by several NRC presenters. However, many of the stakeholders indicated that Part 53 as it stands is not equivalent or comparable to Part 50, but instead imposes more regulatory burden. Can you comment on this a little bit?

MS. VEIL: It's a common theme, you heard it first with Mo and then with Nan so I'll just kind of bring that together.

Part 53 is intended to provide the same level of safety as Part 50 and 52 but what's different is the means to which applicants would have to really show they are meeting the safety criteria, and also, most importantly, ensuring defense in-depth. So, that's different and because it's philosophically different, there's going to be inherently different touch-points,

regulatory touch-points, and that's not unexpected.

I'll give you an example, you've also heard from our earlier panel that Part 50 and 52 have a lot of conservatism and a lot of prescriptive requirements. So, those requirements have to be licensed and approved before licensing.

The difference in Part 53, because it's performance-based, is that it's much more reliant on design-specific analyses and programs that are going to monitor that compliance throughout the life of the plant. So, while it's true that stakeholders are going to see different regulatory touch-points with Part 53, it's also true that the flexibility Part 53 is going to provide will replace some of that prescriptive nature in 50 and 52, which then inherently would allow designers to optimize their designs. So, there is a balance and a trade-off.

COMMISSIONER WRIGHT: This came up late in the first panel, I'm trying to formulate a question based on it, but you referred to that. We heard the PRA and QHO concerns and some of them spoke to it being in guidance and not in the rule. So, obviously, it's received very diverse feedback.

Can you explain, and maybe Nan may want to kick in on this too, what the Staff is doing given these diverse views? And how does the staff proposals for potential uses of PRA compare to the industry's proposals?

MS. VEIL: I'd like to start off to address something that was mentioned in the last panel and then turn it over to Nan to provide some more detail on that.

The staff in my recollection has never said the PRA has to

be submitted and approved. I don't believe that's ever a statement the staff has made. So, we talked a lot about, and I love the question of QHOs or what else? So, there has to be a safety criteria, that's the whole point of having a technology-inclusive rule.

So, at this stage, and this is why the extension was so important, the staff was trying to have predictable concrete safety criteria in the rule. If you have guidance that is being relied on by all these various different designers, then you're losing some of that predictability.

So, that's the balance we've been trying to strike, and you do have to have a safety criteria. And rather than making something up, for lack of a better word, the Commission policy and QHOs are established means of setting that safety criteria in the rule and not in guidance.

So, I'll turn it over to Nan or Mo, whichever one wants to address it.

MS. VALLIERE: Thank you, Andrea, I don't know that I can add much to what you said. I will say that we are trying to implement the Commission's direction, which was to use the existing safety goals and safety performance criteria in Part 53 for advanced reactors.

And in addition to that, we are striving to keep the rule technology-inclusive and, of course, to keep it technology-inclusive, that really limits the types of metrics you can use.

So, while we do believe that QHOs in the rule is the best technology-inclusive safety metric we have at our disposal, we do recognize that guidance in this area is going to be helpful for particular technologies to perhaps develop surrogates to meet those high-level safety criteria.

MR. DORMAN: Thanks, Andrea and Nan, for that and,

Commissioner, I wanted to also touch on how Doug True commented on a concern from the operator's perspective of having to manage the QHO in the daily operation of a facility. And I think that's something for us to take on board and look at how we frame it in the rule. We have, for example, dose limits at site boundary in the siting criteria in Part 50 that need to be met in the analysis that supports the licensing of the plant. But that's not something that you manage the plant operation to.

So, I think there's room here for a continued conversation on how we frame the use of the QHO and how it translates from the licensing analysis into the design features that are then what you manage in the operation of the plant.

COMMISSIONER WRIGHT: I would assume this is going to be something that you're going to use the nine-month extension to really get into more meat on this?

MS. VEIL: Definitely, and that's the reason why the extension is so important, because the staff was never planning to just put a rule out that doesn't meet the criteria and the vision that we have for the rule. So, this extension then allows this continued discussion and the benefit is that these big, difficult, complex issues are on the table early.

COMMISSIONER WRIGHT: That's all the more reason, and you know this, we've had conversations about it, the communication part of this has got to -- and I think from our side we need to be really over the top in trying to communicate with the innovators and with the industry and all of the stakeholders that are involved to get to the bottom of some of these concerns and address them appropriately. So, thank you for that and I've got one last question I want to ask you.

Last week at the hearing at Senate EPW I was asked about the NRC planning to implement a structure kind of like tiger teams, core teams, which I believe my answer was, yes, I'm pretty sure we are, modeled on the Vogtle Readiness Group or whatever.

Can you share a little bit more about how you're going about that and are you going to be Part 53-centric or are you going to be maybe individual application-specific?

MS. VEIL: The Vogtle Readiness Group has been and continues as we speak to be such a valuable asset to supporting the oversight of Vogtle construction. So, we're definitely going to take the lessons learned when we get to that point of advanced reactor construction and use that framework. But we're also going to continue to use the core team approach, which is the dedicated folks who work on each application. And then they go to the subject-matter experts and technical divisions or other parts of the Agency as needed. So, we're definitely going to continue that and we're going to have extensive -- you mentioned communication -- management interaction.

I have an incredible team and so the team is going to be engaging very closely with the staff as we go through, again, to raise issues early and resolve them in a timely manner. But the bottom line is we're looking at the most appropriate model for the oversight piece and it will include a structure and the lessons learned from the Vogtle Readiness Group.

COMMISSIONER WRIGHT: Thank you so much.

CHAIRMAN HANSON: Thank you, Commissioner Wright. Thank you, Andrea, and Mo and Nan, everyone, for your presentations.



There were a bunch of themes. I think the Staff presentations provide us perhaps an equally rich target environment. But one of the themes I think that's emerged that I want to praise the staff for is this issue of what I would call adjacency.

As we develop Part 53, there are key pieces of that that people in the outside world, whether they be prospective licensees or vendors or utilities or public interest groups or what have you, they can say, oh, I recognize that. And I think QHOs are an important part of that, PRA is an important part of that. We're not starting with a completely blank sheet of paper. We can't because of the timeframe that we've asked the staff to be under and we can't for the sake of predictability out there.

So, while vendors may have some really innovative ideas and so forth, they're still fundamentally a framework for making adequate protection determinations that we have.

I didn't get a chance in the earlier panel to ask about ALARA, this as low as is reasonably achievable criteria. But I'd like to now, and it was touched on in couple of contexts, I think Mr. True, Dr. Lyman touched on this. And of course, the staff's proposal is to put ALARA into the design requirements.

Currently, it's on the operational side but I wanted to give Andrea, you or Mo or Nan or anyone else the opportunity to talk about the logic in your thinking around ALARA and its placement in the proposed rule?

MS. VEIL: I can start, and Mo may want to add some more detail, but ALARA is an extremely concept and it goes back I think to the communication piece that you mentioned, Commissioner Wright.

It's fundamentally whether or not ALARA's been given an

elevated role in the design or whether it's an operational concept. And so the staff again has been listening to stakeholder feedback.

So, some of the preliminary language was much more directly about leaning more towards design. But because of stakeholder feedback, we are trying to clarify and note that we are citing Part 20. There are other regulations that apply here but actually citing Part 20 and having ALARA in the rule and then supplementing with guidance, there's no miscommunication or misunderstanding about what we are trying to do.

But remember, this is a new paradigm where designers are starting from the beginning and can inherently design in some aspects. So, we're not trying to elevate and be inconsistent with ALARA. It's an important concept for the last 50 years, so we're not looking to drop it from the rule. We're trying to clarify what it means in a rule and what it does. And Mo probably has more detail to provide.

MR. SHAMS: Andrea, you've done fabulous on this. Not much really to add other than it is a miscommunication piece. It is not our intent to elevate ALARA as a design requirement, perhaps more of an option during the design, just as well as operational considerations, which has been the case anyway in the existing framework for the regulations.

And another element I just want to add is, in listening to the industry's concerns about the level of information associated with radiation protections in general and ALARA in particular, we're taking a hard look. And we have taken steps in the guidance space to be able to also focus the review on the relevant elements of radiation protection, the programmatic aspects of it, and less of design aspects.

CHAIRMAN HANSON: I think that's really helpful and I think one

of the other themes we've heard this morning is the relationship between structure and flexibility, between predictability and flexibility. I think having ALARA, while it's raised a few eyebrows, in the design space can be a pretty powerful tool with regards to flexibility and the kinds of things that we consider as we look at these designs. So, thank you very, very much for that.

The Commission's advanced reactor policy statement says regarding advanced reactors, the Commission expects as a minimum at least the same degree of protection of the environment and public health and safety, and the common defense and security that's required of current-generation light water reactors.

We heard a lot this morning about safety and about QHOs.

We've heard a little less about the environment. I'm very curious about how environmental considerations are being accounted for in Part 53 development?

MS. VEIL: We're very focused on the environmental review. We work very closely with the environmental reviewers and we are ensuring these advanced reactor designs are going to meet the NEPA implementation regulations.

We're doing other things, for example, guidance and developing the generic environmental impact statement, or GEIS, which has a broad umbrella. So, we are considering environment.

We talk about safety a lot, it's our mission, but you're right, we need to emphasize the environmental piece. But the bottom line is the environmental protection standards remain, we're doing the guidance, and we're doing the GEIS.

CHAIRMAN HANSON: Thank you. I'm curious, at this point we've had a lot of both application and pre-application discussions with folks like Kairos and X-Energy, and I'm not playing favorites here, those are just the two examples that pop to mind. What are we learning from topical report reviews and other kinds of interactions, and how is that informing the development of Part 53?

MS. VEIL: I cannot stress enough the importance of pre-application and effective pre-application activity. What I mean by that is there's some complex issues. These are new and novel designs and so if we can handle those designs in the topical report ahead of time, when it comes time for the applications to come in, there's no miscommunication.

Again, going back to the communication about what the expectations are for review, we can get to any policy issues that may have been unintended, things we didn't necessarily know about until we actually saw these topical reports and white papers.

And so it's extremely important, we don't make guarantees a particular schedule is going to be shortened because it's not a one for one.

But tackling these issues early, getting the expectations on the table, and more importantly, for these designers and applicants to understand what the regulators' expectations are is invaluable. And it makes for a smoother review that inherently could lead to efficiencies in schedule. Again, we don't promise one for one it's going to do that but we have seen where there's a better and smoother review when we have effective pre-application activity.

CHAIRMAN HANSON: Thank you. As some of you know, I got to do a little international travel this fall. I was really intrigued by some of the experimental facilities that are being developed around the

world.

We just saw the U.K. picked a high-temperature gas reactor for their experimental facility, the Japanese, of course, just restarted theirs. The Swedes are talking about building perhaps a lead-cooled fast reactor as an experimental facility.

But I think we're leading the way in terms of the regulations and commercial deployment of some of these things. I'm just curious what kind of feedback we heard among the staff from our international counterparts, or even level of interest from other regulators.

MS. VEIL: We've had really extensive interactions with our international counterparts. They are watching, they're watching the development. Like you said, we're leading the way and they're very closely watching the development of Part 53. And just to give you an example, recently we invited our British counterparts to present on their regulation of fusion technologies, which, of course, is one of the agencies you talked about for this Part 53 rule.

So, that was very important and I think biggest activity that we're doing now is the memorandum of cooperation with CNSC. And it's tangible, it's not just going to meetings and talking and exchanging information. We're exchanging information, we're looking at regulatory frameworks and comparing them. And we have two reports that we issued so again, it's tangible there are things that are coming out of this.

And the first is the X-energy XE-100 reactor pressure vessel construction code. The first report documents the assessment of the review of our position and Canada's position. And the second report is a broad comparison of our regulatory frameworks and a specific comparison of

the licensing modernization project. And that cooperation, of course, is going to continue.

But those are two tangible products that have occurred already. My favorite is the personnel exchanges. It's virtual right now but we have Kevin Fice from CNSC virtually at the NRC and we have Andrew Profitt from the NRC virtually at CNSC. So, you get that day-to-day real deep dive of looking at the regulatory framework. So, those are just examples of some of the interactions.

CHAIRMAN HANSON: That's great, thank you so much. Commissioner Baran?

COMMISSIONER BARAN: Thanks. I want to start by thanking the panelists and the rest of the Part 53 team for your incredible work. This is a major effort and it is not easy. Creating a risk-informed, performance-based, technology-neutral framework that can work for molten salt reactors and high-temperature gas cooled reactors, micro-reactors and reactors of several hundred megawatts; I think everyone agrees is challenging.

On top of that, you've been navigating an intensive public engagement process that has never been attempted before, so thank you. I've been very impressed with your expertise, your professionalism, and your openness to feedback and new ideas.

I'd like to start by asking about the more deterministic pathway that the staff is working to develop. What is your vision for what that will look like? If PRA isn't taking a leading role and we don't have prescriptive requirements like we do for light water reactors, what's the pathway going to involve?

Is it more of a qualitative safety case and how do we avoid the problem of evaluating custom safety cases in a way that results in uncertainty about what NRC will find acceptable?

MS. VEIL: I'll start and this is definitely a Mo detail question so I'm calling you out, Mo. We have had extensive discussion, that's why we call it 5X, because we don't know where it's going to end up right now.

We're having that discussion and again, the extension will allow that discussion to continue but this was one of the things that we heard most loudly and most frequently. There needs to options and there needs to be a deterministic option.

And you could argue, yes, there is a deterministic option already with Part 50, that is true, but you've heard the theme that Part 50 and Part 52 are extremely prescriptive and have conservatisms.

So, unless you do a different framework, wherever it ends up, you're not going to get the flexibilities that are in Part 53 if you're only relying on Part 50.

So, there's some puts and takes that have to occur, wherever it ends up, to get the option from having PRA in a lead role to get the flexibility that you're getting with some of the other things that you get with Part 53. It is not easy and this is the focus, quite frankly, of the extension request. One of the biggest focuses is to get this particular part of the framework development right.

And so, Mo? Don't say I covered everything because I didn't.

MR. SHAMS: I can't get away with this one. Thanks,

Commissioner, I think that's a great question, it really is going to the challenge that we have on our hands.

If we look at Part 53 as a whole, we started out with the PRA-centered approach because that was the work that's been done for several years and been described by the earlier panel and some of us about this is where the effort went.

This is a new part that we're taking on in response to stakeholder feedback. We're trying to fashion an approach here to provide the flexibility. We also heard feedback related to an international element to it. Some of the vendors are looking to submit or certify or license the design internationally and want to have limited impact to their design or application. So, that's our way of responding.

To your point, Commissioner, about how do you avoid case-by-case reviews, we're very mindful of that and we're early on in the process. But I think we have a good start I believe with some of the elements we've done already. For example, advanced reactor principle design criteria that we've put together. We have those already for a couple of technologies like HDGRs and sodium fast reactors. We're also working with ANS to establish those.

So, those give us a starting point for what requirements are needed. We're also developing guidance to get into developing a systematic approach for identifying initiating events and accident sequence.

So, that should also inform and guide the process. Our experience with light water reactors would also offer a starting point of where we need to focus and what design basis accidents and licensing basis events are relevant.



In my personal view as well, I think it comes a lot through the industry comments, risk insights are going to play a great role early on in these technologies that we have limited experience with. Because these risk insights, whether it's the PRA or some other approach, will help also guide what will be the relevant design-basis accident, like the initiating events that we need to work on. So, those are the things that are giving us a good start to flesh this out.

COMMISSIONER BARAN: Thanks. One criticism of the current draft language we've heard is that it's incorporating beyond-design-basis events into the design basis.

My understanding, though, if we're talking about the PRA-focused pathway for a moment, my understanding of the licensing modernization project approach, that methodology, is that it assumes or contemplates that applicants are going to identify all the potential events, including beyond-design-basis events, they're going to bin them by significance and they're going to address those to ensure you have at least the same level of safety that you would get under Part 50 or Part 52.

Can someone talk a little bit about what they see the rule doing in this area and then why the staff thinks this is the right approach?

MS. VEIL: I can certainly start but get revved up, Mo, because we're coming back to you and Nan.

And you've hit it right on the head as to the benefit of Part 53, it's what I said earlier about the prescriptive nature of Part 50 is you have these criteria that are approved before licensing.

If you're going to take advantage of Part 53 and an LMP, there are parameters that you have to meet. If you meet those parameters

you get flexibility in other areas, like staffing, like all of the other parameters we've talked about as we've developed this rule.

So, again, it is a trade-off. You may have to spend time to do more upfront but down the line, you get more operational flexibility if you meet the criteria.

And I'll just end before I turn it over to whoever is going to take this to say that it goes back to what you're gaining from using either framework. Yes, it's equivalent but you get to it a different way and that's what we have to do to have a technology-inclusive approach.

MR. SHAMS: Thanks, Andrea, I can take it and I agree with your assessments about Part 53 offers a different approach and really achieving the same level of safety.

As for the point of how are we addressing beyond-design-basis events, I think there's a bit of a miscommunication over that area as it goes back to Commissioner Wright's point early on. We certainly need to engage further on this area.

It is not the intent of the staff to include beyond-design-basis events into the design basis accidents or the design basis for the facility. Because the approach for the PRA-centered part of the rule is to develop frequency bands and assess these events within it, that's the reason design basis events are identified within that frequency band of rare events.

But how they're being treated within the regulatory framework, they're not required to have safety-related equipment, the level of information associated with that is different. The equipment within these events are not in technical specifications. So, they're treated essentially the

same as they're treated now in the current regulatory framework.

So, we just need to communicate further with the stakeholders on this to explain what our vision is and hopefully address the concern.

COMMISSIONER BARAN: Great. That just reminds me of one point that I think is always worth bearing in mind when we talk about equivalent level of safety, which is that adequate protection is the minimum, it's the floor. And the current regulatory framework we have goes beyond that. We have numerous requirements on the books now that are cost-justified substantial safety enhancements, right?

And if you weren't reflecting the essence of those kinds of requirements in Part 53, we would be losing something. It would not be the same level of safety. Adequate protection alone is not enough, that's the floor.

I don't have too much time left, but I wanted to raise one area. When I look at some of the draft ruling, which I worry that in some areas it may be taking the logic of a risk-informed approach to the extreme.

One example that comes to mind for me is drug and alcohol testing and fitness for duty requirements. In that section right now, there's a concept that if a reactor were considered safe enough, those requirements would fall away. But from a public confidence point of view, it's hard to imagine having an approach where the Agency isn't requiring any actions to prevent reactor operators from being impaired on a job.

Are we taking the risk logic too far in this area?

MS. VEIL: That would be Michele Samson.

MS. SAMPSON: Thank you, Commissioner Baran, for

that question. We are proposing a graded approach to fitness for duty that's been informed by the staff's experience with programs for license and certified operators at research and test reactors.

For facilities that demonstrate security by design limits of significance release of radiation, the licensee's fitness for duty program will include traditional elements including a behavioral observation program, training, written policies and procedures and sanctions.

While this proposal would not require these licensees to drug and alcohol test their staff, the licensees must implement a fitness for duty performance monitoring program and may elect to drug and alcohol test their staff. Particularly, where a licensee might consider drug and alcohol testing their staff would be as an effective tool for a licensee whose performance monitoring program identifies potential performance concerns.

Thank you.

COMMISSIONER BARAN: That gives us a lot to think about and I know the rule language will continue to evolve over the coming months. Thank you again for your tremendous work on this effort.

Each Commissioner and every stakeholder is going to have their own concerns and their own ideas, and I recognize it's very difficult to balance all of that. But everyone I talk with has said really positive things about the way the staff is going about this work, so we really appreciate it. Thank you.

CHAIRMAN HANSON: Thank you, Commissioner Baran. I will wrap up this morning. I want to thank again the staff for your presentations, for your engagement.

I think as a public communication effort it's important for

you all that I know are out there having very technical conversations, having to come in here and explain it to three non-technical people like us, that translation function I think is actually really critical for the public to understand what it is that we're engaged on here. And hopefully, to come away with some appreciation of the magnitude of the task.

And ultimately, down the road, however we make decisions across the various spectra of concerns, flexibility, predictability, and other kinds of things, that's also clear to the public about how and why we're making those determinations, and ultimately, how we're evaluating the various technologies that are going to come before us.

I want to share my colleagues' thanks and appreciation for the undertaking that the staff has really engaged in here and for your ongoing willingness to really take some innovative approaches to not only the substance of the rule, but also to getting public feedback and stakeholder interactions on this.

With that, thank you all again, we're adjourned.

(Whereupon, the above-entitled matter went off the record at 12:17 p.m.)