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U.S. NUCLEAR REGULATORY COMMISSION

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PUBLIC MEETING

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PUBLIC MEETING TO DISCUSS THE PART 53 RISK-INFORMED, TECHNOLOGY-INCLUSIVE REGULATORY FRAMEWORK FOR ADVANCED REACTORS RULEMAKING

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THURSDAY

JUNE 16, 2022

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The Public Meeting met via Video Teleconference, at 1:00 p.m. EDT, Bob Beall, Facilitator, presiding.

NRC STAFF PRESENT

ROBERT BEALL, Facilitator

AMY CUBBAGE, NRR

CANDACE DE MESSIERES, NRR

WILLIAM JESSUP, JR., NRR

CHARLES MOULTON, NRR

JOHN SEGALA, NRR

MOHAMED SHAMS, NRR

MARTY STUTZKE, NRR

ROBERT TAYLOR, NRR

BOYCE TRAVIS, NRR

ALSO PRESENT

KATI AUSTGEN, NEI

ROBERT BUDNITZ, Public Participant

RANI FRANOVICH, Breakthrough Institute

MIKE KELLER, Hybrid Power Technologies

ED LYMAN, Union of Concerned Scientists

ADAM STEIN, Breakthrough Institute

PATRICK WHITE, Nuclear Innovation Alliance

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

(1:00 p.m. EDT)

MR. BEALL: Good afternoon. I want to welcome everyone and thank you for participating in today's public meeting to discuss the risk-informed, technology-inclusive regulatory framework for advanced reactors for the Part 53 rulemaking.

My name is Bob Beall, and I am from the NRC's Office of Nuclear Material Safety and Safeguards. I'm the project manager for the Part 53 rulemaking and will be serving as the facilitator for today's meeting. My role is to help ensure that today's meeting is informative and productive.

Slide 2, please.

At today's meeting, the staff will be providing an overview of the Framework B subparts and a comparison of the A and B frameworks in the Part 53 rulemaking. This discussion will include the supporting Alternative Evaluation for Risk Insights, or AERI approach.

I have placed a link in the Teams chat window for this meeting for the Framework B preliminary proposed rule language, the two preliminary draft regulatory guides for AERI, and a White Paper containing background information about Framework B.

We will also have a 15-minute break this afternoon.

Slide 3, please.

I would now like to introduce Rob Taylor. Rob is the Deputy Office Director for new reactors in the Office of Nuclear Reactor Regulation. Rob will give opening remarks for today's meeting.

Rob.

MR. TAYLOR: Thanks, Bob.

Good afternoon, everyone. We're pleased to be here today to provide an overview of the NRC staff's efforts to develop Part 53 Framework B, a technology-inclusive, risk-informed licensing alternative for new commercial nuclear plants where risk insights are used in a supporting manner, similar to the established licensing paradigms in Parts 50 and 52.

The draft preliminary rule language for Part 53 Framework B was released publicly last Friday and is available in the NRC's Agency-wide Documents Access and Management System, or ADAMS at accession number ML22145A000.

A link to this preliminary proposed rule language will be provided in the Teams chat for this meeting. Hopefully, you have seen that we have emphasized carrying forward as much Framework A

flexibility into Framework B as is reasonable and supportable. A key feature of Framework B is a first-of-a-kind optional alternative evaluation for risk insights, or AERI, that can serve as a replacement for a probabilistic risk assessment, or PRA, for designs where the projected consequences of postulated accidents are very small. The approach is responsive to stakeholder feedback to provide flexibility in leveraging qualitative risk insights to inform design and licensing decisions. We look forward to providing additional details on AERI during today's meeting.

Stakeholder engagement continues to be an important element in the Part 53 development process. This importance is highlighted today as stakeholder feedback was a primary motivator in Framework B and AERI development. Robust dialog with a diverse set of stakeholders in public forums such as this continues to benefit the Part 53 preliminary rule language. And enhanced common understanding of key issues supports informed changes to the rule, increases clarity, promotes reliability, and enhances efficiency.

The result is an enhanced version of Part 53 that recognizes the benefits of a flexible regulatory framework allowing potential applicants to select the best fit path for its regulatory reviews and decisions,

as was our goal when we put forth our vision and strategy for non-light-water reactor readiness more than 5 years ago.

We thank you for your participation in this public meeting and look forward to hearing your perspectives and feedback.

And I'll turn it back over to Bob.

MR. BEALL: Thanks, Rob.

I would now like to introduce the NRC staff who will be leading today's discussions. Myself as the meeting facilitator, Bill Jessup, Marty Stutzke, Charles Moulton, and Boyce Thomas -- Travis, excuse me, from NRR will be leading the Part 53 Framework B and AERI discussions.

If you are not using Microsoft Teams to attend this meeting and would like to have, you to have a copy of the presentation slides, they are located in the NRC ADAMS database and on regulations.gov. And I have placed a link for the slides in the Teams chat window for today's meeting. The ADAMS accession number for today's presentation is ML22165A114.

Slide 4, please.

The purpose of today's meeting is to exchange information, answer questions, and discuss the Framework B subparts of the Part 53 rulemaking.

Today's meeting will focus on the initial iteration of the Framework B preliminary proposed rule language and the supporting AERI approach.

This is a common gathering public meeting to encourage active participation and information exchange with the public to help facilitate the development of the Part 53 rulemaking. The feedback that the NRC receives today is not considered a formal public comment, so there will be no formal response to any of today's discussion.

Today's meeting is using a workshop format to allot more time for open discussion of the various topics. This will require all of us to continually ensure that our phones are muted when we are not speaking, and to do our best not to speak over each other.

In addition, please turn off your camera when you are not speaking to the staff. This will minimize any internet bandwidth issues during the meeting. For participants in the room, please set your cell phones on mute.

To help facilitate the discussion, we request that you utilize the raised hand feature in Teams so we can identify who to elect to speak next. The staff will then call on the individual to ask a

question. The raised hand button, which is shaped like a small hand along the top row of the Teams display area, you can also use the chat window to alert us when you have a question. Please do not use the chat window to ask or address any technical questions about the Part 53 rulemaking.

The chat window is not part of the official meeting record and is reserved to identify when someone has a question or handling any meeting logistical issues. To minimize interruptions, the staff will call on participants who have used the raised hand feature or chat window to identify when they have a question.

If you are attending the meeting using the Microsoft Teams bridge, you may not have access to these features. If you would like to ask a question or a provide comment, you will need to press star-6 on your phone to unmute your phone.

The staff will pause at the end of each topic to make sure that all participants have an opportunity to ask a question before moving on to the next topic. After your comment has been discussed your phone line can be muted again. If you have additional questions, you will be -- you will need to press star-6 to unmute your phone.

This meeting is being transcribed. So,

in order to get a clean transcription and to minimize distractions during the meeting we ask everyone to mute their phones when they are not speaking, and to identify themselves and the company or group you may be affiliated with.

A summary of this meeting and the transcript of today's meeting will be publicly available on or before July 16th, 2022.

Finally, this meeting is not designed or intended to solicit or receive comments on other topics other than the Part 53 rulemaking activity. Also, no regulatory decisions will be made at today's meeting.

Please note that towards the end of this, end of the presentation, there are slides containing acronyms and abbreviations that may be used during this meeting. In addition, there are backup slides that contain additional information about today's topics.

Slide 5, please.

And with that, I'd like to turn the meeting over to Bill Jessup, who will start today's discussion of the Part 53 Framework B rulemaking.

MR. JESSUP: Thanks, Bob.

And staff appreciates the opportunity today to present on Part 53 Framework Bravo.

As both Bob and Rob alluded to, this is

our first opportunity to engage with stakeholders following issuance of the first iteration of Framework Bravo last week, along with two draft preliminary regulatory guides and additional supporting material. So, it's a great time to walk through some of these materials and provide a bit more context on what was issued last week.

This is our third opportunity to talk about Framework Bravo. We've had two prior discussions on Framework Bravo during advanced reactor stakeholder meetings. And we've appreciated the early feedback that we've gotten regarding some of the concepts that we presented. And we're looking forward to getting more feedback as we shift from conceptual to detailed design of Framework Bravo.

So, to jump back into Slide 5 here, I wanted to provide some context for today's discussion by looking at Part 53 from a big picture standpoint.

So, what's on the slide right now is Part 53 overall. And what I mean by that is Framework A and B. And what you'll see is that, in general, Part 53 is set up as a series of subparts, Subparts Bravo through Kilo making up Framework Alpha. Subparts November through Uniform making up Framework Bravo. Whereas, Subpart Alpha is common to both frameworks.

So, remember, the frameworks split after Subpart Alpha.

Future slides are going to address the similarities and some of the differences between the frameworks at a subpart level. But, again, I just wanted to provide some context by looking at Part 53 in its totality.

Note as a refresher, on the right-hand side of the slide we included some distinguishing features of both frameworks. Notably, that Framework Alpha is built around the assumption that PRA is central to the establishing of a licensing basis decision case for a given design, and the establishment of functional design criteria is part of that iterative design process. That's central to Framework Alpha.

Whereas, Framework Bravo, or Framework B leverages risk in a complementary or supporting manner. And then that also includes the alternate evaluation of risk insights or the AERI approach that Marty Stutzke is going to talk about later. Framework Bravo is also distinguished by the use of principal design criteria that were established at the outset of the design process, and follow a more linear approach.

Next slide, please.

Okay. So, Slide 6, this is a different view of the frameworks to emphasize where they align

and where they diverge. So, note that most of the subparts they align in main, for the most part. And you will see here there is some highlighting. The highlighting is important to talk through.

Where you see in this green color, general provisions, construction and manufacturing requirements, decommissioning requirements, licensing basis main events, reporting, and quality assurance criteria, these subparts are subparts where we think both content and structure-wise the frameworks are aligned. And for folks that have had an opportunity to look at the rule language and compare and contrast Framework Alpha and Framework Bravo, that's likely readily apparent. And we'll talk through some of that later today as well.

For the other subparts, notably Subparts N, P, and R, these are shaded a different color, which is indicative of the fact that they diverge either in content or structure when you compare and contrast the frameworks. And they're what we're likely going to spend more time on today.

And I want to make that point, too, that we are going to focus more on the differences between the frameworks and not necessarily an exhaustive review of the portions of Framework Bravo that are the same

or similar to Framework Alpha, since those have been covered extensively in previous stakeholder engagements. A few other things to point out on this table. You'll note that the siting requirements, which are covered in Subpart D or Delta in Framework Alpha, Framework Bravo currently references the existing siting requirements in Part 100, similar to the way that the existing regulatory frameworks in Parts 50 and 52 treat siting. I'm going to address this in a later slide as well relative to areas that the staff still evaluate for potential incorporation into Framework Bravo.

The other thing to note is Subparts Bravo and Charlie in Framework Alpha. Those are the safety and design requirements, respectively. So, there are no corresponding subparts in Framework Bravo. Rather, the way that these safety and design requirements are translated in Framework Bravo is found more in Subpart R. And I'm going to go into this in some level of detail later on. But these requirements show up more as technical content of application requirements in the same way that they're treated in Parts 50 and 52 today. And so, we carried that approach through to Framework Bravo, again consistent with the approach that is in the current regulatory frameworks. But, again, I'll

hit on that later.

Another note that I want to point out is I am going to go a bit out of sequence. I'm going to leave Subpart R to the end because that's going to give us a transition point to the AERI discussion Marty Stutzke is going to lead later.

Next slide, please.

Okay. So, Slide sleven -- seven, excuse me, this just goes over the development approach. We talked about this a couple times previously in advanced reactor stakeholder meetings. But I think it's important to understand the methodical approach that the staff took in developing Framework Bravo.

Framework Alpha, it provided a real useful starting point for Framework Bravo since one of our key goals was to development Framework Bravo as its own set of standalone requirements that cover the life cycle of a given plant, to the extent practical. And not only did we adopt the structure of Framework Alpha, but as you will see in that top-left quadrant, we also looked at some of the innovative requirements that have been developed for Framework Alpha to see if they could be adopted in a traditional design and licensing paradigm.

And as you can tell from the previous slide,

there are sections in the individual subparts where the draft rule language in Framework Alpha is independent of the design and analysis methodology. And so, it was adopted largely in Framework Bravo either through cross-references or bringing over the provisions into Framework Bravo to conform the changes.

Where we were unable to leverage some of the innovative provisions developed in Framework Alpha, the staff looked back at the provisions and the existing regulatory frameworks Parts 50 and 52 to determine whether those existing frameworks could inform analogous requirements in Framework B. This was largely the case where Framework Alpha's requirements were directly tied to the safety and design requirements that are PRA-centric and aren't necessarily easily translated to a traditional licensing framework.

So, where we couldn't leverage what was in Framework Alpha, what wasn't, what was in the current regulatory frameworks, we developed unique rule language. And, you know, this, this arose a lot where the existing requirements in Parts 50 or 52 weren't necessarily technology inclusive. And so, in those cases the staff did need to develop unique provisions for Framework Bravo. And you'll see a note here that when we were developing unique rule language, we

considered a lot of state-of-practice relative to certain topical areas, such as any ongoing research or policy initiatives that might be able to inform the rule.

Now, in the lower left-hand quadrant is considering compatibility with international standards. And I wanted to pause here for a moment and just make a point and take us back a little bit and talk about the motivation for Framework Bravo, one of which was the idea that you may have reactor vendors that pursue international licensing initially, prior to approaching the domestic market. The development of Framework Bravo would provide another option for those vendors to come back to the domestic market, in addition to Parts 50 and 52, which were largely developed for large light-water reactors and inform my operating experience of the current fleet. But the idea is that the international standards and the guidelines, they largely align with our traditional regulatory frameworks.

And, so, as we were going through and developing Framework Bravo, especially when we were developing the new language, we kept an eye on, you know, what, what's being done in the international community to see whether it can inform our efforts

consistent with Commission policy. So, just wanted to do a refresher on the development approach here.

Next slide, please.

Okay. So, Subpart N, this is the first subpart that we're going to go through for Framework Bravo. And this is focused on definitions. And the reason we broke out a separate subpart currently in the draft rule text is that we, we do have definitions that are unique to Framework Bravo. They couldn't be captured in a common subpart or a common section.

But right now we currently have four definitions that do fall into that bucket of being unique to Framework Bravo, the first being anticipated operational occurrence, or AOO. That was brought over because Framework Alpha also defines this term but it is different. It has a frequency component. That's a consequence of the analysis approach to safety in Framework Alpha. So, what we did in Framework Bravo is essentially took the definition from Appendix Alpha in Part 50 because we use it in the same context as Framework Bravo.

The terms "design bases" and "reactor coolant pressure boundary," these are terms that are not necessarily used in Framework Alpha, but we do use them in certain contexts in Framework Bravo. These

terms were pulled directly from Part 50, section 50.2, because we use them, again, in the same context as Framework Bravo's. They are used in the existing regulatory frameworks.

And then safety-related SSCs, or structures, systems, and components. This definition we, we actually split.

If you look at the current definition in Part 50, it is light-water reactor-centric. And so, what we did currently in the draft preliminary proposed rule text is we have an LWR portion of the definition which aligns directly with what's in section 50.2, and then we have a non-light-water reactor version of the definition, both of which they follow the same basic structure, which is that they focus on SSCs that are relied upon to remain functional during and following design basis events to assure any of three specific functions.

For two of the three functions, we use the same terminology for non-light-water reactor safety-related SSCs.

For the third function we did develop something unique and we tied it to the safety functions that are determined as part of a DBA or design basis accident and analyses that are required by

53.4730(a)(5)2) and 53.4730(a)(36) respectively.

So, the last note here is that, you know, we do have four specific terms for Framework Bravo, but there are several definitions that are going to remain common to both those Frameworks Alpha and Bravo. Those will remain in subpart Alpha when the frameworks are merged. And those terms will, again, remain applicable to both frameworks. And I'll, I'll hit on this again towards the end of the presentation.

Next slide, please.

So, Subpart O, construction and manufacturing requirements. This is one of the subparts that I alluded to on an earlier slide where, both from a content and structure perspective, the staff looked at these. And we looked at what was in subpart E in Framework Alpha. And concluded that, essentially, all of the provisions could easily be translated over to Framework Bravo. So, that's how we developed Subpart O, which is we used Subpart Echo, or E, as a starting point. So, any variations in Subpart O they're generally limited to any conforming changes that were needed to adapt Framework Alpha provisions over to Framework Bravo.

Next slide, please.

So, getting into Subpart P, this is another

subpart that actually has some variations between the frameworks. But, you know, this provides an overview of the structure of Subpart P, which is not unlike the structure of Subpart F, which has the requirements for operations in Framework Alpha. I'm going to hit on some of the highlights of these sections in the next few slides. But I did just want to give an overview of the structure to show that it is in general, it follows the same track as Subpart F for Foxtrot over in Framework Alpha.

Next slide, please.

Okay. So, again, I want to hit the highlights here of some of the variations between Subpart E and Subpart F, the requirements for operation and the frameworks.

The requirements in Framework Bravo for ensuring the effectiveness of maintenance activities, they are largely based on the maintenance requirements that exist today in 10 CFR 50.65. So the analogous requirements for maintenance effectiveness in Framework Alpha, they, those generally rely on SSC classification schemes and other requirements that are unique to Framework Alpha.

And so, we determined that the use of the maintenance rule in 10 CFR 50.65, as it's used today

in existing regulatory frameworks, is a better option for Framework Bravo. When we translated the provisions of 50.65 over to Framework Bravo, the idea was not to make any material changes to the requirements, but rather conforming changes both for numbering and for technology inclusiveness. So, as you go through that, that is likely what you will see. Any variation between the current requirements were generally made for technology inclusiveness and numbering.

So, technical specifications, they follow a similar track. We align ourselves very closely with the existing requirements in 10 CFR 50.36. Really the only difference between the existing requirements and what's in Framework Bravo are driven by technology inclusiveness and driven by the license classes that are covered in the existing regulatory frameworks and what we're covering here in Framework Bravo, which is limited to nuclear plants.

And then going into programs. From a program standpoint, you'll see that the frameworks are, they're aligned very closely when you compare the requirements for security, emergency preparedness, radiation protection. In some cases we had to translate these requirements to Framework Bravo by copying the requirements over and making conforming

changes for internal references and minor differences in terminology.

In the case of emergency preparedness, this was a place where we had the opportunity to just cross-reference the provisions in Framework Alpha. So, you're directed over to 53(a)(55) in that case.

Other programmatic requirements on the slide, they include environmental qualification of electric equipment. So, this is a special, this is a type of special treatment that was translated to Framework Bravo. And it acknowledges the different approach taken for developing and applying special treatment requirements when you compare the two frameworks, that being that they're a bit more prescriptive in the existing regulatory frameworks. And so, we align ourselves with that approach here again. It's very similar to what I mentioned with 10 CFR 50.65, 10 CFR 50.36 above. When we translated 10 CFR 50.49 over to Framework Bravo, we did not intend to make any material changes. Rather, changes were limited to making those provisions technology-inclusive, such that they could be effectively used in Framework Bravo.

The integrity assessment program, we did translate that from Framework Alpha to Framework Bravo,

with the primary difference being the scope of SSCs that the program applies to in Framework Bravo. In Framework Bravo we applied the IAP to the scope of SSCs that they more closely align with actually what's in 53.4210, the maintenance rule requirements. I didn't put that provision in the top bullet, but it was on the prior slide. Based on when we looked at a comparison between the scope of SSCs that the IAP covers in Framework Alpha, we thought that the scope of SSCs covered in our equipment and maintenance rule actually was a good comparison. So, that's really the only difference in how the IAP was translated over to Framework Bravo.

And then, lastly, we did include a programmatic requirement related to containment testing because for water-cooled reactor we do maintain the existing requirements for pressure-retaining structural containments for those designs in the same manner that they're applied today in Parts 50 and 52.

I would pause here and acknowledge that, you know, when you look at the containment requirements, these programmatic requirements, you see that we do maintain a reference to 10 CFR Part 50, Appendix J. And this is an area where we would propose conforming changes to those parts of Part 50 to accommodate that,

if that's ultimately what we go with.

Next slide, please.

So, another key feature of Subpart P, or Papa, is staffing, training, personnel qualifications, and human factors. So, in Framework Bravo we adopt most of the requirements from Framework Alpha, they're translated directly to Framework Bravo either through cross-references or copying the provisions over to Framework Bravo and making some minor conforming changes for terminology, or internal cross-referencing.

The second major bullet there is a concept that's new to both frameworks, which is the requirement to have engineering expertise available to the on-shift crew. This, this individual providing the expertise, they would need to be familiar with the operational facility. And they would have to meet one of the three requirements in 53.4226(f)(1)(i) through (iii), either through education or credentialing. This was developed in response to feedback from ACRS regarding the blanket removal of the SDA position that had previously been presented in a prior iteration of the draft preliminary proposed rule language for Framework Alpha. And it will be discussed further in a couple of more upcoming stakeholder engagements. Note also

that right now the Framework Alpha provisions for alternatives to the traditional licensed operator paradigm had not been translated to Framework Bravo. But this is an area that the staff's continuing to evaluate to see whether these provisions can be adopted from Framework Alpha.

And I'm going to turn the presentation over to Chuck Moulton now on Slide 13.

MR. MOULTON: All right. Go ahead and advance the slide.

All right. So, fire protection. This is Chuck Moulton from NRR, technical staff.

So, for fire protection we created a subpart. It's essentially a combination of 50.48, Appendix R to Part 50, and portions of NFPA 805, Chapter 3. All the requirements are contained in line rule text. This has no appendices to Part 53, which is a change from Part 50. There's no cross-references back to Part 50 or Part 52. And there's no consensus standard for us to incorporate by reference, a change from our NFPA 805 was implemented.

In Framework B there's no PRA that's required. But applicants, licensee, designers may find it useful in performance-based justifications. We have included a provision for performance-based

alternatives to detail requirements, with NRC approval. It was very similar to 58 -- 50.48(c)(2)(vii) and (c)(4) for NFPA 805.

One of the big things about writing this section was that it needed to be technology neutral. Therefore, designers need to define what the safe and stable state is for their design. And they need to determine safe shutdown functions that are needed to achieve and maintain that safe and stable state. This is a major change from Part 50 and NFPA 805 in which large light-water reactors are throughout the foundations of those, those rules.

That's all I have for fire protection. If there's any questions, I'll take them. Or I'll them back over -- turn it back over to Bill.

MR. JESSUP: Thank you, Chuck.

We can move to Slide 14.

Okay. Continuing to move through our subparts here. Subpart Q provides the decommissioning requirements for Framework Bravo, again, very similar to the story with Subpart O that I discussed previously. Subpart Q has a parallel structure, parallel structure and content framework out as Subpart G. Subpart G was used as our starting point in Framework Bravo. Again, the variations being limited largely to conforming

changes that were needed to adapt Framework Alpha over to Framework Bravo.

And I just, I would pause here to amplify that second bullet, which is it would be nice to point a Framework Bravo user over to Subpart Golf directly, but you would find yourself having to go down other pathways to the internal cross-referencing in those other subparts. Just wanted to emphasize that point and drive home what we're talking about here relevant to conforming changes to the internal cross-references.

Okay. Next slide, please.

So, Subpart S, this is maintaining and revising licensing basis information. Analogous to Subpart I in Framework Alpha both in structure and content. But I did want to call out some notable differentials here between the frameworks. So, in section 53.6010, the application for amendment of a license, the Framework Bravo provisions were informed by 50 -- excuse me, 10 CFR 50.90 and portions of 10 CFR 50.91 to reflect that what's needed for a license amendment in Framework Alpha differs slightly because of the analysis methodologies that underlie Framework Alpha. So, again, we find ourselves reverting back to what's required in the traditional frameworks and existing frameworks to develop our provisions.

So, this section 53.6040, updating licensing basis information and determining the need for NRC approval. Here we informed this section by going back to 50.59. And really the primary difference is that we pulled in the definitions from 50.59 so that we could support the use of those provisions in 50.59 and later sections. That's really the primary difference between the frameworks in that section.

If you look at section 53.6045, which is updating FSARs, this was really, this section we reverted back to the requirements in 10 CFR 50.71, paragraph Hotel. And we also adopted certain state-of-practice policy initiatives, notably requirements that would actually reduce the burden for COL applicant that's requested the suspension of the NRC review of its application, or for a COL holder that's decided to delay or suspend the construction of a facility. We recognize that as a state-of-practice policy initiative that we felt was appropriately to adopt in the current draft of the rule text.

Section 53.6050, such as evaluating changes to the facility described in the FSAR, this, this was very -- the approach taken in Framework Alpha it is different largely because, again, of the analysis approach that underlies Framework Alpha. So, we

reverted back to 50.59, which is a very familiar set of provisions in the existing regulatory frameworks. We pulled over those provisions directly with, with no changes. If there were any changes, I think they were very minor. I don't think we made any changes to those.

And then the last section is, on this slide is 53.6052, which is maintenance of risk evaluations. This is new for Framework Bravo but it is not new in general relative to current regulatory frameworks. Because of the role that PRA plays in Framework Alpha, the maintenance and updating of PRAs is addressed differently. So, we looked back at the current requirements in 50.71(h) largely to assess what requirements we really needed to develop Framework Bravo, not just for probabilistic risk assessment, but this section also covers the maintenance of an alternate evaluation for risk insights, or AERI. Marty's going to talk about that later. But, again, the idea behind that is even if that AERI approach is pursued, it's not a one-time-only activity, it's maintained.

Relative to the balance of subpart S, the remaining variations are largely limited to, again, conforming changes where we adapted Framework Alpha provisions over to Framework Bravo.

Next slide, please.

Subpart T, reporting and other administrative requirements. So, again, I'm probably starting to sound like a broken record here. But Subpart T, this was also a subpart where we were able to leverage both the structure and content from Framework Alpha, specifically Subpart J, or Juliet. We used that as our starting point to develop Subpart T. Three notable differentials on the screen.

Section 53.6320, paragraph Echo, this was added to, again, align with a state-of-practice policy initiative that's going on relative to reporting our requirements for fee purposes. So here, you know, if you look at the requirements actually in Part 171, 171.15, you will see that the NRC begins assessing annual fees for OL and COL holders at the completion of power ascension. However, there's actually no reporting requirement for that to kick in. And so, what we did here is look, again, at state-of-practice policy initiatives and we adopted a reporting requirement such that operating licensees and COL holders would report when their power ascension testing is done, so that these Part 171 requirements would begin to apply.

The last two notable differentials are

really around the immediate notification requirements and licensee event reports, and analogous to 50.72 and 50.73, respectively. We looked at what had been developed for Framework Alpha. And some of that could not be adopted, largely because of the SSC classification schemes, the way they differ between the frameworks. And so, again, Framework Bravo looked back at 10 CFR Part 50 to see how reporting requirements were addressed. We did have to develop some unique rule language here due to the fact that those familiar with the provisions in 50.72 and 50.73 know that there are some very LWR-specific SSCs called out in those sections relative to when a certain event needs to be reported, either immediately or through an LER.

I think this is an area that we're going to be seeking specific stakeholder feedback on. As I look back at how 50.72 and 50.73 had evolved, I can tell that a lot of stakeholder feedback went into casting the right net across the SSCs that are currently in there today. And, again, we'll be looking for feedback here to inform our -- the approach that we've drafted so far.

And, again, the last bullet here, the balance of subpart T, again, largely limited to conforming changes where we pulled over provisions from

Framework Alpha so that we can adopt them.

Next slide, please.

So, Subpart U, or Uniform, contains our quality assurance requirements. This is the last subpart currently in Framework Bravo.

Subpart U, it parallels structure and content to Framework Alpha Subpart K. But the 18 criteria that are used to establish quality assurance requirements in Subpart Q were all derived directly from Part 50 Appendix Bravo. That's not unlike Subpart K in Framework Alpha, but Subpart K had a few more nuances than Subpart U as a result of the different methodologies in the frameworks.

One minor exception. When you compare what's in Subpart U to what's in Part 50 Appendix Bravo, specifically Criterion VII, is that we did replace the term "nuclear power plant" with "commercial nuclear plant" to ensure consistency with our terminology throughout Part 53.

Next slide, please.

Okay. So, I'm going to jump back in the alphabet now, for those keeping score. This is just an outline of Subpart R. I wanted to present this again to provide some parallelism between Subpart H, or Hotel, in Framework Alpha, and Subpart R. Again, you can tell

that they are largely aligned. There's a couple of different sections here that I'm going -- that are not in Framework Alpha that I'm going to get into in a bit more detail.

And a lot of what we're going to talk about today is in the bolded section, which is 53.4730, the general technical requirements. So, that's the reason it's bolded, it is foundational to Framework Bravo.

Next slide, please.

So, Slide 19. Again, Subpart R is analogous to Subpart H, or Hotel, in Framework Alpha. In general, this subpart includes all the requirements for the various application types that are covered in Part 53 for the site permits, construction permits, design certifications, operating licenses, et cetera. And so, when I say they're analogous, they are also very closely related, and many of the process-related requirements they are similar or the same between the frameworks.

For example, all the requirements for an operating license that begin in Section 53.4960, as you saw on the previous slide, they follow the same structure as that in Subpart Hotel over in Framework Alpha. And many of those process-related requirements are identical between the frameworks. And I'm

referring to things like duration of a license, finality, referral dates, arrests, things like that. These are identical.

The key difference there -- and I"m going to spend some time on this third sub-bullet, is in the technical content of application structures. For each application type there's a section devoted to the technical content of application requirements. And that's not unlike Framework Alpha. It's not unlike Parts 50 and 52 today. But many of the safety and design requirements, those technical requirements for a given application, they're included in these technical content of application sections. And, again, just like in Parts 50 and 52, if you look at that section 52.79 for combined license, you would see all of those technical content of application requirements.

So, that's the paradigm that exists in the current regulatory frameworks. And we have adopted that same paradigm here in that most of the technical requirements they appear as technical content of application requirements here in Subpart R, which, again, I'm going to reinforce this. This is the primary reason that you don't see separate subparts for safety and design requirements, as you see in Framework Alpha.

So, the way that Framework Bravo developed

these technical content of application sections for each application type, we did that consistent with the way Parts 50 and 52 do. We actually used those requirements as our starting point. So, for an early site permit we started Section 52.72 -- 17, excuse me, and worked through each of those sections to figure out what we needed to carry over to Framework Bravo and what needed to be modified.

And if you had an opportunity to look at the Enclosure 1 to the summary document that was issued late last week, you would see that the sections I'm referring to actually were derived from those parallel provisions in Parts 50 and 52. And I'm going to, again, go a couple layers deeper on that as well. But I did want to reinforce the way technical requirements are captured in Framework Bravo and how we developed them.

The last bullet here is something of note, that we've also included Section 53.4071 -- or, excuse me, 4731. That parallels 50.69. And it translates many of those alternatives for SSC classification from 50.69 to Part 53 Framework Bravo, with certain changes made for technology inclusiveness. We felt that this was an important, risk-informed application to bring over, you know, due to the fact that these, this is a key difference between the frameworks. And we

thought this was a good addition here to Framework Bravo.

Next slide, please.

So, I, I alluded to the primary difference between the two frameworks in the previous slide and on the earlier slide being those technical requirements and how they're captured in the two frameworks. And I just want to expound on that concept a little further here from an organizational standpoint.

So, during our evaluation of the existing requirements in Parts 50 and 52, we recognized that there was a lot of overlap between the technical requirements for each application type. For example, in 53.4730, many of the technical content of application requirements for a design certification are identical to those in section 52.79 for a combined license. So, we looked at that, and we opted to leverage that overlap and consolidate most of the technical requirements for the various application types into one section, that Section being 53.4730, which is what we call general technical requirements. And to develop this consolidated set of requirements we looked back at the requirements for a combined license in Section 52.79 to provide us with a starting point for developing section 53.4730.

We thought it was really a good starting point since, in theory, the requirements for a COL are largely bounding of the other application types, you know, given that a design license covers both construction and operations. So, we thought that that was a good starting point. So, instead of repeating each requirement throughout the rule, the technical content of application sections for each application type, what they do is they largely reference the applicable requirements in 53.4730 to the extent that they're applicable to a given application type. And I want to reinforce that not all the requirements in section 53.4730 are applicable to a given application type.

So, this sample matrix that's on the right side of the slide, this is a very simplified version of Enclosure 2 to the overview paper that was issued late last week. And it shows that, you know, of the 37 requirements under section 53.4730 some are applicable to all application types, while others are not. You know, in this example here the kinds of quantities of radioactive material that are in 53.4730(a)(3), which is analogous to 52.79(a)(3), would not have to be addressed by a CP applicant or an ESP applicant. But, again, this is a very simplified

version of the matrix. There's a lot of nuances that go into this. I would encourage folks to look at Enclosure 2 to the overview paper that was issued last week to see this, this matrix in more detail.

So, at this point I'm going to turn it over to Boyce Travis to talk about some of the technical requirements in a bit more detail.

So, next slide.

Boyce, I'll turn it over to you.

MR. TRAVIS: Thanks, Bill.

So, in 4730, the technical requirements, the meat of the requirements for analysis can be related back to the existing, more like Part 50 and 52 requirements, are located in section (a)(5). And this slide kinds of breaks out with somewhat more detail what the requirements in (a)(5) are trying to get at.

So, the top level requirement in (a)(5) is the requirement for analysis and evaluation drawn directly from the existing 50.34 and 52.79 requirements. It's broadly applicable to all reactors and applications. And then below that, the analysis requirements are categorized by event classification. And so, the second analysis, it's number 3, but the first category of analysis is for anticipated operational occurrences, or AOOs.

The requirements for AOOs are short and consistent with existing requirements, i.e., the Part 20 acceptance criteria. And the expectations for AOOs such they should not escalate or damage the safety functions associated with the system. The acceptance criteria and the equivalent use to defend AOOs are consistent with the requirements that are used in 50 and 52. And so, again, we're drawing from existing guidance to the extent practical.

The next set of design requirements under (a)(5)(2) is for design basis events -- or design basis accidents, excuse me. These requirements kind of break out at a more detailed level than where the requirements exist today for expectations for DBAs. To the extent that the dose analysis that is required is not conflated with the design basis accident analysis, even though they have the same acceptance criteria. And so, this requirement directly identifies what the acceptance criteria are for DBAs, and stipulates the safety-related SSCs are those that are used to protect against them.

The rest of the requirements kind of go from there. Safety-related SSCs need to be designed to accommodate any hazards associated with DBAs, for instance.

And at the end of this section there is the inclusion of a technology-neutral 50.46 CNOR. It's a new requirement, but it's drawn from existing requirements. And it's probably one of the areas we'll be looking for direct feedback on the rule.

The next category, which is 53.4730(a)(5)(iv) is related to beyond design basis events. And this section defines and requires assessments for analysis of credible beyond design basis events, and then kinds of splits these into two categories.

The first is a requirement for beyond design basis events that are concerned, those associated with recognized initiators, such as ATWS or SBO, which are directly identified in the rule. And In order to provide a technology-neutral requirement associated with those events we have provided a requirement to provide design features or programmatic controls for any of these events.

Then the second category, beyond-design-basis events, is kind of consistent with what is documented in Chapter 19 of the current FSAR today. It would be to ensure that the performance, reliability requirements for safety functions for those events are met. But there are no acceptance criteria

associated with the performance of analysis of those events. I'll also note that in 4740(a)(5)(iv)(e) it directly identifies SSC classification requirements for these events. They are not safety-related but would involve appropriate treatments. And this is associated with the recognized initiators that I discussed previously, not the other BDBEs.

Finally, or not finally I guess, there's several more slides. So, 4730(a)(5) denotes the requirements for severe accidents. These requirements are kind of drawn from the, the language in 52.79(a)(38).

And then a lot of the language that flows from there is kind of splitting what constitutes a severe accident for an LWR, consistent with the existing requirements, because there are some AERI-prescriptive language associated with what is a severe accident based on experience versus for a non-LWR, what constitutes a severe accident based on, you know, some sort of engineering characterization about it. The requirements would have the applicant provide information regarding safety features and barriers, and provide additional analysis and evaluation of severe accident that could lead to a fission product release.

Again, notably, there are no acceptance criteria associated with these requirements, to the point that they are consistent with the existing requirements. I.e., there still is a dose analysis requirement that is separate from this. It might involve the severe accidents that are analyzed in five, but may not based on the specific application guidance.

Then, finally, in 4730(a)(vi) we open the chemical hazards requirement from Framework A that has been included there based on feedback from stakeholders.

I think we'll move on to the next slide.

I believe I'm passing it off to Marty. Or Bill.

MR. JESSUP: Thank you, Boyce.

So, I want to briefly talk about the use of risk insights in Framework Bravo as a lead-in to Marty Stutzke's discussion on the AERI approach over the next few slides.

In general, the requirements in Framework Bravo they've been developed around the idea that risk insights they would continue to support or complement the deterministic design and analysis techniques, consistent with the approach taken in our current regulatory frameworks. And to that end, the existing

requirements related to PRA, they've been translated to Framework Bravo in the same manner as they exist today, whereby applicants must provide a description of the plant-specific PRA and its results. As you can see here on the screen, the requirement for 52.79(a)(44) has been translated into the language that's currently drafted in 53.4730(a)(34)(i).

What we've done is we've included an alternative to this requirement with the introduction of the AERI approach in 53.4730(a)(34(ii). For designs that meet this criteria, the criterion of this subparagraph, no PRA would be required. In addition, meeting these criteria and pursuing the AERI approach it has a few other implications that it implicitly demonstrates that the QHOs are met. It ensures that severe accident vulnerabilities are evaluated as part of the process. It inherently addresses requirements for mitigation of beyond-design-basis events. But it's also going to limit an applicant or licensee's ability to implement certain risk-informed applications that rely on the results in the PRA.

So, and I want to reinforce there in the last bullet that I touched on in Subpart S, that risk evaluations, licensees would still be required to maintain either their PRA or their AERI in accordance

with section 53.6052, that again was informed somewhat by the requirements currently today in 50.71 paragraph Hotel.

So, with that, I'm going over to Marty Stutzke to go into some of these topics in more depth, and also the progress on the guidance that's been addressed, that's been drafted to address these problems as well.

Marty.

MR. STUTZKE: Good afternoon. I'm Marty Stutzke, the senior technical advisor for probabilistic risk assessment in NRR.

Next slide, please.

I'll give you a little background on the evolution of the alternative evaluation for risk insights, or the AERI approach. It evolved from efforts of the staff. We called it the "graded PRA" initiative. It started last spring. And at the time, we were interested in determining how to grade the technical content of a probabilistic risk assessment. By that, we would consider perhaps only the at-power operating mode would need to be assessed for certain categories of initiators, would be assessed within the PRA. And we presented some initial thoughts at the advanced reactor stakeholder meeting in the spring.

And discovered at that meeting that industry was interested in not grading the technical content as much as they were interested in grading the use of the PRA in the licensing process.

So, at the time, Part 53 was referred to as PRA having an enhanced or a leading role. Other adjectives to describe it are PRA-centric or PRA blend, based on industry's licensing modernization project. But in order to grade the use of a PRA, you might think of PRA in a more supporting, or confirmatory, or traditional role, the way that we currently use PRA in Part 52 licensing process.

So, starting after that meeting that's in fact what motivated what has evolved into Framework Bravo, the more traditional approach, although technology-inclusive at the time. But we also began to consider if one could possibly take bounding event, and the consequence of that bounding event was very small, perhaps it would be acceptable to do an alternative in developing a full-scope PRA.

I've been doing PRAs for about 40 years. And they are massive projects. It requires a large amount of expertise, things like that. So, the idea was that we could probably get the same insights and do something less than this full-scope PRA. So, over

the spring and the summer the concept has had various names. I apologize if it's confusing to the audience. We used to call it the dose/consequence-based approach, and referring to the idea if it's small then you don't necessarily need to do the PRA.

That evolved into something we called the technology-inclusive, risk-informed maximum accident, or TIRIMA, approach. That name didn't stick well. So, for a while we were calling it Part 53-BE, for "bounding event."

And in the current preliminary proposed rule text we refer to it as the alternative evaluation for risk insights, or AERI right now. The concept's the same; the name has changed.

Next slide, please.

Well, in order to construct an approach to develop the AERI we went back and we looked at uses of PRA, kind of minimal uses. And you can refer to the Policy Statement on Advanced Reactors that, in fact, references three PRA-related policy statements.

First of all is the expectation that the safety goals will be met.

Second is or references severe accidents policy statement which, when you read that, says you're going to use PRA to search for severe accident

vulnerabilities.

And the third is the use of PRA in nuclear regulatory activities, commonly called PRA Policy Statement. And the idea is you can use risk assessment to identify insights. And by "insights" we mean not just the numbers, but what is the risk assessment telling you? What is important to risk?

And on the other hand, what is not so important to the risk profile of the plant?

So, with that as background we have crafted the AERI approach in two pre-decisional draft regulatory guides. They provide sufficient risk information to help inform our licensing decisions. And also to address some related ACRS recommendations.

In act, the need to address ACRS recommendations explains why there are a key pre-decisional draft regulatory guides.

I'll try to explain this.

Next slide, please.

What you see on the slide is some quotes from four letters that the ACRS has written. And the theme is the same but the context is different.

In the top paper it's in the context of reviewing a SECY paper on "Population-Related Siting Considerations." And it's a long statement about the

need to examine new designs with a blank sheet of paper; to think carefully about failures, combinations, et cetera, et cetera.

The ACRS has written two separate letters concerning our Part 53 rulemaking. And you see the same themes evolving there:

Relate to a knowledge base, perform systematic searches for hazards, initiating events, et cetera. That was repeated six months later in the third major bullet on this slide. Again, about this systematic search for hazards, initiating events, and scenarios.

Then last and not least, when they were reviewing Regulatory Guide 1.247, which is the staff endorsement of the non-light-water reactor PRA standing, again was the suggestion that guidance be developed to do a search for initiating events and accident scenarios without preconceptions or the use of existing lists.

So, we begin to think about these recommendations, and it occurred to us the search for initiating events and accident scenarios always needs to be done. And by that I mean it doesn't matter what licensing framework you're in, whether you're in Part 53, Framework A, or Part 53, Framework B, the

recommendations of the ACRS would also apply if you're going to license under Part 50 or Part 52 as well. So, that is what led us to break off the guidance into two pieces.

So, with that, let's flip to the next slide, and I will walk you through this flow chart as best I can.

So, starting on the left center, Box Alpha, is this need to do a systematic comprehensive search for initiating events and accident sequences without preconception or reliance on predefined lists. I would point out that currently, under Parts 50 and 52, there are regulations that require applicants to do a comparison against the standard review plan. And when you go to Chapter 15 of the standard review plan, on the whole there are predefined lists of accident right there.

But we want to start with a blank sheet of paper and then go back, comparison to see that we've not omitted anything on something like that. So, Box A then is the starting step here. As I said before, it applies to any framework.

Then in Box Bravo the applicant will decide what licensing framework he wants to be in. The upbranch from Box Bravo would be for applicants under

Part 50 or 52 that want to implement licensing modernization program or, later, when he wants to implement Part 53 Framework Alpha.

That being the case, they would transition from Box Bravo to Box Charlie and complete development of a PRA. In other words, the search for initiating events and event sequences are part of a PRA in this process.

Having completed the PRA, they would then implement the LMP process that's shown on Boxes Delta, Echo, Foxtrot and Golf, as shown there. And that is covered in NEI 1804 Rev. 1, as we've endorsed in Reg Guide 1.233.

Once the set of DBAs have been identified, proceeding to Boxes Hotel and India, are the classic transient accident analyses associated with radiological consequences analyses.

So, let's suppose, then, the accident decides, ah, I don't want to do LMP, or I want to be in Part 53 Framework B, they would take the downbranch from Box Bravo. And that puts you into Box J, or Juliet, select licensing events.

Now, this is somewhat at least confusing to me. By "licensing event" we are using this in a very general term as a matter of writing convenience.

Now, licensing events under different frameworks go by different names. For example, if you're in the LMP process they call licensing events "Licensing basis events." That's the complete selection name, includes AOOs, design basis events, and beyond design basis events. And from that collection of accidents, one then convenes an independent decision-making panel which selects the actual design basis accidents.

Again my point, AOOs, DBEs, BDBEs, DBAs. You see a similar structure in Part 53 Framework Alpha. You have AOOs, unlikely event sequences, very unlikely event sequences, et cetera. Boyce has just reviewed proposed nomenclature for Framework Bravo. You've got AOOs, design basis accidents, beyond design basis events, like that.

So, generally, the idea is to get from Box A into Box Juliet down here is you would inform the selection of licensing events by consulting the results in your search for initiators in the event sequences. So, Boxes Alpha and Juliet, the yellow boxes there, are addressed in our pre-decisional draft regulatory guide 1413 that was made publicly available on Friday when the Framework Bravo rule text was released. And it describes one acceptable approach for how they

perform these systematic searches, and then collapse that down into the set of licensing events.

Okay. So, then, proceeding from Box Juliet into Box Kilos and Lima, again that is the classic transient accident analysis and associated radiological consequence analysis.

Then proceeding out of Box Lima into Box Mike an applicant could decide I want to develop a PRA. And then, as I said before, as somebody that's done PRA for about 40 years, I think that's the right choice. However, there is an option, the AERI option that would be available for applicants under Framework B to identify a bounding event. And if the certain entry conditions are met related to that bounding event, as shown in Box Papa here, one could, in fact, start the AERI process which is shown in Box Quebec here. However, if the entry condition has not been met, you would revert back to Box November up here.

So, to try to be clear, the pathway Alpha, Bravo, Juliet, Kilo, Lima, Mike, and November is the way we currently use PRA in the licensing processes in Part 50 and 52.

Now, we've also developed a separate pre-decisional draft regulatory guide 1414 that provides the details of the AERI process. It covers

Boxes Oscar, Papa, and Quebec here in this diagram. And we'll talk about those in the next couple of slides.

Next slide, please.

But we thought long and hard and, quite frankly, struggled a little bit with when would it be proper to allow somebody to use this alternative evaluation of risk insights?

Or, alternatively, when do you want somebody to perform the actual PRA?

So, we crafted this preliminary proposed rule text here you see in 53.4730(a)(34). It's patterned on the existing rule text from Part 52. Provide a description of the risk evaluation. 52, that says description of the PRA but now it's going to broaden to say risk evaluation developed for the plant and its results. And that risk evaluation must either be a PRA, or this alternative evaluation for risk insight provided that you make these entry conditions.

And the entry conditions basically state that the dose to an individual that's located 100 meters away from the site doesn't exceed 1 rem in the first four days, an additional 2 rem in the first year, and additional 0.5 rem in the second and subsequent years. The intent is to provide flexibility in establishing exclusionary boundaries if the source term of a bounding

event is very small. Don't be confused. That 100 meters is a reference location. The actual DAV could be bigger than 100 meters, it could be smaller than 100 meters.

In addition, the emergency planning zone could be bigger than 100 meters or less than 100 meters. So, that 100 meters and associated dose criteria there are merely the conditions to decide whether or not its proper to be varied like that. And, in fact, that 100 meters was back calculated. We developed a scoping model like this. The details, I believe are on the backup slides to this presentation, but I won't be discussing this today due to the lack of time. Rather, I will provide a detailed explanation next week at the ISRI Committee Reactor Safeguards Subcommittee. It's a Part 53 subcommittee that is going to be held June the 23rd to the 24th. Specifically, my presentation sites Friday the 24th at 8:45.

So, with that, the other thing, the last bullet on the slide is important. Again, I'll reemphasize, these are AERI entry conditions to decide when it's appropriate to develop AERI or, otherwise, to develop the PRA. They are not strictly for siting criteria in any respect. So, in other words, the old 25 rem numbers that we're used to for safety criteria

are still in the rule text. We're not talking about that.

Okay, next slide.

Here we go. So, our first pre-decisional draft regulatory guide, which is labeled 1413, talks about the technology-inclusive identification of licensing events. And, of course, it's formatted like a draft, like a regulatory guide like this. The statement of applicability indicates that it would apply to LWRs and non-LWRs, licensed under Parts 50, 52, and 53, Frameworks A and B. So, it always applies. It will always provide useful guidance that way.

We have tried to identify and explain this notion of licensing events as used in the general term, and then relate them with the specific terms that appear in the current and the post-rule text for each one of the license frameworks like that. There's also an explanation, what you find sometimes when people talk about licensing events they're talking about a specific initiating event. In other cases they're talking about a partial event sequence.

For example, as a PRA analyst, when somebody says "station blackout," I immediately think sequence. Loss of outside power has occurred, and all my onsite DC power has failed. Two events. To me,

that's a sequence, it's not an alert. And, so things like that. We've tried to provide some really historical perspectives of how licensing events were considered in the past, and some comments on these recommendations.

Section C provides an integrated approach for doing research for initiating events, and the delineation of event sequences.

And, finally, grouping that information into the specific licensing events that apply to the framework that you're in. And we have a multi-page flow chart to guide you through that process, with associated text to back up each box on that flow chart. So, hopefully, it's worth for us to do.

In addition, we're providing an appendix, preliminary draft regulatory guide on oriented towards how to conduct a good search for initiating events. And we're recommending the use of an inductive method and a deductive method. The combination of both methods, then the strengths of one compensates for the weaknesses of the other, that type of thing.

We have tried to provide pointers to what we think are helpful references: NRC, IAEA. You can read the list down here like this. We're not endorsing or recommending any specific method like this. But

the idea of providing the references is just to truly be helpful and point the user to the literature. At the same time, I wanted to avoid writing a textbook on reliability engineering. Because that would take considerable time.

So, next slide.

Our second pre-decisional draft regulatory guide, which is 1414, provides the framework for conducting the alternative evaluation for risk insights. Again, it looks like a reg guide but it, in contrast to our first guidance document, this only applies to Part 53 Framework Bravo. And we talk about how to identify and characterize a founding event like this. And that would be informed by information from the search for initiating events and event sequences. The Chapter 15 analysis that may have been performed like that, there's a recognition in there that it might be necessary to consider multiple bounding events in some cases. It's not always obvious which one is truly bounding like this.

Then we talk about how the consequences can be estimated for the bounding event to confirm that you meet the AERI entry conditions. These are more realistic types of calculations that are characteristic of PRA. They are not Chapter 15-like analysis with

deliberately-introduced conservatisms.

Then demonstration with the quantitative health objectives in its integral policy statement are met. We've assumed an accident frequency of once per year like this. So, in other words, demonstrating the QHOs are met is possible because the consequence is very small like this. But the intent here to avoid having to justify a lower frequency with a great deal of effort.

And I would caution that leads one into a slippery slope. Ultimately, you would end up in a PRA. If you wanted to argue, gee, my event sequence frequency is a 10 to the minus 2, and I'd have to come back and say, show me. So, that's the intent here.

We then provide some guidance on how to search for severe accident vulnerabilities. That's based on the severe accident policy statement like that. And we developed technology-inclusive definitions of severe accidents. That actually appears in the Framework Bravo real text, as well as what is a severe accident vulnerability?

Some of you may remember back in the IPEs, the original plant examination days that were started by the issuance of general Letter 8820, staff asked licensees to identify severe accident vulnerabilities,

and never actually said what a vulnerability was. And I can remember being on the other side of the fence at the time, working as a contractor. So, what am I supposed to do now?

So, we've tried to provide some helpful guidance that way. Again, the identification of risk insights needs to be based on the entire set of licensing events. All of the information coming from the search for initiators and the event sequences, not only the bounding event like that.

Risk insights, as I mentioned before, are what features of the plant are important to risk, which ones are not so important. Is it the operator actions that are important? Is it certain equipment? Certain types of accident scenarios, be it seismic or station blackout, something like that?

And as my concluding point is, we provided some guidance on how to assess the adequacy of defense-in-depth for the plant, for over the, again, it needs to be done over the entire set of licensing events. But the idea is to provide some reassurance that nothing has been omitted in the search for the bounding event, it couldn't be more important.

So, with that, I'll turn it back to you, Bill.

MR. JESSUP: Thank you, Marty.

Can you go to Slide 30, please.

Okay. So, the NRC staff is pursuing development of guidance that supports implementation of Framework Bravo beyond what Marty was just discussing for identification of license events and guidance that supports the AERI implementation. Kind of what you'll see here on the slide is that the development of guidance supporting Framework Bravo, it follows a similar model to that we described earlier for the development of rule text. Which is that in this top item you'll see that we know that there's a lot, there are a lot of provisions that align between Frameworks Alpha and Bravo. And I hope that point's been reinforced here today. In those cases, we expect that the guidance activities are going to be linked as well.

The second box here on the right-hand side of the slide acknowledges that we pulled provisions from Parts 50 and 52. In some cases we used verbatim. In some cases we had to make changes for technology inclusiveness or conforming otherwise. In those cases, we think that we're going to have to update or supplement existing guidance that covers the existing regulatory framework today.

That may be limited in some cases to just

modifying applicability statements. If you look at something like Reg Guide 1.232 for principal design criteria development, you could likely use it off the shelf today. But that's an example of somewhere where we may have to go back and update the applicability statement to acknowledge the Part 53 Framework Bravo. Those will exist. But then again, the lower box there is that we acknowledge that there's unique guidance that's going to have to be developed for Part 53 Framework Bravo.

We expect that a lot of that unique guidance can actually be captured as part of the ongoing Advanced Reactor Content of Application Project, particularly since many of the tech requirements in Framework Bravo they are captured as technical content of application requirements. So, we are working to dovetail the development of the Framework Bravo rule language with the broader ARCAP project.

If you can go to Slide 31, please.

So, this is the slide that it's covering the merger. And this is really forward-looking. And I would say that this is largely what, what is the staff going to be focused on during the summer relative to the rule text development.

As we start to merge Frameworks Alpha and

Bravo that we saw in an earlier slide, broader landscape, the top box there acknowledges that based on the timing that each iteration went out, you know, the last iteration of Framework Alpha was issued in May. The last iteration of Framework Bravo just went out last Friday. There are places where the frameworks need to align, they should align, but certain differences arose. So, we will be working on tightening those differences up and ensure consistency between parallel provisions.

The second box is really unique to Framework Bravo in that, I acknowledged this a couple times, there's a few areas that we're still looking at Framework Alpha, we're looking elsewhere as well to see are there places that we can continue to further align ourselves with some of the innovations that have been developed for Framework Alpha and elsewhere.

I put three on the screen here:

Siting, so obviously Framework Alpha has a dedicated subpart for siting. We currently reference Part 100 the way it's done producing frameworks. That's an area that we're still evaluating to see whether we can adopt something from Subpart Delta.

Seismic design criteria and requirements for operation. So, in requirements for operation I

already alluded to the fact that we're still evaluating those alternatives to existing licensed operator paradigm that have been introduced through Framework Alpha. And there are other programmatic requirements under Subpart F that we're still looking at to see whether or not it makes sense to adopt them in Framework Bravo, our Subpart D.

And then the third major box down there, the commonalities in Subpart Alpha. So, again, I acknowledged earlier that Subpart Alpha has existed only as a subpart in Framework Alpha in the previous two iterations of the Framework Alpha draft preliminary proposed rule text.

Over the summer we're going to work to drive commonality in that subpart where needed. And that's going to include working on definitions: which definitions are going to remain common to both frameworks; which are going to be have -- which definitions are going to have to be broken out so that they're only applicable to one of two frameworks. And then the general provisions, going through and looking at the general provisions that are currently there. Are there others that need to be included? And ensuring that they're appropriately drafted such that they could be used by both frameworks.

And then, most importantly at the end is that the staff is continuing to assess feedback that's received on Part 53, and considering how that feedback can be incorporated into the preliminary proposed rule text. We got some really good feedback even just during the central discussions during the Advanced Reactor Stakeholder meetings that have even informed what we presented today and issued last week.

So, these are just four key activities. It's not meant to be exhaustive. Certainly the second box, the three bullets that I presented are not exhaustive. But I did want to give a sense for stakeholders that we are working on a lot of things as we start to merge the frameworks and, hopefully, develop and write proposed rule package to present to the Commission early next year.

Next slide, please.

And so, these are just some near term next steps. So, Marty already alluded to the fact that next week we'll be presenting to the Advisory Committee on Reactor Safeguards, the subcommittee. That's a 2-day meeting that's going to cover a lot of topics, including Framework Bravo, and AERI, and some portions of Framework Alpha as well.

And then the Full Committee Meeting, the

Full Committee Meeting is July 6th through the 9th. We present on the 6th, July 6th at 8:35 a.m.

There's an Advanced Reactor Public Stakeholder Meeting on June 30th where a couple of topics relative to Part 53 will be addressed.

And then we have the Part 53 Commission Meeting coming up on July 21st.

And next slide, please.

And so, this is our last slide: additional information.

We provided the website link where external stakeholders can go to take a look at what's going on with part 53, the docket number for regulations.gov to provide comments, and contact information for Bob Beall, who is the project manager associated with the Part 53 rulemaking effort.

And with that, I will turn it back over to Bob Beall.

MR. BEALL: All right. Thanks, Bill.

So, we'd like to open the floor up now to questions from the public stakeholders. If you'd like to ask a question, please raise your hand.

So, Kati. We'll take you first.

MS. AUSTGEN: Thanks, Bob.

I have a couple of questions. The first

one is I think for Marty or maybe Boyce.

On Slide 22 where you talked about use of 50.69 or the equivalent for risk-informed applications, and you specified that if an applicant came in with the AERI process they would, understandably, not be able to do the 50.69 type risk-informed applications. Or maybe I'm adding in the 50.69. But, where it says, "Cannot implement risk-informed applications if AERI approach is used," that's understandable, I think.

If later on, so, subsequent licensing actions, if that same applicant has now chosen to develop a PRA for whatever reason or purpose, would they then be able to do risk-informed applications at that later date with a commensurate PRA?

MR. STUTZKE: Hi, Kati. This is Marty.

MS. AUSTGEN: Hi.

MR. STUTZKE: And the answer is yes.

MS. AUSTGEN: Okay.

MR. STUTZKE: Develop the PRA and go for it.

MS. AUSTGEN: Okay, great. Thank you.

And I'm sorry, I forgot to mention that I'm with the Nuclear Energy Institute, for your record keeping.

Okay. And then my second question, I think

Bill mentioned several times that updates or changes that had been made in the proposed Framework Bravo were for technology-inclusiveness. But I didn't hear anything necessarily about for looking at being performance-based. So, some of those Part 50 sections that were mirrored or used as the basis for many of the things in Framework B are fairly prescriptive and, perhaps, could have been made performance-based.

Did the staff look at that at all? Or is that something that you're waiting for further discussion or feedback from stakeholders?

MR. JESSUP: Yeah, thanks for the question, Kati.

In most cases we did not want to make material changes to those provisions that were brought over. But I would say, you know, we mentioned 10 CFR 50.65, which is actually a good example of a performance-based requirement. And so, we brought those over but, again, made no material changes to them. So, to the extent that, you know, they are performance-based in the existing regulatory Frameworks, those were conveyed. And we also looked at certain provisions in Framework Alpha that, you know, are largely performance-based as well, brought those over.

But I would say, broadly, the intent was not to make any material changes beyond ensuring technology-inclusiveness at that, to those provisions that were mirrored. But certainly we'd be open to feedback, if certain provisions stick out or you've seen something already that in a rule text that caught your eye or you'd like to discuss further.

MS. AUSTGEN: Okay, thank you.

We'll keep that in consideration as we develop our comprehensive comments on Framework B. I think part of our expectation following the intent of the NEMA legislation was that, to the extent possible, Part 53 would also be performance-based.

Thank you.

MR. SHAMS: Can I make a comment, Bob? This is Mo Shams. I'm with the NRC.

So as Bill indicated on one of this slides, there are a number of areas that we're actually looking to continue to work on, including seismic including as well as staffing. And these are areas where we are seeing opportunities for performance-based as well. So to Bill's point, we're just continuing to build a rule from what we've seen in Framework A, what we've imported from R5052 and other areas where we can extend performance based requirements.

MS. AUSTGEN: Okay. Thank you. Those were my only questions for now.

MR. BEALL: Okay. Thank you, Kati. Thank you, Mo. Ed Lyman, you have a question?

DR. LYMAN: Can you hear me?

MR. BEALL: Yes, we can, sir. Please go ahead.

DR. LYMAN: I have a few questions for Marty. So I glanced quickly at the calculation in the presentation. I haven't read the Reg Guides yet. But a couple of things stood out. So the first question is so you used this power law assumption for the decrease in dose with distance. But doesn't that only apply assuming that the R0 is the maximum and that the dose decreases after that because if you have a plume rise, that might not be the case, right? So the maximum could be further out. So I was wondering if there was some design dependence built into that assumption. That's my first question.

MR. STUTZKE: Yes. My interpretation of that equation is that the zeroes are just arbitrary anchor points and then I can scale down the doses and move them farther away or I would actually increase the dose if I move closer like that.

DR. LYMAN: Right. So if you had a -- if

it was a very high plume, and it rose a considerable distance than the maximum might be well beyond 100 meters. That's my question.

MR. STUTZKE: Yes. That's true. And it's a limitation of this very simple approach. I mean, normally we would require a MACCS calculation and in fact that's what is in the guidance if you wanted to confirm. The purpose of the derivation was to try to explain to folks where the 100 meters came from.

DR. LYMAN: Right. And my second question is you also say in the slides that because of SOARCA, if it shows that acute fatality risk is almost zero that you're not going to consider it. But it seems to me that it's also dependent on not only the methodology but the design and also the placement of the EAD and the emergency planning zone and the assumptions for evacuation. So it seems that that assumption is also presupposing some things that you might not want to start out with a blank sheet of paper. Is that a fair statement?

MR. STUTZKE: Yes. Generally, I agree with you. The notion is in order to use area, we would expect all of the results, you know, of the deterministic analyses to be very small. Because in other words one wouldn't even approach 25 rem at the

site boundary but it would be considerably less than that. And so what I'm trying to say here, perhaps a little awkwardly, is I think the QHO for latent cancer fatality should be the basis for the reference point, the area entry conditions.

Clearly, when they get into the actual area analysis, we would expect them to complete not just latent cancer risk but also early fatality risk as confirmation.

DR. LYMAN: Right. Because they think -- there are scenarios you can imagine, I think, where there might be a greater -- where the QHO fatality risk might actually be controlling.

MR. STUTZKE: I agree.

DR. LYMAN: Okay.

MR. STUTZKE: I agree.

DR. LYMAN: And my last question, so I'm confused about the difference between the bounding event and severe accident. Isn't the bounding event the most severe accident you can think of or not?

MR. STUTZKE: Yeah. I mean, clearly the bounding event is one of the possible severe accidents.

DR. LYMAN: Right. So in your search for severe accident vulnerabilities, you're looking for events that may have lower consequences than a bounding

event but may contribute to the overall risk to the site.

MR. STUTZKE: Right.

DR. LYMAN: Okay.

MR. STUTZKE: The policy statement on severe accidents defines a severe accident as damage to the core whether or not there are serious offsite consequences.

DR. LYMAN: Right. Okay. That's all I have right now. Thank you.

MR. STUTZKE: Thank you.

MR. BEALL: Thank you, Ed. Patrick White, do you have a question?

MR. WHITE: Yes. Thank you very much. Patrick White, Nuclear Innovation Alliance. So I think my first question really kind of echoes something that Kati brought up which is I guess, and just for kind of confirmation, would you really characterize this Framework B as being kind of a performance-based rule?

MR. JESSUP: Yes. Thanks, Patrick. I think I would repeat or kind of reiterate my response to Kati, which was we did adopt certain performance-based provisions as they exist today both in the existing framework, Framework A. So to the extent that, you know, we did bring in performance-based

approaches, they are there. But, again, we're looking for feedback. And, you know, to the extent that if we get some proposals relative to that or some ideas, we're interested in hearing feedback on that.

MR. WHITE: Okay. Great. Yeah. Just one thing I kind of noted in kind of the read through of the draft rule is it felt like the area kind of represented this idea of a kind of performance-based alternative PRA method. But when you kind of see all of the stuff that was brought in from 50 and 52, it seemed like more kind of full of prescriptive requirements. And so I would be curious about kind of getting staff's feedback in the future of thinking about are there opportunities to kind of move large portions of that, the early part of Framework B, not necessarily the parts or -- I guess specifically the parts that Subpart R, could those be moved to guidance as kind of recommended ways of kind of meeting this with the focus on having the applicant really provide a safety case that demonstrates their performance with these high level safety objectives like you see in Framework A?

So that's just, I think, a bit of a comment generally on it.

A question I had on kind of AERI about kind

of the implementation is would there be an opportunity for applicants who may propose alternative processes within AERI, recognizing that the draft Reg Guide right now is just that, it's guidance and that an applicant might not choose to use all of those maybe specific processes right now in Framework A or B?

MR. STUTZKE: Thank you for the question and the answer is yes. Applicants can propose alternative approaches. The pre-decisional draft Regulatory Guide provides one acceptable approach and not necessarily the only one.

MR. WHITE: Okay. Great. Thank you. Another question I had, and this was something that I think we might be able to either calculate after the meeting, but it seems when you're talking about trying to meet the QHOs with an assumed event frequency of one per year, ultimately there is some underlying kind of equivalent dose or exposure metric you are using to meet the QHOs. I was wondering if that was something that kind of staff has calculated as kind of drafting this rule and if that is something that you would be able to share, something being calculated later. I'm just curious if you can provide that number now.

MR. STUTZKE: I cannot provide that number now. Let me consider it. Thanks for the comment.

MR. WHITE: Great. And I guess just kind of a final comment. I really would kind of reiterate I think the area approach that is outlined here, at least from kind of our perspective, is an interesting way of thinking about this performance-based regulation but recognizes some of the challenges of bringing in kind of the prescriptive requirements that we saw in Part 50 and Part 52 in thinking about how we can kind of keep this performance-based overall. I thought Marty's comments specifically, and these were things that I could buy ACRS on, kind of keeping that blank piece of paper, are really a powerful way of thinking about the safety of novel technologies in a performance-based manner and that bringing in a lot of these prescriptive requirements from 5052 aren't necessarily starting with that blank sheet of paper.

Instead we're starting with the list of requirements we've already seen for light-water reactors. So I would just maybe kind of encourage thinking about the shift of kind of the performance-based requirements and rule and then maybe thinking about implementation or other ways to meet those is something that would be more appropriate in guidance.

But thank you so much for this presentation

and the interesting work so far.

MR. SHAMS: Thank you. This is Mo Shams again with the NRC. I really appreciate your perspectives on that and the thoughts you're sharing about making sure that we're performance-based. I want to share and reiterate what Bill indicated that when we constructed Framework B, we were trying to go with the option that was responsive to the stakeholders for not leveraging a PRA in a lead role.

But I would urge stakeholders to take a look at Part 53 in totality because it does have various options for how much a vendor is looking to employ performance bases versus reduced reliance on PRA versus no reliance on PRA at all. We try to offer the options, structure them in a way to cater to those that wanted to be able on a different scale of how much analysis versus how much prescriptive requirements are there.

We welcome the feedback. We welcome what you guys are providing. But I just wanted it to be reiterated that Part 53 in totality offers three different approaches to that.

MR. WHITE: Thank you so much. Just kind of one quick response to that, Mo. I appreciate that thought, and it will be good to view kind of the whole rule in its totality when we have kind of more time

to go over it.

But one thing I would just make sure to emphasize is that I want to make sure that we have that option of both kind of heavy and light PRA without necessarily losing performance-based regulation kind of in the interim between those. But, yes, it will be really interesting to kind of see this rule in its whole.

MR. SHAMS: It's an optimization --

MR. WHITE: Yup.

MR. SHAMS: -- problem essentially, you know. The more you have of PRA the less you are going to have or vice versa. So it's an optimization problem but a good thought.

MR. WHITE: I appreciate it.

MR. TAYLOR: So, Patrick, this is Rob Taylor. I would say that you're taking a tool away from the toolbox when you take the PRA away. So you need to inherently assess the various elements of the design and the capabilities and have requirements around those to demonstrate the overarching reasonable assurance of adequate protections for safety. So you won't get to the same level of performance-based as when you have a PRA, which allows you to treat and deal with all of those uncertainties in those design aspects.

That doesn't mean the rule isn't performance-based. The rule has many, many aspects that are performance-based within it, including many of the things that have been brought over from Framework A.

So because you may see a deterministic requirement or a more prescriptive requirement in Framework B, that's a construct of the fact that you no longer have the PRA to allow you to have that higher level performance goal that allows you to assess against it. It doesn't mean the rule is not performance-based. It's not a binary. Performance-based isn't an on or off situation. It's a spectrum based on the level of effort you want to put into the design and the characterization of the events and the sequences. So be careful that we don't fall into that trap that it's either or. It's a spectrum. And when you ask for less PRA, you need other components to demonstrate reasonable assurance. So you have to look at it in totality. So I encourage you to please do that as you look at the rule and assess the comments that you're going to give us. Thank you.

MR. WHITE: No, I really appreciate that Rob. I think it is very interesting to see this trade-off and appreciate the complexity of what tools you have available. I think just one thing I again

would kind of push back on is trying to think about how can we allow the applicant the flexibility to try to pick what methods make the most sense for them. And so what can we leave in guidance and what can we essentially leave on the applicant's side, but recognizing that this is a lot of different things that we're trying to balance out here between predictability, flexibility, use of risk information and ultimately kind of, yeah, meeting that goal or reasonable assurance of adequate protection?

So very interesting things for us to think about in its entirety.

MR. BEALL: Okay. Thank you, Patrick. Adam Stein, do you have a question?

MR. STEIN: It seems that Framework B is essentially replacing PRA as a tool, as Rob Taylor just said, with the more typical application of fault trees, which has been in risk analysis for decades. So it's replacing one tool for another. It's not just removing the use of a tool. So I would suggest that using that different tool we still can get to a more performance-based option than we currently see although I know the staff is still working on the actual language. So I appreciate that.

I would like to suggest that since Marty

indicated that he was not going to over the analysis method that is in the backup slide due to time, and he plans to present that to ACRS at a later date where stakeholders do not have the opportunity to ask questions in ACRS meetings that since there is still about an hour left in this meeting, we take the scheduled break. And when we come back, we hear from Marty on the back-up slides.

MR. STUTZKE: I love to talk about math. If the time allows, let's go for it. I'll leave it up to Bob.

MR. BEALL: That is something we can entertain. This meeting is supposed to go to 4 o'clock. And if there is interest with the stakeholders and if Marty is willing to do that, but we want to get through all of the other questions first, and we'll see how much time we have left for that, Adam.

Okay?

MR. STEIN: Thank you.

MR. BEALL: No problem, sir. Are there any additional questions from the staff on Framework B or the area overview we presented? Is there anybody on the bridge line that would like to ask a question? If you hit star 6, it will unmute your phone, and you can ask a question. Yes. We have one question from

Rani.

MS. FRANOVICH: Yes. This is Rani Franovich. I just wanted to make a quick observation. And I appreciate that Rob and Mo are present. I speak on behalf of the Breakthrough Institute, which is an independent 501(c)(3) global research center that identifies and promotes technological solutions to environmental and human development challenges. We advocate appropriate regulation for licensing and oversight of advanced nuclear reactors to enable the timely deployment of safe, innovative and economically viable emerging nuclear technologies. We believe new and advanced reactors, including light-water small modular reactors representing critical pathways to climate mitigation and deep decarbonization. The Breakthrough Institute does not receive funding from the industry.

So it appears to me that the staff may be conflating risk-informed with performance-based. I believe these concepts are separate and that our divergent perspectives on this very critical conceptual disconnect warrants further discussion because NEIMA mandates that the regulation that is being developed through Part 53 be all three things, technology inclusive, risk-informed and performance-based. So

the idea that you can't be performance-based and risk-informed is at odds with the very mandate of NEIMA. So I have made a request on behalf of the Breakthrough Institute and in partnership with the American Nuclear Society just yesterday requesting a workshop that would allow for some more collaborative engagement and discussion and sharing of views on what may be understandings that are not mutually held on what NEIMA requires. And I would like to know, Rob, if the NRC staff is willing to honor the request and accommodate a more fulsome discussion on things we may be talking past each other about.

MR. TAYLOR: Rani, thanks. This is Rob Taylor. We aware of your letter. We just received it yesterday. And we are taking it under consideration. Our presence here today should be construed as our interest in seeking stakeholder input as well as the numerous meetings we've had on this topic. We remain open to further engagement and will consider the form and the mechanism to accomplish that. But we haven't had time to digest your letter or assess it as we were preparing for today.

I do want to clarify something. Nothing should be construed in what I said to say that risk-informed and performance-based are in conflict

with each other. That was not the intent of my statement. My statement was to say as you use different tools and you use different capabilities to conduct your assessment, how you developed your regulatory framework can be informed by those tools that get used. So it's not an either or.

And I want to be clear. The staff is not approaching this as an either or. We're being as risk-informed and performance-based wherever we can be within the regulations. And we may at some places stop and say we don't think we can include something in here because we don't think the technical basis will exist to demonstrate that capability. And so I do see somebody in the room who wants to add or to voice their report.

MS. DE MESSIERRES: Yes. Thank you. This is Candace De Messierres, staff member working on the Framework B team. And it's a very diverse team and lots of individuals throughout the agency working on this effort. I did want to clarify with regard to performance-based and risk-informed, SECY-98-144 contains a very specific explanation of the delineation between various terms, including risk-informed, risk-informed performance-based.

The staff is very, very much aware of these

subtleties and have studied the commission policy in this area extensively. I would say that while a more deterministic approach such as in the Part 50 and 52 that we're adapting, you know, some of the concepts in response to stakeholder feedback, we are doing what we can to incorporate performance-based approaches despite a primarily deterministic framework which, as Bill mentioned, relies on a more linear design approach.

So I just wanted to mention that, you know, at a staff level and, you know, in all levels of this effort, we are constantly looking critically at each provision and thinking, well, it's not just what the -- you know, performance-based is really about flexibility and the mechanism to demonstrate the outcome. And in every provision we've written, we've been thinking about that concept. So I just wanted to mention that.

MR. TAYLOR: Thanks, Candace. And this is Rob again. So I just wanted to go back and make sure we're all clear on what NEIMA does explicitly state.

Under technology inclusive regulatory framework, it says, the term technology inclusive regulatory framework means a regulatory framework developed using methods of evaluation that are flexible

and practical for applications for a variety of reactor technologies, including, where appropriate, the use of risk-informed and performance-based techniques and other tools and methods. So we're committed to that definition here at the NRC. We recognize that stakeholders may have views on whether a particular requirement in the regulations is sufficiently performance-based. Let's have that conversation. Let's talk about that particular requirement and have that conversation.

I think that characterizing that Framework B or giving the appearance that Framework B is not performance-based I think would be disingenuous to the overall look at that and how much performance-based requirements have been incorporated into it. So if there is one that you think is not performance-based, let's talk about it. Let's talk about what needs to be done and why it's there. We certainly support and engage in that dialogue. And we have a whole other hour left to do that

MS. FRANOVICH: I appreciate that, Rob. And I appreciate Candace's comments too. I am aware of that SECY paper and its foundational relevance to where we are today. And I certainly agree with you, Rob, that that is a conversation worth having. And

there is a rich pool of very knowledgeable experts and professionals in the regulated community that I think would also like to participate in that discussion. I don't know that this is the best format. I believe workshops that are much more inclusive in a real kind of give and take exchange, discussion is probably going to be the answer to having that discussion and having that sharing of diverse views and thoughts.

And I am encouraged that you agree that we need to have that discussion and look forward to hearing more about the staff's entertainment of this proposal to advance tools and rules and frameworks, particularly Framework B, that the industry will find useful and reasonable for deploying these new technologies. So it sounds like we're in violent agreement. And I look forward to hearing more from the staff on the proposals.

MR. BEALL: Okay. Dr. Lyman, you're next.

DR. LYMAN: I'll say one thing, and Rob beat me to it by quoting from NEIMA, that NEIMA does have that very important caveat where appropriate. And that gives the NRC full discretion to determine where the use of risk-informed performance-based techniques is or isn't appropriate. And I would submit that in an option where there's no PRA that those simply

aren't appropriate. So I think the discussion here is going to a kind of absurd territory. I think staff has gone overboard to try to accommodate the flexibility that the industry has been demanding. And you have to, I guess, draw a line at some point and say you have done enough. But where appropriate the agency has full discretion so you have to be pretty careful about what you say NEIMA does or doesn't require. Thank you.

MR. BEALL: Okay. Thank you, Ed. Boyce.

MR. TRAVIS: Yeah. I just wanted to add something to the discussion. I think it's important that -- is this mic on? Can you guys hear me?

MR. BEALL: Can you speak up a little?

MR. TRAVIS: Yes, sorry. I think it's important that -- and I think Rob may have touched on this, but I think it's important that we look at Part 53 as a whole, not just Framework B but Framework A and B, because ultimately one of the NRC's responsibilities as part of this is to provide a durable, consistent and predictable rule that can provide at least an equivalent level of safety to the regulatory framework that exists today. And so in constructing Framework B and Framework A as part of Part 53, staff has also been looking to take that, you know, into account.

And, again, we're looking for and seeking feedback and taking that feedback into account where appropriate to make this rule the best it can be. But I mean, ultimately there is a benchmark for this rule, and it's an equivalent level of safety at least where we are today.

MR. BEALL: Okay. Thank you, Boyce. Ed, do you have a follow-up question? Okay. Mike Keller, did you have your hand up?

MR. KELLER: Yes. This is Mike Keller, the president of Hybrid Power Technologies. We are a small business developing an advanced reactor. We would like to second the request for a separate meeting where these issues can be better fleshed out without having to deal with the constraints of time that invariably occur with a meeting like this.

So we think it would be a good idea if for no other reason than it would at least clear some of the problems clearly out there relative to this proposed rule and the particular area that was brought up, which strikes me as kind of fundamental. Thank you.

MR. BEALL: Okay. Thank you, Mike. Okay. Additional questions or comments? Okay. Not seeing any, let's take a 10-minute break and then we'll come back, and Marty will walk us through the background

slides on AERI. And so we'll reconvene at 10 minutes at 3:00 East Coast time. Thank you.

(Whereupon, the above-entitled matter went off the record at 3:00 p.m. and resumed at 3:10 p.m.)

MR. BEALL: So welcome back, everyone. So we're going to go through the back-up slides. That starts on slide, was it 37? Is 37 up there? And so Marty will walk us through the seven slides on AERI.

So, Marty?

MS. STUTZKE: Yeah, thanks Bob. As a prelude to the conversation, remember the purpose of the entry conditions is to determine when it would be acceptable to use the AERI approach versus when you would require a full scope PRA to do that. And we thought about several options before we came up with this mathematical type of approach here that I will describe in a little bit. Now for example, one could prescribe an entry condition based strictly on thermal power. And we thought about that and the gap in, gee, if thermal power is small then the source term ought to be small, which implies the consequences ought to be small.

The thermal power alone is not sufficient to bound the problem. It has to do more with the complexity or the complications of the design. You

know, classic PRA is crafted, let's say, to worry about all the individuals, you know, components within the plant and how they all interrelate to each other like that. So simpler designs would imply I could develop simpler event trees and fault trees and things like that. But it's very hard to do that on a technology inclusive type of basis. So then we turn to something that could be reasonably gauged by an applicant and that would be dose because that would be informed by the Chapter 15 types of transient accident analyses, just what kind of doses are you talking about over certain accidents?

That's problematic itself because the time windows are very different, you know, for example, the 25 rem at the worst two hours that we use for the EAB versus 25 rem over the duration of an accident, if accidents would have different durations like that. In contrast for individual early fatality risk, you know, early fatality means within one year of the accident like that.

Latent cancer fatality risk is nominally a lifetime risk. And for computational purposes, we've always used 50 years like that. So you can begin to appreciate the problem. How do I take a worst two-hour dose and extrapolate it out to 50 years? That's a

pretty complicated problem like that. So being that as it may, let's jump into the arithmetic here and let's see. So Step 1 is just the classic statement that risk is the sum of the frequency times the consequences over a set of accident sequences, like that.

Step 2 then is the notion is if I can define a bounding event like this then I can jump to Step 3 and factor out that bounding event consequence like that. And it's that separation of the consequence being the sum of the accident frequencies that enables the approach. That's the purpose of the box like that. Now the sum of the event sequence frequencies here -- now some of the consequences are apt to be zero or essentially zero because not all event sequences result in an accident. In fact, the dominant one is there. So in fact the sum of the event sequence frequency is something you can think of as total release frequency, like that. But again, there is this issue of how do you estimate that number without a PRA? And so far we're comfortable with this once per year. Our guidance would allow you to justify something lower than that. It doesn't provide any hints as to how to do that. So I'm open to suggestion there.

Okay. Next slide.

So starting at Step 5, there is just a

reminder. There are two QHOs. One for individual early fatality risk of 5x10-7 per year, and individual latent cancer fatality risk at 2x10-6 per year. And I provided the reference for those values is in NUREG-0880, Rev. 1, specifically Pages 30 and 31. That document is old. It was written at the time the cyclical policy statement was being conceived back in the early 80s. It is my understanding that subsequent -- remember the actual statement in the policy statement for the QHO says 0.1 percent of the risk. And so for example, total cancer risk, like that.

And one could make an argument, you know, since the 80s, medical technology has gotten better. Fewer people actually die of cancer. And that's true. But if you look at some of the numbers, it's not enough to really change that numerical value of 2x10-6, like that. We could debate whether it is really 1.7x10-6 so you can understand the minus 6, something like that.

Okay. So Step 6 is, as Ed Lyman had pointed out, I guess the way that I view it is when you're applying this type of an approach, the bounding event for latent cancer fatality risk may be different than the bounding event for early fatality risk. Okay?

So two separate accident scenarios, one that would create, you know, an acute problem early

on like that. This derivation then is under my belief that it's the longer term. It's the latent cancer fatality risk is apt to drive the answer. Again, even if you met 25 rem at the fence over a short time period that's not a large enough dose to begin to worry about early fatality risk as compared to the latent cancer risk. So, anyway, that's kind of the rationale behind there.

Moving on to Step Number 7 then, the conditional individual early cancer fatality risk, excuse me, conditional individual latent cancer fatality risk would be simply the ratio of the expected number of cancer fatalities within 10 miles of the site occurring over 50 years after the bounding event and divide by the total population within 10 miles of the site. That formulation actually appears in NUREG-1860, which is not on the view graphs.

So with that, let's go to the next slide.

So what Slide 8 is showing you, in this whole area, is the calculational grid that MACCS uses. Traditionally going back into the early days of PRA, say NUREG-1150 or so, what they did was divide the area surrounding the site into 16 sectors, which are 22-1/2 degrees. More recently for example the SOARCA studies will use up to 64 sectors in order to get more precision

in the calculation. But I opted to use the 22-1/2, which is roughly -- the idea is the plume expands out as it travels away from the plant. That's the effect you're trying to model. Anyway, by picking this framework, what it means is there is no chance of a latent cancer fatality in 15 out of the 16 sectors because the plume simply doesn't go there like that.

Okay. One of the key assumptions then is Step 9, assume the uniform population density. Well, we all know that is not true. In fact, the way MACCS is structured is in order to do the calculation, it will look at the distribution of the population around the site, and it realizes some people live in more sectors than others and then some live closer to the plant than the others. And so it tries to represent that through its calculational grid like that.

The other thing that MACCS does is it realizes the impact of weather on the direction of the plume. So specifically, what goes on in a MACCS type of calculation is you input a set of hourly wind directions to 8,760 different points so the wind can blow plume in any which direction. And then MACCS works by a Monte Carlo, which takes a sample out of that distribution. For example, suppose the accident occurs on New Year's Day at 2:00 in the morning versus

Christmas Day at 5:00 p.m., that type of thing. It will sample it, build it up statistically.

In this simple approach, I can eliminate the need to treat that by assuming the population that you formally distributed around the site boundary like that and that totally eliminates wind direction. In other words, it doesn't matter which way the wind is flowing. So it's an analytical simplification to do that.

Next slide, please.

Okay. So within the small differential area that I showed you like this, you have a certain number of people living there. And they have a probability of dying as a result of passing by in the area. And that could be represented by a binomial probability distribution. And that assumption is important because then it says the expected number then is the probability that an individual would die times the number of individuals in the sector that are exposed to the plume. The complication here is the probability of dying is a function of a radial distance away from the site. If the plume spreads out there would be, once dosed like this, but there is a competing effect because the further away you move from the site, the more people are exposed to that dose. So you're faced

with a trade-off situation. The dose is going down but the number of people are going up like that.

One way to model the probability that an individual dies is the one year no threshold model that says the probability of a latent cancer fatality is proportional to the dose. And that constant of proportionality is known as the risk coefficient. I'm well aware that the linear no threshold model is highly controversial. In fact over the last couple of weeks, I have watched a series of ET presentations that the health physics society made that go back into the history of the LNT model. It's all quite interesting. It's not just scientific but some other political and ethical sorts of things like that. So quite interesting, and I recommend it to you.

That being said, in recent years the commission received three petitions for rulemaking that said the NRC should essentially give up the LNT model and use something that's more realistic. And the Commission responded in the middle of last year, roughly a year ago, like this and said no. We're staying with the LNT model. So while I appreciate the scientific controversy like that I'm stuck with using the LNT model. Now these risk coefficients, normally we get them from the National Research Council, the so-called

BEER Committee, Biologic Effects of Ionizing Radiation, like that, and they published a series of reports. The latest one is Number 7 like that. And it gives for a biologically average individual. The first coefficient is 6x10-4 per rem of a cumulative radiation dose like that.

Again in an actual consequence calculation using max, we would follow various cohorts, so adults, children, old people, this sort of thing like that. And they all have the unique coefficients. But in the interest of time, just simplify the calculation, I just have a single cohort corresponding to the biologically average individual.

Okay. Next slide.

So Step 12 is this assumption of this power log dose model that says dose decreases inversely to some stated power of the distance. So in other words, the further away you move from the reactor itself, the lower the dose you expect, like that. And the value suggested in NUREG-0396, which is actually the document that established the notion of an emergency planning zone, they used this 1.5 number in there, like that.

The other thing I would point out, I don't know whether it's a coincidence or not, but if you look at the recommendation in NUREG-0396, it says the EPZ

should be approximately 10 miles. Okay? That's also the distance that is specified in the commission on safety goal policy statement that says when you're computing latent cancer fatality you list an average over 10 months. But I've been able through my research at least to establish a connection. Why did they pick 10 miles?

I know when the safety goals were originally published that was a 50-mile radius from a site. You know, it was realized you are averaging very small doses through a very large number of people by going out to 50 miles. And so they squished it down to a 10 mile type of situation like that.

The other thing is this is a very simplistic model as Lyman had pointed out. The actual travel of the plume depends on any number of effects like this. It could easily jump over somebody sitting at 100 meters. So they would receive a lower dose than somebody further away from the site like that. And this model is not capable of representing that. But it was one of the more simple methods I could come up with to try and relate dose versus distance, which is the fundamental problem that I was confronted with solving.

So after that in Step 13, I would simply

do the calculus, substitute in the various formulas into the relationship there, and you can analytically solve the integral and get the result there for the expected number of fatalities in this 22-1/2 degree sector that has got a length of 10 miles on it.

One of the things I would point out is when you use complicated software like MACCS and its Monte Carlo, in my personal view you lose this engineering insight that a nice, elegant analytic equation gets you. You don't really see what's factoring, but rather you become, you know captive to your software models and things like that. So, you know, this equation shows you some interesting things like that.

Moving on to Step 14, the next slide, the total population in the area is simply the population density times the difference in the areas like that. And I showed the simplification like that. So when I combined these two in Step 15, you will notice some interesting things. First of all the population densities cancel out the numerator and the denominator. It doesn't matter how many people are there, like that. Other things, you know, of course, the values of Pi cancel and things like that. And you're left with this expression in Step 15, like that. But you notice that it factors out, this term on the line, R+10- R1, like

that, is separable in there.

So the next step was the realization, I can just pick R1, which is the radius of the exclusionary boundary and just set it to zero and say, okay, there is no exclusion areas right on top of this point source it's creating. That would be the maximum of the equation. And by doing that then I simplify it down even further. That's where the square root of 10 comes from in there. I set that down equal to the QHO and back solve. And I get a relationship that does hit the reference point times the distance at the reference point raised to the 1.5 power has to be about .422, something like that.

So that's the relationship that we need to satisfy in there. So I go to the last slide, next slide, please. I actually plot that thing out. And then of course in log law space, it walks as a straight line like this. What the line is trying to show you is that any point on that line will satisfy the criteria. So I picked 100 meters and got 27.2 rem in there.

I could have picked another distance. And it turns out it's hard to see on this graph because it's condensed down, and it doesn't have the lines in there. But it turns out I could have picked 150 meters and then I would have had a dose criteria of 15 rem.

That one is kind of pneumonic to me, 15 rem at 50 years is 150 meters. Okay? It's nice, like that.

But anyway, that's the idea. Then to relate it back to the criteria, so what was specified was rem in the first 96 hours plus 2 rem additional in the first year 24-1/2 rem over the second and subsequent years if you use the 27-1/2 rem number. So lo and behold the numbers match.

I'm a little bit surprised. I guess I'll raise the topic of people should realize where those dose limits came from, and they are in fact the EPA PEGs. So I'm not saying the EPA PEGs are the regulatory basis. I'm just saying coincidentally if you met the EPA PEGs at 100 meters, you would also meet the QHO. Okay? That's the proper interpretation of the calculation. And with that, I'm certain you have many questions.

MR. BEALL: Okay. Thank you, Marty. If you have some questions for Marty, please raise your hand. Adam Stein, go ahead.

MR. STEIN: Hey, Marty. This is Adam Stein from Breakthrough Institute. Thank you for going through this. I really appreciate you taking the time. I do have several questions. I'm going to ask a couple and then give other people a chance to ask some questions

before circling back around.

You mentioned correctly that there is a trade-off between considering distance with population increasing as you go out in the proposed 22.5 degree plume cone and dose response for binomial power law response from the dose reducing it over distance. I did that calculation for you, and it looks like it still reduces by a factor of 1.27 all the way out to 10 miles considering the larger population of 10 miles versus the power law reduction deficit. I would be happy to discuss with you at a later time how I came to that. But it still seems that this is towards the conservative side the way that you have done it versus considering potentially higher consequences for the larger population at 10 miles.

I was going to ask why you are using 10 miles in there instead of just the 100 meters because at some points you are calculating at 100 meters and at other points you do calculate the dose all the way to 10 miles. I'm not quite sure why we are doing both at different points. Perhaps you could clarify that to me.

I do appreciate your simplification of using a uniform population density in MACCS. You also simulate uniform weather variability. Have you

considered just putting in a single directional data set of weather so it always is looking down the same 22.5 degree plume cone to further simplify it?

And I would like clarification as to using a conditional risk with a frequency of once per reactor year, which if I am interpreting what your objective is here correctly, you are essentially looking at having a maximum accident where you would most likely have core damage to have a maximum accident every reactor year. Is that correct?

MR. STUTZKE: So I'll see if I can remember all the questions. But you're right. It would assume every reactor trip which occurs at a frequency of roughly once per year would be the bounding event, which is obviously conservative like that.

You know, again, the problem is to justify a lower frequency. And I want to emphasize, it's not the frequency of the bounding event that's important in the calculation. It's the frequency -- or the sum of the frequency sequences that release material to the environment that's important. So when you again consider all the possible event scenarios like that, it's what I called before the slippery slope into the PRA because they all have unique frequencies because there are different events like this and that's exactly

the problem with trying to eliminate.

That being said, you know, I realize all of the area work, including the development of the pre-decisional draft Regulation Guides, I had a working group of some 12 to 15 people involved, and this was one of the most contentious discussions within the working group was once per year. You know, some people agreed with me. Others said, wow, that's horribly conservative, and you ought to give them some credit. But, again, I'm not quite certain how to go about giving that credit. So I would entertain some suggestions.

MR. SEGALA: But, Marty, this is John Segala at NRC. But the guidance allows justification for a different number, right?

MR. STUTZKE: Absolutely. So, you know, one way to elegantly state it is we provided flexibility to the applicant to justify something lower, you know, within reason.

Now to pick up on your other things, the idea -- if we can go up to Slide 39. Yeah. Scroll up to where it says area entry conditions -- 5 of 7 -- oh, too far, 5 of 7, please. Thank you. That power law model, let's be clear. The D0 is the 27-12 rem number. And the R0 is 100 meters. That's the purpose of the calculation is to come up with those numbers.

The 10 miles is the area over which you are averaging the dose or the response to the dose. So, again, early into the -- closer to the site, you have a higher dose with fewer people exposed, and the further away you move you have a lower dose where more people are exposed. So you are just taking an average like that. And, again the 10 miles was described in the cyclical policy statements so that's what I used.

Now the only other comment I'll make is the switching from units from miles into meters, when you actually solve the equation, you get some large number of decimal points in miles, and I was looking for some more elegant way to frame the problem. And it turns out the exact number is like 97.36 meters. And they went, oh, well, let's just round it to 100 meters because it's convenient to use and easy to remember like that. But, again, the purpose of the calculation was to come up with this relationship between dose and distance, defining this reference point. In other words, the relationship between 0 and R0 that would ensure if I met that relationship, I would always meet the QHO or individual latent cancer fatality risk, not crediting accident frequency.

And as I said earlier, you know, we could pick other reference points, for example 15 rem at 150

meters also satisfies it. Did I answer everything, Adam?

MR. STEIN: Yes. You did cover everything that I asked at this time. I'd like to give an opportunity to others to ask questions. Thank you, Marty.

MR. STUTZKE: Yeah, thank you.

MR. BEALL: Okay. Ed Lyman, you had your hand up and you took it down. You don't have a question?

DR. LYMAN: Yes. I'm all set. Thanks.

MR. BEALL: Mike Keller, you're up next.

MR. KELLER: Mike Keller, Hybrid Power Technologies. It seems to me you made this way too complicated, and I think you are going to inevitably end up stepping into a land mine field. Why don't you just arbitrarily say, I don't know, 25 percent of 25 rems for the duration of limiting DBE at the site boundary and let the applicant figure it out. It avoids the whole QHO controversy, and it is a controversy, and recognizing that I think inevitably there will be further calculations on these dose issues anyway as the design moves onward.

But you're just trying to get within hand grenade range anyway with this initial path, and you may deviate off the path anyway ultimately. So, again,

just avoid the whole damn controversy in the first place and admit it's kind of arbitrary as to how you entered the entry point. Thank you.

MR. SHAMS: Mr. Keller, thank you. This is Mo Shams with the NRC. I think probably the group would benefit again from maybe, Marty or others, just put up the slides that describe the current language for AERI. Because I want to probably share the view that it is not that complicated. It is actually straightforward. So maybe we are not doing a very good job presenting that aspect. So if we can just put the slide up to show it to everyone that would probably be helpful.

MR. KELLER: Yeah. What I'm actually trying to suggest is avoid the whole QHO thing in the first place.

MR. SHAMS: And we are actually.

MR. KELLER: Well, it's integral to your calculation.

MR. SHAMS: What Marty is saying is inevitably when you actually show that your dose is at 100 meters are low such a limit, you inevitably need the QHOs. You're not making calculations to meet them. You are already inherently meeting them.

MR. KELLER: Meeting what? I don't think

the QHOs are in the Code of Federal Regulations, are they?

MR. SHAMS: Again, the point is whether or not you are doing the calc to show you're meeting them. And what Marty is saying is you're not doing that. He's saying the limits that we're putting in AERI gets you there without having to do anything extra.

MR. KELLER: Yeah. But the point is there is QHO, which is admittedly controversial. I'm suggesting just avoid the whole mess in the first place.

MR. SHAMS: Thanks. The comments is noted. Thank you.

MS. CUBBAGE: All right, Mo. Thanks. I'd like to read a question on behalf of Steve Schilthelm with BWXT. He was having difficulty being able to speak up.

And so the question is, are the area consequence based criteria consistent with the MHA consequence criteria of non-power reactors, which do not typically require PRA? If not, can you speak to the difference and basis for the difference noting that non-power is not necessarily researched in all cases?

MR. STUTZKE: I know in the NPUF rule, which the commission has not yet acted on, they were using a criteria of 1 rem at the site boundary as I

recall. So that is consistent with the 1 rem at 96 hours that we have in this preliminary proposed rule text like that. However, the NPUF rule again is only concerned about the short-term, and you go out to the individual latent cancer fatality risk requires 50 years. So I would argue they are not incompatible.

The other thing is I have done some scoping calculations of the test reactor at NIST as well as the one at MIT up in downtown Cambridge. And they easily meet these area entry conditions.

MR. BEALL: Okay. Patrick White, you've got your hand up?

MR. WHITE: Yes. Thank you. I just want to make a quick comment that I really appreciate this level of detail and this kind of presentation on the background behind this. I think this is really helpful as we're kind of taking a look at the rule and providing additional feedback. So I just wanted to thank Marty and the staff for kind of preparing this information. It will make, I think, more specific responses in the future really helpful. So thank you for this.

MR. STUTZKE: Thank you.

MR. BEALL: Okay. Are there any additional questions? Adam Stein?

MR. STEIN: Thanks for the opportunity to

ask questions again. This is Adam Stein from the Breakthrough Institute. I am just trying to find my question that I wrote down. Give me one second, please.

Not to belabor the point about frequency, I just want to be clear that I understand the use of the maximum accident, once per reactor year, which would most likely have core damage, is clearly a maximum of maximum assumption to avoid the use of defining a lower frequency, as Marty suggested. However, I would suggest that it is an impossible assumption because if you're actually failing the core, you can't do that every year. So an impossible assumption is beyond a maximum credible assumption in my view. I would like to know if that was part of your discussions with the working group because you clearly could not have a frequency that large. It would not be feasible. If you could comment on that, please.

MR. STUTZKE: Our working group didn't discuss the idea, you know, it is impossible to have one event per year, which would imply you would have the accident and then you would replace the plant and get it started up, and it would fail again and et cetera, et cetera, like that.

So, you know, it's a statistical type of thing like that. But, again, it's very difficult to

begin to justify lower frequencies without resorting to some sort of risk assessment, which would imply some sort of model, which you would look over the possible spectrum of accidents and estimate their frequencies. So anyway, that's where we are. As John Segala had pointed out, your applicants can justify something that is lower and that would be fine.

MR. STEIN: Okay. I just wanted to know if that consideration of the assumption not being potential or possible was discussed so I can better form comments later on to help inform the process here. Thank you.

I would also like to know if the -- and once again, I understand that you are doing this to avoid performing a justification of the frequency. However, in Framework A, which is a different framework, the concept of using the QHOs in Framework A has been defended as a need to include a metric of cumulative risk.

In this case, it is a metric of cumulative risk by using bounding maximum risk. So that is potentially an order of magnitude higher because your frequency is significantly higher. So would that not make this approach several orders of magnitude more constrictive than Framework A?

MR. SEGALA: So this is John Segala. One of the things I want to say is that the AERI entry criteria again is not used as the safety criteria for the design of the plant. It is used to determine whether or not you need to do a probabilistic risk assessment.

MR. STEIN: So if you can screen for the AERI approach, then you just avoid the need to do the PRA is what you're saying.

MR. SEGALA: Yes. Because you meet the QHOs by default. And we look at the PRA for the operating fleet. You look at core damage frequency and large early release frequency as surrogates for demonstrating that all of the designs meet the QHOs. And so if you meet the QHOs using this bounding approach, then you don't need to do a PRA. And that's what we're trying to -- we're trying to use the entry criteria to find these low consequence safe designs that are simple and, therefore, it doesn't make sense for them to have to do a PRA. And so we tried to come up with criteria by which you could assess your design against and show that you meet the QHOs and, therefore, it's not necessary to have to do a PRA.

MR. STEIN: Thank you for that clarification. So you are, and feel free to correct

me if I'm wrong, you are essentially trying to make a technology inclusive surrogate like a LERF for very low consequence designs.

MR. TRAVIS: This is Boyce Travis. The rule is trying to present a procedural simplistic criteria that allows small designs to not have to use a PRA as an optional for a subset of facilities. It is asking the question, or we asked the question internally, how small and safe would you have to be that we could totally obviate the need to have a PRA? And this was, again, as Marty pointed out, one solution that was proposed and came up within the guidance or in the draft preliminary guidance that has been put out along with the rules.

MR. STEIN: Okay. Thank you for the discussion.

MR. BEALL: Rob Budnitz, do you have a question?

MR. BUDNITZ: This is Bob Budnitz. Can you hear me?

MR. BEALL: Yes, we can, sir.

MR. BUDNITZ: First, I want to start out by saying that I've been a consultant to the staff and Marty on this, but my question is not related to that. I want to make an observation.

Every single reactor that comes into Part 53 has to start out with a Box A on that chart that goes A, B, C, D all the way down to Box R and S. And Box A is you have to do a systematic search with a clean sheet of paper for all the initiating events. Okay? Everybody has got to do that.

Now when you get down to AERI, you have to identify the bounding event. And presumably that bounding event has an initiating event, which you have identified. It is the initiating event for the bounding event. Now it's not a full PRA, but it's not difficult to work out the frequency of that initiating event. And if it's one every 500 years, well, that's a factor of 500 compared to the once per year. And maybe you can use that if you really need to in order to meet the entry condition.

So although the guidance says once per year or justify lower, I suspect that for most of these designs the bounding event is not going to happen once a year. It's not even going to happen every 10 years. It's not going to happen every 100 years. You know, it's going to be fairly uncommon. And it won't be difficult to show that if the designer/applicant wants to show it to meet the entry condition. So I'm not so troubled by that although I may be off base about

this. And I just wanted to throw that comment in for your consideration.

MR. BEALL: Okay. Thank you, Bob.

MR. BUDNITZ: And the point is it's not a full PRA. It's only one number for one initiating event for one bounding accident.

MR. BEALL: Okay. Thank you. Are there any other questions? If you're on the bridge line, please star 6. Yes. Rani?

MS. FRANOVICH: Okay. This is Rani Franovich again. I remain very interested in having a discussion about performance-based regulation under Framework B. And, you know, I took a look at SECY-98-144. And it defines the term risk-informed and risk-based and performance-based. And it draws distinctions among these terms. And in fact, it acknowledges that a performance-based approach can be implemented without the use of risk insights.

So, Rob, just before the break, you and I agreed that divergent perspectives do warrant further discussion. The Breakthrough Institute and the American Nuclear Society proposed an appropriate venue for that level of discussion and requested NRC to host an open, inclusive and collaborative workshop or series of workshops to have a substantive discussion and exchange

of ideas on the development of Framework B.

And I look forward to that discussion. I don't think it can be accommodated by comment gathering meetings. So I really do encourage the staff to, you know, carefully consider this request in the interest of having a really useful pathway under Framework B for a number of developers in the industry.

And I don't have a question. I just encourage the staff to take this under serious consideration. Thank you.

MR. SHAMS: Rani, thank you. I think Rob is in another engagement at this point. I don't see him responding. So I will respond for him.

So, no, thank you. We appreciate it. As he shared earlier, we certainly are aware of the letter. We received it. We'll definitely assess the path forward as far as, you know, further engagement. We definitely plan to engage on a number of issues. And we will definitely take into consideration your request for further engagement on Framework B itself. So thank you.

MR. FRANOVICH: Thank you, Mo.

MR. BEALL: Okay. Thank you, Mo. Are there any final questions, comments from stakeholders?

MR. MOULTON: There was a comment in the

chat that Amy was going to read.

MR. BEALL: Oh, she did that already.

MR. MOULTON: Oh, she did? Oh, sorry.

MR. BEALL: That's okay. Okay. Can we go back to Slide 32 for a quick review?

Okay. So I would like to remind everybody that our next meeting is going to be with the Advisory Committee on Reactor Safeguards on June 23 and 24. And we will continue this discussion with them on the Framework B and AERI approach plus we will also be talking to them about Subpart F, Staffing, from the Framework A language.

Additionally, we will be having a briefing with the commission as you see here on the 21st.

I would like to remind everybody that all new and revised proposed rule language will continue to be posted on ADAMS and on regulations.gov under our Docket ID NRC-2019-0062 prior to any of these public meetings.

We also encourage you to receive information about Part 53 rulemaking by subscribing to the GovDelivery dot service. This will provide you with information about the Part 53 rulemaking directly to your email inbox.

Slide 33, please.

If you have additional input or suggestions for future topics related to Part 53 rulemaking, please send an email to me at the email address on the slide. Your interest and comments will improve our rulemaking effort.

I also encourage you to monitor the Part 53 Rulemaking Docket ID again which is NRC-2019-0062 on regulations.gov website for updates and important documents related to this rulemaking.

Finally, we're always looking for ways to improve our public meetings. And your feedback is important to us. At the end of the meeting, please go to the NRC public meeting website and click on the recently held meetings button and look for this meeting. The meeting feedback form will be at the bottom of the meeting announcement.

I would like to thank everyone for participating in today's meeting. And I hope everyone has a good evening, and this meeting is now closed. Thank you.

(Whereupon, the above-entitled matter went off the record at 4:02 p.m.)