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

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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RELIABILITY & PROBABILISTIC RISK ASSESSMENT

SUBCOMMITTEE

+ + + + +

WEDNESDAY

FEBRUARY 5, 2020

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2D30, 11545 Rockville Pike, at 8:30 a.m., Vesna Dimitrijevic, Chair, presiding.

COMMITTEE MEMBERS:

VESNA B. DIMITRIJEVIC, Chair

DENNIS BLEY, Member

JOY L. REMPE, Member

JOSE MARCH-LEUBA, Member

DAVID A. PETTI, Member

DESIGNATED FEDERAL OFFICIAL:

CHRISTIANA LUI

CONTENTS

P R O C E E D I N G S

8:31 a.m.

MEMBER DIMITRIJEVIC: This meeting will now come to order.

This is a meeting of the Reliability and Probabilistic Risk Assessment Subcommittee of the Advisory Committee on Reactor Safeguards.

I am Vesna Dimitrijevic, Chairman of this Subcommittee meeting.

ACRS members in attendance are Dave Petti, Joy Rempe, Dennis Bley, and Jose March-Leuba.

Christiana Lui of the ACRS staff is the Designated Federal Official for this meeting.

The Subcommittee will hear presentations and hold discussions with the NRC staff and industry representatives of the Proposed Update to Reg Guide 1.200 Rev 2, An Approach for Determining the Accessibility of Probabilistic Risk Assessment Results for Risk-Informed Activities.

The Subcommittee will look at the information, analyze relevant issues and facts, and formalize a report position and action as appropriate for deliberation by the Full Committee.

The ACRS was established by statute and is governed by the Federal Advisory Committee Act.

The NRC implements FACA in accordance with the regulation found in Title 10 of the Code of Federal Regulations Part 7.

The Committee can only speak through its published letter reports. We hold meetings to gather information and perform preparatory work that supports our deliberations.

The rules for participation in all ACRS meetings were recently updated and announced in the Federal Register on June 13, 2019.

The ACRS section of the NRC public website provides our charter, bylaws, agendas, selected reports, and full transcripts of all open Full and Subcommittee meetings, including slides presented in those meetings.

The Meeting Notice and Agendas for those meetings are posted there.

As stated in the Federal Register Notice and in the Public Meeting Notice of the NRC website, interested parties who desire to provide written and oral comments may do so and should contact the designated Federal Official five days prior to the meeting as practicable.

We have received no such requests prior for today -- prior to today's meeting.

We do have a time set aside for spur of the moment comments from anyone attending or listening to our meeting during today's meeting.

Also, we have a bridge line established for interested members of the public to listen in. To preclude interruption of today's meeting, the phone bridge will be placed in listen in only mode during the presentations and Subcommittee discussions.

We will unmute this bridge line when we proceed to the public comment agenda item.

A transcript of this meeting is being kept and will be made available on the NRC public website as mentioned. Therefore, we request the participants of the meeting use the microphones located through the meeting room when addressing the Subcommittee.

The speakers should first identify themselves and speak with sufficient clarity and volume so as they may be readily heard. Make sure that the green light is -- on the microphone is on before speaking and off when it is not in use.

At this time, I request the meeting attendants and participants silence their cell phones and any other audible electronic devices.

We will now proceed with the meeting. I call upon Mike Franovich --

MR. FRANOVICH: Good morning, ACRS members.

MEMBER DIMITRIJEVIC: -- of the NRC staff to begin.

MR. FRANOVICH: Thank you.

First of all, I want to thank the Committee and also the ACRS staff for fitting us in to your busy schedules. I know projects like NuScale are really dominating a lot of attention. There's a lot of material to read. So, thank you, again, for fitting us in.

As you know, the Reg Guide 1.200 really is the backbone of a lot of the PRA work as well as the ASME PRA Standard.

We've got a lot of experience with applying Reg Guide 1.200, both industry and regulator, and we have progressed to a point where we think this update in Rev 3 is necessary to deal with a particular issue. And, that issue is the treatment of newly developed methods.

Why that is important is, while we can make progress currently with newly developed methods going through a regulatory review or what we would call the licensing review, an alternative approach that would help our stakeholders expedite review of

the newly developed methods has been proposed by industry and the solution for many years has been elusive until today.

We've made a great deal of progress. We believe that taking the approach that's going to be defined by -- outlined by the staff today helps fulfill what the Commission actually originally intended which to leverage the PRA Standard to help obviate the need for detailed staff review of PRA models.

Why this is also important and has a high importance for senior leadership and NRC as well as industry, the matter is a top priority for both risk-informed steering committees on both sides and that is, we are approving a number of license amendments for things like risk-informed completion times.

So, for folks in the field who actually these risk tools, the objective here is to give them the most realistic assessments of risk and not have it skewed or distorted by methods that may be less than complete, but are sufficient to move forward with approving the model.

Realism is important. These operational decisions that plants are making and taking equipment out of service for extended periods of time is really

sort of a top issue.

There's a great deal of interest by our stakeholders as we see more and more plants migrating to risk-informed completion time submittals.

We are also approving other programs like 50.69, an alternate treatment of SSCs.

So, there's a lot of momentum. It's an exciting time if you're in the risk business to see a lot of progress forward.

But the newly developed methods area, we believe this alternative approach will help fulfill what was originally intended in terms of using the peer review process in the ASME Standards.

So, you're going to hear a great deal of details today about how we've been working with our stakeholders to build the Standard out and Reg Guide 1.200 update which, in essence, we would endorse the provisions that'll be built into several industry documents, including in the PWR Owners Group document which you'll hear about later today.

Ultimately, we would try to finalize Reg Guide 1.200, but where we are today is we're looking to move forward and incorporate feedback from the Committee as well as some of our internal stakeholders and get this draft document out for stakeholder

comment in accordance with our normal processes using the Federal Register.

It is on an aggressive schedule, again, I appreciate your time and making the time to hear us today. And so, we look forward to your comments.

CHAIR BLEY: Michael, I don't want to sound like a complete jerk, but I think I will. But this is really addressed at --

(OFF MICROPHONE COMMENTS)

CHAIR BLEY: What can I do about it?

(OFF MICROPHONE COMMENTS)

CHAIR BLEY: It's really addressed at all the speakers. When I read this newly developed methods requirements, it seems the tautology, whereas I don't find substance there. It spends a lot of time figuring out, is this a new method?

And, it's the sort of thing that feels like any good analyst would do without all of this baggage to get them there. And, if they can't, maybe they should be doing this kind of work.

So, I'm really interested in what this is going to do to help. Because it seems to not get to the real meat, but maybe there is some. I'm looking forward to finding it today.

MR. FRANOVICH: I think one -- just to add

one perspective, at the end of today, we need to have some level of assurance that these methods are appropriate.

In particular, if you're taking equipment out of service. So, while it's heavily process focused, that really is the end objective.

And, I think that's what I'm getting from you. Just if you're looking for technical like in this particular method, a lot of the construct is about process, bringing in the right individuals, and using the high level requirements to give us, at the end of the day, confidence that those methods are appropriate.

CHAIR BLEY: Okay. And, when I go through the flowchart which is all process, I don't see many things there that -- and it's mostly being able to say, oh, this is not a new method and doesn't need review. Oh, this is a new method.

MR. FRANOVICH: I think you'll hear from our stakeholders a little bit more why that is in terms of the concept of -- or issue of PRA upgrade versus maintenance, is a big factor, whether or not you need to bring in a group to do a focused scope PRA review.

So, it has tentacles and other trigger

points and other aspects that affect the stakeholders.

CHAIR BLEY: Thank you. I'm looking for the meat. I'll be here.

MR. WEERAKKODY: Should I go ahead then? I think that Mike then now -- yes.

So, I want to repeat what Mike said with respect to the Committee and also the staff pulling us in because we really wanted to get in front of you, get some initial reactions, not necessarily understanding it's not going to be a formal position from the Subcommittee but your questions might be insightful and we'll take notes and try to factor that as much as possible in to the Revised Reg Guide before we put it out for public comment.

So, thank you, again. My name is Sunil Weerakkody. I'm the -- I'm one of the two senior level advisors in PRA in the Office of Nuclear Reactor Regulation. My special focus is operating reactors.

I have Dr. Reisi Fard here. He's got significant experience of the actual application of Reg Guide 1.200 in reviewing a large number of licensing actions over the last, should I say decade or five, six years in NRR.

And then, we have the Office of Research, our lead, to update the Reg Guide 1.200 has been

extremely closely working with us to get this done on the expeditious time scale that Mike has imposed on us.

So, when I say the senior management, so, thank you, again.

So, we have several specifically three presentations for today from the three of us.

You know, my presentation for the next half an hour has one primary objective. I want to give you more details about what Mike spoke about which is the most significant change to the Reg Guide 1.200 that's primarily driven by significant increase by licensees in adapting risk-informed initiatives.

It's been significant because not just because of the RITS-4b AOT, but then there are other rules they are adapting.

Let's go to the next slide.

What I wanted to do is to -- I wanted to communicate, I know there's a couple of members at least who are very familiar in the PRA area, but I really want to give the -- all Subcommittee members the context in the next 25, I will use 12 slides to go over the seven bullets I have highlighted below to give you the context of what we are trying to do.

And then I'll give some details on the

most significant change we are making to the document which is our plan to endorse the revised version of NEI 17-07 and also the document that the PWR Owners Group has created which lists out the review requirements for new review of methods.

And, I believe in our -- Dennis, you mentioned -- should I call you Dr. Bley or --

(OFF MICROPHONE COMMENTS)

MR. WEERAKKODY: Okay.

I think when the PWR Owners Group, they are on here, they will go over some of the efforts we have explained there with respect to coming up with a clean, clear definition of a new review method.

So, review requirements is not the only thing, but any questions that they do not satisfactorily answer, we have a follow up presentation with this.

So, first off, I will go through and give you a historical summary of the evolution of the peer reviews process, the objective that is to convey to you that this is a process that the Commission started in endorsing about 20 years ago. So, I will give you a perspective of that.

And then, within that, I will summarize the role of Reg Guide 1.200 and the role of Reg Guide

1.200, it's relationship to a number of other Reg Guides that are related to risk-informed initiative.

Then, I use the work gap here. We did find out as in -- during our implementation, especially in the 805 that there si a gap in Rev 2 of Reg Guide 1.200 with respect to newly developed methods.

And then, we concluded that it is really significant to close that gap. And, I have to thank the industry representatives. They volunteered to do a number of things to help us close that gap.

And then, I will go over the current status and next steps and using a very brief summary.

CHAIR BLEY: Sunil, what led to this? Was it that the staff and applicants couldn't agree on what things meant?

MR. WEERAKKODY: I believe the short answer is this, and that is a presentation -- there is a bullet here that specifically speaks to that.

But in summary to your question, we realized not having a good clear requirement with respect to a definition of newly developed method or how to review and accept a newly developed method was creating a lot of inefficiencies.

This came up during the fire PRA reviews.

The staff felt that there were a number of fire PRA methods that have been used that were not properly substantiated. And then, therefore, the staff starting reviewing those methods because they've got to fulfill their safety mission and make sure that methods that are used is acceptable.

On the other hand, some of the licensees felt that, hey, you know, we have the PRA review process the Commission endorsed 20-some years ago is the staff doing things that they don't have to in terms of reviewing things that they have to.

So, that created a lot of negative energy and a lost of trust in the peer review process.

CHAIR BLEY: Okay.

MR. WEERAKKODY: So, that's --

CHAIR BLEY: So, the hope is this will help both the applicant and the staff figure out where the staff has to dig in and do a more detailed review?

MR. WEERAKKODY: Yes, that is the hope. And, I still call it a hope for a couple of reasons.

One is, I think we have done, in my personal view, done a tremendous job in the technical area with the support of the Owners Group in terms of setting up a very detailed criteria so that the chance of a deficient method getting through is very low.

But there is another big element to it which is, well, once we established that are there, you know, and we are working with our Office of General Counsel on this, in terms of moving that responsibility back to the independent license agreement was is, are there any legal concerns with that?

So, we are addressing that. We have a number of interactions ongoing with our Office of General Counseling regarding that.

Today, we are going to focus on primarily the credibility of what the industry has proposed, but I will mention the other element in brief.

So, let's go to the next slide.

Now, what I have done here is listed some key Commission communications. Because of the time constraints, I am not going to go into details, but what I will do is make an overarching remark on each of these things. So, all members here, even if you know this, will be refreshed with respect to the issue of PRA quality, or acceptability how it originated about 20 years ago, and then how we have addressed that issue and implemented over the years.

First off, I am referring to SECY-99-256. So, in October of 1999, the staff made a proposed

rulemaking on 50.69, you know, it was published in 2004. And, what it did was, during that proposal, the staff made it clear to the Commission that the issue of having PRAs of acceptability is a key concern.

And, staff also pointed out that these would be burdensome to the industry to demonstrate that they have developed models of acceptable quality to the staff and highlighted two potential parts.

One is the staff reviews and approves every PRA model, all the details.

A second is to rely on the peer review process where are the independent peer review was -- will review it and the staff will choose to go -- take a deep dive into any area that they choose is important to safety. And, that's in SECY-99-256.

Then, if you look at COMNJD-03-0002, some of you may remember that we had Chairman Diaz here, a big proponent of PRA, he wrote to his two fellow Commissioners basically saying that, this is a significant policy issue.

He basically said to the other Commissioners, it's not just 56.90 for all of these risk-informed initially, it is very important for the staff and the Commission to have a policy with respect to how we issue acceptability. And, that's in COMNJD-

09-0002.

The two other Commissioners, Commission Merrifield, and the other Commissioner, I can't remember the name. I can only remember so many details, but they agreed with Chairman Diaz. And, based on that, directed the staff to prepare an implementation plan which is SECY-04-0118.

Now, in SECY-04-118, which is titled, Plan for Implementation of the Commission's Fast Approach to PRA Quality, which was issued in 2004, the staff communicated to the Commission, you know, they had like a 23-page attachment.

In that attachment, the Commission told the status of various tools that are being produced by the industry and the SME and the staff to get to basically to go with the peer review process.

At that time, I believe NEI had published what we call NEI 002 that outlines the peer review process. And the ASME/ANS has started developing the Standard, excuse me if I say anything inaccurate.

And then, on the staff side, we had put out Reg Guide 1.200 that we talk about today, the trial version.

So, clearly in SECY-04-0118, the staff informed the Commission with respect to the efficiency

and all of the other reasons our preferred path is the peer review process.

The Commission issued the SRM pretty much approving that plan. And, that's why I would basically say that the peer review process was brought to their attention by the Commission in as early as 2004 and was then approved by them through the SRM.

And then, of course, I'll go into a little bit more details how the whole process is set up in my next slide, we established the peer review process. And, sometimes, there are questions with respect to whether there is our -- there are regulations in NRC that has qualified. I say, do we have a regulation that has necessarily pointed to the peer review process as an acceptable way of reviewing the actual quality?

The answer is a definite yes, when you look at 50.69, there is rule language, not Reg Guide, rule language that specifically points to the peer review process as our vehicle, at least as one way of accepting the PRA quality.

Any questions on that slide? I just wanted to give you sort of a summary of the -- in a story kind of way with respect to where we are. If not, let's go to the next slide.

(NO AUDIBLE RESPONSE)

MR. WEERAKKODY: So, this is a slide that, and I still, you know, feel sad. This is something that Dr. Mary Drouin created which we use pretty much in most of our presentations. She's no longer with us, but her legacy continues.

This is a great picture to convey to anyone in a very brief way the different documents that we have used and how they interact with each other to implement the peer review process.

So, if you look at the -- one of the blocks that's title PRA Standard to Demonstrate Conformance with Staff Positions. Some of the members may have already looked at the Standard, but if you haven't, if you open the Standard, what you would see is they have a listing of technical elements. And, under each technical element, they will list, okay, here are the high level requirements, here are the supporting requirements.

It's a very thorough way of making sure that our independent peer reviewers go and do a peer review. And, as Chairman Dimitrijevic knows, I have been a licensee. And, I'll tell you, I have been subjected to that peer review process.

I would personally be subjected to a staff

review then that peer review because they come in and they spend the night in this looking at every corner of your PRA and they do a good job. But that is my dated memory. I don't know how things are today. I think he knows more. So, that's one component.

The second component is where usually, not usually, always we have the Nuclear Energy Institute creating a document that delineates the process. It points to how the peer reviewers should use the Standard to do a thorough peer review.

And, a third document which is -- which has the regulatory statute is Reg Guide 1.200. It not a rule requirement, but in my personal view, because we do not have a PRA rule, it basically fills that vacuum in a big way with respect to PRA acceptability.

And, some of the licensees that I have talked to almost looked at Reg Guide 1.200 pretty much like a rule, even though it is not a rule.

So, what Reg Guide 1.200 does is it gives us the clear, unambiguous position as a regulator to make the final call.

What we do is, we point to the peer review document and the Standard. And, basically endorse them. And, if there's anything there that we do no endorse, we highlight that.

So, that's why when you open Reg Guide 1.200, there is a whole appendix that tells you, clarifying, you know, where we agree, where we don't.

So, the reason I say that is, we call the final call, even though we are using the industry documents to establish the Standard.

Let's go to the next slide.

So, I wanted to convey a couple things. Again, because of the time constraints, I'm kind of rushing through this, but there are two points I wanted to make wtih this slide.

One is, when it comes to PRA acceptability, it's a function of the application. Okay? How deep we look for the applications like risk-informed ISI versus RITS-4b AOT very different.

And, when I say very different, with respect to acceptability, there are four key dimensions. One is the scope. Do we have the fire PRA? The seismic PRA? Have you modeled internal events? External events? That's one element.

The level of detail, you want to make sure that when you use it for an application, it has sufficient level of detail to match the needs for the application.

The technical elements, HRA, you know,

does it have all the technical elements? Because for each of those technical elements, when you go to the Standard, you find those high level and supporting requirements.

And, the Standard presentation, we want the licensee to use a model that reflects the as-built as operating plant. Ensuring that they do that is very important for some applications, less important for some of the other applications.

For example, if it's a risk-informed ISI, if there's some deviation, it's not going to influence. But if you're talking about changing the allowable outage time, they have to always have a situation where the plant is operating after the PRA model.

So, with that, let me go to the next slide. Okay?

Now, what I want to convey here is the special emphasis to RITS-4b. Mike mentioned this, but this is the application where licensees will use the quantified numbers, and I want to emphasize the word quantified numbers from the PRA model, typically includes the internal events and the fire to compute the allowable outage time for simulated stains that have been in the tech specs.

So, the staff have sensitivity and the most detail review is on this application. Because in comparison to this, the other applications have lots of qualitative elements to compliment the -- what's coming out of the PRA model.

I make that point strongly because the subject matter of the issue today is most important to that particular application. And, that's why the staff is very much committed to getting this right for RITS-4b applications.

MEMBER MARCH-LEUBA: You're having too much talking to yourself.

MR. WEERAKKODY: I know, so please.

MEMBER MARCH-LEUBA: I'm going to correct you for the rest of it.

I'm a big, big non-fan of risk-informed.

MR. WEERAKKODY: What is that?

MEMBER MARCH-LEUBA: I am always complaining about risk-informed things. And, my primary concern is that you don't really know the risk. If you knew the risk, everything else, the MAAP and application would work perfectly.

My complaint is, you don't know the risk because of the completeness of your analysis. Okay? So, it's always what physical mechanism, what failure

mechanism, what activity to the operator do you not include on your model?

So, we already know this improves the review of the completeness. And, how do you really, really go into completeness?

MR. WEERAKKODY: So, let me give you a high level answer to that covers all of those applications. The completeness of the model that you point to is a very well known, I would call it a limitation of the PRA model.

And, if you go to Reg Guide 1.174 which tells licensees to how they need to submit the application, that particular uncertainty has to be addressed in the manner that is acceptable to the staff.

So, and then, the other thing we do for each of these applications when we recognize that the completeness, the uncertainties, sensitivities, they are there as inherent of the PRA model.

MEMBER MARCH-LEUBA: And, what would you say if I tell you that we are reviewing a new reactor, imaginary new reactor and, therefore, got a very important design basis event, they didn't even know it existed.

And, it was not on a license Chapter 15,

it was not included in Chapter 19, the operators were not aware of it, but it's a very important event. Call it a tsunami, call it a small break LOCA --

MEMBER REMPE: Oh, let's just call it transportation to the site and installation of a reactor with a loaded core and then removal of an operating reactor --

MEMBER MARCH-LEUBA: If you need an example, let's go to the bottom solution and then outcomes.

MEMBER REMPE: Yes.

MEMBER MARCH-LEUBA: But if there are not a member of the plant, forget -- let's go with the tsunami. Forget to include a tsunami on their PRA, how can you say that I made a risk-informed -- if I didn't include a tsunami on my PRA?

MR. WEERAKKODY: Okay. So, there are certain things that you know that you're not including in the PRA and you can, and we have, and we should if we don't, consider that in the application specified here. Okay?

Now, but you can still take me to a world where how do you deal with unknown unknowns? And, my standard answer would be, that's why we never rely on the number only, we always supplement them by

difference in that, safety margins, and performance monitoring.

So, we have put those measures in place.

MEMBER MARCH-LEUBA: But what I'm going to is this unknown unknowns, I don't know how to find them other than look very hard for it. And, that is where the peer review and independent reviews and blind reviews come into effect.

And, do you consider the tsunami or not? And, if we start removing all those things, you're making your -- your basic data more incomplete than before or certainly less probability that it's complete.

And, I don't have any problem with the MAAP. I don't have any problem with the application. I have a problem with, is your basic data correct?

CHAIR BLEY: But you have the same problem with the traditional approach to licensing.

MEMBER MARCH-LEUBA: Absolutely, absolutely.

CHAIR BLEY: Which can leave out the same sorts of things.

MEMBER MARCH-LEUBA: Absolutely.

CHAIR BLEY: And, we try to find them every way we can. And, once in a while, Mother Nature

teaches us a new one.

MEMBER DIMITRIJEVIC: But you know the perfect solution doesn't exist in anywhere in the universe. So, the thing is, if you're trying to emulate can he take or separate out facility feed water, pump out for two weeks instead of one week like what you disallow the outage time, then does he have a tsunami or not? What's your feeling? Is that important or not? Probably not.

So, the things which we forget and usually on peer review, doesn't influence the basic essential things. So, you know, you are not making decision about meaning of the life, you are making decisions about some that you have to know lots of things --

MEMBER MARCH-LEUBA: If you have --

MEMBER DIMITRIJEVIC: -- to arrive to the --

MEMBER MARCH-LEUBA: If you are able to compartmentalize the problem you're trying to solve, optionally, you should also be comparing them both and see which one is best. That's a very good application of this.

MEMBER DIMITRIJEVIC: Well, then --

MEMBER MARCH-LEUBA: But when you're --

MEMBER DIMITRIJEVIC: -- you know, but if

you're like was talking about tsunami protection wall, obviously, I mean, they will go and say, wait a second, this risk is not analyzed. It's not about -- your concern is about, you know, bore revolutions, things like that, you will look to include that, the systems which can prevent such events.

And, you know, what is their function? And, if they said the systems in the questions and that you can circle --

MEMBER MARCH-LEUBA: But the problem is the basic phenomenon was when I didn't identity --

MEMBER DIMITRIJEVIC: And, you are completely right. But, you know, look and work on Chapter 15 so they think their exact science.

So, the thing is that, I mean, you -- there is no, you know, every time you update RELAP, you get the new answers. I mean, obviously, there is no perfect solutions to that.

MEMBER MARCH-LEUBA: Well, we have to make it.

MEMBER REMPE: Isn't the problem really that you're concerned because there's more confident in the results from the PRA. So, you've taken out some of the conservatisms that you like with your --

Because in both cases, the completeness is

an issue. You have design basis accidents with conservative assumptions.

MEMBER MARCH-LEUBA: My concern is when you remove peer review and staff review and you go with the 50.59 where the interested party that it's his money you're spending. Is the one has to do the evaluation.

The completeness has got to go down. They're going to be -- jump to making a conclusion, that's not the problem, don't look at it.

MR. WEERAKKODY: So, can I respectfully disagree with you on that point?

MEMBER MARCH-LEUBA: Might have in some case.

MR. WEERAKKODY: And, I will make the following statement. And, since you mentioned Chapter 15, I would submit that, number one, and I'm specifically I can say this because I'm consulting in the development of a safety guide for IAEA, and one thing we have brought in, and I think the Agency is doing this, as opposed to in the past where we created a list of design basis events based on the best guesses of --

MEMBER MARCH-LEUBA: Gut feelings.

MR. WEERAKKODY: -- we are now using

operating experiences to add to that list so that you come up with a plan that is well founded on the actual risk issues.

MEMBER MARCH-LEUBA: If you can do it on operating experience, I'm all for it.

MR. WEERAKKODY: That is what we do because if you look at the design of the new reactors, and I'm not an authority on that subject, but since you are reviewing the NuScale, I'm sure you are aware in over there.

MEMBER MARCH-LEUBA: We won't use names.

MR. WEERAKKODY: That's fair. Okay, so, my point is, if you look at what the international committee is doing, and I'm sure we have done that with respect whenever we go to new designs, we have used the insights of PRA to really make sure we don't miss out on important things.

And, as Professor Dimitrijevic has know very well knows that, we used to try to design plants without high pressure injection systems. We used to. We wouldn't dream of it today.

So, I would say that, of course --

CHAIR BLEY: In any of the later talks today, you know, it wasn't the purpose of this meeting, but is anybody going to go through how the

peer reviews that are actually organized and worked?

I know I've been involved, not involved, I've observed some of them and they bring in people from outside, they're not people from the plant.

MR. WEERAKKODY: Yes.

(OFF MICROPHONE COMMENTS)

MR. WEERAKKODY: Nuclear energy --

CHAIR BLEY: Okay. If you can do that, that would be great. And, I don't know if we've come to the point yet of thinking hard, but the place we're most likely to have a completeness problem, well, we always had one, but the most likely to have a significant one are on some radical designs where we have no experience.

And, does the -- if we've reached a point where we've developed a way for the peer reviews to look at the creativity in the search for events, if we can get to that, I think that would be very helpful to all of us.

MEMBER MARCH-LEUBA: Yes, and I was falling asleep. I wanted to start --

MR. WEERAKKODY: Well, thank you for waking us all up.

(LAUGHTER)

MEMBER MARCH-LEUBA: And, it's not that.

MR. WEERAKKODY: It's a very energetic conversation, but can I -- I'm going to get back because I don't want to take more time.

CHAIR BLEY: Any time you get a break, keep going.

MR. FRANOVICH: Mike Franovich, again.

Just on that thought about innovation, new vulnerabilities through designs, we are not -- that's not coupled with this current version of 1.200.

In fact, the staff is working with industry, in particular, with non-light water reactors and coming up with a separate approach for dealing with that.

So, we're not going to have probably today a satisfactory or fulfilling answer on that part.

CHAIR BLEY: I didn't expect that, but I was hoping.

MR. FRANOVICH: Yes, I know.

MEMBER REMPE: But we're kind of going off topic. As part of what they're doing with industry, are they starting to look about a way to think outside the box and be innovative and think about new challenges? That's good to hear because I have not heard that so far in the discussion, so that's great.

MR. WEERAKKODY: So, I'm going to go with

the next three slides. The purpose of the next three slides to just to -- if some of the members would knock away some key initiatives to give you a high level flavor.

We have something called Tech Spec 5b or this is an effort where licensees are using inputs of PRA in combination with other things like performance monitoring to change the surveillance intervals about 75 percent or maybe if more of our plants have already received approval to conduct this.

Let's go to the next slide.

MEMBER MARCH-LEUBA: Let me -- since I wasn't ready. This application is perfect.

MR. WEERAKKODY: Thank you.

MEMBER MARCH-LEUBA: You have operating experience for that particular component. You -- most of them are PRA and I'm always the devil's advocate, is you're a PRA expert and when you tell me one number you use for the input data for your failure frequency, you say, well, I got together with a bunch of my friends and we all agree on ten to the minus two. I mean, that's the answer I get, being honest.

But in this particular application, you have got the pump, that excel pump, I mean, it's been running for 40 years and I know it has failed only

once. And, therefore, I know what the frequency is and it has not -- and we haven't mentioned this problem that the seals are not degrading and, therefore, I don't need to do it every 12 hours.

CHAIR BLEY: Well, maybe not as perfect as it smells because you've been doing maintenance on the current frequency. And, if you slip out from 31 days to 18 months, new failure modes can exhibit themselves.

So, you really have to be careful after you do that that nothing new is coming in and changing that experience data we've collected.

MR. WEERAKKODY: Yes, that is why the performance monitoring is extremely critical.

So, let's go --

MEMBER MARCH-LEUBA: Unknown unknowns which is the issue of completeness.

CHAIR BLEY: But it's an area where from other experience you know that can happen. So, it's not too many unknowns.

MEMBER MARCH-LEUBA: Yes, but this doesn't bother me as much as from the applications.

MR. WEERAKKODY: In another application, this is one, even though the rule was published in 2004, industry's interest in adopting this is

extremely high.

A number of the licensees, I can't remember exact count, have adopted these. And, what we hear from the industry is most licensees will adopt that and the faster this is, they will use PRA inputs and the inputs of an expert panel to probabilistic of plant operations and design to move -- to reclassify a sub-zero safety related systems as safety related, but lower significance and will enable licensees to manage them using not necessarily pressed with requirements, but other requirements.

This is --

MEMBER DIMITRIJEVIC: So, you have -- you said there is a much more because up to the year or two ago, there was not too -- I mean, you could count them on one hand the applications in the --

MR. WEERAKKODY: Correct.

MEMBER DIMITRIJEVIC: And, that was a pity. So, you said that you have a much more application now?

MR. WEERAKKODY: Yes, we have a number more applications, exactly. I think it's more than ten. We have issued the approvals but industry has informed us that large numbers of others will be coming into this.

MEMBER DIMITRIJEVIC: I see, all right.

MR. WEERAKKODY: But I want to make -- okay, let's go to the next one.

And, this is the one that should be the most focus because this is the one that really gives us the expeditious need to update Reg Guide 1.200.

The -- this is where the licensees will use PRA inputs to, as you can see, the change in the tech specs, it says three days or in accordance with the risk-informed completion time program.

And, we have a number of licensees who are using this. I recognize the members' concern with the completeness. I don't want to kind of go into a detailed discussion on that, but I would say that the staff has thought about those things hard in terms of before we approve the program.

So, if you don't mind, let's --

MEMBER DIMITRIJEVIC: Yes.

MR. WEERAKKODY: So, this slide, I wanted to convey that Reg Guide 1.200 is foundational with respect to the acceptable quality. But you have for each application another Reg Guide that is more directly lined up with the specific needs of that particular application.

So, you have the 1.175 on in service

testing, 1.17 on technical specifications, and for ISI, 1.205 is for 805.

The one I forgot to list here is as foundational as critical, that's 1.1200, is 1.174, that tells the licensee how they need to -- that's where -- how -- where they will come and tell us how they would manage the plant in safe way using PRA in light of some of the limitations, uncertainties, and so on and so forth.

Let's go to the next slide.

So, I already told you that for each technical element, the ASME/ANS Standard provides high level requirements and supporting requirements.

Now, here, I think I gave the, based on your question, I gave an answer pretty much that covers that. Things appears to be fine before 805 came along. When 805 came along, we had NUREG-6850 that gave screening method, but there was screen method and some licensees used some in adverted methods without good technical substantiation which basically revealed that we had a chink in our armor with respect to assuring PRA quality.

We call it a chink or a big hole in the armor but that's what gave us pause and said, okay, we want to rely on the PRA review process, but we'd

better close this gap as soon as possible.

And, we got industry very motivated to help us out. And, I'll tell you how that happened using the next slide.

The staff, and I, you know, rightfully so, when we were approving RITS-4b AOT, staff was dead against doing business as usual with respect to newer methods because, you know, you use numbers from PRA to adjust AOTs.

So, what I have put here is the current condition that we have imposed on the licensee. And, what we said, it's highlighted in red there is that if you change the method, okay, and this only for this application, you need to get prior approval from the NRC before you incorporate it again.

MEMBER MARCH-LEUBA: Educate me. Method is mathematical process to get there or is it a model or is it an input? What is a method?

MR. WEERAKKODY: Okay. So, I am going to defer that answer to someone who's more knowledgeable from the PWR Owners Group. Because I don't know whether you have in your presentation the definition of the method.

MEMBER MARCH-LEUBA: I don't want to, let's finish --

(OFF MICROPHONE COMMENTS)

MEMBER MARCH-LEUBA: If you talk, you have to be on the record, you need to go to a microphone and tell your name or else be quiet.

MR. LINTHICUM: How do I turn this on? It's on? Okay.

So, this is Roy Linthicum, Chairman of the Risk Management Committee for the PWR Owners Group.

So, in our presentation, we don't actually have the definition covered, but we have the definitions that we provided in our document, the PWR-OG-19027.

(OFF MICROPHONE COMMENTS)

MR. LINTHICUM: Oh yes, Victoria Anderson has it in hers. So, we did recognize that defining what a method is was critical. So, because we have had differences of opinion. Is this a model change or a method change? We need -- and then, we knew we needed to have that nailed down.

MEMBER MARCH-LEUBA: Is this defined? I mean --

MR. LINTHICUM: Yes, it's defined now.

MEMBER MARCH-LEUBA: I'm not looking for a lawyer decision, just educate me, what is it? In ten words or less, what's a method?

MR. LINTHICUM: So, in ten words or less and I didn't have time to pull it up, but it is an overall compilation of the model data and evaluation techniques that are used to --

MEMBER MARCH-LEUBA: So, how do you use it?

MR. LINTHICUM: Well, that they use to put into a PRA model. It's not a PRA model itself, but it's a piece of the PRA model.

MEMBER MARCH-LEUBA: Is the input data --

MR. LINTHICUM: Input data --

MEMBER MARCH-LEUBA: -- how you connect the cutsets and how you process that?

MR. LINTHICUM: Well, not so much the cutsets, the method is more what goes in before you get into the cutsets.

MEMBER MARCH-LEUBA: Sure.

MR. LINTHICUM: So, it's --

MEMBER MARCH-LEUBA: How you connect it --

MR. LINTHICUM: But how you connect the data to the results, what assumptions and what certainties are associated with it?

MEMBER MARCH-LEUBA: It's under the whole universe of evidence?

MR. LINTHICUM: It's a compilation of that

so it might have changed.

MEMBER DIMITRIJEVIC: There are a lot of different methods in the PRA, depending on the type of the, you know, for example, to calculate human reliability, to calculate fire damages, I mean, to address the flooding. I mean, there is million different methodologies --

MEMBER MARCH-LEUBA: Yes, I'm going to be able to focus my mind if you are talking MAAP or you're talking input data or you're talking your tree and you're talking every factor?

MEMBER DIMITRIJEVIC: No, and you know, I don't really, I mean, like, you know, in Section 15 you use the method to address, you know, the pressures and subjects there.

MEMBER MARCH-LEUBA: It was Chapter 15 I had.

MEMBER DIMITRIJEVIC: I can do it.

MEMBER REMPE: It doesn't go as far as the MAAP, for example, or -- right? That's not considered in that?

MR. LINTHICUM: Well, I mean, it would include the calculations needed to do -- you don't do the different calculational technical but it doesn't include like, you know, it would be like addition,

subtraction type, that's not a method.

MEMBER REMPE: No, and if they put a new model into MAAP and suddenly they decided that a new phenomena occurs and that affects severe accidents, then that would need to go through this process for evaluation.

MR. LINTHICUM: It could, yes.

MR. WEERAKKODY: So, let me try to wrap up in the next ten to five minutes.

I think what I wanted to highlight here was, you know, we basically put this license condition. It assures safety but at the expense of us having to review large numbers of license amendments.

Because theoretically, what would happen is any time any licensee uses a new method, they have to send us an amendment and we have to review them. It's not something that the industry wants to do because it is -- they are very inefficient.

And, also, for the staff also, it takes a lot of resources.

CHAIR BLEY: They have to send you an amendment to their license?

MR. WEERAKKODY: Yes.

CHAIR BLEY: Is the PRA part of the license?

MR. WEERAKKODY: PRA is --

CHAIR BLEY: I don't understand that.

MR. WEERAKKODY: So, PRA, this is a very important subtle point. PRA model is not part of the licensing basis.

CHAIR BLEY: I know.

MR. WEERAKKODY: But the configuration process, configuration control process which you have imposed using a license condition like this, becomes part of the licensing basis.

So, if you look at the -- these words are part of the -- we are -- we have changed their license to basically say, any time you use a PRA method, you need to --

CHAIR BLEY: I think, reflecting it back on the fire PRA, I won't say debacle, but something approaching that, and this last few words explains to me why what I thought was a tautology is viewed as essential.

MR. WEERAKKODY: I missed your last part of the sentence.

CHAIR BLEY: What I had thought was a tautology, I see why the industry may look at it as essential.

MR. WEERAKKODY: Right.

MEMBER DIMITRIJEVIC: So, wait a second. This PRA configuration process is only part of licensing that the licensee has a risk-informed applications.

MR. WEERAKKODY: Right.

MEMBER DIMITRIJEVIC: Otherwise, that's not --

MR. WEERAKKODY: Otherwise, it does not, yes, but what we do, yes.

MEMBER DIMITRIJEVIC: So, if licensee has a risk-informed application which he already submitted, then is approved like risk-informed which almost everybody now has implemented. Do they still have to submit -- even they're not changing anything, do they still have to submit to you changes in the methodologies?

MR. WEERAKKODY: I don't know the exact license condition in risk-informed ISI. All I can say is, Steve, okay, Steve Dinsmore.

MR. DINSMORE: Yes, hi, is this on?

(OFF MICROPHONE COMMENTS)

MR. DINSMORE: Yes, this is Steve Dinsmore from the staff.

I guess what happens is when we do a review, they give us a set of stuff to review about

the PRA. And, we'll go through that and we will decide that the PRA is acceptable to use for this application.

So, every time they come in with a new type of application, we go through the PRA. And, what this thing did was, when we got finished looking at the PRA that they had at that time, we said that that PRA is acceptable to use for 4b.

However, as you change it in the future, that's why that other red stuff.

MEMBER DIMITRIJEVIC: But this is completely different type of application because it's one time. But the people who submit the application will they using it right now up to the life of the plant.

Do we ever -- like, for example, is the -- out in South Texas is a good example because they have always performed applications, you know, doing the 50.69.

When their PRA updates, do you guys go back and check implication on all existing risk-informed applications?

MR. WEERAKKODY: Not unless we do it as part of our formal OSI process. I mean, we have like several inspection procedures that you must --

MR. DINSMORE: Only if they submit it, do we look at it.

MEMBER DIMITRIJEVIC: Only something new then?

MR. DINSMORE: We at NRR. I don't know about the inspections, but so, most of the applications they can change it as they want, like for 50.69 because it's not in the condition.

But as Sunil was saying, this one is very -- it's kind of special so we wanted to put controls on the future changes.

MEMBER MARCH-LEUBA: So, again, for my education, I come from the Chapter 15 universe. And there, we license codes. For example, we approve, we the staff, approve NRELAP5 for use in non-LOCA transients.

And then, that approval puts an A at the end of the of the number in the topical report and it can be referenced in tech specs because it's in the licensing basis.

So, if they want to use that code to change a set point, they have to use the code that's approved. They cannot use a different version, it has to be that one.

Is this the same you are doing here?

You're -- by referencing a model, you put that model into licensing basis. And then, if you want to change anything in there, you have to do a license amendment request?

MR. DINSMORE: No, well --

MR. WEERAKKODY: Not anything, the mechanism.

MR. DINSMORE: -- I can't see it really because I don't have my glasses. What is --

MR. WEERAKKODY: Method only, yes.

MR. DINSMORE: What it's supposed to say is, if there is another method that's been approved by the staff, you can put that in your PRA without you coming in for --

MEMBER MARCH-LEUBA: If it has an A --

MR. DINSMORE: Well, if it has an A --

MEMBER MARCH-LEUBA: -- number.

(SIMULTANEOUS SPEAKING)

MR. DINSMORE: -- on the end, you can use it for this. You don't have to come in once it's been approved.

MEMBER MARCH-LEUBA: Is that the basis of -- is that what you said?

MR. WEERAKKODY: I kind of missed the context of the conversation but I can tell you what

I'm trying to say. I can repeat it.

If a plant has adopted RITS-4b, for those plants only, if they change -- if they use a newly developed method, before they use it, they need to come and get our approval according to this slide.

MEMBER MARCH-LEUBA: Even though if it was approved for a Plant B?

MR. DINSMORE: No.

DR. REISI FARD: No, under that scenario. This is Mehdi Reisi Fard.

So, the current admin textbook language says that if a method has been accepted as a part of the review or method that has been accepted or approved as a part of other licensing activities.

So, if for another plant, you have accepted or approved that method, that wouldn't fit into the newly developed method kind of framework.

MEMBER MARCH-LEUBA: Now, let me ask you a question. Say that, in my method, I have decided my failure -- the frequency probability of this type of valves is ten to the minus twelve or one or two, whatever.

And now, there's an obscure university in Italy that has collected data from all Russian reactors and comes up that it should be twice as much.

And, they decide to go and change that number. Is that a change of the method?

MR. WEERAKKODY: That's not how -- in my mind, that's not a change in the method.

DR. REISI FARD: That's not changing the method, no. That's part of the PRA configuration control, PRA is updated according to the, you know, the --

MEMBER MARCH-LEUBA: That's why I was asking what the method is. The method --

MR. WEERAKKODY: No, that's not a method because we have standard ways of doing those updates that we have had exposure to that are acceptable. So, as long as they stick to that.

MEMBER MARCH-LEUBA: They already have the flexibility to --

MR. WEERAKKODY: Correct, yes.

MEMBER MARCH-LEUBA: Just makes a lot of sense. And, you have to be making license amendment requests for --

MR. WEERAKKODY: No, no, no, no, no, it's not that bad.

MEMBER MARCH-LEUBA: Okay.

MR. WEERAKKODY: So, my point is, industry recognized that in order for to -- they have an

request to change this so that, in my layman's words here, methods can be peer reviewed and used without prior NRC approval.

But they understood that in order to -- for us to even consider that proposal, there should be clear criteria that says what is a new method and how are you going to review and approve for the peer process whether that method is acceptable.

Owners Group has those criteria. We typically like to have them in NDMs standard, but because of the expeditious nature, right now tentatively, it will be in the Owners Group document.

And, NEI updated the peer review process to accommodate basically describe how it needs to be done.

Let's go to the slides, I'm taking too much time from everybody else.

So, in terms of closing the gap, as I said, PRW Owners Group, you'll hear details from the industry, provide definitions related to NMDs, PRA maintenance, and PRA upgrade, provide six high level requirements and 21 supporting requirements for peer review NDMs.

Seventeen-oh-seven delineates the process that peer reviewers must use to peer review NDMs in

addition to other technical elements of PRA.

So, that's our strategy. Next one, please?

Current standard, we have had -- I'm not going to dwell on this because he's going to go details. We have a number of meetings, observations on these -- the work that the industry has done.

And, next steps, we want to complete the update of the Reg Guide 1.200. Our goal is to give you a, you know, after this meeting, create a version of Reg Guide 1.200 that is -- and get the OGC approval, management approval, put it out for public comment.

And then, I have -- and then, of course, incorporate those comments.

One of the key things I do want to mention, we are briefing you with respect to the Reg Guide, but there's another element of the Agency's functions which we have enhanced to recognize the importance of these initiatives.

We have updated about four inspection procedures that would enable our inspectors to, on a performance based, risk-informed basis, to go and do some sample checks on whether they are following through on their commitments to keep these models with

acceptable quality. So, most of that work has been already done.

And then, the final item is the NEI proposal, the industry proposal would change the tech spec is very related to the Reg guide, updating the Reg Guide is an essential component, but it does not itself is the conclusion. That is something that is going through a legal review.

And then, at some point in time, once we get the Agency to agree or decide we, our senior management will make a decision and communicate that decision to the industry.

CHAIR BLEY: I have not made myself familiar with the inspection procedures related to PRA. Are those inspections like the physical inspections run out of Region 2 or do the -- each region use their PRA people to do these inspections?

MR. WEERAKKODY: They don't usually use PRA people. There are -- they use that as their inspectors. And, what happens is, if they get into a situation where they need some PRA information --

CHAIR BLEY: They'll come back to --

MR. WEERAKKODY: -- they'll come back to the Regional SRA OS. And, I know that Branch Chief is not here, but we are doing a lot of training to get

the agents to go out and learning this area. But we are not planning to make the inspectors PRA experts. We will stay accessible to support them as needed.

CHAIR BLEY: Okay. Is this new or has this been going on for a long time?

MR. WEERAKKODY: It's been going on for a long time. I think what is new is that we took a holistic look at all of our procedures. It came to our attention primarily because of RITS-4b. But in the process, we realized that it should be just focused on that.

Every application should have a peer review check and for some applications, we need to verify maybe a one-time check on whether the licensee has implemented the program.

If you are interested, I could send you the list of inspection procedures for your awareness that we have updated those.

CHAIR BLEY: Yes, that's a good idea.

MR. WEERAKKODY: Okay. I will take an action item. I'll share the request and send the inspection list.

MR. WEERAKKODY: So, that concludes my presentation and thank you for waking everyone up because I was having it too easy.

MEMBER MARCH-LEUBA: It's our job to make your life miserable.

MR. WEERAKKODY: That's impossible.

MEMBER MARCH-LEUBA: But I think you enjoyed it.

MR. WEERAKKODY: Right, this is my life. I enjoy this work.

MEMBER DIMITRIJEVIC: Yes, I'm sure you do.

MR. WEERAKKODY: Yes, was not going to attest to that, I have at least 30 years experience in this area.

MS. ANDERSON: All right, so, my name is Victoria Anderson. I'm with the Nuclear Energy Institute where I work in Risk-Informed Regulation.

And, I am going to talk about NEI 17-07 which is the industry document that is going to go through the peer review process in general as well as specifically on newly developed methods and also give a little bit of background and cover some of the questions that were asked in the first presentation.

All right, so, I'm going to give just a little background on how we got to NEI 17-07. I'll talk about the guidance itself and how it relates to supporting documents. And, I'm also going to go over

the extensive stakeholder interactions that we've had.

NEI numbers its documents with the first number being the year it was developed. So, this was developed in 2017.

So, as you can imagine, there has been a lot of stakeholder interaction, many rounds of comments between the staff, many public meetings.

MEMBER MARCH-LEUBA: Only two years, that's not bad.

CHAIR BLEY: That's not bad at all.

MS. ANDERSON: I'm not saying it's bad, but we did -- I mean, this was -- we were meeting very regularly and passing comments back and forth and really trying to make sure that we were all aligned.

MEMBER MARCH-LEUBA: Let me rephrase that. It is bad, but it's not unexcepted or unusual. It should be shorter.

CHAIR BLEY: Victoria, this new document, it's all the guidance now on --

MS. ANDERSON: It's all. Yes, I will actually get into that --

CHAIR BLEY: Okay.

MS. ANDERSON: -- in a couple of slides.

So, I think as we discussed during the first presentation, the peer review process has really

been a vital component of the implementation of the ASME/ANS PRA Standard since its inception.

And, just to talk a little bit about how the peer review process works, it -- when we did sort of like the early peer checks, I mean, back in like the late '80s, early '90s, we didn't really have solid criteria. We more had people going around talking about, well, this state of the practice, is this what we expect?

And, we've since then moved along to a much more standardized set of expectations. And, that's really what the ASME/ANS PRA Standard does. It really lays out, here's exactly what we expect to have done.

And, that's led to much more consistency in the peer reviews. It's helped the licensees develop their PRAs with those expectations in mind. And, it's ultimately led to a higher quality of PRA that has a better technical applications throughout risk-informed regulation.

It provides a very rigorous process. As Sunil mentioned, he thinks that licensees would rather go through an NRC staff review than a peer review.

I think, in some cases, perhaps. I think it's definitely very rigorous. But it's stable. I

think the expectations at this point are really well known thanks to the ASME/ANS PRA Standard and the peer review process documentation that we've put together.

This also reduces the NRC resources that need to be expended on PRA technical adequacy. So, in the course of the peer review process, the peer reviewers write up findings that are against a specific supporting requirement from the Standard.

And so, what the staff can do is they can take those findings from that report and they can look at where the potential weak points of the PRA are. And, areas that they may need to review more closely in their licensing reviews.

CHAIR BLEY: Is that something they would audit or those submitted to --

MS. ANDERSON: They're audited. Well, what gets submitted usually is the open findings.

CHAIR BLEY: Okay.

MS. ANDERSON: It's submitted, not the entire peer review report because those are provided there.

CHAIR BLEY: But the things they are still working on?

MS. ANDERSON: Yes, the open findings will usually get submitted with the licensing application,

depending on the specific licensing application and what is and is not relevant.

And then, the report will usually be available for audit and for staff review, but not submitted on the docket.

So, this does definitely cut back on the amount of review the staff has to do. And, really, it helps them in focusing on what they need to review to ensure that the PRA can support the decision being sought.

MEMBER MARCH-LEUBA: Well, going back to my original question of completeness, I'm a reviewer for -- I do reviews for my living and we review often, let's say, review a thousand pages a week we have to go through.

So, it's very easy to nitpick on the three conclusions and the three items that the staff or you guys send me. And, it's very hard to try to figure out what they forgot. When, because simply because of the volume of it in our case.

So, do you give any thought -- my problem is, do you remember to account for the tsunami? And, when you go through this process when that checking your MAAP and, oh, look at that conclusion two, I don't agree with it. I would have done it this way

and I still would have reached this conclusion two. You are not thinking about this or that.

So, I would like for the peer review -- I don't want the staff to do it, because the staff would always take 18 months to do it.

And, I'm going to their famous red herrings which they always do the same one. But the peer reviews should concentrate on what did you miss on your model?

MS. ANDERSON: I think the peer reviews do an outstanding job of that. We have at least one licensee at the table and one in the back.

CHAIR BLEY: Before you go ahead, I want to -- I've only looked at two or three for particular utilities I had worked with in the past.

And, the ones I saw, the peer review team really asked sophisticated questions and not some of them were things they had to do. But, you know, you might want to do a much better job in this area. And, really searching for the missing things.

I've heard other people say they've seen some years ago, after the Standard was in place, but some years ago, they had seen some that really didn't delve deeply at all and were not extraordinarily good.

What kind of, as you talk through this,

let us know what kind of controls you have and checks you have on the folks who go out and do these peer reviews --

MS. ANDERSON: We have --

CHAIR BLEY: -- to see consistency and thoroughness in their examination.

MS. ANDERSON: We have -- so, I mean, NEI has a peer review task force that includes all the peer review team leads. Roy's Owners Group has a project to work on that.

MR. LINTHICUM: Yes, this is Roy Linthicum from the --

(OFF MICROPHONE COMMENTS)

MR. LINTHICUM: Once again, this is Roy Linthicum from the PWR Owners Group.

So, within our process and we, as an Owners Group, do more peer reviews than any other organization just because of our size.

We actually -- we have specific requirements above and beyond even what's in the NEI guidance. We do ensure anyone we have in our peer review is qualified in the area that they're going to be reviewing to their company standard.

You know, we don't -- everyone has a different set of qualifications.

We also ensure that they're aware of the Standard and the peer review process. So, we don't take someone for a peer reviewer that has never been part of a peer review before. And, that could be --

(OFF MICROPHONE COMMENTS)

MR. LINTHICUM: Well, we have what we call working observers. So, that's -- it's either through being a working observer or, if you're a utility person, defending your PRA as part of a peer review was also a way we get through that process.

MEMBER MARCH-LEUBA: Do you have subject matter experts?

MR. LINTHICUM: And, we have subject matter experts.

MEMBER MARCH-LEUBA: A PRA expert? The physics guys?

MR. LINTHICUM: The physics guys, well, we did have a challenge on a recent peer review on external flooding trying to find external flooding PRA people. They really don't --

MEMBER MARCH-LEUBA: Yes, PRA people, it has to be a --

MR. LINTHICUM: Right, but once again, finding -- so how do you -- but how do you find someone that's not a PRA person that also has some

knowledge of those things?

MEMBER MARCH-LEUBA: But you're --

MR. LINTHICUM: So, we do address all that.

MEMBER MARCH-LEUBA: How about, sorry to interrupt, how about the role of the moderator? Because whenever you have a group of reviewers, the guy with the biggest mouth with, in this case, it's me, that dominate the decision?

MR. LINTHICUM: So, that -- yes, so we do have what we call peer review lead and Andrea Maioli sitting next to Victoria here is our --

MEMBER MARCH-LEUBA: Not lead --

MR. LINTHICUM: -- most experienced. But while we call it -- the lead is the moderator.

MEMBER MARCH-LEUBA: Yes.

MR. LINTHICUM: So, the primary role of the peer review lead is not to actually perform the review, even though they can.

MEMBER MARCH-LEUBA: But that --

MR. LINTHICUM: But to herd the cats, so to speak and to ensure that the loudest voices are being heard. So, the primary role is to ensure that all the reviewers actually get to a consensus before they have the finding.

MEMBER MARCH-LEUBA: Okay.

MR. LINTHICUM: And, that's a tough challenge, especially when you're dealing with PRA people that always tend to be a very opinionated. But we do deal with that.

CHAIR BLEY: These teams, when they go out on a peer review, are they from many different utilities or do they all come from the same one?

MR. LINTHICUM: No, well, we try and avoid having multiple people from the same utility for a number of reasons.

One, we want a broader range of expertise, plus most utilities don't want to support multiple reviewers because there is a kind of expense involved in time and resources.

But we try actually for a 50/50 split when we can of utility and consulting -- consultants. We don't always achieve it, but that's kind of our -- that's kind of where we kind of target.

MEMBER DIMITRIJEVIC: What would be interesting and in my knowledge, that would happen is actually to do the peer review of the same plant with two different teams who don't know each other. And, which plant will pay, because usually utilities pay for that and then maybe NEI can sponsor that just to

see what's the consistency of that peer review.

MS. ANDERSON: You might run into some -- the Heisenberg uncertainty principle there that PRA model gets affected simply by the peer review team being there. So, it would be hard to do.

You know, it's pretty common for a review team to come in and they'll have suggestions for the PRA that don't necessarily rise to the level of a finding that are pretty easy fixes. So, then, they wind up changing the model as a result of the review.

MEMBER DIMITRIJEVIC: Well, I have been part of five different teams from five different nations doing the PRA of the same reactor and you can see it's not the same PRA.

MS. ANDERSON: Yes, it's --

MR. LINTHICUM: Well, yes.

MEMBER DIMITRIJEVIC: There's a lot of similarities but it's interesting the different teams. That was fascinating from my point of view. And, I was thinking it would be the same fascinating to have a review done with that.

MR. LINTHICUM: Well, yes.

MEMBER DIMITRIJEVIC: It's all dependent on the human assumptions and priorities and, yes.

MR. LINTHICUM: Right. There is that

which is why we strive for a diverse team and everyone on the team brings their own set of kind of beliefs and interpretations and what's important for them.

But in general, I mean, we do find it is a -- we do really, you know, shake the tree, so to speak and get to all the important elements. That's been a consistent process.

Utilities aren't always happy with the results. They don't like findings necessarily. But, you know, it is what it is and we -- I think we have been very successful at improving the quality of PRAs over the last 20 to 30 years.

MEMBER REMPE: So, maybe this isn't the best slide to bring this up on, I was reading your document. I was curious on why you wouldn't allow the author of the method to be typically should be a peer reviewer because of, I think about MAAP, again. That's kind of where my angle comes from is in the phenomena assessments.

If they weren't involved in actually doing the application of the method for that plant, it seems like a developer of a method might be a good person to have because they'd know whether the analyst had correctly implemented them.

MS. ANDERSON: Yes, I --

MR. LINTHICUM: So, that's different.

MS. ANDERSON: That's separate, yes.

MR. LINTHICUM: So, what we're looking at is the peer review requirements of the method. So, we don't want the method developer reviewing their own method.

MEMBER REMPE: Okay.

MR. LINTHICUM: No, now, the -- it's perfectly okay -- so, any new method, once the utility puts that method into their PRA, has to have an implementation period.

MEMBER REMPE: That makes sense. Okay, I --

MR. LINTHICUM: But now, that implementation peer review, it would be perfectly okay to have the method author be part of that implementation peer review.

MEMBER REMPE: You're right, I misunderstood those.

MS. ANDERSON: Yes, I guess the only case where that would be potentially problematic is if you were reviewing the implementation and the method at the same time which is allowable by the guidance. But I don't see that necessarily happening very much.

MR. LINTHICUM: Yes, well, our utilities

in general have said they'd rather make sure the method is good before they spend the time and resources putting it in their model.

MEMBER REMPE: So, I mean, MAAP's never been reviewed by the staff has it? Is it an approved method?

MS. ANDERSON: Well, it's a state of practice --

MR. LINTHICUM: It's a state of practice.

MS. ANDERSON: -- on a consensus method. Well, sort of get -- that's sort of part of the definition --

MR. LINTHICUM: Part of one of the definitions.

MS. ANDERSON: -- of newly developed method. We sort of addressed the concept of, you know, obviously, not everything is going to go through either NRC staff review or this peer review process because we've accepted these for decades and we've been using them and we have experience with them.

MEMBER REMPE: Okay. So, then, I'll throw you a curve ball. We're learning a lot from Fukushima. Those vessels have failed for the BWRs. I wouldn't be surprised if you're going to see some updates in MAAP.

And so, you're going to have to do something about that and so will the MELCOR folks, too. But it'll be an interesting situation.

MR. LINTHICUM: So, that is, you know, part of the question that needs to be answered. And, we are planning on developing a set of examples and MAAP updates is one of those.

So, depending on the extent of a MAAP update and what the revision is, that may or may not -- that new revision may or may not be a new method. But that's something that would have to be evaluated on a case by case basis.

CHAIR BLEY: I don't know if you've read it, but must be 20 years ago now, Alan Swain did a review of HRA methods for the Germans. And, he lays out all the methods in his book.

And then, in the appendix, he has each of the developers of each of the methods kind of evaluate all the others and their own.

And, some of it was a surprise to him, but not so much to me. It turned out that almost all of the developers didn't like any of the other methods and said they could not be used for these applications but their own method because they understood how to adapt it, could be used. And it was -- it's a pretty

interesting report if you've never seen it. I recommend it to you.

MS. ANDERSON: I have to look it up.

All right, any other questions on the peer review process in general before I move on to NEI 17-07 in newly developed methods?

(NO AUDIBLE RESPONSE)

MS. ANDERSON: All right, so as was alluded to earlier, we took all these peer review guidance documents and supporting documents and we're putting them all into NEI 17-07.

We previously had actually four documents just for peer review, one on external hazards, one on fire, one on internal events, and then, also we had an appendix on closing peer review findings.

So, we had a lot of guidance out there and we put it into one document that would make it easier for utilities to implement and also for the NRC to endorse.

CHAIR BLEY: The lower right one on newly developed methods --

MS. ANDERSON: Yes?

CHAIR BLEY: -- it's -- that source is this PWR Owners Group report?

MS. ANDERSON: It's related to that. This

-- NEI 17-07 has the process and qualifications and all those kinds of things. The PWROG document has the technical requirements.

And, we kept those separate for a very specific reason --

CHAIR BLEY: Okay.

MS. ANDERSON: -- because if you sort of look to the analog of NEI guidance for peer review versus the ASME/ANS PRA Standard.

The PRA Standard has requirements. Our peer review guidance document is a guidance document. It does not have requirements.

So, the PWROG document includes requirements and criteria.

MR. LINTHICUM: Right. Now that is intended to be short-term. Now, well, relatively short-term in nuclear space. Because the intent is to have the requirements that we have in our document put into the next edition of the ASME Standard.

And, in fact, they are currently --

CHAIR BLEY: Oh, okay, that's what I said.

MR. LINTHICUM: They are currently in the draft version that's out for comment ballot right now.

CHAIR BLEY: Okay.

MR. LINTHICUM: But we -- because of

what's happening with risk-informed completion times and the need to clarify that license condition, we wanted to move sooner than the standard process.

So, once that's fully put into the ASME Standard then a subsequent or revision of Reg Guide 1.200 would be expected to just reference the ASME Standard and our guides.

MEMBER DIMITRIJEVIC: How do you put fire when it was done after you explained to us the '17 year and they're obviously, fire was then after the 07 because it was 012. So, how did you manage to put something in --

MS. ANDERSON: Oh, sorry, that's a typo, that should be '0712.

MEMBER DIMITRIJEVIC: Oh, I see.

MS. ANDERSON: Sorry, operator error.

MEMBER DIMITRIJEVIC: So, we're already advancing into the future this week.

MS. ANDERSON: Yes.

(LAUGHTER)

MS. ANDERSON: That would have made it hard to get through NFP-805.

All right, so, in 17-07, we didn't really make that many changes compared to the original peer review documents. We did incorporate some lessons

learned, namely related to how we use observers as Roy talked about earlier, how we confirm reviewer qualifications, just some process clarifications.

Most of our changes were related to the support of newly developed methods. And, this provides an alternative to explicit NRC approval of PRA methods.

So, as promised, we have our definition of a newly developed PRA method. And, this may also kind of answer the MAAP update question, too.

So, I'll just read this here, a newly developed PRA method is one that has either been developed separately from a state of the practice method or is one that involves a fundamental change to a state of practice method. So, therefore, it is neither a state of practice method or a consensus method.

When we say consensus method, that's also defined in the document, the PRA review document and it's something that's done by a large group versus like one individual contractor, one individual utility.

So, the most obvious example we have in front of us is the work jointly that the Electric Power Research Institute and NRC do on fire PRA.

That's considered a consensus method because there is so much input from so many stakeholders, it's essentially accepted by the industry and the regulator, the entire technical community as a whole.

So, there is not really any value to be gained in a newly developed method peer review.

MEMBER MARCH-LEUBA: So, I'm still confused maybe because I don't know what is it. Is the fire PRA a method?

MS. ANDERSON: The fire PRA is an approach. So, that's an approach to modeling fire risk.

MEMBER MARCH-LEUBA: I'll quit.

MS. ANDERSON: But like a --

(OFF MICROPHONE COMMENTS)

MS. ANDERSON: Yes, there are many methods within a fire PRA. So, like the method that you use to model electrical cabinet fire heat release rates, that's a method within your fire PRA which is the approach to modeling fire risk.

MEMBER MARCH-LEUBA: But then you would call it a subroutine? And that's why --

MS. ANDERSON: Sure. And, I think that's probably pretty analogous.

MR. LINTHICUM: Right. But you're getting

to the point, it's the question was asked, you know, in the beginning, why is this important to the industry?

Well, these questions, you know, what does this mean? You know, they seem important and you've asked me what a method is, I may have a definition, you may have something different.

MEMBER MARCH-LEUBA: I simply only have one.

MR. LINTHICUM: Right, so we needed to make sure that everyone had the same concept and definitions. So --

MEMBER MARCH-LEUBA: If the methods go down to the subroutine level, then you have so many and during licensing basis, are there something wrong with their strategy?

MR. LINTHICUM: Well, I wouldn't say we would say a method goes down to the subroutine level. It would -- but it would include any of the subroutines.

So, the big -- probably the biggest area in that case would be something like MAAP that has a lot of different algorithms, a lot of different assumptions imbedded in that.

MEMBER MARCH-LEUBA: So, if I have a plant

that is fully gung-ho on risk-informed, how many methods do I have on my licensing basis? Two? Twelve? A hundred and twenty?

MR. LINTHICUM: Well, in your thousands.

MS. ANDERSON: Yes.

MEMBER MARCH-LEUBA: So, it goes down to the subroutine level?

MR. LINTHICUM: Well, no, I mean we're talking about a PRA in whole, I mean, you're talking about how do you --

MEMBER MARCH-LEUBA: And, I really think the change --

MR. LINTHICUM: -- quantify the model? So, are you, you know, I mean, physically, how do you quantify the cutsets in some subset? That's a method.

MEMBER MARCH-LEUBA: One thousand methods?

MR. LINTHICUM: There are probably if there's too many to call out and we have been asked by the staff to previously, can we list all the methods that they've accepted? And, we said, that's an impossible task just because there's so many.

MEMBER MARCH-LEUBA: Okay, this is --

MEMBER DIMITRIJEVIC: In the thousands, but --

MEMBER MARCH-LEUBA: There's something

wrong with that.

CHAIR BLEY: If I get a little -- if I get the motivation that led us here, right, and had a lot to do with the fire PRAs. And --

MR. LINTHICUM: It did.

CHAIR BLEY: -- there was a lot of bickering back and forth between various licensees and the staff. And, as that evolved, and I remember, I forgot what they called them, but the staff would come up with new criteria and they had a name for them.

And, that just grew and grew of things that they decided people weren't doing right and they needed to do better.

But a lot of those were pretty small changes within a method. So, it doesn't feel like this will help in that kind of situation.

MS. ANDERSON: Yes.

CHAIR BLEY: Do you think it would?

MS. ANDERSON: I think, so, I think you're referring to the FAQ process that we had for --

CHAIR BLEY: Yes.

MS. ANDERSON: -- NFP 805 and fire PRA.

CHAIR BLEY: I forgot what they called them, but --

MS. ANDERSON: So, this doesn't replace

that, but if you look at back, you talked earlier in this meeting about that flowchart that's there.

What that would do is it would say this is something that goes through normal licensee process controls for maintaining the PRA.

So, that part of what we've done addresses that. This part with the newly developed method PRA peer review addresses those things that cannot be addressed solely by the licensee maintenance and upgrade process.

CHAIR BLEY: And, your hope is, this is will really focus NRC's involvement in the reviews?

MS. ANDERSON: Yes.

MEMBER DIMITRIJEVIC: Let me ask you something. Let's say that the Subcommittee can use old fashion --

(OFF MICROPHONE COMMENTS)

MEMBER DIMITRIJEVIC: So, let's say the utility have used some old fashioned model for something. So, it's not using the state of practice. But decide to update to state of practice. Would that be considered newly developed method?

MS. ANDERSON: No, it wouldn't be a newly developed method but it would be a new method at that plant so they may need -- or it could be a new method

at that plant and so they may need a focus scope peer review to evaluate how to implement it.

MR. LINTHICUM: Right. That goes to the definition of upgrade versus maintenance.

MS. ANDERSON: Right.

MEMBER DIMITRIJEVIC: I see. No, but this is the model upgrade. I mean, the model upgrade that --

MS. ANDERSON: Right.

MEMBER DIMITRIJEVIC: -- right. But they're not fitting in your definition?

MS. ANDERSON: Correct.

MR. LINTHICUM: Right.

MEMBER DIMITRIJEVIC: Okay.

MR. HYSLOP: This is J.S. Hyslop. I'm on the staff in NRR and I was involved in the fire PRA in 805. And, there were a lot of changes that the staff did feel need to be made for this fire PRA. Some were small and sometimes they weren't challenged by the peer reviews.

And, if there had been some process that had some of these assumptions had to go through, then, that certainly would have given us more confidence.

It doesn't mean we would have agreed necessarily, but it would have given us more

confidence.

But everything wasn't small, you know, the main control room abandonment evolved through the RAIs process that went through 805. And, that became much more robust. And, in some cases, the analysis didn't seem to be well considered necessarily at the beginning of the RAI process, but it was later.

So, if there had been a process that licensees had to go through and someone had flagged that sort of thing as a newly developed method, then, yes, I think it would have been better before it got to us.

MS. ANDERSON: And, I think one of the big advantages of the process we've developed in concert with the NRC staff is the main advantage is that we have these concrete criteria for evaluating newly developed methods.

So, while the ASME/ANS PRA Standard does make provisions for peer review teams to review methods themselves, it doesn't lay out the criteria for what should this method do.

So, that helps both with the evaluation of them and it helps the method developers know what criteria they're trying to meet versus let's make something that's acceptable or good and what does that

really mean?

And so, it really helps them focus on exactly where they need to be getting their data from and what kinds of considerations they need to be taking in.

And, we found that when we piloted this newly developed PRA method peer review process that the peer reviewers were -- they were very hard on the methods. They were extremely rigorous in their review, but they were also very focused. And, it was very clear at the end of the review what needed to be done to the method to make it acceptable versus in some past situation where we might have just been passing methods back and forth and saying, is this good enough? No, it's not.

And, that just took so much time, this was a much faster process, but it still included a good deal of rigor. So, I think we've -- this is a very good process that can help both the industry and the NRC both move quickly and improve the technical rigor of the review.

So, I think I've moved beyond this slide.

MEMBER REMPE: Just out of curiosity, this high energy arcing fault situation, have you been thinking about how what you're doing might assist

what's going on with that issue?

MS. ANDERSON: Yes, it's possible. I think any kind of work that would be done relative to the high energy arcing fault issue where there's a potential to change the zone of influence for high energy arcing faults based on some testing data, I think anything that would be done under there would be considered a consensus method because it would be -- there's the project plan involves support from Electric Power Research Institute, National Labs, NRC, it's a broad technical community doing the work.

So, I don't --

MEMBER REMPE: So, it would be a new method that's a consensus method is what you're hoping?

MR. LINTHICUM: So, it'll be -- so, you know, I look at the little bit in our presentation. But the newly developed methods peer review process is one way of getting acceptance but not the only way. We still have the topical report or NUREG type approach.

So, that's another way that you can have a method accepted by the NRC. And, if it's accepted by the NRC, then it's a consensus method and you don't have to go through the separate peer review.

So, my expectation is, the high energy arcing fault would go through that process.

MS. ANDERSON: I mean, I don't think it needs acceptance.

MR. LINTHICUM: It's --

MS. ANDERSON: But it would be -- it's the broad technical community is involved.

MEMBER DIMITRIJEVIC: But we have another thing today on the agenda in the afternoon which is very good example that was there is a, you know, a couple tests in NUREGs done on the leakage time on the instrumentation of cable which are far from being implemented in the PRA because you had to differentiate between losing signal and getting false signal.

So, that will be totally new method in the current situation, only that it's cooled down a lot.

MS. ANDERSON: Right. So, it would be a new method. But, again, that might be considered a consensus method, depending on how many --

MEMBER DIMITRIJEVIC: Especially if there's nothing existing at this moment.

MS. ANDERSON: Right.

MEMBER DIMITRIJEVIC: Okay. So, new method, it has to replace something existing and in

this case it's the PRA.

MEMBER PETTI: So, can I ask a question? I know everybody is aware of the ASME/ANS Standard. For a facility like that's in the design phase like NuScale, they've done a PRA as best as they can.

Does this help them at all? And, because it seems like it's very focused on the industry, utilities, you know, that really have a tremendous amount of operating experience.

Is there something useful for the designs that are coming in that don't have a lot of that operating experience, even if it's, you know, the intent of what's going on instead of the letter of the law?

MS. ANDERSON: Yes. Potentially, it could help with some of the new designs because if they are going to be taking a new approach that's outside what the technical community uses right now, they could include that peer review as part of the peer reviews they do to support their design certification.

MEMBER PETTI: I mean, I would imagine even some of these advanced reactors would be using different methods and approaches.

(OFF MICROPHONE COMMENTS)

MEMBER PETTI: Yes, yes, yes, right, yes.

MR. LINTHICUM: Yes, but we did, yes, we did have input from the advanced reactor community as well.

MEMBER PETTI: Okay, you have?

MEMBER DIMITRIJEVIC: I am very interested in a lot of related to that subject. So, we're going to wait for a decision to come back.

MS. ANDERSON: Yes, I mean, I think it's --

MEMBER DIMITRIJEVIC: Any of the new reactors.

MS. ANDERSON: It's sufficiently generic in technology neutral that this process could be used for, I mean, design.

All right, so, I think we already got through all of these key points that, yes, you can review a newly developed method either in parallel with or separately from implementation in a plant PRA.

As a matter of practice, we think for the most part, you will see it done separately because licensees want to make sure that it's a viable method before they invest in putting into their PRA.

MEMBER DIMITRIJEVIC: Wait, wait, wait. So, who does it? Licensee does it separately?

MS. ANDERSON: Well, the licensee has the

review for the implementation of the method done.

MEMBER DIMITRIJEVIC: And, who does it separately?

MS. ANDERSON: And then, whoever owns the method or whoever developed it, we call it the method developer --

MEMBER DIMITRIJEVIC: I see.

MS. ANDERSON: -- they will be responsible for getting the peer review done. So --

MEMBER DIMITRIJEVIC: So, does EPRI factory develops method?

MS. ANDERSON: Well, for the most part, EPRI methods would be consensus methods because they work, again, with like National Labs and the broader technical community.

But, for example, some of the -- we had one method that was developed by the NEI fire PRA task force.

MEMBER DIMITRIJEVIC: Okay, all right.

MS. ANDERSON: And, we piloted that and we had consultants that did the peer review. And, I think the Owners Group is going to talk about their method developing experience. So, in their case, the method developer was Westinghouse, the Owners Group.

MR. MARKLEY: Yes, it was developed for

the Owners Group from one specific vendor and we had other vendors or members with expertise involved.

MS. ANDERSON: Right, yes.

I think one thing that's also important to note is that a newly developed method with open findings cannot be used in a PRA licensing application. So, once those newly developed methods review gets done, if there are open findings, a licensee can't use that method in a PRA that supports a licensing application.

MEMBER DIMITRIJEVIC: After those findings are closed, right?

MS. ANDERSON: Yes, once those findings are closed, it's all good to go, it can go to support a licensing application. And, this is really --

MEMBER DIMITRIJEVIC: All right. So, now, on the closure of those findings --

MS. ANDERSON: Yes --

MEMBER DIMITRIJEVIC: -- which is also interesting question --

MS. ANDERSON: Yes, and we actually conducted that as part of our pilot. So, we had one method that had several findings I think on the order of like 12 to 14. And, they conducted a closure review of that.

Actually, using the original team that conducted the first review, so they were already familiar with the method. They were familiar with some of the gaps that needed to filled and --

MEMBER DIMITRIJEVIC: And, those are ones the team identified those findings?

MS. ANDERSON: Right, yes. So, they identified the findings and then, the method developer was able to come back and explain how they addressed all of them.

And, there was a lot of time saving there because we didn't have to go over familiarity with the method and all of that. And, it was a pretty efficient process and it was also, again, very rigorous, the method developer had to put a lot of detail into how he addressed each of those findings. So, it was a pretty successful process and I think we got a good product out of it.

Okay, so I think we've covered everything else there. Just a couple of other changes in 17-07. As I mentioned earlier, we enhanced the discussion on the concept of unreviewed versus not reviewed which is sort of a fine point related to which supporting requirements actually got reviewed or did not get reviewed because there wasn't sufficient information.

MR. MARKLEY: Can I offer a comment to the Committee?

This is Mike Markley. I'm the Chief of Licensing for Region 2 plants.

And, this is my opinion, I don't share the views of the staff and NEI or the industry with regard to the tech spec change on the last bullet on the previous slide or Slide 13 on the previous presentation where Mr. Weerakkody.

The tech spec is the requirement for them to use NRC approved methods. And, just like your Chapter 15 and issues with PRA and how we do tech specs.

The tech specs are founded on using NRC approved methods. I worry that we'll lose control of the design on the licensing basis of the plant through PRA if we don't have oversight of this piece in a very strong manner. That's all.

MEMBER MARCH-LEUBA: At a minimum, now that you bring that up, once you have a list of all the approved methods, and I just heard that that's an impossible task. I mean, it's worrisome.

I mean, it's not just that you don't do a review of them or probably you have. But that you cannot even list them?

(SIMULTANEOUS SPEAKING)

MS. ANDERSON: I want to address the specific question with respect to what methods need to be approved with respect to tech specs.

So, this goes back to 505 Risk-Informed Completion Times, and there is the original safety evaluation on NEI 06-09 which goes through the process for risk-informed completion times --

MR. WEERAKKODY: If I may, you know, I'm the lead staff member in NRC on this task. I just want to emphasize that as the process goes on with respect to the acceptability of the NEI proposal, we are going to be considering all these including the risk that Mike has expressed.

So, it will be part of our process, we are going through that right now. There are some -- a number of us who feel that the PRA report says once you incorporate this original tech until it is sufficient, but there are some of us who feel differently.

We have Agency processes to appropriately consider all of those things in making an informed decision. Just wanted to share that.

MEMBER MARCH-LEUBA: When I am not reading the submittals trying to prepare for this meeting, so

reviewing stuff and I'm doing computer programming. And, I see it is so easy to when it's your own program and you have to send it to somebody else to change the subroutine, but I meant from an energy float, there should be an intergen.

And then, two months later, you realize that that just killed you. And, it's a pain in the neck. I mean, you are used to us, a vehicle from NRR and doing peer reviews -- not peer reviews, approvals of topical reports and it takes 18, 24, 36 months to get anything done, which is a little abusive and it's wrong.

But if you change that process forces you to be thorough and methodical and to documenting. And, maybe we are going too much, too far. But if you remove it completely, then you're losing that inertia based on change.

MR. WEERAKKODY: Well, yes, I think that I'll say this and I don't want to divert the discussion, but one of the things we are considering based on feedback we got from legal is that clearly some type of threshold if all the criteria which if it exceeded would require a particular method to come to us for prior approval.

So, that is under consideration. We don't

know how we -- we haven't discussed how exactly to go that line, but your point, like we take.

MEMBER MARCH-LEUBA: It forces, I think, real -- I mean, let me use my example. The main value that ACRS provides is the fact that you know that you're coming here. We don't know anything, okay?

But just because you have to come and confess to us, you're doing a good job.

MR. WEERAKKODY: Thanks.

MEMBER MARCH-LEUBA: And, the same thing happens when you have to get a dash A on your report. The review -- the staff review doesn't add anything to value but they did a good job because they knew they were coming here.

And, if you remove that, then people have to be more thorough and more dedicated and there is money pressures all the time.

MEMBER DIMITRIJEVIC: I have a question because I want to understand. This sort of methods change on tech specs, there was a matter related to tech specs simulation or made to the changes PRA is that you are going to tech specs?

MS. ANDERSON: Yes, it's -- so, what the tech specs -- what the supporting documentation for risk-informed tech specs referenced, when it said --

when that documentation said method, if you really dig into what was written there, and that safety evaluation, it's clear that what they meant was fire PRA for modeling fire risk.

Seismic PRA for modeling seismic risk. Seismic margins analysis for modeling seismic risk.

And so, we sort of went back and forth and said, well, how do we make sure it's clear what's meant? And, I think with the staff, we came to the conclusion we needed to use the word approaches.

So, fire PRA is an approach to modeling your fire risk. Seismic margins analysis is an approach to modeling your seismic risk.

And, that's what needs to be reviewed and approved, well, not approved by the staff, but reviewed explicitly by the staff and approved for use in risk-informed completion times. And, there was no change to that.

We still --

MEMBER DIMITRIJEVIC: That's already approved for using the PRA, right?

MS. ANDERSON: It's approved for use --

MEMBER DIMITRIJEVIC: I mean, let's say that you have a --

MR. LINTHICUM: For that application.

MS. ANDERSON: Right, for that application.

MEMBER DIMITRIJEVIC: Yes, well, let's say that you have a peer reviewed PRA with all elements, fire, seismic, blah, blah, blah.

MS. ANDERSON: Right.

MEMBER DIMITRIJEVIC: And, somebody's using it that's for tech specs, why would that be the question?

MS. ANDERSON: It would have to be something that the safety evaluation that that licensee got from the NRC. It would have to explicitly say, this program is conducted using fire PRA, internal events PRA, and seismic PRA.

So, if I originally got my application approved doing internal events and fire PRA, and then seismic margins analysis and a seismic penalty factor which several licensees have done, if I then developed a seismic PRA and wanted to explicitly use that in my risk-informed completion time program, I have to go back to the NRC staff to get approved to use that seismic PRA in my risk-informed completion time program.

So, there's still --

CHAIR BLEY: And, that's for focused

review kind of thing you were talking about?

MS. ANDERSON: Yes, it would be a focused review because they wouldn't be looking at your entire program again. They would be looking to make sure that that new approach, that new seismic PRA you wanted to use was technically acceptable to support your program.

MEMBER DIMITRIJEVIC: And, I just want to add something for the people who doubt, let's look what the tech specs debate. What's the tech spec, let's say, I don't know, high pressure injection pump, can we get out for two weeks based on what? Based on the tech spec with existing, you know, what Westinghouse first time --

MEMBER MARCH-LEUBA: If you want --

MEMBER DIMITRIJEVIC: Yes, it would -- it doesn't have any basis and two weeks, why two weeks? Why not three? Why not four? Nobody knows, but suddenly, it's a Bible.

MEMBER MARCH-LEUBA: If you --

MEMBER DIMITRIJEVIC: And now, when we want to introduce some risk inputs to that, people get nervous. They should, just think of the origin of the deterministic regulation and what that debate is first.

MEMBER MARCH-LEUBA: When, not if, when you're reading the transcript and go back 12 pages, you'll find out I said, this was a perfectly acceptable application of PRA in my mind.

MEMBER DIMITRIJEVIC: Yes, I know. That's what you said.

MEMBER MARCH-LEUBA: I agree with you.

MEMBER DIMITRIJEVIC: Wait until actually just stated to something better or if we don't even know what that was.

MEMBER MARCH-LEUBA: When you have a tech spec that says three days, somebody pick out of the air. And, probably was based on the fact that they estimated it would take three days to fix the problem, so let's give them three days. And, that's what it came from.

MS. ANDERSON: The other rationale is that it's one percent of a year, so it can't be that much impact.

MEMBER MARCH-LEUBA: Maybe we'll use that, we'll use that. You think probabilistic.

MEMBER DIMITRIJEVIC: And, they're doing life extension, I was told, right? Whatever it is that is -- which was based on the internal -- the manual originally advisement in 1960, I mean, 40 years

of life and now we have a very scientific way to extend it.

MS. ANDERSON: So, I think I've essentially covered my conclusion slide. But I do just want to underscore, we had a lot of stakeholder interactions, several public meetings.

We completed three pilots of the newly developed method process and NRC observed all three with a rather large team at all three instances.

(OFF MICROPHONE COMMENTS)

MS. ANDERSON: Three different newly developed methods, yes.

And, we revised NEI 17-07 to incorporate lessons learned after each pilot.

MEMBER DIMITRIJEVIC: And, all those lessons are fine?

MS. ANDERSON: They all had findings.

MR. LINTHICUM: They all had findings.

MS. ANDERSON: But they went through the process okay.

MEMBER DIMITRIJEVIC: Okay. They're all in the fire PRA?

MS. ANDERSON: No.

MR. LINTHICUM: Only one, only one.

MS. ANDERSON: Yes.

So --

(OFF MICROPHONE COMMENTS)

MR. LINTHICUM: Yes, it would be located --

MS. ANDERSON: Yes, it's in the next one.

So, at this point, we've done a lot of revision of 17-07 to address NRC comments and right now, we don't have any outstanding NRC comments to address. If more come our way, we'll be happy to address those.

And, with that, I think I am done and we are ready to talk more about the --

MEMBER MARCH-LEUBA: Let me subject you to a review.

MS. ANDERSON: Sure.

MEMBER MARCH-LEUBA: Can you go back to Slide 7? This is just nitpicking. On the next to the last sentence says, the NRC will endorse all of the above.

Are you making up NRC's mind? Or it's a fact?

MS. ANDERSON: Well, it could -- well, we actually have seen a draft of 1.200 and it does endorse all the above. And, when I say --

MEMBER MARCH-LEUBA: It has been, though?

MS. ANDERSON: No, it hasn't been endorsed because 1.200 isn't final. When I say will endorse, that could also include endorsement with exception.

MEMBER MARCH-LEUBA: Okay. An applicant yesterday, I chastised them on their SER -- SAR for using aspirational goals in their statements. So, you really mean you have an agreement that they will do it, right?

MS. ANDERSON: They will endorse it and if there are exceptions, that's obviously the staff's prerogative, but --

MEMBER MARCH-LEUBA: And, you have read the draft and you are in violent agreement and --

MS. ANDERSON: Yes.

MEMBER MARCH-LEUBA: -- there is no disagreement between the two of you?

MS. ANDERSON: I mean, because the alternative would be that the NRC staff would have to find some alternative document to endorse and there isn't.

(SIMULTANEOUS SPEAKING)

MR. LINTHICUM: Yes, the industry has --

MS. ANDERSON: I guess they could write their own, but I don't see that happening.

MEMBER MARCH-LEUBA: Well, we could keep

on behalf and we've kept the reactor safe for the last 50 years. It's very expensive, very cumbersome, but it works.

MR. LINTHICUM: I mean, the industry has provided comments on the draft. Not -- I wouldn't say they're --

MS. ANDERSON: Groundbreaking.

MR. LINTHICUM: -- I mean, they are more clarifications.

MEMBER MARCH-LEUBA: But the real way, are you happy with the way the draft reads?

MR. LINTHICUM: Yes, I would say we expect the staff to endorse.

MEMBER MARCH-LEUBA: Okay. I hate aspirational goals.

MR. LINTHICUM: I understand.

MR. WEERAKKODY: If I may just for the record, the original version of 17-07, we had about 70 comments.

MS. ANDERSON: It was more like a 107.

MR. WEERAKKODY: We had 90 public comments.

MS. ANDERSON: To the person who addressed them, it was more like 107.

MR. WEERAKKODY: But I want to very

clearly say what the staff will do. So, we have gotten to a point where we have a version that we think is reasonable and we said we have no comments.

But we recognize that as we go through the public review process, we may get comments from the public, you know, we may get comments from you which will come back to think that, hey, you know, we need some additional changes and we will comment them to NEI.

And, in the end, our part is to endorse 17-07. It will be great if we can endorse it without any exceptions, but if that becomes necessary, we will do so.

MR. MARKLEY: This is Mike Markley, NRR again.

I'd just like to remind you that these are guidance documents that are full of shoulds and very few shalls that you'll find anywhere. And the requirement is in the tech spec.

MEMBER MARCH-LEUBA: Yes, we all say that, but if they come in with something that's to satisfy URG, you approve it. And so, very rarely disapprove it. So, it is not that requirement, but this has sufficient -- it's not the necessary but it has sufficient condition.

MS. ANDERSON: Okay, we're ready to turn it over to --

MEMBER DIMITRIJEVIC: So, I hope you -- you have more slides or --

MS. ANDERSON: I don't have any more slides, but the Owners Group does.

MEMBER DIMITRIJEVIC: Okay, all right.

MS. ANDERSON: Do you want me to pull up the Owners Group presentation?

(OFF MICROPHONE COMMENTS)

MEMBER DIMITRIJEVIC: I think -- so, we are running a little behind, surprise, surprise. So, let's make a break now and come back in 25 minutes before 11 and then we will go through the Owners Group and then back to Dennis, so, 15 minutes break.

(Whereupon, the above-entitled matter went off the record at 10:20 a.m. and resumed at 10:36 a.m.)

MEMBER DIMITRIJEVIC: Okay, we are on the record.

MR. LINTHICUM: Okay, now I can start. So, good morning. This is Roy Linthicum again from the PWR Owners Group.

My part of this is going to be very brief and then, I'm going to turn it over to Andrea Maioli

who, Andrea and Reed LaBarge were the primary authors of our document, so they can answer any detailed questions you may have.

MEMBER DIMITRIJEVIC: Okay.

MR. LINTHICUM: Next slide?

And, when I say very brief, I was going to go over the background and purpose, but we've pretty much discussed a lot of this.

I will say the important part to note from my perspective is, we didn't actually go down this path because the fire PRAs, we went down this path because -- we started down this path because there is a lot of disagreement between what constituted an upgrade and a maintenance change, or the PRA model.

And, when I say differences, there are differences in interpretation between the NRC staff that were doing audits of submittals and the licensees. There were differences between peer reviewers through our licensee people and other licensees.

And, when you look at the current version of the ASME Standard, the -- what constitutes an upgrade and what constitutes a maintenance update are not mutually exclusive. So, that was a lot of the problem. So, we felt they needed to be well defined.

And then, as we saw, and it evolved into the risk-informed completion time where we're having, you know, the definition of method and acceptability of methods and newly developed methods as part of a licensing condition, we wanted to avoid the same types of disagreements.

Especially as a licensing condition, the industry just can't live with something that was not well defined. That didn't serve our needs.

And, it actually worked well, it didn't really serve the NRC needs either. So, we were able to reach a mutually, I would say, agreeable position that this is something that needed to be addressed.

MEMBER MARCH-LEUBA: If you look at the example, and I would encourage you to talk to your colleagues, of the computer codes that I use for, let's call it Chapter 15, since she likes that nomenclature.

We approve an issue with a dash A for a topical report for a computer code. But then, the -- if, during the application of that particular revision 4.22a, the applicant finds a mistake on an output card or a comma missing or even parameters of just correlation having to be found incorrect, they are allowed to change it without notifying anybody.

And, you're supposed to keep your code maintained. Now, you decide to change your CSF correlation from this to that, I mean, a whole new server thing. And, that is an update.

And, once you have the update, you are required to do all of your QA, your full QA, you have to run your 10,000 cases and verify they correlate and work and all that.

So, there's a difference between maintenance and update and I think you can use that --

MR. LINTHICUM: Right, and that concept is factored into the decision. So, like I say, when we say something's a newly developed method, it's a compilation of all the inputs.

So, a correction of an error, something along those lines where you're not fundamentally changing the method would not be a newly developed method so it would not have to go through this process.

So, it would just be a revision, you know, that would be issuing this.

MEMBER MARCH-LEUBA: I mean, is that well understood? Because I tell you, for codes it's not, it's done but it's not really what -- I've been on QA audits.

MS. ANDERSON: Thanks to this document it is.

MEMBER MARCH-LEUBA: On QA -- I mean, are we being clear on this on the -- on a vendor's place where we claim them because they have corrected some output cards on their card but that's not the approval.

So, there has to be a well understanding, be well defined. You can get in trouble on it.

MR. LINTHICUM: Right, right. And, that's why we actually went through and actually made some definitions and created definitions to support the method.

And, the last thing I'll say really before I turn it over to Andrea is this -- our document is a PWR Owners Group document but we had inputs from a lot of stakeholders, including the BWR Owners Group, NEI, the Joint Committee on Nuclear Risk Management that owns the PRA Standard, the NRC, and even had some advanced reactor input as well.

So, we did address a large number of stakeholder comments and inputs into the final process. We do recognize that, you know, as this gets published in the Federal Register through Reg Guide 1.200, we may have to address some additional

comments. But we'll deal with those, you know, as any comments come forward.

CHAIR BLEY: Ray, did any of those non-PWR groups of potential vendors get involved with this with you?

MR. LINTHICUM: I don't -- there was one specific vendor that did, but I don't feel comfortable mentioning them by name.

CHAIR BLEY: That's fine, but only one?

MR. LINTHICUM: But only one, yes.

CHAIR BLEY: Don't know if they knew what was going on or --

MR. LINTHICUM: No, they did.

CHAIR BLEY: Oh, they did?

MR. LINTHICUM: They did.

CHAIR BLEY: They did.

MR. LINTHICUM: Yes.

CHAIR BLEY: They didn't really --

MR. LINTHICUM: Yes, but only one actually wanted to actually engage.

CHAIR BLEY: Interesting. Okay.

MR. MAIOLI: I would say through JCNRM, though, the advanced reactor is represented. The advanced reactor community is represented with multiple vendors there. And, they have all been kept

in -- up to speed to what this process was about and some of those participated as well through the workshops.

MS. ANDERSON: And also, through NEI as those vendors are all NEI members. So, NEI did consult with them on a lot of these updates.

CHAIR BLEY: Thanks.

MR. LINTHICUM: Okay, Andrea?

MR. MAIOLI: Okay, so, good morning. My name is Andrea Maioli. I'm with Westinghouse. I am supporting the Owners Group for this activities with LaBarge. We are supporting this project.

As Roy mentioned, I'm also one of -- well, both Reed and myself also one of the peer review leads for the Owners Group and we have supported a number of peer reviews and both involved also, I think, actually, everybody at this table is actually a JCNRM member supporting the evolution of the PRA Standard.

So, PWROG-19027 is really the document where we are documenting the requirements that are hopefully, likely, potentially, being endorsed by the NRC and the Reg Guide 1.200 Revision 3.

Victoria mentioned before that, this PRA Standard was used and an important role in putting more structure in the review of the PRAs and, of

course, also in suggesting how the PRA should be developed.

I think the addition of the newly developed method, the technical element that is documented in these documents and this suggested or recommended to be included in the next edition of the JCNRM Standard is an evolution of this.

The standard always adds short statements saying, if there is a new method, that was -- didn't go through a peer review, it is up to the peer review team to assess the technical adequacy of that method.

And, that was the only statement, there was no structure. So, when you go through the peer review, you find a new method that is used for anything, for flood calculation, for seismic fragility. And, if you find something new, that would be up to the peer review team to do the PRA review.

Well, this process and these supporting requirements put structure in that review as well as all the standards had done in the previous years for all the other elements of the standard.

We have talked about definitions before going to the actual supporting requirements. These are the six key definitions that were either introduced or changed from what they are currently,

documented in the current verison of the standard or Reg Guide 1.200.

And, it's important to look at these definitions because the newly developed method section of the standard and this document is a part of the configuration control process of the PRA.

A lot of the questions that came out today were how things changes, if there is an error on a method, for example, well, that's captured in the PRA configuration control which has its own set of requirements, its own set of items that would need to be looked at when a peer review is done for the PRA.

Newly developed method is another element in the PRA configuration control. When you have an upgrade, due to the fact that you are introducing a new method in your PRA, but this new method is also newly developed for the industry.

So, of course, newly developed method, the key definition then all the supporting definitions as matter to trying to, as we discussed before, trying to put a box around a method for a -- and there may be a lot of them in a PRA.

And, what the stated practice is. We talked before, it's not the intent of this document or of the process to go back and re-peer review through

the newly developed method full tree analysis method. That's sort of state of practice and it should be -- if you want to grandfather in the process.

And then, the definition of consensus method and model which is based on NRC approval or usage in an application.

And then, a clarification on the PRA upgrade and maintenance review, removing that overlap in the definition, that Roy was talking about. So, that both the licensee and the peer reviewer are looking at a change in the PRA may have an easier life in identifying whether that's an upgrade, a better process, re-peer review or its maintenance that doesn't require a peer review.

And, the flowchart that was mentioned at the beginning really goes through the configuration control process and where the newly developed method place in the -- play in the configuration control process.

So, if you are familiar with --

(OFF MICROPHONE COMMENTS)

MR. MAIOLI: Oh, you have the printout.

(OFF MICROPHONE COMMENTS)

MR. MAIOLI: So, the newly developed method is written in the same format of every other

technical element and every other part in the standard. So, technical elements, another technical element, for example, may be initiating events. So, initiating events analysis is one technical element in the standard.

So, the newly developed method is another technical element in the standard. Sunil had a summary of how the standard is structured with a high level shower requirement and then supporting technical element.

So, the newly developed method -- technical element has this six high level requirements that puts every subject for a sort of structure in the review of the method.

CHAIR BLEY: A quick question for Victoria. Is the new NEI document on peer review, does it call out the Owners Group report as for the requirements?

MS. ANDERSON: Yes.

CHAIR BLEY: Okay. And, eventually, we hope that will change and would --

MS. ANDERSON: Right.

CHAIR BLEY: -- be a part of it?

MS. ANDERSON: It'll just be a part of the standard and then we can just strike that when we

revise 17-07.

MR. MAIOLI: So, the six key high level requirements --

CHAIR BLEY: I'm sorry to interrupt you. I'm just remembering back to all the elements of the standard and how many years it took to beat agreement out of everyone involved to publish them.

Has this gone through the group that will be approving the standard eventually? They're on board with it?

MR. MAIOLI: Is it going through? We have provided this in draft form to JCNRM up to the ballot for the next version of the standard just it's about to close. And, it includes --

CHAIR BLEY: This?

MR. MAIOLI: -- this.

CHAIR BLEY: That's right, okay.

MR. MAIOLI: JCNRM provided it --

(SIMULTANEOUS SPEAKING)

MR. MAIOLI: JCNRM provided some initial feedback which was the reason for the most recent update of the document in December, included some feedback from JCNRM.

So, JCNRM will go through their own consensus process through the ballot with comments and

address those. But it's done in collaboration.

MEMBER DIMITRIJEVIC: But let me understand how that will work. So, you have a peer review team which is reviewing, let's say, I don't know, for this we'll say the initiating event.

And, then, there is a new method in initiating events, let's say. So, then what happens? This is going to be on end of all, you know, high level requirements.

And then, so, there is a Person A reviewing the initiating event and then, what, there is a Person A1 reviewing the method?

MR. MAIOLI: It is possible.

MEMBER DIMITRIJEVIC: Or how do they know that there is new method?

MR. MAIOLI: So, 17-07 identified two alternatives. You can do a dedicated peer review of the method itself outside of its application. Sometimes it's possible, sometimes it's maybe more challenging, depending on the method.

But and a lot of utilities have told, well, I'm not going to use in my PRA a method that has not been gone through this process.

If a method is peer reviewed along with this application, there will likely be dedicated

people in the team looking at the method which may or may not be the same people also looking at how the method is implemented.

It is an additional scope to a peer review. So --

MEMBER DIMITRIJEVIC: So, they should define that before asking for -- so it would not be standard peer review team, you may have to have experts?

MS. ANDERSON: Yes, I --

MR. MAIOLI: If we have identified that the scope included a newly developed method, or the alternative is that during the review and that you identify the newly developed method, then the review may be stopped and the scope and the other team. That's part of how we normally do the process.

MR. LINTHICUM: And, this is -- let me -- I mean, this is Roy Linthicum.

So, we try and avoid those challenges mid review. So, we do ask the utilities to identify any change in methods or any new methods that they've used in their models so we make sure we have the right review team going in.

Now, sometimes you do get surprised at what they consider a new method. It might not be what

we do, so you may get surprised by that and that's where you would potentially run into a situation where the review team would say, we don't have the right people. So, this part we can't review. You'll have to schedule a, you know, a follow up focused peer review.

MS. ANDERSON: Yes.

MR. LINTHICUM: If we don't have the right expertise.

MS. ANDERSON: And, that gets documented in the peer review report. And, we'll, essentially, this portion of the PRA and these high level requirements were not reviewed.

CHAIR BLEY: It's a finding?

MS. ANDERSON: It's a type of fact observation.

MR. LINTHICUM: It's a type of -- it's a fact --

MS. ANDERSON: It gets documented, it's something that the staff would see in the licensing application.

MR. LINTHICUM: The application, right.

MS. ANDERSON: And, I think is the important thing.

MEMBER DIMITRIJEVIC: So, all your peer

review teams will have to be very knowledgeable about this.

MR. MAIOLI: All the peer review teams go through --

MEMBER DIMITRIJEVIC: Definition of that.

MR. MAIOLI: -- go through --

MEMBER DIMITRIJEVIC: What's your definitions are.

MR. MAIOLI: Right. All the peer review teams go through refresh on the standard, on the process and we are going to include this as part of the training before ever peer review. That happens before they kick off, before any material is made available, all the peer review teams go through that training.

MEMBER DIMITRIJEVIC: Okay, thank you.

MR. MAIOLI: So, at the high level, I mean, I'm not going through the details here because it's hard to read and it's in the report.

But the six elements here within this document requirement, six high level requirements have to do with purpose and scope. It's the first one.

The second one is essentially detecting all bases.

The third one is on the data used, how

it's used, where it's -- well, the data sources, how it's manipulated.

There is a dedicated high level requirement on uncertainties.

And then, a high level requirement on their other results or should expect to fit with the scope and the end scope of the method.

CHAIR BLEY: I'm pleased that in both the high level requirements and the lower level requirements you don't make a distinction between the two capability categories. The same thing applies at --

MR. MAIOLI: Right, right.

MR. LINTHICUM: Right.

CHAIR BLEY: It's about time.

MR. MAIOLI: yes, we kept the structure because we provide it as a plug-in for the standard with all the capability being the same. But there is no differentiation in capability category for the NDM technical elements.

The last one is on documentation. The last high level requirement is on documentation with two focuses. One, the same focus that every other technical element has which is to provide trustability of the work.

But the other one here, it's very specific to what the differentiation between reviewing the method and reviewing it's application. So, making sure that documentation is clear on how a newly developed needs to be implemented in the PRA.

And this provides the structure for the review.

MEMBER DIMITRIJEVIC: And, the that was reviewed by NRC? Is that method if those are reviewed by the NRC?

MR. MAIOLI: If the method was reviewed by the NRC, it's a different part where it's the, let's say, the normal submittal as a topical of the method to the NRC. These requirements are not applicable in that case. These are what the industry looks at.

MEMBER DIMITRIJEVIC: So, wait a second. So, a new method, where is the definition of the new method, does that involve if there's no review but --

CHAIR BLEY: It's this flowchart.

MR. MAIOLI: The consensus method and model? So, if a method is a consensus method, it means it's approved by the NRC for use.

MEMBER DIMITRIJEVIC: Then -- okay, so, it's not --

MR. MAIOLI: Then it doesn't go through

this process. It's one way in that flowchart to say, well, this is good. There is no need for a review of the technical adequacy of the method.

CHAIR BLEY: I have, yes, you're not going through the details of the lower level requirements. I'm pleased to see that you have one on uncertainties and that's pretty well through the standard.

I'm uncomfortable in your later lower level requirement to ensure uncertainties do not preclude meaningful use of the newly developed method results. I rather wish you had said, make sure you present the results including uncertainties in a meaningful way.

This looks like a way for a people to duck out of doing the uncertainties because, oh my God, nobody could understand it.

MR. MAIOLI: There is a lot of wordsmithing in the developing supporting requirements of the standard and, here, it was really not -- the standard comment in here was really not different.

The goal was definitely not to let out people from looking at uncertainties. It was to make sure that the uncertainties were addressed and the results were still applicable.

CHAIR BLEY: Okay, okay.

MR. MAIOLI: We went through --

CHAIR BLEY: We got what you're saying, yes.

MR. MAIOLI: Yes, I understand.

CHAIR BLEY: The one before that, since all new methods are expected to be improvements, at least that's what I heard earlier today, having the secondary requirement that we should compare the results with newly developed methods without some explanation.

It worries me, again, a little because it could lead to a spot like Jose was describing where NRC says, my God, they're different. And, yes, they're different on purpose because we're now addressing something we weren't addressing before. It's just worrisome.

MR. MAIOLI: Right.

MS. ANDERSON: Yes, I think what's -- it meant there is that if it has -- it says identify the causes and I think the idea is that you want to understand why you get different results.

CHAIR BLEY: Good. I hope it doesn't backfire.

MR. LINTHICUM: Well, yes. We did -- I mean, we tried to choose the words to say what we

didn't want to happen was to say, you've got the results that you expected to get when you developed the method because you're unexpected results might be real.

CHAIR BLEY: Yes.

MR. LINTHICUM: So, just because you didn't get what you expected doesn't mean it's not a valid method. So, but you need to understand why there's a difference and being able to point to the fact of the reason was the intent of that supporting requirement.

CHAIR BLEY: Let's hope it works that way in practice.

MR. LINTHICUM: Well, it has to be. So, the three we've done.

MR. MAIOLI: I presented a few like the underlying supporting requirements only for the first one and just for awareness.

This follows, again, the same structure of the supporting requirement for the rest of the standard.

So, they are written in, of course, a generic fashion because they are not specific to a method. If you want the challenge of this specific technical element that needs to be wide enough to

accommodate different methods.

It could be a fire method, a seismic method, a method dedicated to data analysis, a method dedicated to fragility, a method dedicated to different elements. So, it needs to be generic enough.

It's also not prescriptive of how something needs to be addressed like all the other supporting requirements in the standard, it's telling what is the topic, what is the thing that needs to be addressed, but not how to address it. And, that also needs to provide that same level of flexibility like everything else in the standard.

So, and, I think the example that was raised before on uncertainties is a very good example. It also needs to not be open ended. So, as you were pointing out before, compare maybe open ended, but then identify where you -- try to understand the differences. It's trying to close the loop on that.

So, those are the supporting requirements for the first technical element.

Next few slides on the actual pilots that we went through and a few words on the field review report.

The same process is essentially used for

the peer reviews with specific differences and specific caveats that are included in 17-07.

The report is also very similar. The peer review reports, an NDM peer report is very similar in structure to a peer review report that is provided for PRA for implementation.

The main difference, if you want, is the addition of this non-proprietary appendix at the very end that you need to understand the context of the process.

So, a method developer developed the methods. They want to go through peer review to, let's say, bless the method, stamp it with the NDM peer review. The method may be proprietary, may have some proprietary information in that.

So, the way we work this out was there would be a non-proprietary appendix or a self-sustained document that summarized the review. That would be non-proprietary and that can be made public. It can go in ADAMS, it can go in some other structure that are public.

So, the then plant implementing that method can call it and reference it and close the loop in that way.

CHAIR BLEY: Have you -- you haven't done

much of this yet. Have you run into any, I guess what I'm hanging on the whole PRA there on each PRA is on a specific design, plant specific basis. Some of that is proprietary.

MR. MAIOLI: Correct.

CHAIR BLEY: Here, we talk about proprietary methods. I don't remember in the standard if there's any mention of proprietary --

MR. MAIOLI: The standard does not care if you want the method is or something is proprietary or not.

CHAIR BLEY: So, have you run into any --

MR. MAIOLI: But the process --

CHAIR BLEY: -- problems with reviewer -- getting reviewers who are acceptable to the people who own the proprietary information?

MR. MAIOLI: We face that situation multiple times and I think every time it was -- what we found the solution, sometimes -- so, realize that the peer review process takes five weeks.

CHAIR BLEY: Yes.

MR. MAIOLI: The week on site, the full week before. Normally, the material is made available to the reviewers maybe on a SharePoint or something like that.

When there is some proprietary information, maybe that proprietary information, if they -- if the vendor or the utility is not comfortable in posting it, it's only made available during the week of the on site review.

CHAIR BLEY: On site?

MR. MAIOLI: It's only printed. But --

CHAIR BLEY: It hasn't been an issue? You've been able to deal with it?

MR. MAIOLI: Yes, we were able to deal with that successfully every time. And, there have been cases like that that I've observed.

MEMBER DIMITRIJEVIC: So, how many slides you still have planning to present?

MR. MAIOLI: Two or three more slides.

MEMBER DIMITRIJEVIC: Okay. Because now we are getting a little concerned because we need to leave the and now so we should speed it up.

MR. MAIOLI: Yes, so, I'll not go to much more through in detail on the peer review report.

MEMBER DIMITRIJEVIC: No, no, that doesn't mean maybe only like several comments.

MR. MAIOLI: But maybe it's worthwhile to just spend a few words on the three pilots.

MEMBER DIMITRIJEVIC: Okay, no, no, that

is fine.

MR. MAIOLI: These are the three methods that have been piloted, different kind of methods. Two methods from the Owners Group, one method on the review was managed by NEI.

So, topic here would be the emergency diesel generator failure data or refined room cooling effect screening and modeling or the fire in cabinets method that was.

MEMBER DIMITRIJEVIC: Very nice, very interesting. Okay.

MR. MAIOLI: There are -- there were three dedicated teams. We decided to use methods that were relatively simple. We didn't want to challenge the overall process with a method that was contentious for some reason, just to make sure the process worked.

MEMBER DIMITRIJEVIC: So, this is different failure data, it wasn't just changing the data, it was changing methods?

MR. MAIOLI: It was changing the way --

MR. LINTHICUM: Depending on how you analyze it.

MR. MAIOLI: -- data is looked at to generate failure rates. It was not just changing -- swapping data from two different references, but re-

looking at how the data is characterized or the events are characterized to generate data that it's used in the PRA.

So, it's not only like I'm using Reference A, now I'm using Reference B and this newly developed method, it's Reference B is massaging the same data in different way and generating different failure rates. So, yes, I'm changing the number but there is something underneath.

CHAIR BLEY: I have a question about that one because I'm a little fuzzy.

Some years ago, the NRC published its, it started to call it the Data Handbook, it was eventually called, I forget the exact name.

Were there real methods here that weren't somehow included in that reference document?

MR. LINTHICUM: Yes. So, the answer is yes. And, as the Owners Group, we've actually had separate meetings with NRC to research on this approach and those discussions area ongoing as well.

So, as a result of this, this may actually end up being more of a consensus method if staff accepts our approach and changes the way they look at it and how they publish the underlying formula data.

CHAIR BLEY: Well, you've gotten my

interest, I may have to delve into that.

MR. LINTHICUM: So, I mean, and in the interest of time, though, I think that I'll just ahead. But so, the real result is we did three pilots, the result of the pilots, we did make revisions to the peer review criteria.

Those have been incorporated and then revised as a result of JCNRM input and other inputs. And, that's where we're at today.

So, we piloted successfully. We learned lessons learned. And, that is all culminated in our final report.

With that, I think we can just open up for questions.

MEMBER DIMITRIJEVIC: You changed your criteria based on this?

MR. LINTHICUM: Yes, we did some clarifications, some reordering based upon the lessons learned from the first couple peer reviews.

MR. MAIOLI: Yes, if you look at the, for example, this slide as some feedback on the newly developed method, number two, if you look at the total number, it's 20 SRs.

If you look at the next one, it's 27. And, if you --

MEMBER DIMITRIJEVIC: Twenty-seven?

MR. MAIOLI: And, if read where the presentation is 21. The reason is, we started 20 looking at our -- the scope, the intent.

As a feedback from the first two reviews, we split apart some of the SRs. Some were too big, some needed to be refined and we ended up with 27.

And, actually the JCNRM then helped us saying, well, these two are actually redundant, this may need -- you may want to merge that in a different way and we ended up with 21, so back closer to where we were.

CHAIR BLEY: I read through them and they seem pretty straightforward. Do you have any concern that, in a year, you're going to really have to revise these extensively?

MR. MAIOLI: I hope not extensively. I don't think extensively. We realize the standard has been around for so many years and SRs are continuously tweaked. So, I wouldn't be surprised if a word or two changes, but I think the concept is there and the majority of the wholes are there.

And, we put a lot of thought in the action word and made sure that it's consistent what we wanted the what to be. What the reviewer looks at.

CHAIR BLEY: When do you expect the standards groups, and you guys are probably on it now --

MR. MAIOLI: Right.

CHAIR BLEY: -- to actually take this up and maybe incorporate it?

MR. MAIOLI: So, this 19-027 has been provided to JCNRM. It has been included in the current ballot.

CHAIR BLEY: Oh, they're voting on it?

MR. MAIOLI: Yes, which were -- yes. So, standard time is realistic, but --

CHAIR BLEY: That's good, I understand.

MR. MAIOLI: -- it should be there.

CHAIR BLEY: This year or five years from now.

MR. LINTHICUM: Or five years, right.

(SIMULTANEOUS SPEAKING)

MR. MAIOLI: What you want to takeaway is that we take relatively straightforward method, if you want. We didn't want to change the process. But it was very detailed. Every method came up with some not mets and the number of F&Os, some of those were documentation, some of those were identifying better the scope, some of those was challenges, some of the

technical basis or the data used.

So, I think there was a lot of feedback provided. One of the method closed all the F&Os, the other two methods, the older one that used previous version of the SRs will be re-peer reviewed with the same the most updated versions to clean them up.

And, that's the current plan. So, there are more details but in the interest of time, unless you have questions, we can --

MEMBER DIMITRIJEVIC: Yes, too bad, actually. I wish we had more time. Well, time is clearly is about and I may ask that even they come back on.

Let's save them I know the respect of like was the room cooling identifies some issue which a problem could exist in many utilities. Would that may have a raise to the level of the, you know, some generic issue and what will be done in that case? I will ask that they come back, it's not.

But I mean, just see --

MR. MAIOLI: That would be part of the configuration control portion of a PRA. There is the expectation that the utility is looking out for updates or use of this time, hey, there is a method that was used before, now it's wrong, which was not

the case here. This was like an evolution of the method, actually, two methods put together.

But that would be captured through the configuration control process of the PRA. So, the utility will see the information and would need to act on that information if there is ay.

MEMBER DIMITRIJEVIC: So, I think I expressed my concern about like, for instance, I always was concerned about this room heat up, especially in the case of fire which is always in back that just heat up, you know, when the ventilation gets closed and you have a fire, it's not just, you know, what is above cabinet and things like that.

So, but then that's not the case here. I understand. But there may be a case that somebody goes and looks at that and sees that that's a problem. That would be problem everywhere, but they're doing the -- this is not a consensus issue, it's done as a part of that peer review.

They finish that peer review, they peer reviewed everything is fine. But the industry doesn't know about what they discovered by the new method.

MS. ANDERSON: Yes, well, I think -- so the question you're asking is, if in developing a new method, it's discovered that what we currently do is

substantially insufficient enough that we have safety vulnerabilities we're not aware of?

MEMBER DIMITRIJEVIC: Yes, yes.

MS. ANDERSON: And, I think what would happen in that case, you know, the newly developed method we talked about that non-proprietary appendix, that gets provided to the NRC for information.

And, when we talked about that SR about comparing your previous methods and why you have the differences would state that.

So, I think the NRC staff would be made aware. The industry is very good about sharing OE with each other. So, I think informally people would definitely raise that with each other. You know, staff would become aware and then if it were significant enough, yes, that be an issue.

MR. LINTHICUM: Yes, and both Owners Groups have processes where if there is a significant industry issue that we identified through what we have processes to formally make that available to all of our utilities and even to the NRC if needed if we know that the NRC is relying on some information that we now know may be insufficient.

So, we have other processes that would cover that.

MS. ANDERSON: Yes.

MEMBER DIMITRIJEVIC: So, they would benefit from like different interpretation of this generated data. You know, I mean, I would just wonder what's the way to industry to share this if it's --

MR. WEERAKKODY: This is Sunil Weerakkody.

We will give you some information with respect to how we have put some checks and balances in place to catch and react to situations like that.

MEMBER DIMITRIJEVIC: All right, okay. Thank you.

MR. LINTHICUM: Thank you.

MR. MAIOLI: Thank you.

MEMBER DIMITRIJEVIC: Thank you very much, it was too bad that the issue of the time.

MR. GILBERTSON: So, good morning, Subcommittee Members, my name is Andres Gilbertson. I'm a reliability and risk analyst in the Office of Nuclear Regulatory Research.

Mehdi Reisi Fard is a reliability and risk analyst in the Office of Nuclear Reactor Regulation.

This morning, we will be presenting -- continuing our presentation to give you just a summary of some of the changes that are being proposed for the next revision of Reg Guide 1.200.

I'm going to just go over some general overview and then Mehdi is going to talk more about the external stakeholder engagement and how we've been considering feedback externally, and, again, also internally as well.

So, first, you know, we're going to have -- actually, if you can go to the next slide?

I just wanted to take a step back and just give you sort of the higher view of the plans for Reg Guide 1.200. We are, obviously, we're working on Revision 3 currently. That is active in progress.

Revision 4, we are looking forward and anticipating endorsement of the three standards listed there. So, as has been mentioned previously, the next edition of the ASME/ANS Level 1 PRA or Level 1 LWR PRA Standard is under ballot right now. It's in the process. So, you know, perhaps sometime before the end of this calendar year, that may be published as an ANSI Standard.

Potentially, similarly, with the Level 2 PRA Standard, and then also the LWR PRA Standard we expect to include in Revision 4.

So, our schedule, you know, is dependent on the Standards Development Organizations, in this case, the Joint Committee on Nuclear Risk Management

which is ASME/ANS.

And so, we haven't set out a firm schedule for Revision 4 yet, but it will be considering their schedule as well.

And then, I also wanted to just point out that the advanced non-LWR PRA Standard which is being developed by the JCNRM, that is going to be endorsed in a new regulatory guidance document and we have a separate effort to address that, the review and endorsement of that document.

Next slide, please?

Okay, I will hand it over to Mehdi.

DR. REISI FARD: Good morning, Subcommittee Members. My name is Mehdi Reisi Fard. I'm a reliability and risk analyst in the Office of Nuclear Reactor Regulation Division of Risk Assessment.

The purpose of this portion of the presentation is to go over the NRC review of the overall framework for peer reviewing newly developed methods. That includes the reviewing the requirements, the peer review process, and all the associated definitions that you've seen so far.

As a part of that, I'll briefly discuss some of our observations from pilot peer reviews.

And, at the end, I'm going to switch gears to some -- a couple of other important clarifications that we made in Reg Guide 1.200, not directly related to newly developed methods on the definition of PRA upgrade and also addressing key assumptions in risk-informed applications.

Next slide, please?

Let's start with the discussion on newly developed methods. NRC staff developed a set of criteria for peer reviewing newly developed methods about two years ago.

Around the same time, PWR Owners Group started a series of workshops to refine and start to develop those criteria.

And, NEI also consolidated all the peer review guidance documents for fire, external events, and internal events into one document, NEI 17-07. And, that consolidated guidance also includes the peer review for newly developed methods.

Once we determined that the PWR Owners Group criteria and NEI 17-07 were ready, we conducted -- the industry conducted three pilot peer reviews of newly developed methods. We observed them, I'll discuss them later. And, as a result of the comments that we provided and the comments that -- a large

number of comments that also peer review team members identified, both PWR Owners Group documents criteria and documents as well as the NEI 17-07 were revised which led us to issuing Draft Guide 1362. At this time with no exceptions or clarifications.

As Sunil explained, as we go through the process, we may come across new issues and we'll address them appropriately at that time.

One point I want to emphasize here is that, in the past 18 months or so, we've had significant -- we've provided significant input and contributions to the overall process.

Yesterday, I was trying to count the number of public meetings and PWR Owners Group workshops that we attended. I don't have the exact count, but it's close to 15 just in the past 18 months.

So, we've had significant interactions with the industry on --

MEMBER DIMITRIJEVIC: Just on these three methods?

DR. REISI FARD: Some of it was with the new methods, some of it was also about like the definition of PRA upgrade and some other issues, but mostly it was on newly developed methods.

Next slide, please?

MEMBER DIMITRIJEVIC: So, is this something you are very interested?

DR. REISI FARD: Oh very much so.

With respect to pilot peer reviews of newly developed methods, as I mentioned, in May and June of last year, we observed three pilot applications of industry NDM peer review process.

Staff observed the on site portion of the peer review which means the interactions between the method developers and the peer review team.

We also had access to supporting documentation through SharePoint sites, a wide range of documentation including the discussion of -- description of the method, the technical bases, self-assessments by the method developer, the peer review results, so on and so forth.

MEMBER DIMITRIJEVIC: It must be something we are likely to see on here or do you think it's about one time?

DR. REISI FARD: So, at least --

MEMBER DIMITRIJEVIC: And, those three methods something you expect to see again or you think it's just one time?

DR. REISI FARD: So, for the fire methods,

the industry closed all the findings. So, I guess the next step for them is to -- and I'm going to go through the rest of the presentation I'll talk about -- the next step according to the process is for the method developer to send NRC a report describing some details about the method.

For the other two, industry is going to have another peer review of the room cooling method sometime later this month.

And, for the other one, it seems like they're working through the Office of Research to handle it.

So, we are going to see -- we are going to observe the peer review of the room cooling one, the other one on EDG failure rates, they're working with the Office of Research.

And, I think we should see -- we should be seeing some documentation with respect to the fire method as well.

Next slide, please?

This slide at a high level explains our objectives for observing the peer reviews.

First of all, we wanted to make sure that -- or we wanted to determine whether the high level requirements and supporting requirements are adequate

for determining the acceptability of methods.

We also wanted to see whether there are differences between the process that is used for peer reviewing the implementation of methods versus the process that is used for determining the acceptability of the method. And, I'm going to talk about that later on.

And, finally, are there specific considerations in relation to oversight activities of NDMs? I'm not going to talk about this aspect much. Sunil touched on this one when he talked about making revisions to inspection procedures.

I'll talk about the reporting, some of the reporting criteria later on.

But I'm mostly focus on the first two bullets here.

Next slide, please?

In summary, we found that the process and requirements provide a well structured approach for reviewing NDMs.

Nevertheless, the NDM technical acceptability peer review has significant differences that the process has differences from compared to the process that is used for reviewing the implementation of the method.

And, once, finally, once the process is properly implemented, and all the supporting applicable supporting requirements and high level requirements are met, then the method will be acceptable to be used in risk-informed decision making.

Next slide, please?

The outcome of the NDM observations, as you heard earlier, several high level requirements and supporting requirements were revised based on peer reviewers and NRC comment -- staff -- comments from NRC staff.

There were no significant changes, but there were some deletions and additions and kind of consolidation of comments based -- requirements basically.

NEI 17-07 was also revised to address some unique aspects of peer reviewing the acceptability of methods. And, the three bullets on this page kind of provide at a high level what are those differences.

First of all, for peer reviewing implementation of the method, it's a sampling process. They don't look at all aspects of the implementation.

For determining the acceptability of a method, it's beyond a sampling process. They need to

have a more in depth knowledge of all aspects of the method.

Secondly, we provided comments to NEI with respect to ensuring that the peer review team has the right expertise to peer review the method.

A number of times, this expertise is non-PRA expertise. So, we included some language to make sure that that expertise exists for peer reviewing the method.

And, finally, the NDMs with finding level F&Os cannot be used in PRAs supporting risk-informed applications.

In the next slide, I discuss the basis for that. We found that this is an important issue in the context of the peer review of NDM peer reviews.

The peer reviewers in the peer review framework, the peer reviewers determine whether supporting requirements have been met or not. It wasn't clear if their open findings, how the peer reviewer, at a high level, will determine that a method is acceptable for risk-informed application or not.

So, for that reason, we said all the findings need to be closed before they move on to implementing it for risk-informed application.

Also, it wasn't clear how licensees or peer reviewers of implementation can justify the use of NDM considering the expertise that is needed and the detailed knowledge of the NDM.

For typical implementation issues, licensees, at times, justify that certain findings don't impact the application. They -- it doesn't -- it may not take a whole lot of non-PRA knowledge to make that determination.

But for newly developed methods requires specific expertise and requires a detailed knowledge of NDM. So, it's not something that licensees can do generally on their own.

And, finally, NDM documentation issues are very important for implementation. Again, for peer review implementations, a number of -- in many cases, licensees argue that they provide justification that the documentation issues don't impact the results because they are simple documentation issues.

In the case of NDM, documentation issues should actually impact the implementation. So, we found that, you know, all the -- again, another reason that they need -- all the F&Os documentation or otherwise need to be closed before the method is used in risk-informed decision making.

Next slide, please?

I'll say a few words on NDM peer review reports that will be provided to the NRC to support our oversight activities.

NEI 17-07 lays out that peer review reports should include, and these are some of the items from 17-07, a clear discussion on conclusions regarding the NDMs, a description of the method that was peer reviewed, the technical justification, and a summary of the review against each of the requirements that the method was peer reviewed against.

This information will be provided to the NRC and it will be publically available. Obviously, if there's proprietary information, it will be redacted appropriately consistent with our processes.

But this will provide a starting point for the staff in case we need to have further interactions with respect to oversight activities.

MR. WEERAKKODY: This is a good point to address requests for -- sorry -- this is a good point to address the question, I would say it's a largely safety question that you raised.

The -- as part of the NEI industry reports with the tech specs, they are also proposing that they will send us a report on that he describe.

And, we are in the process of developing how we will use our oversight process, if necessary, to expeditiously engage the licensees.

If we see anything that we don't like, what I'll do as I committed to Dr. Bley earlier, I will send you that inspection -- those inspection reports and with, you know, a summary description of how they would be used.

MEMBER DIMITRIJEVIC: Okay, all right. Thanks.

DR. REISI FARD: In summary, staff provided significant inputs to the development of NDM review criteria and peer review guidance through public meetings, workshops, observations.

We believe that NDM criteria provides a well structured framework within the existing peer review process for reviewing NDMs.

And, finally, we will periodically audit implementation of the NDM peer review process to ensure proper implementation and correct understanding of the criteria and process in the future.

With that, I'm going to switch gears to the other two subjects that I wanted to --

CHAIR BLEY: Before you go, the pilot studies that the industry did, are those reports

available in ADAMS?

DR. REISI FARD: So, the reports are not --

CHAIR BLEY: If you've got them, and can you pass them on to Chris?

DR. REISI FARD: I'll check whether they are publically available. I believe at least part of them are publically available. No, no, so, we have seen, again, it's not now, the appendix will be, the summary appendix will be.

CHAIR BLEY: Right.

DR. REISI FARD: so, that part of the peer review report that I described a couple of slides earlier, that will be provided to the NRC at some point when they close F&Os and it's ready for implementation.

MR. WEERAKKODY: Next slide?

DR. REISI FARD: Next slide, please?

So, I have one slide on PRA operate, determining what PRA changes constitute PRA upgrade is an important element of Reg Guide 1.200 framework because once it's determined that a change is PRA upgrade, there needs to be a focused scope peer review of the change.

The current definition considers changes

in scope and capability that impacts significant accident sequences or significant accident progression sequences as upgrade.

In the past several years or so, in the licensing reviews that we've had, we've had a lot of, you know, back and forth and RAIs on what constitutes PRA upgrade and the licensees have provided further justification on, you know, their determination on PRA upgrade versus maintenance.

So, the goal here was to provide a more clear and streamlined kind of definition of PRA upgrade. And, basically, you know, you have the definition there. I'm not going to read the entire definition.

What is does is that it basically focuses on changes in the scope and method would constitute PRA upgrade without necessarily linking it to the significant change in accident sequences and accident progression sequences.

So, as simple as that. If it's a change in the scope or method, then it's an upgrade.

Next slide, please?

On the issue of key assumptions, at a high level, Reg Guide 1.200, obviously, needs for detail of the PRA and allows the NRC staff to focus on peer

review findings and key assumptions.

And, that makes evaluation of key assumptions as a pre-qual element of NRC review.

We -- in the Draft Guide, we've clarified the guidance for identifying and dispositioning key assumptions based on the recent experience that we've had in 50.69 and specifically 50.69 and 65 of fire reviews.

Next slide, pleas?

So, basically, it's a three step process. The, say that the key assumptions are generally identified for an application from the assumptions and approximations in the base PRA.

ASME/ANS PRA Standard requirements has -- they have -- there are several requirements for identifying assumptions when utilities develop PRAs. And, identifying assumptions, that could be a starting point. Those assumptions that have been identified and have been peer reviewed, that could be a starting point for identifying assumptions.

And the next step, those that are key to the application are identified, meaning that they may impact or they may influence the decisions.

And, those that are key will be characterized and addressed using appropriate

sensitivity analyses or consistent with, you know, the guidance in NUREG-1855 if there are other approaches to the address them, 1855 also has a detailed -- more detailed guidance on how to address, you know, key assumptions.

With that, that ends my portion of the presentation.

MR. GILBERTSON: Okay. If there are any questions?

MEMBER DIMITRIJEVIC: But I mean, not to all new PRAs based on the 1.206 have key assumptions identified in the FSAR, but all PRAs didn't have key assumptions, right?

MR. WEERAKKODY: Yes.

MEMBER DIMITRIJEVIC: I mean, so, does this key assumptions, I don't remember the key assumptions required in the standard.

CHAIR BLEY: I don't remember either.

DR. REISI FARD: They key --

CHAIR BLEY: But they should have been.

DR. REISI FARD: So, are you referring to the PRA standard?

MEMBER DIMITRIJEVIC: Yes.

DR. REISI FARD: So, the PRA Standard in several parts and under several technical elements has

as specific requirements for identifying assumptions.

MEMBER DIMITRIJEVIC: Right, assumptions, but the reason --

(SIMULTANEOUS SPEAKING)

DR. REISI FARD: Yes.

MEMBER DIMITRIJEVIC: So, what does this slide mean, that you're going to go on the key assumptions that for every application you're going to track what key assumptions are applicable?

DR. REISI FARD: As a part of, yes, as a part of all applications, the licensees provide a list of key assumptions that they have identified using the guidance.

So, they need to identify those assumptions that influence the decision. And --

MEMBER DIMITRIJEVIC: Okay, let's just start with the CFR 50.69. Every assumption influences decisions.

DR. REISI FARD: And so, the --

MEMBER DIMITRIJEVIC: And, plus, I don't even know what the licensee have, you know, I mean, I don't really know what is the status on this standard issue.

MR. DINSMORE: Yes, hi, this is Steve Dinsmore from NRR again.

Key assumptions is a bit of a difficulty we're working through. Obviously, they have lists of assumptions that they get from the peer review teams for each of the elements.

And then, they have their own assumptions, well, there's a bunch of assumptions in two EPRI documents, one on internal events and one on fires.

And, the NUREG-18 -- whatever it is --

DR. REISI FARD: 1855.

MR. DINSMORE: -- it tells them to go, for each application, you're supposed to go through those, all those assumptions and identify those that might be key. And, if you identify some that might be key, you can either do a sensitivity study to demonstrate that they're not for that application or you can keep a sensitivity study in your process which are kind of the two options.

The only problem is it's a little difficult that one step from going from assumptions to those that are key is very dependent maybe on the decision making at the time.

So, but we're working through the process but that's how supposed to work.

DR. REISI FARD: So, the intent is not to identify every assumption that impacts the results.

Obviously, all the assumptions impact the results one way or another.

Then the real criteria that it may influence the decision, meaning that, based on certain assumptions for 50.69, you go from HSS to LSS or the other way.

So, if it impacts the decision, does it impact the results so much that it would impact the decision. That's kind of is the criteria that we used in recent reviews.

MEMBER DIMITRIJEVIC: Okay.

MR. WEERAKKODY: Can I go to the next slide?

MR. GILBERTSON: Yes, please.

Okay, I will try to go through this as rapidly as I can.

I think in many regards, the redlines strike out that we provided to you, it sort of self-demonstrates a lot of the changes that we made. So, I'll just summarize a lot of them at a high level. And, please, just stop me if you have any questions, obviously.

So, in general, the changes that we made to Reg Guide 1.200 were focused mostly on NDMs and the guidance on the peer review process.

We did look at it more holistically to look at other parts of it, other pieces of language. We had a few parking lot items that we also worked in.

So, but the big items are the new staff endorsements, the NEI guidance document, the PWR Owners Group document as well as the seismic ASME/ANS PRA Seismic Code Case which provides a set of alternative requirements to the Part 5 Seismic PRA Requirements.

MR. WEERAKKODY: Should I do a page down?

MR. GILBERTSON: Yes, you can -- next slide.

So, this is -- and, we've already kind of touched on this. These are just a little more details about the documents.

NEI 17-07, it's consolidates guidance from the predecessor documents on the different hazards. It incorporate Appendix X which was developed for those documents and relates to the F&O independent assessment.

And then, also, it points out to the newly developed methods requirements.

The Case 1, that's the seismic PRA code case. The NRC wrote an acceptance letter on that. And so, we've just brought our comments and our

position in that letter into this endorsement.

And then, of course, the Owners Group document, we have brought in definitions. We brought in -- by bringing, I mean, we are endorsing definitions, a process for determining whether a change is an upgrade or a maintenance. And then, also, the requirements for the newly developed methods peer review.

Okay, next slide?

(SIMULTANEOUS SPEAKING)

MR. WEERAKKODY: I will also send you the ML number that's highlighted.

MR. GILBERTSON: Oh, yes, you know what? I can call that out just so that it's on the record, it's ML-20030A437. So, apologies for not including that.

CHAIR BLEY: NEI 17-07 Appendix X?

MR. GILBERTSON: So, previously --

CHAIR BLEY: I don't see one.

MR. GILBERTSON: Right, there's no -- it's not Appendix X in NEI 17-07. It was previously called Appendix X, I think the X was just sort of a placeholder, you know, identifier.

And, this was intended to go along with NEI 00-02, 05-04, and 07-12. And so, they both -- I

believe it's Appendix E.

MR. LINTHICUM: I believe it's Appendix E in 17-07 but it was Appendix X because in a different peer review guidance documents, they were different appendices.

MR. GILBERTSON: Right, right, so, yes.

Okay, next slide?

Okay, so, just in general, the enhancements and clarifications summary rely -- related to the key assumptions source of uncertainty as Mehdi was talking about, it touches on risk-informed decision making.

We included a glossary of terms, a listing of hazards in a new appendix. And then, there's a discussion on peer acceptability. I'll talk about that in a little more detail.

Organization, we did reorganize some of the contents of Sections A, B, and parts of C and that was just to create a more smoother narrative flow.

Next slide, please?

So, again, Sections A and B, the guidance that we received from our internal process for some of the sections in the guide, they're fairly distinct.

And so, the Revision 2 has almost like a running narrative in terms of it blends in from

background, from purpose, it all sort of runs together. So, those are separated out in this new revision.

And, of course, we have a discussion on PRA acceptability which is what Sunil had showed that three triangle diagram. It really just describes that that paradigm is. That had never really been explicitly discussed in 1.200. So, and that is consistent with our resolution of that DPO 2016-01.

Next slide, please?

Okay, and so, Section C.1, we used or we used language that was a little more precise. We wanted to, in may places, we refer to a PRA in general. And so, but it's more appropriate to refer to the base PRA. So, we used that kind of language.

We more specifically referred to the PRA Standard or the Standard as the ASME/ANS Level 1/LERF PRA Standard. So, we're just being more explicit.

And, we reorganized the technical elements in Reg Guide 1.200 just to be consistent with the organization in the PRA Standard for Level 1 LERF.

We also separated out all of the requirements for the staff position for low power and shutdown PRA. We did not change any of those staff positions, they were simply moved to a new section,

their own section. And, again, that's just for clarity.

Next slide, please?

Section C.2, again, this is just the lead in to the discussion on the consensus PRA Standard and industry PRA program -- peer review programs. So, it's just a general introduction.

We talked about the code case and we made some revisions for general clarity.

Next slide?

Again, this is just, we -- this is a short paragraph or paragraph or a few paragraphs and it just introduces the notion that we're going to talk about in th additional guidance and the subsequent sections.

So, go ahead and --

Okay, and so, C.2.2, this is really where most of the changes were made. We divided this section up into five subsections based on the peer review, the base PRA, upgrade or newly developed method, and then, the discussion of facts, an observation, independent assessment.

So, next slide, please?

So, we, in 2.2.1, we talk about the peer review process. We included changes to the team qualifications, the documentation, and this is

consistent with NEI 17-07 and also several of the points that are brought in from the PWR Owners Group report.

We do include, you know, as far as, say, you know, team qualifications, just with relation to previous questions, you know, we talk about independence. And, you know, requirements that the team members be independent from the work that's being performed. They also need to be -- they should not have supervised work. They can't peer review work that they have supervised.

So, we're just trying to separate out those potential conflicts of interest. And so, those are built in. So, regardless of how the PRA is actually -- the peer review is actually performed, if it's with a, you know, a base PRA peer review or if it's a focused scope, we still expect those requirements.

CHAIR BLEY: Can they be from the same utility company but a different plant or do they need to be independent of the --

MR. GILBERTSON: Notionally, yes. I think they could be. The requirements --

CHAIR BLEY: The organizational conflict that you're worried about?

MR. GILBERTSON: Right, right. So, you know, a staff member shouldn't be reviewing their supervisor's work, for example. But if they're reviewing another, you know, supervisors work in a different component of their, that should be okay.

CHAIR BLEY: Okay.

MR. GILBERTSON: Okay, next slide?

So, this is the section that provides the guidance on whether a change to the PRA is an upgrade or it's PRA maintenance.

It's a relatively short paragraph or two and really just calls out to Appendix C which is where we are endorsing the process that's provided in the Owners Group document. And, that is, you know, getting to the flowchart that's provided in that report.

And, we have some other -- we have additional discussion that goes along with that in Appendix C.

Next slide?

So, this section is for the PRA peer review of an upgrade. And so, again, we're calling out NEI 17-07 related to how that peer review is performed. 17-07 has the guidance for performing the focused scope peer review on an upgrade.

And then, also, it calls out and endorses the requirements in the Owners Group document for that purpose.

Next slide?

And, this section is brand new and it's just pulling in the requirements that are discussed in the Owners Group document and NEI 17-07 provides the definition of a newly developed method.

And, again, all of these definitions are provided as well in the glossary for 1.200 which doesn't exist. There's no glossary right now in Revision 2 of 1.200.

And, it also pulls in the requirements for documentation of the newly developed method peer review.

Next slide?

And so, Section C.2.3 is focused on the independent assessments. Again, we're, by and large, we're just providing a description of what the F&O independent assessment is and then we're referring to and endorsing the NEI 17-07 guidance.

It's consistent with the letter that I have mentioned before, the acceptance letter on Appendix X. So, we did -- we sought not to change our position on that.

And, it brings in the new requirements as well for -- from the PWR Owners Group report.

Okay, and so, Section C.3, there's really just a handful of clarifications here and it's along the lines of what Mehdi had already mentioned, some similar language to what he provided in his slides.

Next slide?

And, Section C.4 is just related to documentation. So, we pulled in all of the related requirements for documentation for a newly developed method peer review, of peer review and upgrade and the F&O independent sections.

Okay, and this is just a listing of the glossary of terms that we're going to include in the Reg Guide.

The main thing I want to point out here on these next two slides is that the endorsement of the 2009 ASME/ANS PRA Standard remains unchanged.

We have brought that over from Revision 2. So, Appendix B is going to have the code case endorsement.

And, on the next slide, we have Appendix C as the guidance for classifying changes to the PRA.

And then, Appendix D, this provides a listing of other hazards. So, it's really just to --

it's a listing of other hazards, well, I should say, hazard. It's intended to be complete.

So, it talks about internal hazard or internal events, et cetera, internal flood, the typical ones as wells others that are included. But it provides a description as well.

So, it's an aid to help try and scope out what a PRA analyst should be looking at. And, it does include things like tsunami and, you know, take you -- pick your random hazard, meteor strikes, whatever you like, it's intended to be comprehensive.

Okay, so the next steps, as Sunil had mentioned, we will be considering feedback from external stakeholders and internal stakeholders that includes public, ACRS Members that are in this meeting, NRC legal, et cetera.

After we finish this briefing, we're going to start preparing the document for our final publication process and approval by our management and legal review.

And then, after that, it will be issued for public review, a formal public review and comment through the Federal Register.

So, just to be clear, DG-1362 hasn't been issued formally yet, it was a draft working copy was

provided for a public meeting on the 16th and also to you for your consumption.

CHAIR BLEY: And, you're not anxious to get a letter from us at this time, will you be after it's a final draft?

MR. WEERAKKODY: That is correct, I think what I was -- sorry -- what I was thinking is after the Committee -- Subcommittee Members who are here have a chance to caucus, you know, mean for Christiana Lui and get some, you know, no?

MEMBER MARCH-LEUBA: It doesn't work that way. We are not allowed to give you feedback as ACRS Members.

MR. WEERAKKODY: No, I was referring to questions on the letter.

MEMBER MARCH-LEUBA: We can write you a letter as a private individual.

MR. WEERAKKODY: No, we are not asking for a letter like that.

MEMBER MARCH-LEUBA: I mean, I can give you opinions or something.

MR. WEERAKKODY: Oh yes, yes, right.

MEMBER MARCH-LEUBA: It wouldn't be, so you understand, telling you ACRS things.

MR. WEERAKKODY: No, we understand.

MEMBER REMPE: Even the members can't decide about a letter. It goes to the Full Committee to make the decision.

MEMBER MARCH-LEUBA: So, you will get a letter or you don't get nothing.

MR. WEERAKKODY: Mike, did you want to say something about that?

CHAIR BLEY: Except what you got today.

MR. WEERAKKODY: Okay.

MR. FRANOVICH: I don't think I have much to add to that other than to say, you know, we always value the, you know, endorsement from the Committee with comments and exceptions, I understand.

But we might benefit better from seeing all the stakeholder comments collected on the Draft Guide then weigh in via letter.

MEMBER MARCH-LEUBA: In a sense, if we were to write you a great letter saying everything looks great, go ahead and publish it, it wouldn't do you any good.

MR. FRANOVICH: I don't think so and it would eat up a lot of your valuable time.

MEMBER MARCH-LEUBA: Unless we have something to say, you don't want to hear from us.

CHAIR BLEY: But you will come back after

public comment?

MR. FRANOVICH: We would be absolutely happy to come back.

CHAIR BLEY: I just think at some point we need to write a letter on it eventually.

MEMBER MARCH-LEUBA: Oh, yes, eventually, we'll need to published, but I think we need to talk among ourselves if we have something to say. If --

MEMBER DIMITRIJEVIC: Well, that's true.

(SIMULTANEOUS SPEAKING)

MEMBER DIMITRIJEVIC: And, we have to bring it to the Full Committee. I mean, we cannot write a letter without Full Committee.

MEMBER MARCH-LEUBA: If you two think that there was something wrong in one particular area, then we need to have a Full Committee letter. If not --

MEMBER DIMITRIJEVIC: If you think we would tell them today.

MR. WEERAKKODY: So, we have talked about is definitely what we do is, we have provided you a version about a month before this meeting.

After we go through the public comment period, we will provide you a version that clearly shows changes things that changed version.

MEMBER MARCH-LEUBA: And, for that final,

writing a positive letter of recommendation and you did a great job is valuable. So, intermediate unless we have anything or something bad to say.

MR. WEERAKKODY: No, I was forewarned by Christiana that the Subcommittee Members reaction does not constitute any formal ACRS positions. I wasn't asking for one.

MEMBER MARCH-LEUBA: You get what we think and it may affect some of your decisions.

MEMBER DIMITRIJEVIC: Should we ask for public comments?

CHAIR BLEY: yes.

MEMBER DIMITRIJEVIC: If we have any, open public line.

CHAIR BLEY: And in the room.

MEMBER DIMITRIJEVIC: Or for the people in the room if anybody has a comment to make, please find a microphone and do so.

Chris, can we open the public line?

MEMBER MARCH-LEUBA: They improved the lines. We don't have no docket anymore.

MEMBER DIMITRIJEVIC: You have to go so I cannot ask you that.

So, is there any -- do we have anybody on the public line who is listening to the meeting today

and who would like to make a comment?

(NO AUDIBLE RESPONSE)

MEMBER MARCH-LEUBA: I think the five-second rule applies.

MEMBER DIMITRIJEVIC: Five seconds? Okay. And, hearing nothing, we will assume that nobody has a comment. All right.

So, we can down table, we'll ask Joy, she had to go, but I will go down and finish on your side.

Dave?

Well, we were interested on the applicability of a lot of things which were brought to us for new plants. And, obviously, that's going to come in your version Rev 4 which I just said the standards for the advanced light water reactor will be applicable for that or the new plants, will that be -- will that say anything about like design certification, COLA applicability, or not? We can discuss that, okay.

MR. GILBERTSON: Yes, yes, yes, we're planning to include.

MEMBER DIMITRIJEVIC: Okay.

Dave? So, you don't have any comments?

(NO AUDIBLE RESPONSE)

CHAIR BLEY: Nothing more.

MEMBER MARCH-LEUBA: Yes, I do have some philosophy. I like the idea of the stakeholders taking responsibility for their actions. Yes, and they have -- and it was to have to write anything and make the final decision.

I'm conflicted on the value of the staff review. And, it has value just for the fact that it exists, that's the main value. But it forces into not cut corners and do it right.

But on the other side, I've seen so many red tape, 18, 24, 36 month reviews that shouldn't take more than two days that -- so, I'm conflicted on this.

And, one way I see that this can be fixed at the Agency level is let them make the decisions, let them do all the work and we just audit the results here and there. I mean, do a quality control.

And, at the beginning when you have something new, you do quality control 80 percent on their submittals.

After we know everything is working you quality control on it 20 percent on the submittal. So, it's still a review and everything we pick and choose which ones we want to do an audit which is not the high quality as our review, but it doesn't take as long.

So, I'm very supportive of the stakeholders taking responsibility for their plants. And, I think they would like to do it, too. But we cannot let them alone. If you leave them alone, and don't audit it, you're asking for trouble.

MR. WEERAKKODY: Thank you.

MEMBER DIMITRIJEVIC: Well, and, I have to say, you know, as much as I was listening, I heard something I really worry about and I think in this moment we are making risk-informed regulations so complicated and more and more complicated every day.

And, they -- maybe there is a time for a new evolution of this type. We're already using PRA, but we have it came officially in '75, this is now 45 years since this policy statement on user PRA that is '95, 25.

We have so many years we will start using and applying PRA, maybe we should make regulations such that what we learn is already implemented before all of this check and balances.

That may give some idea, you know, what we were doing on this new model of risk-informed sites or something. We already learned something, you know, we replaced two weeks with this, you know, risk-informed the tech specs.

And now, we have this living organism which is the PRA which breathes and breathes and change and moves a little here and a little there. You know, so what is this now? You know, three weeks or two weeks?

It's all depending on this little changes which will be upgrade or maybe operate, but we already learned from this PRA what is important and we can say, okay, if it's important don't keep it longer than three weeks, it is not important keep it as long as two months.

We can make it as simple as those two weeks where have been if we have enough data and experience. Otherwise, it scares me when I see how much requirements we are putting on this.

And, especially it scares me because I see that we have new plants which will benefit from 50.69 more than anybody because they're doing procurement and things like that.

And, new plants are, of course, afraid, because their PRA is not any state of completion but how many changes we will see and will that change see some risk achievement was changing from, you know, the 1.9 to 2.3 and something, something becomes important.

Don't get me wrong, I love a PRA, I can

indulge in those numbers a million times but somehow just listening to you today, this is just a new method.

There are so many methods in the PRA, nobody went through and bothered checking those. They were just also taken in, hey, that's how we are doing it. And, we were doing it for years and now this suddenly states the licensees state and this is what we have to form the new and much broader state of consensus so we cannot not anymore have a butterfly in Beijing flips his wings, oh let's check on it.

Somehow if we can find a way, which I don't really have a solution, but I think that we should really take benefit of experience we have in all of this here.

MEMBER MARCH-LEUBA: While you were talking, I was thinking, there's a false sense of security on the complexity of the analysis. So, it isn't difficult and so complex it has -- whenever we have a PRA I see in there, my whole tree has a thousand, million cutsets.

Yes, well, but you're missing the important one. And, because there is so much complexity that you feel that it is good, you tend -- it's so difficult to do that you tend to not

concentrate on what's missing because you don't have time to do it.

MEMBER DIMITRIJEVIC: No, complexity, I completely disagree. I think complexity reflects lack of knowledge. Whenever you have enough knowledge you can make things simple.

MEMBER MARCH-LEUBA: Absolutely, you're right. I'm with you.

MEMBER DIMITRIJEVIC: And, my famous standing charter once said that one of the courses that he said, that's unfortunately there is limited how simple things we can make, but there is no limit to complicate.

(LAUGHTER)

MEMBER DIMITRIJEVIC: So, that's why we have to be careful. It's like much, we like MAAP and everything, let's don't make things too complicated, try to keep them simple and identifying -- I will make these comments today in the afternoon too because we are talking about risk and review that maybe the new direction is not to have risk-informed application, but let's make regulation risk-informed.

We learned something from risk area, I mean, you know? Let's put this into something and let's don't really get afraid every time and something

change, we were using two weeks for, you know, and look at how industry make it.

And, anytime that some things go in industry wrong it wasn't something because it's in the PRA.

You know, tsunami or the some of the Chernobyl making letters of commission so, you know, the wrong training in Three Mile Island.

All right, thank you, guys.

MR. GILBERTSON: Thank you.

MEMBER DIMITRIJEVIC: Off the record.

(Whereupon, the above-entitled matter went off the record at 12:03 p.m.)

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**Roy Linthicum, Andrea Maioli**

# Newly Developed Method Requirements

February 2020 ACRS meeting

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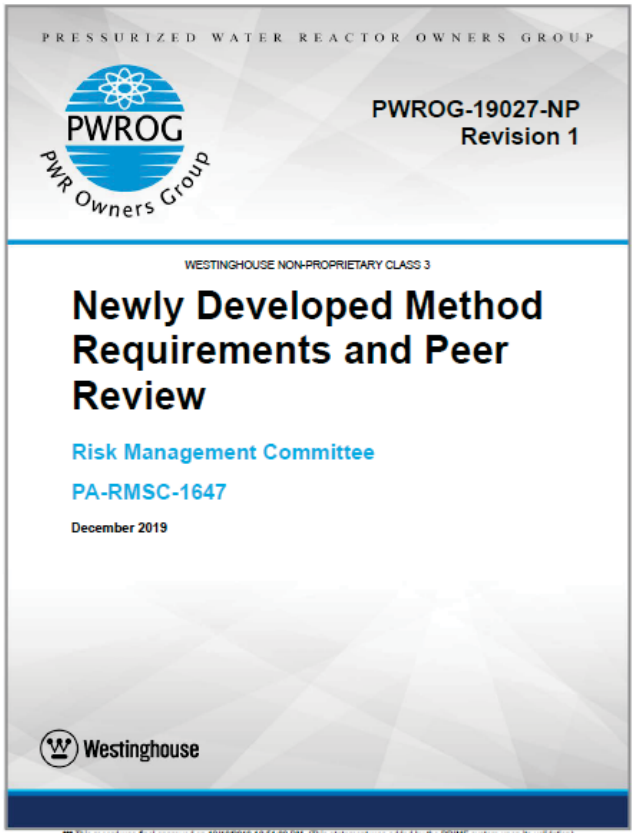
# Background & Purpose

- Develop process/requirements that allows the technical adequacy of a newly developed method to be accepted through the PRA Peer Review Process.
- Definitions, requirements and peer review process developed during multiple dedicated workshops (PWROG, BWROG, NEI, JCNRM, NRC)
- Three peer review pilots informed the final draft wording (requirements, report content, etc.)
- Results of the workshops were transmitted to JCNRM for considerations for inclusion in the next edition of the standard (i.e., through the normal consensus process by JCNRM)

# Key Document

- PWROG-19027 – Revision 1
- Documents the requirements for the review of a Newly Developed Method (NDM) recommended to be added in the PRA Standard
- Revision 1 includes feedback from JCNRM (New edition of the Standard being balloted now)



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# Key Definitions

- Newly Developed Method
- PRA Method
- State-of–Practice
- Consensus Method/Model
- PRA Upgrade
- PRA Maintenance

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# NDM Technical Element

| Designator | Requirement |
|---|---|
| HLR-NM-A | The purpose and scope of the newly developed method shall be clearly demonstrated. |
| HLR-NM-B | The newly developed method shall be based on sound engineering and science relevant to its purpose and scope. |
| HLR-NM-C | The data (note that data can be numeric or non-numeric in nature) shall be relevant to the newly developed method, technically sound, and properly analyzed and applied. |
| HLR-NM-D | Uncertainties in the newly developed method shall be characterized. Sources of model uncertainties and related assumptions shall be identified |
| HLR-NM-E | The results of the newly developed shall be understandable and reasonable given the assumptions and data, and given the purpose and scope of the newly developed method. |
| HLR-NM-F | The documentation of the newly developed method shall provide traceability of the work and facilitate incorporation of the newly developed method in a PRA model. |

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# New NDM SRs

| Index No. NM-A | Capability Category I | Capability Category II |
|---|---|---|
| NM-A1 | ENSURE that the stated purpose of the newly developed method (i.e., what is being achieved by the newly developed method) is consistent with the scope (established boundary) of the newly developed method. | |
| NM-A2 | ENSURE the applicability and limitations of the newly developed method are consistent with the purpose and scope in NM-A1. | |
| NM-A3 | Based on the limitations and applicability of the newly developed method, IDENTIFY which areas of the PRA the newly developed method is intended to be used for (e.g., hazards, technical elements, plant features, SRs impacted by the newly developed method) and, as appropriate, which areas of the PRA the method is not intended to be used for. | |

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# NDM Peer Review Report

- Similar in structure to a normal Peer Review Report (SR assessment, F&Os)
- Main differences
  - **Explicit global assessment of the method from the review team**
  - **Non proprietary appendix with minimal key information for public availability (e.g., on a method developer web site, in ADAMS, etc…)**

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# NDM Peer Review Report
# Non Proprietary Appendix (piloted in PWROG-19019 and 19020)

- Minimal set of information that can be shared to confirm that the method went through the NDM review process (and be referenced in future implementations of the method)
  - **Basic information**
  - **Unique identification of the method**
  - **Team composition**
  - **SR met/not met**
  - **F&O listing**
  - **List of SRs to be peer reviewed in a plant PRA focused scope review following method implementation**
  - **Explicit technical adequacy statement**

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# NDM Pilot Peer Reviews

- Three recently developed methods have been peer reviewed in 2019 to pilot the NDM peer review process (developed before the NDM process and SRs)
  - **EDG failure data (PWROG)**
  - **Refined room cooling effect modeling (PWROG)**
  - **Fire in cabinets (NEI)**
- Three dedicated teams of 2/3 people each (qualifications addressed for method)
  - **Stand-alone NDM review (i.e., not within implementation in a plant PRA)**
- Lessons learned resulted in refinement/finalization of the NDM requirements and definitions in PWROG-19027
- Development of “public available appendix” for the NDM review

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# NDM Pilot Review #1

- The method used to estimate the EDG reliability parameters in this NDM, specifically the fail-to-load and fail-to-run failure modes, is distinct from the method used in NUREG/CR-6928 and in the USNRC Dataset (2015)
  - The USNRC data sources identify the FTLR parameter as a “per hour” failure rate
  - This NDM identified that this success data is reported by utilities to INPO as “demand” events. As a result, FTLR was calculated as a “per demand” failure rate in this NDM
- Findings were primarily related to documentation and uncertainty
  - This method was not originally intended to be reviewed as a stand-alone method
  - Scope and limitations needed to be identified
  - Assumptions and uncertainty needed to be documented and characterized

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# NDM Pilot Review #2

- Two methods merged together for effects of room cooling failure (screening + probability of failure beyond EQ limit)

**Table F-3: Summary of Overall Results of the Method Review**

| PRA Element | Number of Supporting Requirements Meeting Each Capability Category | | | | |
|---|---|---|---|---|---|
| | Not Met | Met | N/A | Not Reviewed | Total |
| NMA | 6 | 12 | 2 | 0 | 20 |

**Table F-5: Summary of Facts & Observations for the NDM Peer Review**

| Element | F&Os | | | |
|---|---|---|---|---|
| | Findings | Suggestions | Best Practice | Total by Element |
| NMA | 13 | 5 | 0 | 18 |

- Findings associated with interface between the two methods that were merged
- Needed Clarification of method boundary/scope
- Need better documentation of technical basis for one of the screening criteria
- Need uncertainty characterization (for the failure probability method)

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# NDM Pilot Review #3

- Guidance on developing scenarios for in-cabinet fire damage of a Group 4 Electrical Cabinet multi-function control cabinet

**Table 4-1**
**Summary of Overall Results of the Method Review**

| PRA Element | Number of Supporting Requirements Meeting Each Capability Category | | | | |
|---|---|---|---|---|---|
| | Not Met | Met | N/A | Not Reviewed | Total |
| NMA | 8 | 16 | 3 | 0 | 27 |

- Reviewed against SRs updated following the first two pilot reviews
- Observations focused on:
  - Improving the documentation of the limitations and assumptions of the method
  - Improving the guidance for implementation of the method
  - Clarifying the technical basis, which in this case specifically refers to clarifications on the selection and analysis of fire events data in EPRI' Fire Events Database

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# Observations

- NDM peer review along with expected documentation helps clarifying and standardize the SR(s) that need to be reviewed during the implementation review
  - **Clarifies the scope**
  - **Spells out the technical SRs in the other Parts of the Standard**
- Documentation SRs in the NDM TE are geared towards two key elements
  - **Provide traceability of the work developing the method (similar to other documentation SRs)**
  - **Ensure implementation guidance is clearly documented to minimize misuse of the method**

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# Feedback to process

- An F&O closure can be used to close NDM F&Os, but the definition of upgrade and maintenance is slightly different for an NDM
- Examples of NDM maintenance activities
  - **a correction of an error that does not change the intent or the conclusions for the method;**
  - **the processing of more input data with the same process that does not change in the intent of the conclusion of the method;**
  - **the expansion of documentation for data and assumptions already used (but not appropriately documented in origin);**
  - **performance of more sensitivities to discuss uncertainties and or to confirm the applicability of the method within the original intended range of application;**
  - **clarification of the documentation in support to implementation of the method.**

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# Feedback to process

- Examples of NDM upgrade activities
  - **extension/change of the scope/applicability of the method;**
  - **a fundamentally different way to process input/output data (beyond usage of a different tool to perform the same process function)**

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# Backup Slides – NDM SRs

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# NDM HLRs

| Designator | Requirement |
|---|---|
| HLR-NM-A | The purpose and scope of the newly developed method shall be clearly demonstrated. |
| HLR-NM-B | The newly developed method shall be based on sound engineering and science relevant to its purpose and scope. |
| HLR-NM-C | The data (note that data can be numeric or non-numeric in nature) shall be relevant to the newly developed method, technically sound, and properly analyzed and applied. |
| HLR-NM-D | Uncertainties in the newly developed method shall be characterized. Sources of model uncertainties and related assumptions shall be identified |
| HLR-NM-E | The results of the newly developed shall be understandable and reasonable given the assumptions and data, and given the purpose and scope of the newly developed method. |
| HLR-NM-F | The documentation of the newly developed method shall provide traceability of the work and facilitate incorporation of the newly developed method in a PRA model. |

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# HLR-NM-A - Scope

| Index No. NM-A | Capability Category I | Capability Category II |
|---|---|---|
| NM-A1 | ENSURE that the stated purpose of the newly developed method (i.e., what is being achieved by the newly developed method) is consistent with the scope (established boundary) of the newly developed method. | |
| NM-A2 | ENSURE the applicability and limitations of the newly developed method are consistent with the purpose and scope in NM-A1. | |
| NM-A3 | Based on the limitations and applicability of the newly developed method, IDENTIFY which areas of the PRA the newly developed method is intended to be used for (e.g., hazards, technical elements, plant features, SRs impacted by the newly developed method) and, as appropriate, which areas of the PRA the method is not intended to be used for. | |

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# HLR-NM-B – Technical Basis

| Index No. NM-B | Capability Category I | Capability Category II |
|---|---|---|
| NM-B1 | ESTABLISH the technical bases for the newly developed method using analysis or engineering/science founded on established mathematical and/or engineering and/or science principles (e.g., established through operating experience, tests, benchmarking, or acceptance by the scientific community). | |
| NM-B2 | ENSURE that if empirical models are used, they are supported by sufficient data which is relevant to the newly developed method. To the extent possible, ENSURE that the experimental data are shown to be repeatable. | |
| NM-B3 | IDENTIFY assumption used to develop the technical bases of the newly developed method. | |
| NM-B4 | JUSTIFY the rationale for the assumptions identified in NM-B3 (e.g., backed by appropriate operational experience). | |

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# HLR-NM-C – Data

| Index No. NM-C | Capability Category I | Capability Category II |
|---|---|---|
| NM-C1 | IDENTIFY the data needed to support the development of the newly developed method (e.g., relevant plant-specific data, industry-wide current operating experience and data, or experimental or test data). | |
| NM-C2 | COLLECT relevant data consistent with current technical state-of-practice. | |
| NM-C3 | DEMONSTRATE that the data used, including experimental data or test data, is relevant to and supports the technical basis of the newly developed method. | |
| NM-C4 | PROVIDE basis for exclusion of data identified in NM-C1. | |
| NM-C5 | ANALYZE data (e.g., modifications to the data, use of data in a different context or beyond the original ranges, statistical analysis) using technically sound basis or criteria. | |
| NM-C6 | ENSURE that data is applied consistent with the purpose and scope of the newly developed method. | |

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# HLR-NM-D – Uncertainty

| Index No. NM-D | Capability Category I | Capability Category II |
|---|---|---|
| NM-D1 | CHARACTERIZE the parameter uncertainties associated with the newly developed method; this characterization could include, for example, specifying the uncertainty range, qualitatively discussing the uncertainty range, or identifying the parameter estimate as conservative or bounding. | |
| NM-D2 | IDENTIFY the sources of model uncertainty associated with assumptions identified in NM-B3. | |
| NM-D3 | CHARACTERIZE the model uncertainties (identified in NM-D2) associated with the newly developed method; this characterization could be in the form of sensitivity studies. | |

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# HLR-NM-E – Results

| Index No. NM-E | Capability Category I | Capability Category II |
|---|---|---|
| NM-E1 | REVIEW the results from the newly developed method to determine that they are reasonable and understandable. | |
| NM-E2 | COMPARE the results of the newly developed method with existing methods and, when possible, IDENTIFY causes for substantial differences. | |
| NM-E3 | ENSURE uncertainties do not preclude meaningful use of the newly developed method results. | |

| Index No. NM-F | Capability Category I | Capability Category II |
|---|---|---|
| NM-F1 | DOCUMENT the newly developed method specifying what is used as input, the technical basis and the implementation expectations and limitations. ADDRESS the following, as well as other details needed to fully document how the set of the NM SRs are satisfied:<br>a) the purpose and scope of the newly developed method<br>b) the intended use of the newly developed method<br>c) the limitations of the newly developed method<br>d) the detailed technical basis for the newly developed method<br>e) the data source, collection process and data manipulation performed in support of the newly developed method<br>f) the assumptions and uncertainties associated with the newly developed method<br>g) the interpretation of the results of the newly developed method in the framework of the intended use and application | |
| NM-F2 | DOCUMENT the process by which the newly developed method can be applied to a PRA model consistently with the intended used of the newly developed method and taking into account the purpose, scope and limitations. | |

# NEI 17-07 and Newly Developed Method Peer Reviews

Victoria Anderson, NEI

February 5, 2020

NUCLEAR ENERGY INSTITUTE

# Overview

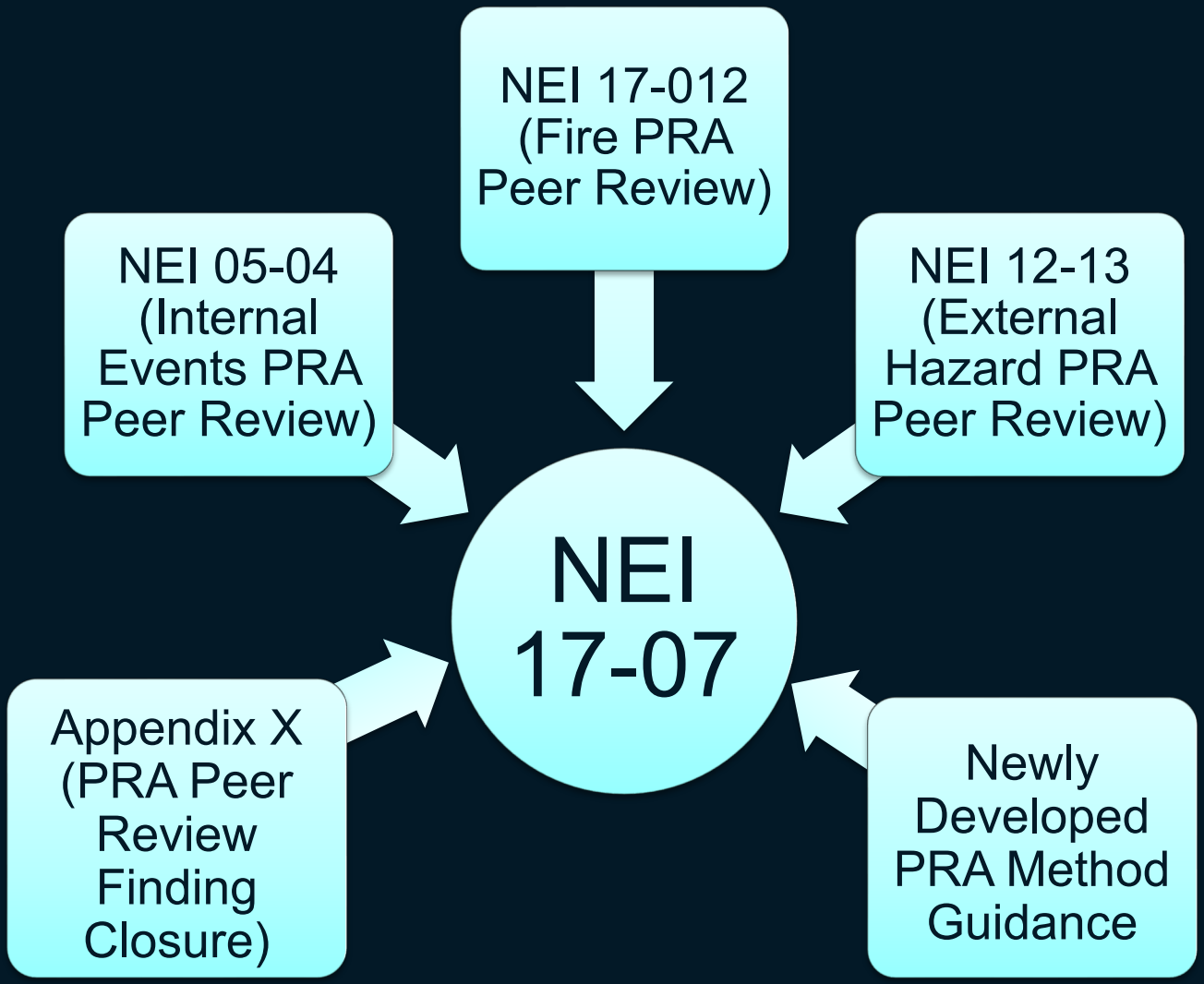
- Background
- NEI 17-07: PRA Peer Review guidance
- Relationship between supporting documents
- Stakeholder interactions

# Background

- Peer review process has been a vital component of implementation of ASME/ANS PRA standard since inception
  - Provides rigorous process for review of licensee PRAs prior to use in licensing applications
  - Reduces NRC resources expended on PRA tech adequacy
- NEI undertook effort to improve process and documentation after over a decade of experience
  - NEI 17-07: Performance of Peer Reviews Using the ASME/ANS PRA Standard
  - Latest version: Revision 2, August 2019

# Major Product: NEI 17-07



# NEI 17-07: Body of Document

- Few changes compared to original peer review documents
  - Confirmation of reviewer qualifications
  - Role of observers
  - Use of walkdowns
  - Post-on-site review week work
- Most changes
  - Support of review of newly developed methods
    - Provides alternative to explicit NRC approval of PRA methods

# Newly Developed PRA Method

- Definition: A method that has either been developed separately from a state-of-practice method or is one that involves a fundamental change to a state-of-practice method.
- Not a state-of practice or a consensus method.
- Accompanied by detailed description and justification of its technical basis.

# Review of Newly Developed Methods

| | |
|---|---|
| NEI 17-07 | • Provides guidance on review process<br>• Describes reviewer qualifications, review documentation |
| PWROG Criteria Document | • Gives technical criteria (supporting requirements) for newly developed methods<br>• Provides definition of key terms |
| ASME/ANS PRA Standard | • Provides relevant technical<br>• Next edition will include supporting requirements for newly developed methods |
| RG 1.200 R3 | • Will endorse all of the above<br>• Provides regulatory footprint for process |

# Key Points on Peer Review of Newly Developed Methods

- Can be reviewed in parallel with, or separately from, a licensee PRA model peer review
- Cannot use a newly developed method with open findings in a PRA licensing application
  - Finding closure is an option
- NRC review via topical report process remains an option
- Will be explicitly referenced in new tech spec admin section for licensees adopting TSTF-505 (Risk Informed Tech Spec Completion Times)

# Additional Changes in NEI 17-07

- Incorporated guidance on closure of findings
- Augmented discussion on concept of unreviewed/not reviewed
- Addressed lessons learned from over a decade of peer reviews
- Enhanced discussions on reviewer qualification and documentation

# Stakeholder Interactions

- Completed three pilots of newly developed method process
  - NRC observation of all three
  - Revised NEI 17-07 to incorporate pilot lessons learned
- Revised NEI 17-07 to address NRC comments
  - Multiple public meetings and teleconferences over 2 years
  - No outstanding NRC comments remain

# PRA Acceptability and Status of Regulatory Guide 1.200

Sunil Weerakkody, Ph. D.
Senior Level Advisor in PRA
Division of Risk Assessment
Office of Nuclear Reactor Regulation
February 5, 2020

# OBJECTIVES

- Inform the ACRS PRA Subcommittee about staff plans to update Revision 2 of RG 1.200.
  - Provide some details on the most significant change
- Receive ACRS PRA Subcommittee members' feedback.

# OUTLINE

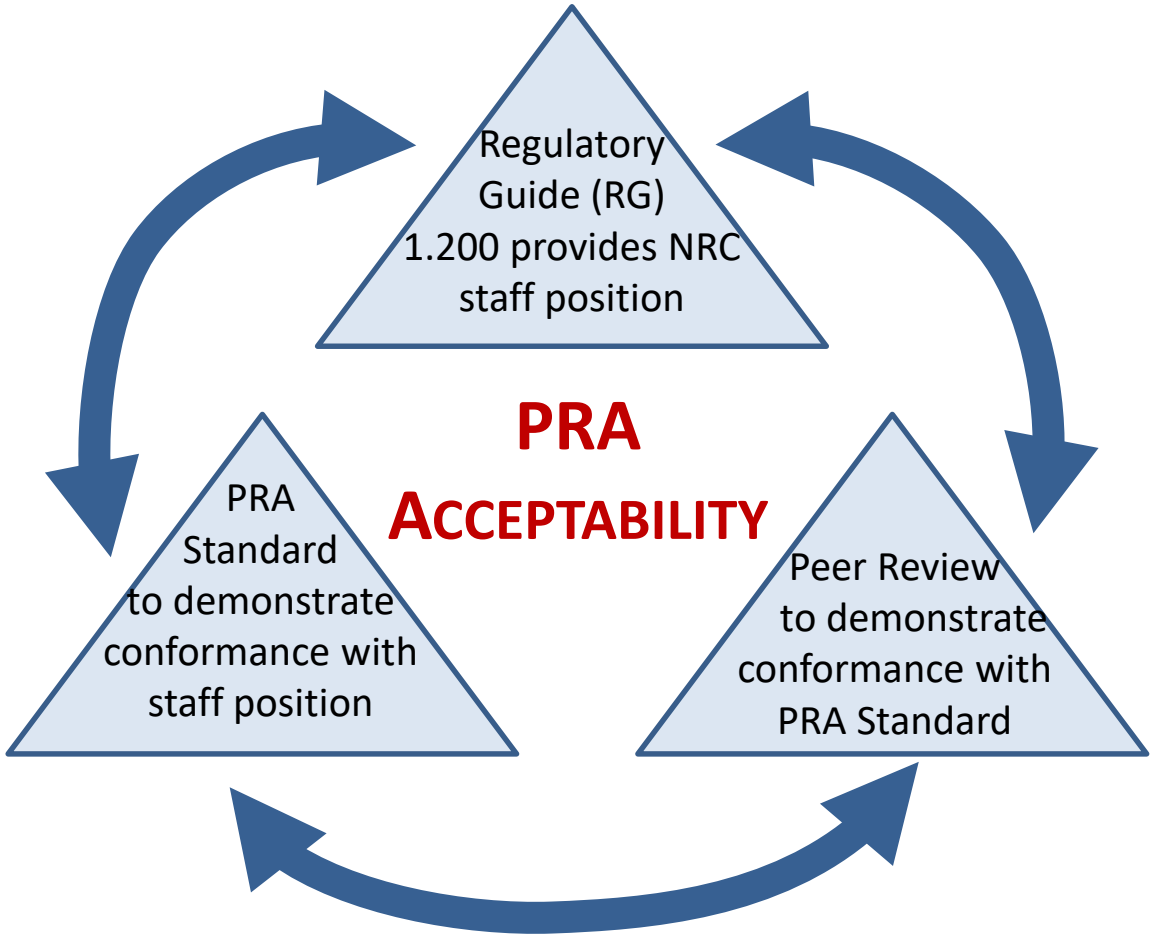
- Evolution of the peer-review process.
- Role of Regulatory Guide (RG) 1.200.
- Relationship between RG 1.200 and other RGs that support risk-informed initiatives.
- "Gap" in Rev. 2 of RG 1.200 with respect to peer-review of newly-developed methods.
- Significance of closing this "gap," specifically for (Risk-Informed Technical Specification (RITS)-4b).
- Strategy to close this "gap" using PWROG-19027 and NEI 17-07.
- Current Status and Next Steps.

# EVOLUTION OF PEER-REVIEW PROCESS

- SECY-99-256: "Rulemaking Plan for Risk-Informing Special Treatment Requirements," October 29, 1999.
- COMNJD-03-0002, "Stabilizing the PRA Quality Expectations and Requirements," September 8, 2003.
- SECY-04-0118, "Plan for the Implementation of the Commission's Phased Approach to Probabilistic Risk Assessment Quality," July 13, 2004.
- SRM-SRM-SECY-04-0118, "Plan for the Implementation of the Commission's Phased Approach to Probabilistic Risk Assessment Quality," October 6, 2004.
- Establishment of the peer-review process using RG 1.200 and consensus standards.
- Peer-review process acknowledged in regulations (10 CFR 50.69, November 2004).

# THREE ELEMENTS OF PRA ACCEPTABILITY

All 3 elements have to work together to demonstrate PRA acceptability



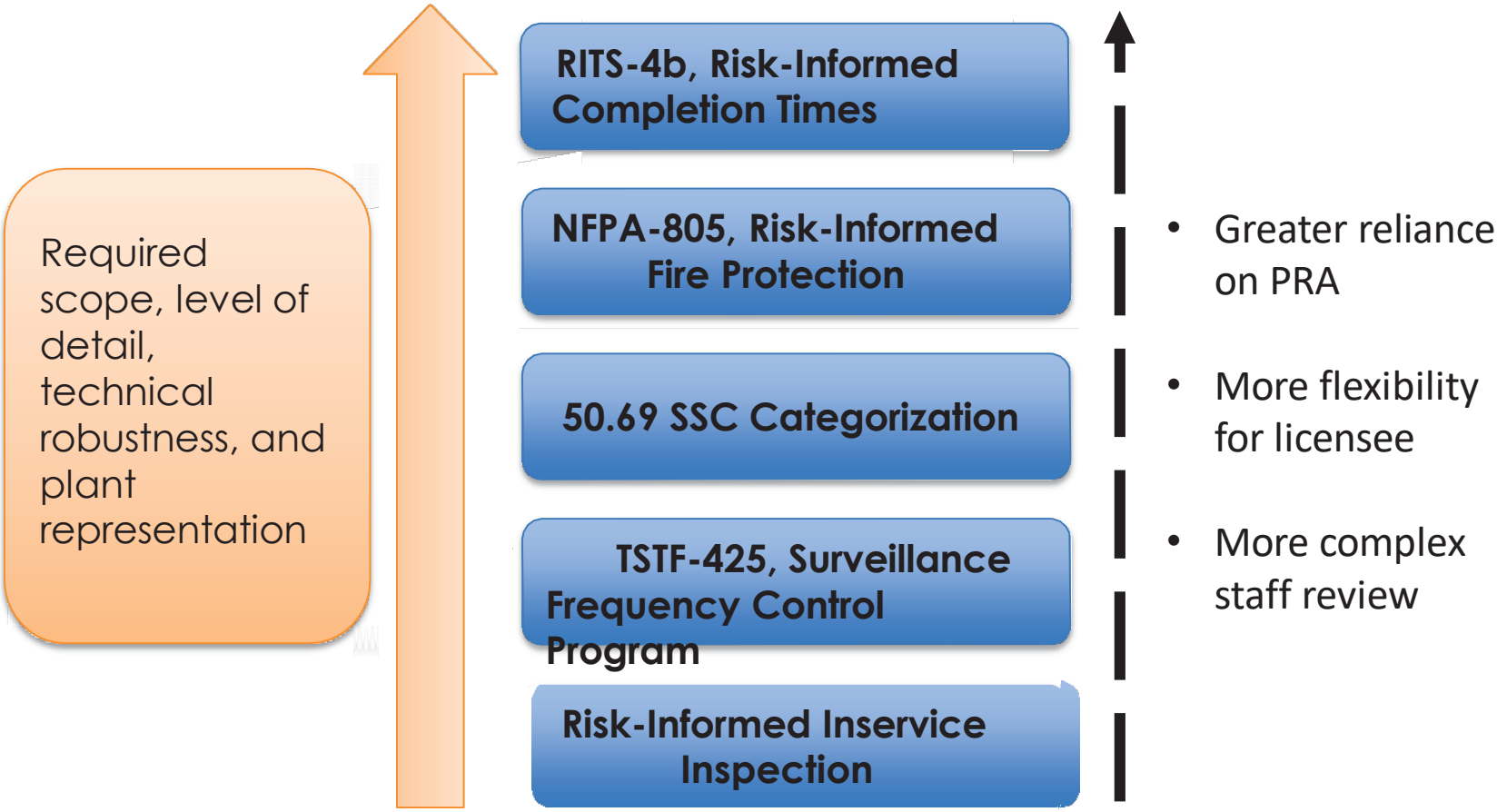

***This process is to obviate the need for a detailed staff review of PRA***

# RG 1.200: AN APPROACH FOR DETERMINING TECHNICAL ACCEPTABILITY OF BASE PRA

Evaluate base PRA model acceptability for the intended application

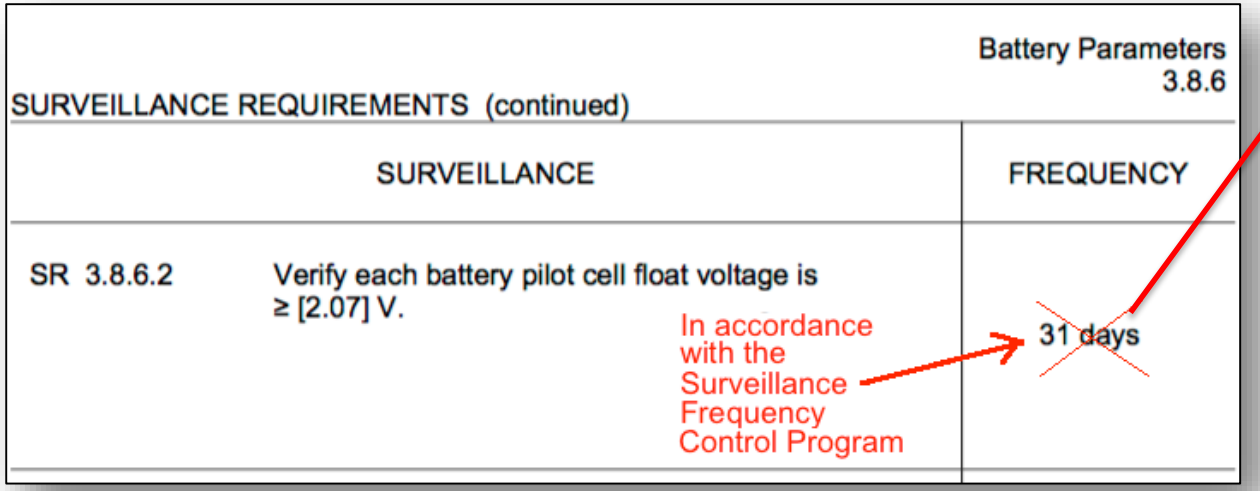
- Scope
  - Address all hazard groups pertinent to the requested change
- Level of detail
  - Sufficient detail to model the impact of the proposed change
- Technical elements
  - RG 1.200 provides one acceptable approach to ensure PRA technical acceptability
- Plant representation
  - PRA represents the As-Built, As-Operated plant to the extent needed to support the application

# PRA MUST BE SUITABLE FOR THE APPLICATION



# Surveillance Frequency Control Program implemented at most US plants

- TSTF-425 and NEI-04-10
- Adopted by greater than 75% of industry (Limerick pilot plant)

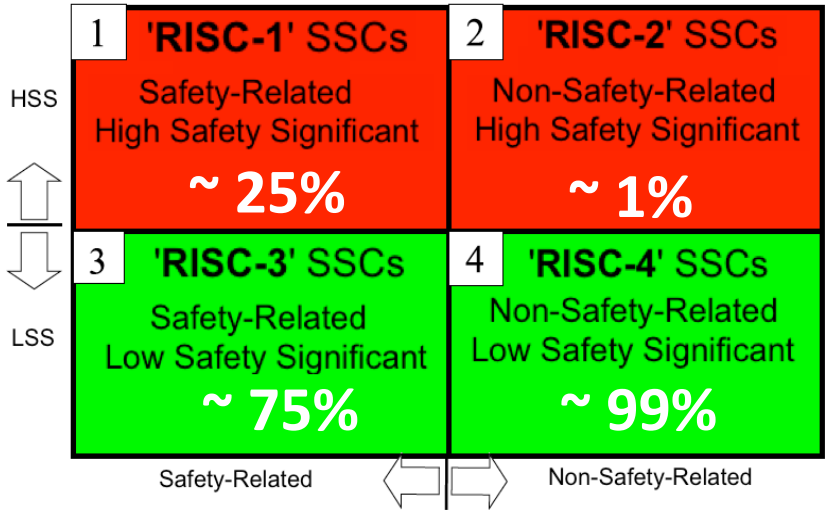



Move to 92 days

| | |
|---|---|
| 24 | Hrs |
| 3 | Days |
| 7 | Days |
| 31 | Days |
| 92 | Days |
| 6 | Months |
| 18 | Months |

# 50.69 Allows Treatment of SSCs According to Safety Significance

- Most licensees plan to adopt
- Adjust scope of SSCs subject to "special treatment" controls
- Rule consists of three major elements
  - Categorization Process
  - Alternate Treatment
  - Feedback and Process Adjustments



# RITS-4b: Risk Informed Completion Times

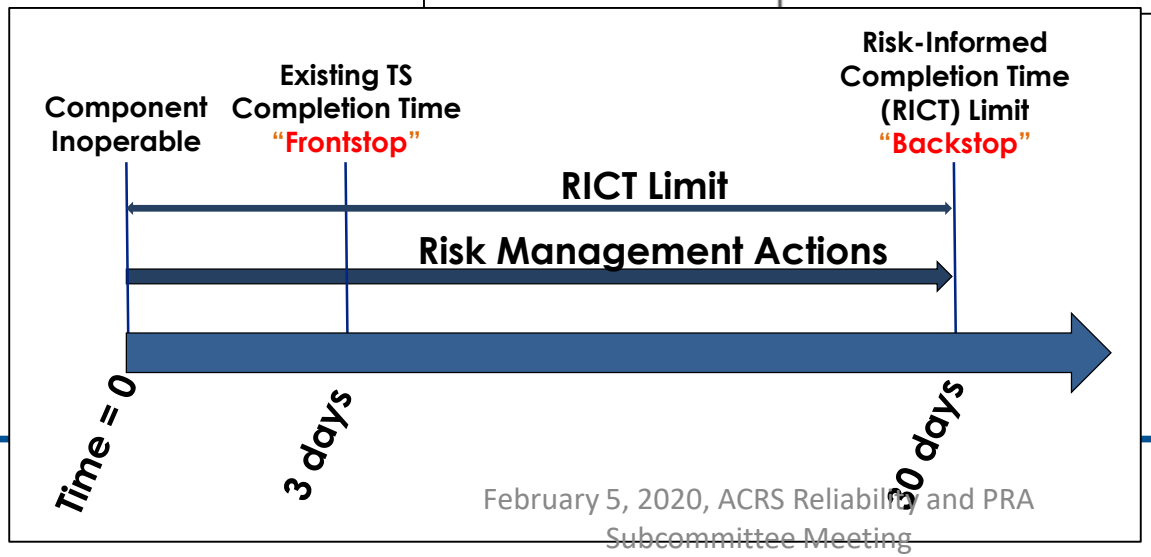
**R** - Risk

**I** - Informed

**C** - Completion

**T** - Times

| ACTIONS | | |
|---|---|---|
| CONDITION | REQUIRED ACTION | COMPLETION TIME |
| A. One subsystem inoperable. | A.1 Restore subsystem to OPERABLE status. | 3 days<br>OR<br>In accordance with the Risk Informed Completion Time Program |



# APPLICATION SPECIFIC REGULATORY GUIDES FOR RISK-INFORMED DECISIONMAKING

- RG 1.175, An Approach for Plant-Specific, Risk-Informed Decisionmaking: Inservice Testing (ADAMS Accession No. ML003740149)
- RG 1.177, Rev. 1, An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications (ADAMS Accession No. ML100910008)
- RG 1.178, Rev. 1, An Approach for Plant-Specific Risk-Informed Decisionmaking for Inservice Inspection of Piping (ADAMS Accession No. ML032510128)
- RG 1.205, Rev. 1, Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants (ADAMS Accession No. ML092730314)

# A "GAP" IN REGULATORY GUIDE 1.200 & ASME\ANS PSA STANDARD

- For each technical element, ASME\ANS PSA Standard provides high-level review requirements (HLRs) and supporting requirements (SRs).

- Current version of the ASME\ANS PSA standard does not provide HLRs or SRs for newly-developed methods (NDMs); Furthermore, there is no definition of what constitutes an NDM.

- This "gap" resulted in inefficiencies in the staff's review of NFPA 805 applications and loss of confidence of the peer-review method to adequately peer-review NDMs.

# CURRENT SOLUTION TO "GAP"

- For RITS-4b applications, staff has imposed the following Administrative TS\License Condition:

"The risk assessment approaches and methods shall be acceptable to the NRC. The plant PRA shall be based on the as-built, as-operated, and maintained plant; and reflect the operating experience at the plant, as specified in Regulatory Guide 1.200, Revision 2. Methods to assess the risk from extending the completion times must be PRA methods used to support this license amendment, or other methods approved by the NRC for generic use; and any change in the PRA methods to assess risk that are outside these approval boundaries require prior NRC approval."

- Industry voluntarily developed PWROG-19027-NP and updated NEI 17-07 to specifically address NDMs to support a less restrictive Admin TS.

# CLOSING THE "GAP"

- PWROG-19027-NP:
  - Provides definitions related to NDMs, PRA maintenance, and PRA upgrade.
  - Provides 6 High-Level Requirements and 21 Supporting Requirements for peer-review of NDMs.
- NEI 17-07
  - Delineates the process that peer reviewers must use to peer review NDMs in addition to other technical elements of the PRA.

# CURRENT STATUS & NEXT STEPS

Status

- Held large number of meetings with industry to discuss and reach alignment on PWROG-19027-NP and NEI-17-07.
- Observed three NDM pilots using HLRs and SRs in draft PWROG-19027-NP.
- Shared draft RG with key internal and external stakeholders.

Next Steps

- Complete update to RG 1.200.
- Complete updates to inspections procedures.
- Decide whether industry request to modify administrative technical specification can be approved.

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*Protecting People and the Environment*

# Status Briefing on DG-1362, Update to RG 1.200, Revision 3


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February 5, 2020
ACRS Subcommittee on Reliability and PRA

# OVERVIEW

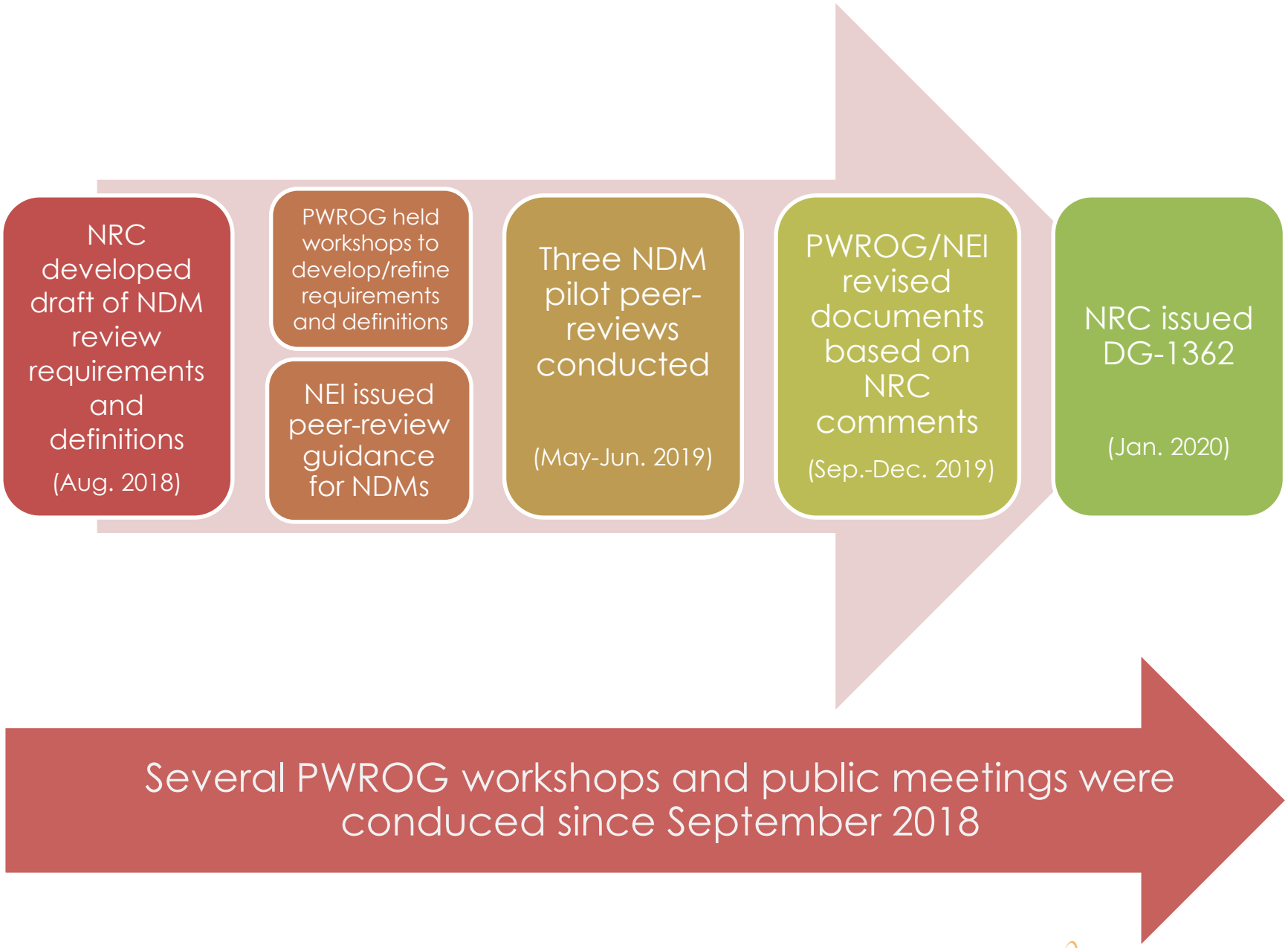
- Planned updates to RG 1.200
- Summary of external stakeholder engagement
- Proposed changes to RG 1.200 for Revision 3
  - Summary
  - Details
- Planned next steps

# Planned Updates to RG 1.200

- Revision 3 draft guide (DG-1362) in progress
- Revision 4 of RG 1.200 will include endorsement of the following LWR PRA standards:
  - Next edition of the ASME/ANS Level 1/LERF PRA standard; and
  - ASME/ANS Level 2 PRA standard
  - Advanced LWR PRA standard
- Advanced non-LWR PRA standard to be endorsed in a new RG

# Objectives

- Discuss the NRC review of ***NDM review requirements, process, and associated definitions***
- Discuss ***observations*** from pilot peer-reviews of NDMs
- Discuss enhancements in the draft guide related to ***PRA Upgrade*** and addressing ***Key Assumptions***


NRC developed draft of NDM review requirements and definitions
(Aug. 2018)
PWROG held workshops to develop/refine requirements and definitions
NEI issued peer-review guidance for NDMs
Three NDM pilot peer-reviews conducted
(May-Jun. 2019)
PWROG/NEI revised documents based on NRC comments
(Sep.-Dec. 2019)
NRC issued DG-1362
(Jan. 2020)
Several PWROG workshops and public meetings were conduced since September 2018

# Pilot Peer-Reviews of NDMs

In May and June 2019, staff observed three pilot applications of industry's NDM peer review process and associated guidance.

Staff observed ***"on-site" peer review discussions*** between peer reviewers and method developers.

Staff had access to ***documentations*** via a SharePoint site (method reports, method developers' self-assessments, resulting peer review reports, and associated documentation).

# Objectives of NDM Peer-Review Observations

- Are NDM ***HLRs and SRs adequate*** for determining the technical acceptability of NDMs?
- Are there differences in the ***process guidance*** and ***reporting*** due to differences between peer reviews confirming the proper application of methods versus peer reviews of acceptability of NDMs?
- Are there specific considerations in relation to ***oversight activities*** of NDMs?

# Summary of Observations

Process and requirements provide a well-structured approach for review of NDMs.

NDM technical acceptability peer-review has key differences compared to implementation peer reviews.

By meeting all applicable SRs under all HLRs, NDM will satisfy the intent of HLRs and therefore the method will be technical acceptable.

# Outcome of NDM Observation

Several HLRs and SRs were revised based on peer-reviewers and NRC staff comments

NEI 17-07 was revised to address unique considerations for peer-reviewing NDMs

- A detailed examination of supporting information is needed for NDM methods ***beyond a sampling review***
- Team should include ***expertise*** needed to review the newly developed method
- ***NDM with finding-level F&Os*** cannot be used it in PRAs supporting risk-informed licensing applications

# Importance of Closing NDM Open Findings

- Peer-reviews determine whether requirements of the Standard are met; framework for NDM to be deemed acceptable is unclear unless all SRs are met
- Unclear how licensees/peer-review of implementation can justify use of NDM with findings (considering lack of expertise, detailed knowledge of NDM, etc.)
- NDM documentation issues are important as those issues potentially impact implementation of NDM

# NDM Peer-Review Reports

- Peer- review reports include (in part):
  - a clear discussion of conclusions regarding any NDMs reviewed by the peer review team
  - a description of the method reviewed
  - the technical justification provided
  - a summary of the review against the NDM PRA requirements endorsed by the NRC as well as SRs relevant for the implementation of the newly developed method
- This portion of the peer review report will be provided to the NRC by the method developer.

# Summary

- Staff provided significant inputs to development of NDM review criteria and peer-review guidance (e.g., public meetings, workshops, peer-review observations).
- NDM criteria provide a well-structed framework within the existing peer-review process to review NDMs.
- Staff will periodically audit implementations of the NDM peer review process, as well as review a sampling of the final peer review reports.

# PRA Upgrade

- Current definition considers changes in "scope" and "capability" that impact "significant accident sequences or significant accident progression sequences" as PRA Upgrade.
- Challenges in implementing the current definition.

A change in the PRA that results in the applicability of one or more Supporting Requirements that were not previously included within the PRA ***[change in scope]***, an implementation of a PRA method in a different context, or the incorporation of a PRA method not previously used ***[change in methods]***

# Key Assumption

Evaluation of key assumptions is a critical element of NRC review.

RG 1.200 allows reviewers "to focus their review on ***key assumptions*** and areas identified by peer reviewers as being of concern […]".

Reviewers ensure that "key assumptions […] identified as having the potential to significantly impact the particular PRA results have been ***characterized in an acceptable manner*** given the current state of knowledge […]".

Staff clarified the guidance related to definition, identification and disposition of key assumption based on recent reviews.

# Key Assumption (Cont.)

Key assumptions for an application are identified from the assumptions and approximations ***identified in the base PRA***.

An assumption is ***key*** to a RI decision when it could affect the PRA results that are used in a decision and, consequently, ***may influence the decision.***

Identified key assumptions will be used to ***identify sensitivity studies*** as input to decision-making.

# Summary of Proposed Changes to RG 1.200, Revision 3 (1 of 3)

- Proposed changes provide additional clarity, improve process efficiency, and enhance safety
- Proposed changes in RG 1.200, Revision 3, include:
  - New staff endorsements
  - Enhancements/clarifications to guidance
  - Updates related to organization of RG content

# Summary of Proposed Changes to RG 1.200, Revision 3 (2 of 3)

- NRC staff endorsements:
  - NEI 17-07, Revision 2[1]
    - Appendix X – Facts and Observations (F&Os) independent assessment process
    - Newly developed method (NDM) peer review requirements
  - ASME/ANS RA-S Case 1 for seismic PRA[2]
  - PWROG-19027-NP, Revision 1[3]
    - definitions related to NDMs, PRA maintenance, and PRA upgrade (Section 2)
    - A process for determining whether a change to a PRA is PRA maintenance or a PRA upgrade (Section 3)
    - requirements for peer review of newly developed methods (Sections 4 and 5)

[1] See Agencywide Document Access and Management System (ADAMS) accession No. ML19241A615
[2] Available via http://www.asme.org
[3] See ADAMS accession No. MLXXXXXXXXX

# Summary of Proposed Changes to RG 1.200, Revision 3 (3 of 3)

- Enhancements/clarifications to guidance:
  - Key assumptions and sources of uncertainty
  - Risk-informed decisionmaking
  - Glossary of terms
  - Listing of hazards
  - Discussion on PRA acceptability
- Updates related to organization of content:
  - Reorganization of Sections A and B and parts of C

# Proposed Revisions to Sections A and B

- Reorganized for clarity
- Provides current status of PRA standards efforts
- Discussion on PRA acceptability added consistent with resolution of DPO-2016-001[4]

[4] See ADAMS accession No. ML17013A015

# Proposed Revisions to Section C.1

- Revised to provide clarity and consistent language
- Subsections on PRA technical elements arranged consistent with Parts in the ASME/ANS Level 1/LERF PRA standard
- Staff position on low-power and shutdown PRA unchanged, but moved into separate subsection in C.1

# Proposed Revisions to Section C.2

- Revised for clarity
- Includes language related to ASME/ANS RA-S Case 1 for seismic PRA

# Proposed Revisions to Section C.2.1

- Includes language regarding PRA state of practice and peer review of a newly developed method

# Proposed Revisions to Section C.2.2

- Includes language related to the peer review of newly developed methods
- Divided into three main subsections:
  - *2.2.1 Peer Review of a Base PRA Model*
  - *2.2.2 Peer Review of a PRA Upgrade or Newly Developed Method*
    - *2.2.2.1 Peer Review of a PRA Upgrade*
    - *2.2.2.2 Peer Review of a Newly Developed Method*
  - *2.2.3 Facts and Observation Independent Assessment*

# Proposed Revisions to Section C.2.2.1

- Added language on the peer review process, team qualifications, and documentation, consistent with NEI 17-07, Revision 2

# Proposed Revisions to Section C.2.2.2

- Provides guidance on determining whether a change to a PRA is a PRA upgrade or PRA maintenance
- References Appendix C, which endorses process in PWROG-19027-NP, Revision 1

# Proposed Revisions to Section C.2.2.2.1

- Defines PRA upgrade
- Refers to NEI 17-07, Revision 2, for related guidance on the peer review of a PRA upgrade
- Endorses requirements in PWROG-19027-NP, Revision 1, related to focused-scope peer review

# Proposed Revisions to Section C.2.2.2.2

- Defines newly developed method and provides guidance on a peer review thereof
- Refers to NEI 17-07, Revision 2, for guidance on the peer review of a PRA upgrade
- Endorses requirements in PWROG-19027-NP, Revision 1, for the peer review of a newly developed method; includes documentation requirements and expectations on the outcome of such peer reviews

# Proposed Revisions to Section C.2.2.3

- Endorses NEI 17-07, Revision 2, guidance on F&O Independent Assessments.
- Guidance is consistent with the staff position documented in the NRC letter[5] on the Nuclear Energy Institute (NEI) Appendix X to NEI 00-02, NEI 05-04, and NEI 07-12
- Provides overall endorsement of NEI 17-07, Revision 2, as a means of satisfying the peer review requirements in ASME/ANS RA-Sa-2009

[5] See ADAMS accession No. ML17079A427

# Proposed Revisions to Section C.3

- Provides clarifications regarding key assumptions and sources of uncertainty

# Proposed Revisions to Section C.4

- Revised to include documentation requirements related to a PRA upgrade, the use of newly developed method, and F&O independent assessments

# Proposed New Glossary of Terms

- as-built, as-operated
- as-designed, as-to-be-built, as-to-be-operated
- assumption
- base PRA
- consensus method/model
- conservative
- current good practice (or state-of-practice)
- key assumption
- key source of uncertainty
- level of detail
- model
- newly developed method
- PRA
- PRA acceptability
- PRA application
- PRA maintenance
- PRA method
- PRA upgrade
- realism
- risk significance
- significant accident sequence
- significant basic event/contributor

# Proposed Appendices (1 of 2)

- Appendix A: Endorsement of ASME/ANS RA-Sa-2009, unchanged from RG 1.200, Revision 2
- Appendix B: Endorsement of ASME/ANS RA-S Case 1, "Case for ASME/ANS RA-Sb-2013 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment of Nuclear Power Plant Applications"

# Proposed Appendices (2 of 2)

- Appendix C: Guidance for Classifying Changes to a PRA as PRA Maintenance or a PRA Upgrade
- Appendix D: Other Hazards

# Planned Next Steps

- Endorsements will include consideration of comments from internal and external stakeholders (e.g., public, ACRS, NRC Legal, etc.)
- February 2020 – ACRS Subcommittee Briefing; Receive ACRS Reliability and PRA Subcommittee members' feedback
- Prepare DG-1362 for Management approval and Legal review
- Issue DG-1362 for public comment

# Acronyms

| | |
|---|---|
| ANS | American Nuclear Society |
| ASME | American Society of Mechanical Engineers |
| CFR | *Code of Federal Regulations* |
| CT | completion time |
| F&O | Fact and Observation |
| HLR | high-level requirement |
| LAR | license amendment request |
| LERF | large early release frequency |
| LPSD | low power and shutdown |
| NDM | newly developed method |
| NEI | Nuclear Energy Institute |
| NFPA | National Fire Protection Association |
| NRC | U.S. Nuclear Regulatory Commission |
| NRR | Office of Nuclear Reactor Regulation |
| PRA | probabilistic risk assessment |
| PWROG | Pressurized-Water Reactor Owners Group |
| RES | Office of Nuclear Regulatory Research |
| RG | Regulatory Guide |
| RICT | risk-informed completion times |
| RISC | Risk-Informed Safety Class |
| RITS | risk-informed technical specifications |
| SR | supporting requirement |
| TS | technical specification |
| TSTF | Technical Specification Task Force |