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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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FUELS, MATERIALS, AND STRUCTURES SUBCOMMITTEE

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FRIDAY

MAY 20, 2022

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The Subcommittee met via hybrid Video Teleconference, at 8:30 a.m. EDT, Ronald Ballinger, Chairman, presiding.

COMMITTEE MEMBERS:

RONALD G. BALLINGER, Chair

VICKI BIER, Member

CHARLES H. BROWN, JR. Member

VESNA DIMITRIJEVIC, Member

WALTER KIRCHNER, Member

DAVID PETTI, Member

JOY L. REMPE, Member

MATTHEW SUNSERI, Member

ACRS CONSULTANT:

DENNIS BLEY

DESIGNATED FEDERAL OFFICIAL:

CHRISTOPHER BROWN

ALSO PRESENT:

MICHELLE HAYES, NRR

BRUCE LIN, NRR

SCOTT MOORE, ACRS

STEPHEN PHILPOTT, NRR

MIKE TURNBOW, Public Participant

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P R O C E E D I N G S

8:30 a.m.

CHAIRMAN BALLINGER: The meeting will now come to order.

This is a meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Fuels, Materials, and Structures. I'm Ron Ballinger, chairing the Subcommittee meeting.

ACRS members present are myself, of course; Vicki Bier; Dave Petti; Dennis Bley, our consultant; Walt Kirchner; Matt Sunseri; Joy Rempe; Vesna Dimitrijevic.

If I've missed somebody, please chime in.

Chris Brown is the ACRS, of the staff, Designated Federal Official for this meeting.

It's an information briefing, by the way, unless we decide something different, based on discussions. The Subcommittee will receive a briefing from the NRC staff regarding Reg. Guide 1.246, "Acceptability of ASME Code Section XI, Division 2, Requirements for Reliability and Integrity Management Programs, RIM, for Nuclear Power Plants for Non-Light Water Reactors."

The rules for participation in all ACRS meetings, including today's, were announced in The

Federal Register on June the 13th, 2019.

The ACRS section of the U.S. NRC public website provides our Charter, Bylaws, agendas, Letter Reports, and full transcripts of all full and subcommittee meetings, including slides presented there. The meeting notice and agenda for this meeting were posted there.

We have received no written statements or requests to make oral statements from the public.

The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions, as appropriate, for deliberation by the full Committee.

The rules for participation in today's meeting have been announced as part of the notice of this meeting previously published in The Federal Register.

Today's meeting will be held exclusively over Microsoft Teams. A telephone bridgeline allowing participation of the public over their computer using Teams or by phone was made available.

A transcript of today's meeting is being kept. Therefore, we request that meeting participants on Teams and on the Teams call-in line identify themselves when they speak, and to speak with

sufficient clarity and volume, so they can be readily heard.

Likewise, we request that meeting participants keep their computer and/or telephone lines on mute when not speaking to minimize disruptions.

The chat feature on Teams should not be used for any technical exchanges.

Let's make sure that everybody has got their phone on mute.

Now I think -- is Michelle Hayes, Branch Chief, going to provide some opening remarks, or is there another staff member that's going to do that?

MS. HAYES: I was going to provide some opening remarks. This is Michelle Hayes.

CHAIRMAN BALLINGER: Sounds like a plan. Very good. Let's proceed. Thank you.

MS. HAYES: Thank you.

So, good morning.

I'm Michelle Hayes, Chief of Advanced Reactor Technical Branch 1 in the Office of Nuclear Reactor Regulation.

As Chairman Ballinger mentioned, today's discussion is on NRC's endorsement of ASME Code's requirements for integrity management programs, or

RIM, that is found in Section XI, Division 2, of the ASME Boiler and Pressure Vessel Code.

I'm excited that I get to make the opening remarks because I think this project epitomizes NRR's vision for advanced reactors. It makes the safe use of advanced reactor technologies possible because it offers the first NRC-endorsed process these vendors can use to develop and implement a preservice and inservice inspection program. It advances risk-informed and performance-based approaches and safety reviews because RIM itself is a risk-informed, performance-based program.

It leverages partnerships across the agency because the endorsement team drew staff from NRR, Research, and the Regions. This enabled us to perform a diverse and comprehensive review of this new approach to inspections of passive components.

Our interactions with ASME and vendors demonstrated the importance of stakeholder engagement and our commitment to endorsing consensus codes and standards, and issuing this Reg. Guide improves the efficiency and effective use of future reviews of vendors that use RIM.

Before we get started, I want to highlight one procedural point about the Reg. Guide. While the

copy you got is what we consider to be the final version, it won't be issued until the end of June. While RIM will not be incorporated into 10 CFR 50.55a, one of the conditions in this Reg. Guide is to use the 2019 edition of RIM in conjunction with the 2019 edition of ASME Code, Section XI, Division 1, and any applicable conditions in 10 CFR 50.55a. However, the final 10 CFR 50.55a rule that incorporates the 2019 edition of ASME Section XI, Division 1, with the respective conditions, won't be published until the end of this June. So, we don't want to get ahead of that.

Thanks in advance for your attention, and we look forward to your questions.

I'll now turn it over to our in-house RIM expert, Bruce Lin, to provide an overview of the program.

MR. LIN: Okay. Good morning, everyone.

Thanks, Michelle.

So, I'm Bruce Lin. I'm one of the Material Engineers with the Office of Regulatory Research.

Again, thank you for the opportunity to present today at the ACRS on the staff endorsement of ASME Section XI, Division 2, the RIM program.

I'm going to provide a very high-level overview of what RIM is; go over the RIM process, and basically, also the various sections in Section XI, Division 2, just to give you a flavor of what's included in the RIM standard.

In the next presentation, Steve Philpott will discuss the staff review of the RIM standard and the endorsement of Section XI, Division 2, and the Regulatory Guide.

Next slide, please.

So, why is Section XI, Division 2, developed? The industry had been using Section XI, Division 1, for decades, and it's working and it's effective. The problem is Division 1 is focused on, essentially, boiling and pressurized light water reactor technologies. So, under the current Division 1 rule, inservice inspections are specifically described at specified frequencies for doing the 10-year inservice inspection intervals. So, this may not be well-suited for some advanced non-light water reactor designs, some with longer fuel cycles than the typical PWR, you know, 18-to-24-month fuel cycles.

Also, some of the traditional, non-destructive examinations that are currently in use today may not be effective in detecting some of the

degradation that is unique to some of the advanced non-LWRs.

For some, this design may be more effective to use, for example, on monitoring than doing an inspection at the prescribed intervals.

So, Division 2 was developed to allow the possibility for some of the new advanced reactor designs to implement alternate strategies from Section XI, Division 1, requirements. Division 2 RIM is intended to be a technology-neutral code. So, it can be applied to all reactors. It does have reactor-specific supplements to account for the difference in reactor design. The supplement, basically, provides the specific details related to, for example, the degradation mechanism, all evaluations and acceptance criterias for the specific reactor design.

Right now, the RIM standard has a placeholder for six different reactor types, including a high temperature gas reactor, nuclear metal reactors, molten salt, light water reactors, and fusion reactors.

Of course, many of the technology-specific supplements are still under development. Right now, only two have been completed so far.

Next slide.

So, what is RIM? So, in a very high level, it's a program to ensure that the passive components are properly managed to meet the planned recent reliability goals. It's based on the philosophy of maintaining an adequate level of reliability.

So, the objective of the RIM is to implement strategies, I think including the combination of design, fabrication, or inspection and maintenance requirements that are necessary and sufficient to ensure that the reliability targets are defined and maintained throughout the life of the plant.

CHAIRMAN BALLINGER: This is Ron, Ron Ballinger.

MR. LIN: Yes?

CHAIRMAN BALLINGER: In the very beginning, you specified that the code of record was the 2019 version? There is a 2021 version.

MR. LIN: Right.

CHAIRMAN BALLINGER: And I haven't compared the two. So, I don't know what the differences are. But might there be an opportunity to use that version? They don't come out with versions that often.

MR. LIN: Right.

CHAIRMAN BALLINGER: So, there may be an opportunity to keep it up-to-date.

MR. LIN: The staff reviewed the 2019 edition of the Code, and that's the edition we're endorsing. I think there are very minor changes between the 2019 and 2021 editions, only editorial changes.

CHAIRMAN BALLINGER: Okay. Thanks.

Also, while Division 1 has been in use for a very, very, very long time, the industry has evolved to the point where they're using online monitoring and all kinds of other things. So, that it may be that in the future Division 2 might actually be useful for current LWRs.

MR. LIN: Yes. I mean, I think Division 2, again, right now, it's just a process. I think there's going to be a lot more effort still required to initially develop the program. So, Division 1, again, it is very prescriptive and it's pretty easy to follow, if you want to decide to use it. But Division 2 will require, in my opinion, significant effort upfront as we develop the program.

CHAIRMAN BALLINGER: Yes, if you can get by the 10-year ISI. That's very restrictive.

Anyway, okay. Just my personal opinion. Thank you.

MR. LIN: So, yes, this slide covers/describes the RIM process philosophy. RIM evaluates all SSCs for their impact in plant safety and reliability and established the necessary examination tests, operation or maintenance, including repair and replacements, to ensure that all the systems, structures, and components meet the plant recent reliability goal.

This is meant to be an iterative process, you know, during the design stage. So that, if a performance target cannot be met through the inspection or monitoring, the SSC, hopefully, can be redesigned to include maybe a higher margin and the desired operation can be changed to allow provision for maybe replacement during operations.

So, this is very different from the prescriptive approach used in Division 1. I mean, the philosophy of Division 1 is to maintain a sufficient number of tests and examinations to provide assurance that the plant is safe. Division 1 uses the class approach, like Class 1, Class 2, and Class 3, with each class having sort of less rigorous criteria. And it provides very prescriptive requirements, including

what you need to inspect; how often you need to inspect, and the specific method to use. Whereas, in Division 2, it doesn't really have a lot of specific requirements. It's a process. They provide a process for owners to develop their programs.

Okay. Next slide, please.

So, this slides shows the overall RIM process. It started with, you know, we identified SSC to be included in the program, and then, you conduct a degradation assessment to identify and evaluate all the potential degradations.

And the next step is you allocate the reliability target to SSC, and once that's done, you implement your strategies to make sure you meet those target reliabilities. And you implement the program, and then, you monitor and update a program as necessary. I'll go through these steps in more detail in the next few slides.

But the concept is very similar to the recent for ISI, but I believe it's more than ISI. ISI is just one of the strategies that can be used.

CHAIRMAN BALLINGER: This is Ron Ballinger again.

Yesterday, I mentioned that there's a part of the Part 53 discussion that the ASME Fitness-for-

Service Code -- or there's a procedure, FFS-1 -- doesn't use the word "RIM," but that Fitness-for-Service document takes a quite similar approach.

Anyway, again, my personal opinion.

MR. LIN: Yes, I believe that's the standard API 571, if I remember right.

CHAIRMAN BALLINGER: I think it's 589, 590, yes.

MR. LIN: Yes. I had a number, but -- yes.

As I said, I'll walk through these steps in a very high level.

But let's go to the next slide.

Step 1 is, you know, determine the scope of the SSC to be included in the program. Again, RIM is limited to passive SSCs. So, the scoping core, the passive SSCs whose failure could adversely affect plant safety and reliability.

The step itself doesn't really provide a lot of specific guidance on the requirement, on how you, you know, what you need to go about, what SSCs needed to be included in the RIM program. Basically, it required the owner to document a specific list of SSCs that is evaluated to be included in the program, and it also required owners to document the bases for

excluding any SSCs from the program.

MEMBER KIRCHNER: Bruce, this is Walt Kirchner.

MR. LIN: Yes?

MEMBER KIRCHNER: At a high level, what, in practice -- one could use a PRA for defining the scope, for example.

MR. LIN: Right.

MEMBER KIRCHNER: But, in practice, what was the intent of the ASME Code Committee? Was it for the entire plant? This says the entire life of the plant and "each passive SSC that's in scope." But what's the top-level discriminator for defining what's in scope?

MR. LIN: Well, from my discussion with the RIM Committee, I asked the question specifically. I specifically asked the question. I think the scope includes all SSCs in the plant. And I think the PRA would help determine which SSC would have a significant impact on recent reliabilities.

MEMBER KIRCHNER: So, reliability is one thing and that impacts operability.

MR. LIN: Yes.

MEMBER KIRCHNER: And that has a connection to safety. But is it, in your estimation,

is it really focused on those SSCs that are important to safety or those --

MR. LIN: Yes, that's -- right.

MEMBER KIRCHNER: -- SSCs that are important to reliability of the plant?

There is a big difference. Because the first order, you know, I think most designs -- well, I shouldn't say this, I guess. But, you know, the secondary systems can be isolated from the primary systems, and you can define your important-to-safety envelope to the first order. It is that, you know, those primary, NSSS system, or whatever the vendor calls them, as the things that would be in scope. But is this meant to have a scope that's broader, to include the secondary plant, the balance of plant?

MR. LIN: Yes. That's why I wish the ASME Committee would have provided more specific guidance. I think that the scope, the standard bases, says all SSCs that can adversely affect plant recent reliability. So, it's very broad and -- yes. I actually raised that question with the Committee.

MEMBER KIRCHNER: Yes, in that case, then, the steam generator -- well, that's not a good example. But, you know, all the rest of the balance-of-plant, then, comes within the scope, right?

MR. LIN: Yes. Yes. So, the philosophy is, you know, in Division 1 where we have Class 1, Class 2, and Class 3 -- in RIM, there's really no classification. It's all SSCs that can impact the plant safety and reliabilities.

DR. BLEY: Well, this is Dennis Bley, following up on Walt there.

Risk certainly is affected by the reliability of the components. There ought to be some kind of organization of how important the risk we're talking about. You know, some of the secondary systems are quite important; other ones not so much, but maybe a little. And is it everything that has any impact or is it just the things that are prominent or maybe contribute 5 percent or more, something like that? Is there any quantification of how important a risk you consider in this process?

MR. LIN: Yes, right now, the study itself doesn't really provide any quantification or specific requirements. I would imagine this can have some tie-in with the Licensing Modernization Project, where the LMPs will help you classify what component is considered safety-significant; what components are not safety-significant. And right now, that's not in the Code. There's no specific guidance other than, you

know, you look at all components that can affect your plant safety, and then, you identify the component that they need to swing into the program.

DR. BLEY: Okay. Thanks. So, it at least implies it's the ones that are the most important that you pick up, or at least first?

MR. LIN: Yes. Yes, I wish the Code could provide more specific requirements and guidance. So, right now, there's only one paragraph that talks about the scope, and basically, there wasn't a slide showing the --

CHAIRMAN BALLINGER: Yes, this is Ron again.

I don't think we should underestimate the significance of Division 2 here. It represents an opportunity for a very significant change and sort of reorientation of outlook, if you will, on system reliability. It's 150 pages long, but Division 1 is like 600 pages.

MR. LIN: Right.

CHAIRMAN BALLINGER: Keep going.

MR. LIN: Okay. Let's go to the next slide.

So, once the SSC is identified, the next step is to evaluate all potential degradations that

can apply to the SSCs. You know, some things to consider include design characteristics, including materials; fabrication practice, including welding, or what can also contribute to or introduce a degradation mechanism, if it's not properly done.

Other conditions to consider include degradation introduced by operating, and all transient conditions, including temperature and pressure excursions.

Also, a degradation mechanism based on plant-specific or industry experience. You also need to consider including recommendations from SSC vendors.

Again, mandatory Appendix 7 identifies all the potential degradation mechanisms that are applicable to various reactor types. Again, many of the supplements are still under development. And the criteria that is used to identify and evaluate the susceptibility of SSCs to degradation mechanisms would need to be documented in the RIM program documentation.

Next slide.

So, the next step in the process is to identify the plant recent reliability topic for RIM. Again, this just came out from RIM 2.4.1. The plant-

level reliability goals are derived, basically, from the regulatory limits on risk frequencies and radiological consequences of licensing basis events, as defined in the PRA.

The PRA model is also used to allocate or to establish SSC-level reliabilities. The RIM standard, again, doesn't really provide a lot of detailed guidance on how to go about doing this. It provides a general post or event in Appendix 2 on how you divide component reliability from plant safety requirements.

As you can see, the PRA plays a key role in this step and it is important that the scope and level of detail in the PRA is sufficient to support the allocation of SSC reliability targets.

In RIM 2.43, it provides the requirements regarding the technical accuracy and the scope of the PRA, and it, basically, requires that the PRA needs to meet the ASME/ANS RA-S-1.4 standards, which is the PRA standard for advanced non-LWRs.

So, step four is, once you identify your target reliability, the next step is to identify the RIM strategies that are available to meet the reliability targets. You know, you can use a single reliability target -- or strategy I mean, or your

combination of strategies that's needed to meet the targets.

The strategies could include design strategies to reduce or eliminate the degradation mechanism or you can use online leak detection or perform inservice inspections or repair and replacements, et cetera.

The impact of these RIM strategies on the reliability target will need to be assessed.

Okay. Next slide.

So, after selecting the RIM strategies, the next step is to evaluate the uncertainties. If there are inherent, very large uncertainties in the prediction of passive SSC reliability, some of those uncertainties are plentiful in the allocation of reliability targets, but the other source of uncertainties is just difficult to quantify, such as unknown degradation mechanisms, or just lack of operating experience.

So, to account for some of these uncertainties, you can implement multiple RIM strategies over and above what's required in order to provide additional assurance and, also, provide defense-in-depth.

So, the next step is in advance you have

to program; you implement the program. And prior to implementing the program, RIM program documentation is developed. This documentation includes the results from steps one to five, and includes the scope of the SSC that is selected for the program; the result of the degradation assessments; the reliability targets, and the specific RIM strategies that you selected to meet those reliability targets.

So, this is a very important document, as you will hear from the later presentation. One of the conditions in the Regulatory Guide endorsing RIM is to require submittal of this information to NRC for review and approval.

The other aspect of implementing a RIM program includes -- some of the items are listed here -- the inspection intervals. In RIM, the inspection interval is determined by the RIM Expert Panel. I'll briefly describe that panel in the next slide. But it does have a limit of 12 years. The reason for that is because we want to have a step when they have to update the programs.

For several reasons, inspection is only done if in some ways the inspection is selected as a RIM strategy. So, you can have a baseline to start with.

RIM may also involve design requirements to support a select RIM strategy, such as provisions for an online leak detection system.

The other key aspect of the RIM program is examination and inspection requirements. Again, there's another Expert Panel that is responsible for all aspects related to this, and it's the monitoring, the NDE Panel. So, it's responsible for all things related to NDE or inspections.

Okay. So, the final step in the RIM program is to put in place a monitoring program that will monitor the performance of the SSCs within the program and update the RIM program to account for, for example, a change in plant design, operations, operating experience, and results from monitoring and NDE, to update the PRA, or any other technical input that you use in the initial RIM program.

So, this step is very similar to the risk-informed ISI program. So, you have to, basically, continue to monitor your program and update, as necessary. And the minimum frequency of update is once per inspection interval.

Here, I mentioned there's two Expert Panels already. They play a key role in implementing the RIM program. The RIM Expert Panel is, basically,

responsible for the entire program, responsible for the technical oversight, and the development and implementation of the RIM program. So, this panel is responsible for establishing the RIM scope, the reliability targets, and identifying the RIM strategies.

The Monitoring and NDE Expert Panel is responsible for, basically, all things related to NDE. They're responsible for developing, monitoring NDE specifications; overseeing the quantification of NDE methods and techniques.

And there are specific requirements in the Code related to the qualification and who needs to serve on these panels.

Next slide.

So, this slide just shows, and the next couple of slides just walk you through, what's in RIM. This slide shows the organization of RIM. The structure is very similar to Division 1, except for Article RIM-2, which is the RIM program. So, RIM-1 is scope and responsibility. This section covers the scope of RIM, the owner's responsibilities, and other general requirements. It's very similar to Division 1 IWA-1000. As a matter of fact, a lot of the descriptions will refer back to IWA for a lot of the

requirements.

And Article RIM-2 is the RIM program, which is -- I covered the process.

RIM-3 is acceptance standard, and it refers to Appendix 7 for acceptance standards for each reactor type.

And RIM-4 covers repair and replacement activities and is done -- essentially, it refers back to IWA-4000, which is the rules for repair and replacement activities, with a couple of exceptions. One is related to preservice inspection, and then, the other exception is related to pressure testing.

And RIM-5, basically, provides rules for leakage monitoring and leak detections -- retesting.

And RIM-6 covers reporting requirements and is similar to Division 1, IWA-6000.

DR. BLEY: Bruce?

MR. LIN: Yes?

DR. BLEY: RIM-3, is that expected to get expanded, as people consider different reactor types?

MR. LIN: Yes. Well, right now, RIM-3, basically, refers the user to Appendix 7. Appendix 7 will, basically, have reactor-specific requirements or reactor-specific acceptance standards. So, for each reactor type, they'll have their own acceptance

standards.

DR. BLEY: Okay. And I'm assuming that's not complete and will have to be expanded, if new types are brought forward.

MR. LIN: Right. Right. Right now, only two reactor types are complete, including the high temperature gas reactors --

DR. BLEY: Uh-hum.

MR. LIN: -- and the Gen III or above light water reactors.

DR. BLEY: Okay. Thank you.

MEMBER KIRCHNER: Bruce?

MR. LIN: Yes?

MEMBER KIRCHNER: This is Walt Kirchner.

Along those lines of Dennis' question, it seems to me that -- I'm speculating, to be candid -- that these implements for each reactor type really are driven by the coolant choice. I mean, the ASME is in the pressure vessel business, so to speak.

MR. LIN: Right.

MEMBER KIRCHNER: So, the defining characteristic probably is a combination of the coolant type and the temperature-pressure ranges that are expected for the reactor type. Is that a reasonable assessment of what's coming for the

supplements? I can't imagine doing a supplement -- you know, you could have someone do one variation of a molten salt reactor, and someone else do another variation, but, in general, the pressure vessels don't know that it's a different reactor. You know what I mean?

If you need to use a pressure vessel of some kind for a molten salt reactor, it doesn't care whether it has pebbles in it or not.

MR. LIN: Right.

MEMBER KIRCHNER: So, is that the way it's going? Is it more like that or you're trying to go with the Gen IV and DOE designs that are being supported?

MR. LIN: Yes, I --

MEMBER KIRCHNER: It seems to me there might be an opportunity to make this more technology-neutral in terms of the details of the reactor design and focus on what the pressure vessel, boiler and pressure vessel code is all about, which is maintaining the integrity of the component, not picking sides about reactor types.

MR. LIN: Right. I think the strategy is that the RIM process itself is technology-neutral. You can use the process on any reactor type. And the

idea with Appendix 7 is, you know, some of the degradation mechanism is unique to the reactor design. Like, for example, you choose different coolant; that has different degradation mechanisms. So, if you operate at high temperature, then you maybe have to worry about creep and other high-temperature degradation mechanisms.

So, Appendix 7 is supposed to have reactor-specific degradation mechanisms, reactor-specific evaluation standards, and acceptance standards that are all based on the unique design, right? For some of those reactors, they could be operated at atmospheric pressure. So, it's different than the traditional requirement for RPVs. So, they will have their own acceptance standards and unique, their own lists of degradation mechanisms. It depends on the reactor type.

DR. BLEY: Bruce, this is Dennis Bley again.

We had a session yesterday on Part 53 where we're looking at different approaches. And some of those approaches, they require principal design criteria and others they don't.

This Reg. Guide is anchored to a set of advanced reactor design criteria that specifies

certain kinds of testing that need to be done.

I suppose, even if someone uses this new Part 53 and does not define their own Principal Design Criteria, that, at least for most of the designs we expect to see, the ARDC will probably be reasonable. So, that shouldn't cause a problem. But if some new reactor type comes in that would require different design criteria, I guess that changes this whole process. But that's what the appendices will make clear, I'm guessing?

MR. LIN: Right. I mean, I think, like I said, the process itself is very technology-neutral. I would imagine each reactor vendor or designer would have to go through the process and develop their own unique RIM program. You know, maybe for one reactor, it's reasonable to inspect every five years, but they may not incorporate for other reactor designers for the same components, because they operate in a different environment. So, I think each reactor design, a unique design, will probably have their own unique RIM program.

DR. BLEY: Okay. Thanks.

I guess, for Dave, if you're on the line, we had that discussion yesterday about not needing principal design criteria. Well, here we're bumping

into a place where you need almost the equivalent to come out of the process, to be able to use this Reg. Guide and the new standard. So, something to think about.

MEMBER PETTI: Yes. No, I think that may have just been almost semantic. I still think Part 53 requires design criteria. They used the word "principal" because it was tied back to 50 or 52. But, yes, your point is noted.

MEMBER KIRCHNER: Well, Dave, this is Walt.

Given the importance of reliability to support the PRA results through the life of one of the plants that goes through the LMP process in 53, do you see this being invoked directly by 53, or it would be through guidance?

MEMBER PETTI: I mean, right now, probably guidance. And what's in there, you know, is acceptable codes and standards, right?

MEMBER KIRCHNER: Yes.

MEMBER PETTI: And this is one that's been accepted by the staff.

MEMBER KIRCHNER: Yes. I'm just trying to think through the wording in 53. Is there any requirement for a reliability program to support the

PRA through the life cycle of the plant?

MEMBER DIMITRIJEVIC: Walt, do you have a draft? This isn't connected to the passive components. So, let's sort of like step back a little. You know, the passive components, you know, like if it's related to risk-informed ISI, which I'm very familiar with, that is related to just the typings of the different class, which are usually not in the PRA directly, but can be connected to the active components. Several of the passive components, like a check-well, is added in the PRA. This is limited. Most of those things can cause initiating events, and from that perspective, you know, like steam line breaks, feedwater line breaks that lock.

So, the active components, which most of the PRA consists of, are in the RAP program. I mean, that's in the FSAR. You know, it would be part of the ITAAC items.

MEMBER KIRCHNER: Yes, I get that, Vesna. I was just trying to think through. So, say, you know, this program is to actually maintain the reliability, so that you don't challenge the assumptions. But, you know, from the PRA standpoint, don't you look at the possibility -- I mean, an initiating event would be a break in a passive

component.

MEMBER DIMITRIJEVIC: Yes, that's true. But, you know, you have ITAAC items which cover testing, inservice inspections, the RAP program, which is directly connected reliability. It has the same panels that's already part of the FSAR.

MEMBER KIRCHNER: Right. No, I understand that. I'm just thinking -- I'm trying to think through the life-cycle impact of doing this. Basically, it's there to ensure that --

MEMBER DIMITRIJEVIC: Well, currently, you have (audio interference) actions. You have intent, yes, testing the valves, which are part of ITAAC. Currently, all the plants, almost all the plants in like the states are doing risk-informed inservice inspections.

So, I mean, you know, I don't think we have to worry will that be covered. You know, that's what I was trying to respond to your question. It's a part of the ITAAC problem, yes.

MEMBER PETTI: I think the place to look will probably be in TCAP and RCAP, where commitments are made. I don't know which one; I don't recall. But that's, you know, that's basically the content of applications. It's somewhere in there the applicant

would commit to this kind of program.

MEMBER KIRCHNER: Would this -- Dave, I'm also thinking through. We didn't do Subpart F yesterday. But would this show up in operations?

MEMBER PETTI: It might. I just don't -- I don't remember. I don't recall in Subpart F if this is touched on. I'd have to go back and look.

MR. PHILPOTT: Good morning.

This is Steve Philpott. I'm a Project Manager in DANU. I'm going to be your next speaker.

But I would just add in that part, there is a section in Part 53, in the preliminary proposed rule language -- and I'm not sure what subpart it is; in operations I believe, 53.870 -- that would include a requirement for integrity assessment programs. And so, this lines up well with some of that language now. It would be a way of, you know, a method for addressing that section.

MEMBER KIRCHNER: Yes, that's what I was thinking. Thank you.

MEMBER PETTI: Yes. Okay. Thanks.

MR. PHILPOTT: And there is also, in the RCAP program that you're referring to, there is an ISG that we're working on developing to release that is specific to inservice inspection and inservice testing

both. It covers both LWRs and non-LWRs.

And that also, for the non-LWR ISI portion of that, it does refer to RIM as a method to address the information in the application.

MEMBER KIRCHNER: Great. Okay. Thank you.

MR. PHILPOTT: Sure.

CHAIRMAN BALLINGER: This is Ron again.

The industry has been bound by Section XI, Division 1, from the beginning. But, as a practical matter, within Division 1, the inspection regimes, the use of risk information, and all of that, has evolved to the point where they don't call it RIM, but, in effect, that's what the industry has been doing for the last 10 or more years.

And so, it's not that big a jump, as a practical matter, from Division 1 to Division 2. And I look at it as Division 2, while it's applicable to non-light water reactors, and everything, it's an outgrowth of the, if you want to call it, lessons learned from dealing with Division 1 and the degradation in our systems.

Maybe that's a simplistic way of looking at it, but, you know, I look at this as, basically, a codifying of what, in effect, people have been doing

all along, or evolved to be doing now in the light water reactor business.

MEMBER KIRCHNER: I think you got it right, Ron.

MEMBER PETTI: Yes, I think that's right. The biggest difference is the materials are different; the service conditions are different. So, the damage mechanisms are different. And so, that may in the details change, you know, the nature of the inspection. You know, what you look for and how you look for it might change because of all of those things.

CHAIRMAN BALLINGER: Yes.

MEMBER PETTI: But, at a higher level, I agree with you, yes.

CHAIRMAN BALLINGER: I mean, this is, basically, a codified way of doing, what I would call in the information theory business, surprise.

MEMBER DIMITRIJEVIC: But this is very important to the monitoring program because, you know, when you start those inspections, you can discover degradation mechanisms which you didn't really anticipate. So, for this new-type monitoring program for that, new degradations are very important.

CHAIRMAN BALLINGER: Yes, in our business,

surprise has cost us a lot of money.

Okay. Could we keep going? This is very good discussion, actually.

MR. LIN: So, I think this is my last slide.

RIM also has seven non-mandatory -- or mandatory appendices and two non-mandatory appendices. I'm not going to go through the list, but I'll just mention a few that I haven't talked about.

Like Appendix 4, Monitoring NDE Qualifications, basically, provides requirements for qualification of monitoring NDE methods and addresses qualification of NDE personnel, procedures, and equipment.

Appendix 6, the qualifications and requirements for the RIM Expert Panel.

Again, the big appendix is this Appendix 7, which is a supplement for the type of nuclear plant. So, right now, the Code itself has a placeholder for six different reactor types and two have been developed. As I mentioned before, high temperature gas reactors and Gen III or above light water reactor supplements are done. The others are under development.

And two non-mandatory cover alternative

requirements NDE and monitoring and, basically, administrative requirements for --

DR. BLEY: Can you tell us anything about that Appendix A? What kind of alternatives are they talking about?

MR. LIN: Appendix A, basically, provides a process that you can go through to use different NDE and monitoring techniques. I tried to figure it out, because I think this is that there is a code case that was issued before RIM was published, and this Appendix A, basically, is that code case. It provides, it tells you how you go about doing probabilistic assessment to develop different NDE methods. To me, it's really no different than what's in RIM. I don't know why it's in the non-mandatory appendices.

(Laughter.)

DR. BLEY: Okay.

MR. LIN: It's, essentially, it's part of the RIM. It could be part of the RIM process that you can go through and using different RIM strategies. It was put in there, I think, from what I understand -- and I wasn't involved with the development of the code -- there was a code case. I think it was code case 875 was issued before RIM was accomplished, and the information from the code case got put into this

Appendix A.

DR. BLEY: Okay. Thanks.

MR. LIN: Okay. So, I think that's it, and I'll turn it over to Steve Philpott to discuss the staff review of the RIM standard and the Regulatory Guides.

MR. PHILPOTT: Okay. Well, thank you, Bruce.

As Bruce mentioned, my name is Steve Philpott. I'm a Project Manager in the Division of Advanced Reactors and Nonpower Production Utilization Facilities. I was the Lead Project Manager for most of the review of RIM.

I'm thankful and excited to be here to give you an overview. My goal here is to give you an overview of the review process and the review that we did, but, mostly, give you a summary of what the Reg. Guide is; how it's structured, and touch on some of the conditions, and a summary of the public comments that we received when we issued the Draft Guide, and how we resolved those. We'll step through it for you here.

So, go ahead and go to the next slide, please.

So, a little bit about the background of

RIM and our review. ASME sent a letter to the NRC and requested that NRC endorse RIM, the Standard XI, Division 2, in October of 2091. And they specifically asked that we endorse it via 50.55a.

We put some staff together to start reviewing it and met with our NRC Design and Inspection Steering Committee in both the spring and summer of 2020. After we had some time to review it, it went to them with recommendations.

We recommended, and the decision was made, to not endorse by 50.55a, because that would require the use of RIM, typically, if we encoded it in 50.55a, which we did not think was appropriate at this stage. But, rather, we formed a working group to endorse it via a Reg. Guide, as to make it an option for applicants to use, applicants and licensees. So, I'll talk about that a little bit further in the presentation when we get into some of the public comments.

So, we responded; we formed a review working group, and we responded to ASME. Once we decided to go ahead and review it for endorsement via a Reg. Guide, we sent a letter back to ASME and responded in August of 2020.

That working group that we developed was

made up of a team of experienced NRC staff in Component Integrity, Inspection Testing, Codes and Standards, and PSI and ISI programs, and that included some senior technical staff from the DANU Division, the Division of Advanced Reactors, as I mentioned -- I'm just going to use that DANU acronym for the rest of the way -- as well as, as you saw from Bruce, from the Office of Research and their Division of Engineering. We had staff from Region II and Region IV included in the working group with experience in inspections, inservice inspections, and testing, as well as other Divisions in NRR as well, the Division of Engineering there as well. And at times throughout the review, we also consulted with other senior technical staff in the Division of New Reactor Licensing and some of the senior advisors in Research as well.

I guess one point to note is we had one of our senior staff, along with Bruce, who I definitely would consider an expert, we had, also, a Senior Mechanical Engineer, Tim Lupold, who was our NRC representative on the ASME Working Group for the Development of RIM. He was also a lead technical reviewer and did a lot of heavy lifting and worked with us. He recently retired. So, we got to use his

skills and his expertise right up until the end, and even through the comment resolution period.

Oh, and I should also mention that the Office of General Counsel, you know, while not part of the working group, we did get a lot of effort and a lot of good support from OGC, as we worked through some of kind of the unique licensing aspects of this as well and working through the comment resolution as well. So, we're definitely appreciative of that as well.

So, we, then proceeded to conduct a review, a very thorough, detailed review of Section XI, Division 2, for this, developing the Reg. Guide for endorsement. And we specifically did this review for applicability to non-light water reactors, as that was the near-ter need that we saw. The light water reactors are required to use 50.55a, or under 50.55a, are required to use Division 1. And frankly, where we saw the most immediate need was in the non-light water reactors.

DR. BLEY: So, a quick question about that.

MR. PHILPOTT: Yes? Uh-hum.

DR. BLEY: The Reg. Guide is specific to non-light water reactors. The standard itself,

though, is not, is that correct?

MR. PHILPOTT: That's correct.

DR. BLEY: Okay.

MR. PHILPOTT: The standard is written to be technology-neutral and to apply across technologies. That was a strategic decision at the beginning, that we were going to focus our review on the non-light water reactors. So, it is specifically endorsing it for non-light water reactor applications.

And, you know, that may change over time, but at this stage, you know, I think you were alluding to before, RIM is very much a paradigm shift, right? It's a big shift from Division 1. And so, you know, I think we see this as an exciting win moving forward for these non-light water reactors in terms of being able to provide this as an option for the non-lights. We understand that --

MEMBER KIRCHNER: This is Walt Kirchner.

MR. PHILPOTT: Yes.

MEMBER KIRCHNER: But, if I understand correctly, of the two supplements in place, one is for advanced LWRs.

MR. PHILPOTT: The two supplements? I'm sorry, are you talking about Appendix 7?

MEMBER KIRCHNER: Yes, in the actual --

MR. PHILPOTT: In the RIM, the Appendix 7, where they have the plant-specific criteria, yes. One of them is for LWRs, and another one -- several of those are blank, right, they're yet to be developed. There is one --

MEMBER KIRCHNER: No, I understand that --

MR. PHILPOTT: yes.

MEMBER KIRCHNER: -- but I don't understand why you're restricting it. Is this viewgraph accurate of what you're -- are you only endorsing it for non-LWRs?

MR. PHILPOTT: We are only endorsing it for non-LWRs, yes, that is correct.

MEMBER KIRCHNER: Why is that?

MR. PHILPOTT: Well, primarily because 50.55a(g) requires a light water reactor applicant to use Division 1 in that paragraph of 50.55a. So, a light water reactor, by regulation, is required to use Division 1.

Now, we understand that, for some advanced on the light water side, that this could be -- that Division 1 would be very difficult to apply for some of the advanced light water reactors that we see coming down the road. And they do have an option to use RIM, but they would have to use the exemption

process to do that, because of the requirement in 50.55a. And we understand that that may happen.

So far, we're not seeing a lot of interest yet from the LWRs. So, we focused our efforts on endorsing this for non-light water reactors. We do understand that there may be some future light water reactors that do want to use it, and we do know of one, in particular, that does, but their process to do that would be through an exemption from 50.55a(g), and then, we do a plant-specific review in that case.

DR. BLEY: This is Dennis again.

MR. PHILPOTT: Uh-hum.

DR. BLEY: The ASME asked you to review it under part of the regulations where it can't fit unless you change the regulation, basically, is the --

MR. PHILPOTT: Right.

DR. BLEY: Okay. So, you would have had to do a change to the reg to do that and make it applicable.

MR. PHILPOTT: That's correct.

DR. BLEY: Nothing in your review would have precluded LWRs from using this, except for the regulation?

MR. PHILPOTT: Right. Yes. And I think that's, generally, safe to say; that's generally true.

I mean, nothing that -- no, there was nothing that stood out in our review that would specifically exclude LWRs. It's just we did not review it with that focus, and it primarily is the regulation, yes.

We would have to do a rulemaking effort to modify the regulations. You know, we did consider that during the review period, you know, different rulemaking options. But, ultimately, we decided, when we went back to the Steering Committee and the Management Oversight Committee, we did decide that that was not the appropriate pursuit at this point, given the level --

DR. BLEY: I'm just curious. Has anyone requested a rulemaking on this issue to include it for LWRs?

MR. PHILPOTT: Yes, actually. And actually, I'll touch on that briefly when we get to a few --

DR. BLEY: Okay.

MR. PHILPOTT: -- slides later in some of the comments.

DR. BLEY: Fine.

MR. PHILPOTT: Yes. And, yes, I neglected to mention, in terms of the review group that we did and the working group, we did also guide and meet

frequently -- as part of the project plan for this review, there was an established Management Oversight Group at the Branch Chief level that we would meet with on a frequent basis and provide updates, and were guided by some of our decisions that way. And then, we did periodic followups with the Steering Committee on some of the key decisions as well. So, we worked through all those type of questions and issues in those meetings.

CHAIRMAN BALLINGER: This is Ron Ballinger again.

I mean, again, there's a regulatory fence between the two --

MR. PHILPOTT: Uh-hum.

CHAIRMAN BALLINGER: -- Division 1 and Division 2, but, as a practical matter, within Division 1, the industry has been doing or evolved to doing what is, in effect, a lot of it is in Division 2.

So, an exemption request would probably be pretty easy.

MR. PHILPOTT: It may be. I mean, I guess it remains to be seen. But, yes, we understand that, clearly, some of the new light water reactors, Division 1 is not going to be their preferred path,

right?

CHAIRMAN BALLINGER: Yes.

MR. PHILPOTT: But you're right, we're going to have to review that through the exemption process in this case.

And that could evolve -- you know, obviously, the regulatory framework for this could evolve; I expect it probably will evolve over time, right? We were reviewing this based on this submittal and kind of our view of the landscape at the time that we conducted this review.

But RIM is, you know, as I think you've kind of seen, there's still a lot of development to do. We don't have any experience with plants using RIM or submitting RIM programs to us, obviously. So, over time, we do expect to try to gain, you know, to hope to gain more of that experience and see what's involved, and see how it could be applicable otherwise.

Okay. I think we can go to the next slide.

Okay. So, this just kind of provides a timeline of the work that we did. Not a lot of details to share with you here, but, essentially, once we formed that working group from that early initial

stage, August to December of 2022, we did an initial review with the working group and developed our initial staff positions.

And the focus there was to do a first cut, and we confirmed that information in the Code was adequate and it was appropriate to be endorsed. We certainly identified some areas that would likely require conditions, which we did end up having, but we went back to the Steering Committee at that point and received the decision to move forward with a more detailed review and focus on endorsing it via the Reg. Guide.

So, in 2021, most of the first nine months of 2021 is when we did the detailed review, went step by step through each of the positions and paragraphs within RIM. Reached out to other technical experts in the agency, and as I mentioned Tim Lupold was on the working group with RIM development. So, during meetings with that working group, he was able to reach back out to them to help get answers to questions and things that weren't clear to us, as we did that initial review. So, all that.

We developed the Reg. Guide, Regulatory Guide, in that time period, and then, we published it for public comment right near the end of September

2021. And we published it with a 45-day comment period. And since that point, since November, we've been working on the comment resolution and finalizing the Regulator Guide.

We are on track to publish it. It's ready to go. For the most part, we've got that it will now be published in June of 2022.

As Michelle mentioned in her opening remarks, it's tied into, there is some reference in the Reg. Guide to conditions in Section XI, Division 1, the 2019 edition. So, in order to not get ahead of that, we are waiting for the rulemaking to be finalized for Division 1 to be incorporated. So, this will be published as soon as that rulemaking is finalized.

Okay. Next slide, please.

This is just a brief overview of the structure the Reg. Guide. I think this is pretty standard for Reg. Guides. So, I just kind of point it up here to note a few points about the way the Regulatory Guide is laid out. And these are the main points I just want to make.

Section A, obviously, addresses the purpose of the Regulatory Guide, which describes an acceptable approach for the development of an

implementation of a PSI and ISI program for non-light water reactors by endorsing this.

The other point of that to note here is it also describes a method that applicants can use to incorporate their preservice inspection and inservice inspection programs into a licensing basis. So, I'll touch on that a little bit later.

But the main point there is the current regulations in 50 and 52 don't specifically call out a requirement for a non-LWR to have an inservice inspection program. So, they do, in content of applications sections, they do mention needs for periodic testing of structures and maintenance and surveillance, and that sort of thing.

But the license condition, again, this is an area that we worked with OGC quite a bit and determined that the best way at this point to make sure that an inservice inspection program is part of an non-LWR license basis was to include a license condition with the application. And the Reg. Guide provides a sample license condition that an applicant can use to do that.

It addresses the applicability very briefly. Of course, as I mentioned, it's specifically applicable to non-LWR applicants or licensees for an

operating license or a combined operating license under Parts 50 and 52.

This is one of the guidance documents, one of several that will eventually support Part 53, when that becomes final, but, again, it's one of the many documents that will be reviewed for conforming changes and updates to make it applicable to Part 53 as well, when we get to that stage in the Part 53 process.

We touched on the applicable regulations and related guidance. As I started to mention, the current regulations don't specifically mandate an ISI for non-LWRs. There's 50.34 and 52.79 sections in the content of applications that require those applications to include plans for conducing normal operations, including maintenance accounts, periodic testing of structures, systems, and components.

The Reg. Guide gets into a discussion of the General Design Criteria -- it's Appendix A of Part 50 -- and how those can be adapted or can provide some guidance for non-light water reactors or reactor designs other than the light water reactors.

And then, we do point out, and the Reg. Guide includes, a bit of discussion on Reg. Guide 1.232, which is guidance for developing the Principal Design Criteria for the non-light water reactors. And

then, the Reg. Guide spells out a number of the applicable ARDCs, Advanced Reactor Design Criteria, that relate to SSC testing and provide some basis for this approach.

So, Section B provides a lot of the background of how we developed the regulatory basis for it. It, again, discusses that, what I just mentioned, in terms of the regulations in more detail; the fact that they prescribe specific preservice and inservice inspection only for boiling and pressurized water reactors, and it goes through that discussion and develops that process.

It highlights several of the ARDCs, as I mentioned, from Reg. Guide 1.232 that reflect the importance of inspection. It briefly summarizes the RIM process for developing a PSI and ISI program, and again notes the purpose and scope of the staff's review.

And then, the bases, kind of the meat of the Reg. Guide is the bases for the NRC staff's positions. So, that part goes through the staff's positions or the staff regulatory guidance or the conditions for the use of RIM. And it goes through in detail each of those conditions and provides the background of the staff's review and the reasoning for

those conditions. There are 15 conditions overall in the Regulatory Guide, and I'll get to those as well.

Section C, it is the more brief, concise listing of the specific conditions or guidance positions.

Okay. Next slide, please.

And I apologize, I'm a little under the weather today. So, I'm going to sip some water from time to time as we go.

Okay. The Regulatory Guide conditions. Just as I mentioned, there are 15 conditions total listed within the Regulatory Guide. Many are, I would say some are just maybe minor or more kind of focused and more specific, not maybe as significant. So, I don't intend to go through all 15, but we'll do a bit of an overview and a summary. And I do have, the next slides, I do list what those are in general.

But, starting with Condition 1, was the first one, and this is where we provide two things. Condition 1 does two things. It calls out the need for the license condition. It mentions that applicants intending to use RIM should use a license condition. And as I mentioned, it gives you an example of a license condition they can use.

Secondly, it identifies the information

that should be included with their application as an initial application. So, this is when they're coming in with their initial application and to describe their RIM program.

So, in order to support our finding that they meet those 50.34 and 52.79 content of application requirements, we ask them -- in the Reg. Guide, it provides a list of -- a review summary of the RIM program, and it gives some specific examples of what that should include: things like listing of the SSCs that are in the RIM program. We ask them to describe the methodology for establishing the reliability targets; the methodology for determining that the reliability targets will be satisfied by the registered strategies. So, we ask them to identify what those reliability targets are, things like flaw evaluation acceptance criteria, et cetera. So, that all would be included in their initial summary of RIM.

And then, there's a number of other requirements that, as we've gone through the review, are highlighted in the specific conditions throughout the rest of the particular sections, where there are certain things that we ask them to provide. So, things like qualification and certification programs and justification for their PRA, et cetera. Any

alternatives that they're taking to actual Section XI, Division 2, we would like them to identify that in the application.

Condition 4 is where we address any changes to a RIM program after they've had their program submitted to us and it's been reviewed and approved by the staff. In Condition 4, we talk about they can make changes to their program without identifying or without notifying us, but we list some specific areas where we do require submittal to the NRC for review and approval. So, there are some things that we ask them to provide for review and approval; other things that should be submitted to the NRC just for information that we can follow up on, if needed.

For review and approval, this focuses on things like changes to the methods to establish the reliability targets and the methods that they use to demonstrate that the reliability targets will be met; any other alternatives to the Code. Again, if they want to implement a new alternative to the Code, they need to send that to us for review and approval. Any changes involving alternate examination methods would need to be submitted for review and approval as well.

And then, things like submitting for

information or Owner's Activity Report forms submitted to us, and then, the Reg. Guide talks about the periodicity for that, and things like that, and a few other things.

One other one I wanted to highlight is Condition 10. It's not necessarily a real technically-significant condition, or I would say not a lot of background meat to it, but I just wanted to note that there are provisions in RIM that are listed as "in the course of preparation or otherwise under development." And this largely refers to the technology-specific or plant-specific appendices.

And so, we make a note or condition in there that, obviously, if someone is coming in with a RIM program, and the 2019 standard listed as "in the course of preparation and development," we need the applicant to develop that information and provide it to us for review.

Next slide, please.

So, the next couple of slides, I list briefly the other conditions. Again, there's 15 of them. I don't think we need to go through them all in detail. Some are more minor and relatively minor.

One, the top one is we want them to use, if they're using the 2019 edition of RIM, they should

use that and correspond with the 2019 edition of Section XI, Division 1. Or, basically, if they go to a future edition of RIM, it needs to be the corresponding edition of Division 1.

Another one is ANDE. For personnel qualification, RIM mentions or includes use of ANDE-1, which is not an approved qualification standard yet by the NRC. So, we did have to make a note that it's not approved yet at this point. Let's see. And that condition does identify the NRC-approved standard, the CP-189, as well as the standard for performance demonstration that is approved by the NRC.

Things like not overriding the construction code by using RIM. Because RIM would prevent or -- sorry -- would permit using some alternate examinations methods in lieu of the examination requirements specified in the construction code. So, we wanted to make sure that they are not, in their use of RIM, they are not overriding the construction code that's approved for that.

Next slide, please.

Again, a few more high-level ones, summaries. Again, these are some of our more minor, even some minor editorial errors that we noted in the standard; we included that.

Preservice inspection for repair and replacement, the timing. RIM lacked information related to the timing for completion of the preservice examinations that may be needed due to activities such as repair and replacement, modifications that may add components or changes that may add existing components into the scope. So, those weren't specifically called out in terms of needing preservice inspection before going into service. So, we noted that there.

Another, stress relaxation credit was a degradation mechanism that we felt should be considered after discussing with the technical experts within the NRC as well.

Okay. Next slide, please.

Okay. So, moving on, I want to just give you a summary of the public comments that we had, and some of the revisions that we made to the Regulatory Guide, based on those comments.

We did receive comments from eight distinct comment submissions or submitters, and that, all told, it was approximately 35 individual comments. We say, "approximately" because some of them were kind of broad and, you know, sending in information just for consideration; didn't actually have an actual suggestion or recommended change to them. So, it's

some of them were fairly lengthy, but, roughly, there were about 35 individual comments that we had to address or we addressed.

And we received some very good comments. Some of those commenters, they came from representatives of industry. Three of them came from people who were contributors to the development of RIM, as well as some retired industry, and even one retired NRC member.

Like I said, many of those comments led to some good clarifications in the document that I'll describe for you here in the next couple of slides.

We reviewed the comments very carefully one by one; went through; you know, in some cases, again, went back and consulted with some of our senior technical advisors, and then, also had very good discussions with OGC support to work through the changes to the Reg. Guide as well.

We did not eliminate or add any conditions as a result of the comments. And lastly, we did clarify some of the -- the highlights of the things we clarified are the applicability, because we did receive a number of comments on the applicability, as well as some of the information to be submitted for review, and some of the other staff positions.

Okay. Next slide, please.

So, on the next few slides, which are my last few slides, I'm just going to highlight some of the main public comments that we addressed and some of the changes that we made, based on those comments.

The first one is really the biggest one. The main one that was most significant was we had four of the comments suggested that the Regulatory Guide should be revised to allow LWRs to use RIM. Or a different twist on this same theme, the same idea, in some cases, they said the Reg. Guide should explain the regulatory paths for light water reactors to use RIM.

As I kind of mentioned, well, did mention before, light water reactors are required to use, in accordance with 50.55a(g), they are required to use Section XI, Division 1, for inservice inspections. So, you know, the bottom line is it was not appropriate for the Regulatory Guide to address means for light water reactors to counter the actual regulation that's in place. So, we do agree that RIM was developed for any type of reactor design, but we don't, in this Regulatory Guide, we don't take a position on the technical adequacy of RIM for light water reactors, is essentially what we commented in

the commenter response.

And we did not review this standard for light water reactors. So, again, we just reconfirmed that the applicability for this Regulatory Guide is for non-light water reactors.

Addressing light water reactors and including information about a process for light water reactors to use it, whether it's through exemptions or alternatives, would be outside the scope of the Regulatory Guide. However, we did include a footnote, which I've listed here for you, just acknowledging that we understand that RIM is developed for any type of reactor design. Again, we state -- you see the language there -- we state the reasoning why this Regulatory Guide does not address light water reactors in the applicability, and we identify the exemption process as the path that they could use.

Okay. Next slide, please.

In this one, I just wanted to highlight -- like I said, several of the comments did provide, particularly from the developers of RIM, did provide some good clarifications that we considered and that did result in some clarification changes in how we mention, for example, Position 1, which, again, discusses all the information that we ask them to

submit as part of the initial application. We did make some changes to provide more clarity on what we're looking for, and we did get some good suggestions.

So, things like listing of the SSCs; in particular, SSCs included in the scope of the RIM, where previously we just asked for kind of the basis of the scope. You know, kind of clarifying on how certain factors are considered in use of the RIM strategies. We clarified the justification for flaw evaluation acceptance criteria, temperature limits.

And then, there were some clarifications that we made that applied to both Position 1 and Position 4. They rightly noted that there's no need for this NIS-2 form, which is, basically, a completion of repair and replacement activities. It doesn't include specific information that would be helpful that is not already covered, or would be covered, in the OAR, the Oversight Activity Report. So, we agreed no need. We took out reference to that.

Someone rightly pointed out that we previously had a reference to a refueling outage, and we changed that. Obviously, they made the point that some advanced reactors won't have refueling. So, that's more of a terminology clarification there.

Okay. The next slide, please.

Okay. Position 5, this one relates a bit to -- well, we did add a clarification for the use of CP-189 for qualification and certification of NDE personnel. We added the caveat that any conditions that are listed in 50.55a(b)(2) should be applied for that use, and that made sense.

This came in, this comment tied in with -- we did receive several or a few comments that related to they wanted the Reg. Guide to provide a path or allow the use of ANDE-1 for NDE personnel qualification. That is a standard that we've been following and working with the developers there, but that is not a standard that we feel is sufficient to be approved by the NRC yet at this point. So, we disagree with the comment that this should include guidance on how to get approval for use of ANDE-1 at this stage.

So, the Reg. Guide does, again, clarify specifically the standards that we have that are approved for Division. We did include the comment that we don't see -- personnel qualification is not technology-dependent. So, if ANDE-1 later gets -- in the comment resolution; we didn't include this in the Reg. Guide -- but if ANDE-1 later gets approved for

use for LWRs, then it should be applicable to non-light water reactors also. But, again, this isn't what we're going to state in the Regulatory Guide at this stage.

Let's see. Some clarifications on performance demonstration. Again, we added a reference to the appropriate Section XI, Division 1, portion for a performance demonstration, for the approved standards for performance demonstration, in addition, came from that comment.

And there were various other kind of more minor clarification changes that we made throughout.

And that really is my last slide. I guess the one thing I would finish with was, you know, I think this was a very productive review. As I mentioned before, we see this as really a positive -- it's filling a significant need for the advanced reactor community, for the non-light water reactor community.

We do see, as we start to get more information from applicants, as they start to use it, I'm sure we'll learn more about RIM programs and how they're developed, and how they're provided. But this, basically, provides a process.

As we mentioned before, it's very much a

paradigm shift from Division 1, but, again, we think this, the ability to get this Regulatory Guide out and provide this as an option for licensees and applicants, I think is a very good thing at this stage.

So, let me stop there. That is my last slide. So, I'm happy to take any questions.

CHAIRMAN BALLINGER: This is Ron Ballinger.

Can we go back to the first main public comment?

MR. PHILPOTT: Sure.

CHAIRMAN BALLINGER: I forget the slide number. Yes, that will do it.

You can probably guess where the comments came from in this area.

MR. PHILPOTT: Right.

CHAIRMAN BALLINGER: And it kind of makes you wonder whether or not there might be a path forward for Revision X for the Reg. Guide, where you do deal with the 50.55a part for light water reactors, just regular light water reactors.

Is there any kind of plan for the future for this?

MR. PHILPOTT: So, I guess I would say, I

would start by saying, yes. I mean, not a specific plan for changing our course.

But, you know, it was a strategic decision to not try to change 50.55a at this stage. One of the issues, it would be very complicated to try to weave Division 2 requirements into 55a in parallel with the Division 1 requirements. And so, it would be a significant effort to take that under.

One of the things we are doing within the Division of New Reactors is that they are kind of pulsing and looking at some of the light water, potential light water reactor applicants and trying to gauge their interest in the use of RIM. So far, they've only identified the one key player in the use of RIM.

So, there are maybe one or two others that are kind of monitoring it and seeing how it goes for the advanced reactor community or for other light water reactors, but more of the interest really seems to be in the non-light water reactors right now. So, basically, what that tells us right now is, from a resource standpoint, it wouldn't make sense to try to do that now.

Now that could change once maybe someone implements it or they start to see it implemented. We

don't currently see any, or at least the word I saw was that we haven't seen any expressed interest from the operating fleet, for example, at this stage to use RIM. But, if that changes, then it becomes, you know, a much bigger potential resource than we do -- and as RIM evolves, you know, we could evaluate that and reconsider that decision in terms of going forward with rulemaking.

CHAIRMAN BALLINGER: Thanks.

MR. PHILPOTT: Uh-hum.

CHAIRMAN BALLINGER: Questions from the members or consultants?

MR. TURNBOW: This is --

CHAIRMAN BALLINGER: Whoever you are, we're breaking up.

MR. TURNBOW: Can you hear me now?

CHAIRMAN BALLINGER: Yes.

MR. TURNBOW: Okay, good. I'm just switching from mute over.

This is Mike Turnbow.

Concerning the response to the CP-189 ANDE comments that were just made, that's disappointing because we, the industry, built ANDE at, basically, the request of the NRC, the letter we received from you guys back several years ago about how poor NDE

personnel performance was. And it is incredibly documented how poor it is.

And it continues to this day. CP-189, and even the appendices in Section XI, has done nothing to change it. The failure rate at EPRI for PDI first-timers still hovers around 50 percent, which makes no sense.

So, I --

CHAIRMAN BALLINGER: Excuse me. Excuse me. I don't know who you are. I'm guessing that you're a member of the public. If that's the case, we will entertain comments from members of the public after we get comments from members of the Committee, or the Subcommittee. Excuse me.

So, if this is not the case, then I apologize, but can you -- if you are what we would call a member of the public, would you wait just a few minutes until we go around the table, in effect, with members of the Subcommittee?

MR. TURNBOW: Okay. I'm a member, I'm a working group member of RIM, just so you know. But if you want me to wait, I'll be glad to wait.

CHAIRMAN BALLINGER: Okay. So now, you're in the gray area.

MR. TURNBOW: Yes, I'm always in the gray.

Matter of fact, all of it's gray.

CHAIRMAN BALLINGER: Okay. Let's get comments from Subcommittee members first, and then, we'll --

MR. TURNBOW: Okay.

CHAIRMAN BALLINGER: Okay.

MEMBER REMPE: Ron?

MEMBER KIRCHNER: Ron?

CHAIRMAN BALLINGER: Yes, sir or ma'am.

MEMBER REMPE: Go ahead, Walt.

MEMBER KIRCHNER: Ron, I'm thinking about the presentation we heard, and if I understood Steve correctly, the way that non-LWRs would -- let me choose my words carefully -- be required to do inservice inspection is through the content of application requirements of 50 or 52, but not through any direct regulatory requirement, such as exists in 55a(g).

And so, what I'm thinking -- and I know Dave is on the line -- I'm thinking ahead to our deliberations about 53, and if you don't have required Principal Design Criteria or just design criteria per se, which would invoke such a requirement for purposes of, for example, pressure vessels, whether they are low or high pressure doesn't matter. Is that a gap or

is that something that we should be thinking about when we get to Subpart F of 53? So, it's just an observation. It's not a question.

CHAIRMAN BALLINGER: I think Dave is probably much more qualified to respond to that.

Dave?

(No response.)

Well --

MEMBER PETTI: Did you ask me something, Ron? I'm sorry, but --

CHAIRMAN BALLINGER: I just fingered you as being the expert for --

MEMBER PETTI: Oh, the cleaning lady just knocked on my door and looked in. So --

(Laughter.)

What were you saying?

MEMBER KIRCHNER: Well, Dave, it was Walt. I made an observation that it seems to me --

MEMBER PETTI: Yes, yes, I got the off-tech piece, yes.

MEMBER KIRCHNER: Yes, yes.

MEMBER PETTI: I mean, it's something to look at in Subpart F, I guess, on operations.

MEMBER KIRCHNER: Yes, it seems to me, without getting as prescriptive as what's in

50.55a(g), one would want to demonstrate an equivalent level of safety for a non-LWR, inservice inspections. I'll just leave it at that high, general level without trying to resolve how one obtains that result.

MEMBER DIMITRIJEVIC: Well, it will be interesting what would this be in the, you know, non-PRA framework, you know, for selection of the SSCs. So, again, I think we will have to monitor how this goes in the 53.

MR. PHILPOTT: Uh-hum. And as I mentioned earlier, I'm certainly not a Part 53 expert. So, I don't want to speak for that team in great detail, other than to note that they have written in a section related to integrity assessment programs where this would tie in, but not -- I don't see that -- that doesn't necessarily specifically require ISI programs or have that specificity that 50.55a(g) does. It's a different approach, but -- okay.

CHAIRMAN BALLINGER: Did I hear --

MEMBER PETTI: So, just to be clear, before we go to a different topic, I have opened up the draft of Part F, and there's a whole section on maintenance, repair, and inspection programs. So, there's words in there -- "performance," "condition monitoring." I'm just skimming.

But I'll look at it, you know, offline, but I think at least there's a hook. It may need to be noodled, but it's there. There's something there to start with.

MEMBER KIRCHNER: Yes. Yes. Yes, thanks, Dave.

The other thing I'm thinking is the Reg. Guide is guidance, and that's different than 55a(g), which is a requirement.

MEMBER PETTI: Right. This is in the rule text, 53.715, the draft rule text.

MEMBER REMPE: So, Ron, are we ready for another topic?

CHAIRMAN BALLINGER: Yes, I was about to -- I assumed that that was your voice that I heard.

MEMBER REMPE: Okay, yes, this is Joy.

I'm hoping I'll get my comment out. I got kicked off twice in the last 20 minutes.

But, anyway, I'm thinking about path forward. And in July, we had a reservation for a possible letter, which I think is not going to be a letter on this, because the staff even told us today they're going to issue this in June.

CHAIRMAN BALLINGER: Yes, the intent was for this to be just an information briefing.

MEMBER REMPE: And I think that's a good intent.

On the other hand, I know that Dave has a Part 53 letter scheduled for July. And we heard yesterday that what we get on Part 53 at the upcoming Subcommittee is not a sure bet.

And so, I wanted to put out there that I'm thinking that we should definitely have a letter on Part 53, but it might be, you know, whatever we get with respect to Part F and Track B, or whatever option B is, as well as maybe a section on guidance. We've heard some good things today, that there might be a worthwhile paragraph, and then, talking about how it interacts with the rulemaking language. And there's some issues about guidance that might need clarification and how important that is. But we're monitoring the staff progress on guidance to support non-LWR licensing.

And I guess I'm throwing that out there for the Committee to consider, you as well as Dave, since it's his letter that he's leading.

What do others think?

MEMBER PETTI: No, I think it's a good idea, because there's a couple of things in my head that are not necessarily part of 53, but may be better

in guidance. So, it would just be a little section, like you said, where we could put some ideas together. Because, you know, the guidance in many areas hasn't been developed, but these would just be some of our thoughts to make sure that we have them on the record for the staff to think about.

MEMBER REMPE: Yes, in earlier letters, we talked about that. That was one of the things we highlighted, that we needed to have an idea of the guidance and its progress.

So, anyway, that's kind of like I thought it would be good, before we end this discussion, to have clarity. We're not going to have any more presentations or letter in July, and that topic will go off the July agenda, which hasn't been published yet. But Dave's letter will have more certainty, which wasn't very certain yesterday after what we had heard from the staff.

CHAIRMAN BALLINGER: Okay. Other comments from members?

(No response.)

Okay. Hearing none, now we can -- it's the appropriate time to get comments from members of the public, and even the gray area of the public members.

So, Members of the Public, if you would like to make a comment, please state your name and make your comment.

MR. TURNBOW: Okay. This is Mike Turnbow again. And I'm Secretary of the working group, MANDE, under RIM; also, the Chairman of the ANDE Project, when we wrote the standard the first time, which included NRC representation throughout the entire process. I now chair the implementation piece of ANDE.

And my comment is, as I've stated -- just to go back over it one more time -- it's a little disappointing because we started the project at the request of the NRC several years ago. NRC sent us a letter; ASME telling us that the NDE, basically, was broke, was what the letter said, in my terms, and it should be addressed. And we committed to it, and now we've done it.

And it's still in accordance with the same process that -- these are power plant operators, the systematic approach to training through INPO. So, we followed that same, exact process with the NRC staff, taxpayers' money and utility money. We spent about $2.5 million building this.

And so, we're at a point of implementing

it. And it seemed like, since RIM is a new document coming out -- so is ANDE a new document coming out -- it seemed it would be a perfect marriage; plus, it's performance-based, which the RIM folks are very interested in.

Since the beginning, since CP-189 was introduced, and all the appendices in Section XI, around '92, the pass rate at EPRI has hovered around 50 percent. And all the things we've done in the Code and adding these other caveats to CP-189, still results today in a 50 percent pass rate. Basically, we've done nothing to fix that, except we've built a -- so, I'm going to stop there.

I know we're not going to resolve this today, but we'll just have to continue to work together and see if we can't realize we probably have the best solution on the planet right here.

CHAIRMAN BALLINGER: Thank you.

MR. TURNBOW: Thank you.

CHAIRMAN BALLINGER: Other members of the public that would like to make a comment?

(No response.)

Hearing none, then I think we are pretty much done.

I would like to thank the staff -- and I'm

sure the rest of the Committee members would be the same -- for a presentation.

I believe -- and this is one person's opinion -- that this is a very significant change. I would, for one, would like to -- again, I keep saying that the industry has been moving in this direction within the confines of Division 1, anyway. Anybody that's been familiar with environmental degradation of materials knows this, and anybody that's read MRP-227, I think it is, or even the newest version of that, will agree.

But I thought it was a great presentation. And absent any additional comments from members, we would like to thank you very much for the presentation.

And with that being said, we are adjourned.

(Whereupon, at 10:12 a.m., the Subcommittee was adjourned.)

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Overview of ASME Section XI, Division 2, Reliability and Integrity Management (RIM) Programs for Nuclear Power Plants

May 20, 2022

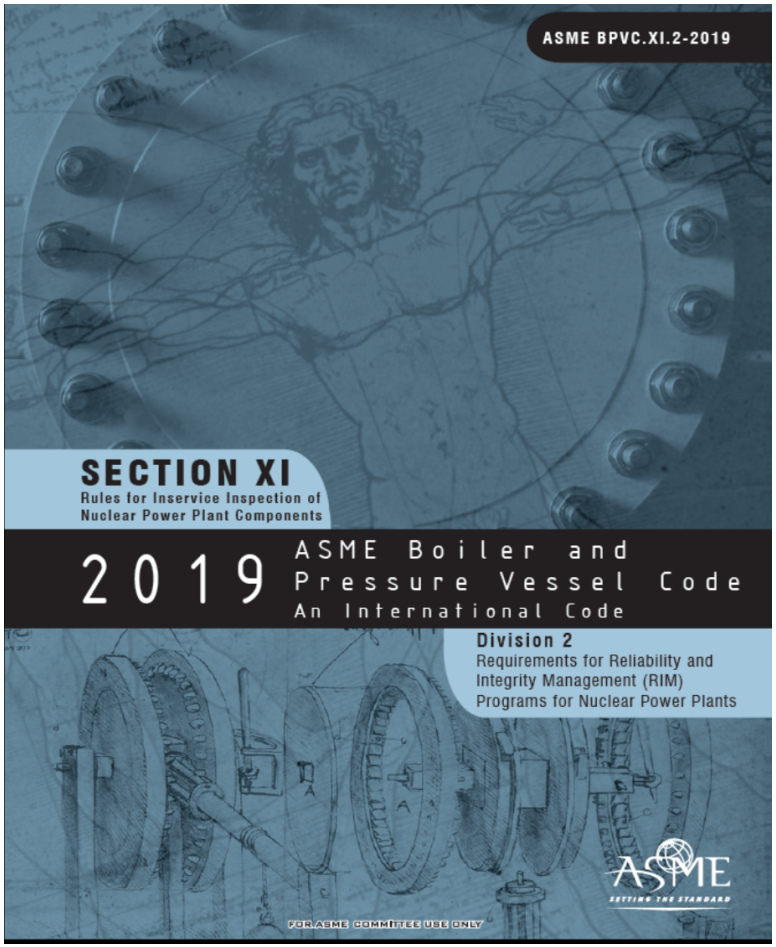
Bruce Lin, Materials Engineer
Reactor Engineering Branch
Division of Engineering
Office of Nuclear Regulatory Research

ASME Section XI

- ASME Section XI, Division 1 was developed and evolved over 40+ years but focused on existing PWR and BWR light water reactor (LWR) technology
  - Consequently, the use of ASME Section XI, Division 1 may not be well suited for advanced Non-LWR reactor designs
- ASME Section XI, Division 2 Reliability and Integrity Management (RIM) was developed to be a “technology neutral” inservice code that can be applied to all reactor types
  - RIM has technology-specific supplements intended to account for different reactor designs
  - Many of the technology-specific supplements are still under development

What is RIM?

- A program to ensure that passive component reliability and integrity are properly managed
- Based on achieving an acceptable level of reliability
- Implement strategies to ensure that Reliability Targets for SSCs are defined, achieved, and maintained throughout the plant lifetime

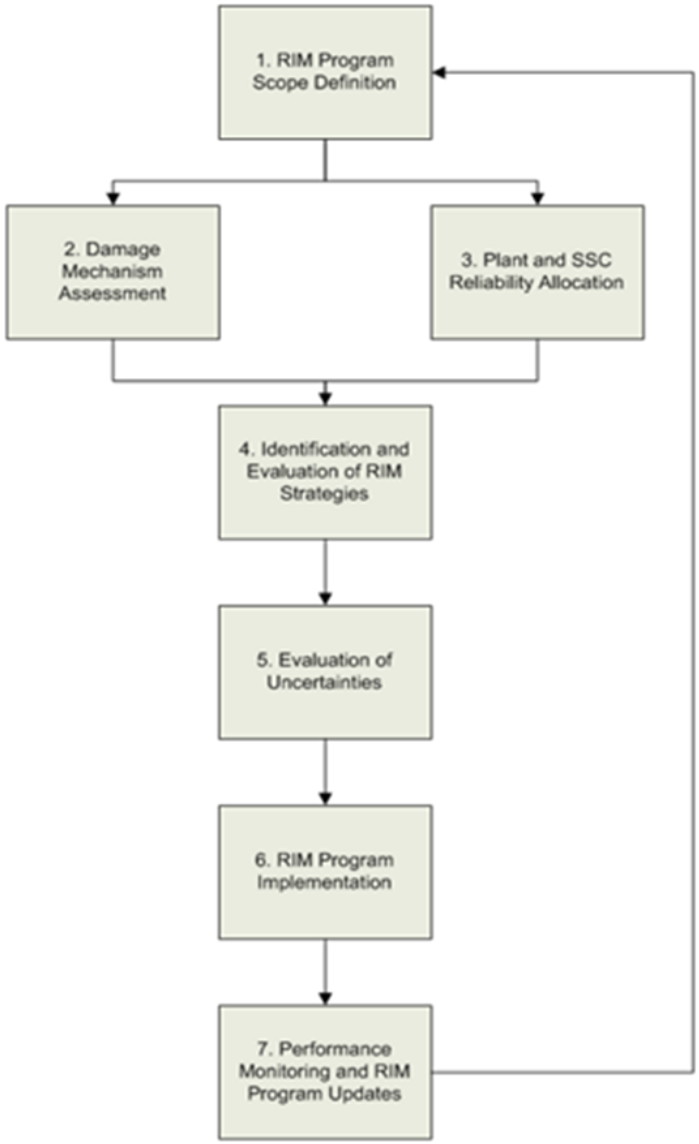


RIM Process Philosophy

- RIM evaluates all SSCs for their impact to plant safety and reliability
- RIM establishes the examination, tests, operation, monitoring, and maintenance requirements to ensure the SSCs meet the plant risk and reliability goals
- This contrasts the prescriptive approach used by Division 1 which uses Class 1, Class 2 and Class 3 approach to ISI with each Class having less rigorous criteria

RIM Process Overview

- Step 1: Determine Scope of SSCs for RIM Program
- Step 2: Evaluate SSC Damage Mechanisms
- Step 3: Determine Plant and SSC Level Reliability and Capability Requirements
- Step 4: Identify and Evaluate RIM Strategies to Achieve Reliability Targets
- Step 5: Evaluate Uncertainties in Reliability Performance
- Step 6: Implement RIM Program
- Step 7: Monitor SSC Reliability Performance and Update RIM Program



Step 1: RIM Scope

- Applicable over the entire life of the plant and each passive SSC that is in scope [RIM-1.1]
- The Owner shall document the specific list of SSCs to be evaluated for inclusion within the scope of the RIM Program [RIM-2.2]
- The scope shall include SSCs whose failure could adversely affect plant safety and reliability [RIM-2.2]

Step 2: Degradation Mechanisms Assessment

- The potential active degradation mechanisms for the SSCs within the RIM Program scope shall be identified and evaluated [RIM 2.3]
  - Design characteristics
  - Operating experience and research experience
  - Results of preservice and in-service examinations
  - Recommendations by SSC vendors
  - Applicable degradation mechanisms including those identified in the applicable Plant Type Mandatory Appendix
- The criteria used to identify and evaluate the susceptibility of each SSC to degradation mechanisms shall be specified in the RIM program documentation

Step 3: Plant and SSC Reliability

- Plant Level Risk and Reliability Targets [RIM-2.4.1]
  - Plant level reliability shall be derived from regulatory limits on the risks, frequencies, and radiological consequences of licensing basis events that are defined in the probabilistic risk assessment (PRA)
  - Plant level RIM goals may include additional goals to meet plant availability
- SSC Level Reliability Target [RIM-2.4.2]
  - Allocation of SSC level Reliability Targets from PRA
  - Mandatory Appendix II provides a general approach
- Scope, Level of Details, and Technical Adequacy of PRA [RIM-2.4.3]
  - PRA shall meet the requirements of the ASME/ANS RA-S-1.4

Step 4: RIM Strategies

- The RIM Expert Panel (RIMEP) shall identify the RIM strategies and evaluate and select combinations of strategies that will meet and maintain the Reliability Targets [RIM-2.5]
  - RIM strategies may include design strategies, operating practices, inservice inspection, repair and replacement practices, etc.
  - The RIM strategies shall account for the potential for specific damage mechanisms applicable to each SSC
  - Impact of each RIM strategy on the reliability of each SSC shall be assessed against the SSC-level Reliability Targets

Step 5: Evaluate Uncertainties

- Evaluation of Uncertainties [RIM-2.6]
  - Lack of service experience
  - Unknown degradation mechanisms
  - Uncertainties in the prediction of SSC reliability
- Use of multiple strategies to address uncertainties

Step 6: RIM Implementation

- RIM Program Documentation
  - Scope of SCCs selected for inclusion in RIM program
  - Results of degradation mechanisms assessment
  - Plant level risk and reliability goals and SCC reliability targets
  - Specific RIM strategies and their impact on SCC reliability performance
  - Evaluation of uncertainties

- RIM Program Implementation [RIM-2.7]
  - Inspection Interval
  - Preservice Inspections
  - Design Requirements for RIM
  - Leak Detection System Requirements for RIM
  - Examination and Inspection Requirements for RIM

Step 7: RIM Program Updates

- Performance Monitoring and RIM Program Updates [RIM-2.8]
  - RIM program shall be re-evaluated to incorporate results from SSC performance monitoring and new information affecting implementation of the program
  - Examples may include changes to plant design, operating and maintenance practices, plant, industry and research experience, monitoring or examination results, regulatory requirements, PRA updates, etc.
- Minimum frequency of updates – Once per inspection interval

Expert Panels

- RIM Expert Panel (RIMEP)
  - RIMEP is responsible for the technical oversight and direction of the risk-informed aspects of RIM program development and implementation.
    - Establishes RIM Scope
    - Establishes Reliability Targets
    - Identifies RIM Strategies
- Monitoring and NDE Expert Panel (MANDEEP)
  - Responsible for all things NDE
    - Develops MANDE specifications
    - MANDE qualification
    - Specific examination requirements
    - Minimum criteria of MANDE

Section XI, Division 2 Organization

- RIM-1 Scope and Responsibility - Similar to Div. 1 IWA-1000
- RIM-2 Reliability and Integrity Management (RIM) Program - This article covers RIM program implementation
- RIM-3 Acceptance Standards - Appendix VII will have acceptance standards for each reactor type
- RIM-4 Repair/Replacements Activities – Done in accordance with Div. 1 IWA 4000 with a few exceptions
- RIM-5 System Leak Monitoring and Periodic Tests – Provides rules for leakage monitoring and leak testing
- RIM-6 Records and Reports – Similar to Div. 1 IWA-6000
- RIM-7 Glossary

Section XI, Division 2 Organization

Mandatory Appendices

- Appendix I, RIM Decision Flowcharts
- Appendix II, Derivation of Component Reliability Targets From Plant Safety Requirements
- Appendix III, Owner's Record and Report for RIM Program Activities
- Appendix IV, Monitoring and NDE Qualification
- Appendix V, Catalog of NDE Requirements and Areas of Interest
- Appendix VI, Reliability and Integrity Management Expert Panel
- Appendix VII, Supplements for Types of Nuclear Plants

Nonmandatory Appendices

- Appendix A, Alternate Requirements for NDE and Monitoring
- Appendix B, Regulatory Administrative Provisions for Nuclear Plants Using RIM Program

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Overview of RG 1.246 Endorsement of ASME Section XI, Division 2, and Resolution of DG-1383 Public Comments

May 20, 2022

Steve Philpott, Project Manager / Acting Branch Chief
Advanced Reactor Technical Branch 2
Division of Advanced Reactors and Non-Power Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Background

- ASME issued Section XI, Division 2 “Requirements for Reliability and Integrity Management (RIM) Programs for Nuclear Power Plants” in the 2019 Edition of the BPV Code.
- ASME requested NRC endorsement in October 2019.
- NRC responded to ASME in August 2020 and formed a review working group.
- Staff working group reviewed Section XI, Division 2 for endorsement via regulatory guide for applicability to non-light water reactors (Non-LWRs).

RIM Review Summary

- Reviewed code and developed initial staff positions: Aug – Dec 2020
  - confirmed RIM is appropriate to endorse with conditions
- Developed staff positions and draft regulatory guide (DG-1383): Jan – Sep 2021
- Published DG-1383 in Sep 2021: 45-day public comment period
- Comment resolution and concurrence review:

  Nov 2021 – Apr 2022
- Publish Final RG: Jun 2022

RG 1.246 Structure

- Section A
  - Purpose
  - Applicability (Non-LWRs)
  - Applicable Regulations and Related Guidance
- Section B
  - Background
  - Bases for NRC Staff Positions
- Section C
  - Staff Regulatory Guidance (Conditions)

RG 1.246 Conditions

Condition 1: Applicants intending to use RIM should include a license condition / Identifies information to be included in their application

Condition 4: Changes to a RIM program and information to be provided to the NRC for review and approval / for information

Condition 10: RIM provisions “in the course of preparation” or otherwise under development

RG 1.246 Conditions

Additional conditions:

- Use with 2019 Edition of Section XI-Division 1
- Document how aspects of Section XI-Division 2 are considered
- ANDE-1 not approved for personnel Qualification
- Editions of supporting standards acceptable for use
- Justify acceptability of the PRA in RIM program
- Cannot override construction code NDE without approval

RG 1.246 Conditions

Additional conditions:

- Preservice inspections for repair and replacement
- Appendix V to be considered for low pressure applications
- Records retention to be IAW QA program requirements
- Stress relaxation to be considered as a degradation mechanism
- Liquid leak test clarifications and hold time limits
- Minor errata type corrections

DG-1383 Public Comments

- Received 8 distinct comment submissions
- Approximately 35 individual comments
- No additional or eliminated conditions
- Clarified applicability, information to be submitted for review, and other staff positions

DG-1383 Public Comments

- Change in Applicability: Multiple comments suggested that RG 1.246 should include applicability to LWR designs. For some LWR cooled / moderated advanced reactors, it would be difficult to implement Section XI, Division 1. RIM is intended to be technology neutral.
  - One commenter recommended rulemaking to amend 50.55(a).
  - Rulemaking is outside the scope of this RG

- Staff reviewed and is endorsing ASME BPV Code, Section XI, Division 2 only for use by non-LWRs.
  - 10 CFR 50.55a(g) mandates the use of the ASME BPV Code, Section XI, Division 1 for boiling and pressurized water-cooled reactors.

- Staff agrees that RIM was developed for any type of reactor design.
  - Added footnote in "Background" section in the RG:

"RIM was developed for any type of reactor design. However, 10 CFR 50.55a(g) mandates the use of the ASME Code, Section XI, Division 1 for boiling and pressurized reactors. If a boiling or pressurized water-cooled reactor licensee or applicant wishes to use RIM, they would need to request an exemption under 10 CFR 50.12 or 10 CFR 52.7 from 10 CFR 50.55a(g)."

DG-1383 Public Comments

Clarifications of Regulatory Guidance Positions

- Position 1
  - Listing of SSCs included in the scope of the RIM program rather than a summary of the bases for the scope
  - Description of the types of factors from RIM-2.5.1 used in the RIM strategies
  - Clarified justification for flaw evaluation acceptance criteria temperature limits to be consistent with the temperature limits of the applicant's construction code
- Positions 1 and 4
  - Removed the need to submit the NIS-2 form and removed references to the NIS-2
  - The term "refueling" outage was removed and changed to use the term "scheduled" outage to be consistent with Appendix B of ASME Code, Section XI, Division 2

DG-1383 Public Comments

Clarifications of Regulatory Guidance Positions

- Position 5
  - For use of ANSI/ASNTCP189 - added “including any conditions applied under 10 CFR 50.55a(b)(2)”
  - Added clarification for performance demonstration of NDE methods and techniques
    - Performance demonstration is beyond the scope of ANSI/ASNT CP189 and ANDE-1
    - Use Section XI, Division 1 Appendix VIII
- Additional clarification changes

Acronyms/Abbreviations

ANDE	ASME Non-destructive Examination
ANS	American Nuclear Society
ASME	American Society of Mechanical Engineers
ANSI/ASNT	American National Standards Institute / American Society for Nondestructive Testing
BPV	Boiler and Pressure Vessel
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
DG	Draft Guide / Draft Regulatory Guide
ISI	Inservice Inspection
LWR	Light Water Reactor
NDE	Non-destructive Examination
Non-LWR	Non-Light Water Reactor
MANDE	Monitoring and NDE
MANDEEP	Monitoring and NDE Expert Panel
PRA	Probabilistic Risk Assessment
PWR	Pressurized Water Reactor
RIM	Reliability and Integrity Management
RIMEP	RIM Expert Panel
SSCs	Structures, Systems, and Components