



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

January 24, 2017

MEMORANDUM TO: ACRS Members

FROM: Michael R. Snodderly, Senior Staff Engineer */RA/*  
Technical Support Branch, ACRS

SUBJECT: CERTIFIED MINUTES OF THE MEETING OF THE FUKUSHIMA  
SUBCOMMITTEE ON OCTOBER 19, 2016

The minutes for the subject meeting were certified on January 11, 2017, as the official record of the proceedings of that meeting. Copies of the certification letter and minutes are attached.

Attachment: As stated

cc w / Attachment: A. Veil  
M. Banks



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
WASHINGTON, DC 20555 - 0001**

MEMORANDUM TO: Michael Snodderly, Senior Staff Engineer  
Technical Support Branch  
Advisory Committee on Reactor Safeguards

FROM: John W. Stetkar, Chairman  
Fukushima Subcommittee  
Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ACRS FUKUSHIMA  
SUBCOMMITTEE ON OCTOBER 19, 2016, IN ROCKVILLE,  
MARYLAND

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting held on October 19, 2016, are an accurate record of the proceedings for that meeting.

**/RA/** **January 11, 2017**  
\_\_\_\_\_  
John W. Stetkar, Chairman  
Fukushima Subcommittee Date \_\_\_\_\_

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS  
MINUTES OF THE ACRS FUKUSHIMA SUBCOMMITTEE MEETING  
ON OCTOBER 19, 2016

The ACRS Fukushima Subcommittee held a meeting on October 19, 2016 in TWFN 2B1, 11545 Rockville Pike, Rockville, Maryland. The meeting convened at 8:31 a.m. and adjourned at 12:08 p.m.

The entire meeting was open to the public.

No written comments or requests for time to make oral statements were received from members of the public related to this meeting.

ATTENDEES

ACRS Members

John Stetkar, Chairman  
Ronald Ballinger, Member  
Dennis Bley, Member  
Charles Brown, Member  
Margaret Chu, Member  
Michael Corradini, Member  
Walter Kirchner, Member  
Jose March-Leuba, Member  
Dana Powers, Member  
Harold Ray, Member  
Joy Rempe, Member  
Peter Riccardella, Member  
Gordon Skillman, Member  
Matthew Sunseri, Member  
Steve Schultz, Consultant

NRC Staff

Mike Snodderly, Designated Federal Official  
Eric Bowman, NRR  
Mohamed Shams, NRR  
Mike Franovich, NRR  
CJ Fong, NRR  
Greg Bowman, NRR  
Steve Wyman, NRR  
Tim Reed, NRR  
Martin Stutzke, NRO  
Laura Gibson, NRR  
Robert Bernardo, NRR  
Shilp Vasavada, NRR

Other Attendees

Andrew Mauer, Nuclear Energy Institute (NEI)  
Greg Hardy, SGH

John Richards, EPRI  
 Doug True, Jensen Hughes  
 Barry Sloane, Jensen Hughes  
 Mike Tschiltz, NEI  
 Phil Amway, BWR Owners Group/Exelon  
 Jana Bergman, Curtiss-Wright

SUMMARY

The purpose of the meeting was to discuss draft Regulatory Guides 1.226, 1.227 and 1.228 in support of the mitigation of beyond design basis events rulemaking. The meeting focused primarily on Regulatory Guide 1.226 and Revision 3 to NEI 12-06. Revision 3 includes guidance for mitigation strategy assessments for the new seismic hazard information that applies to all plants where the ground motion response spectrum is greater than twice the safe shutdown earthquake within 1 to 10 hertz frequency range. Recent changes to Regulatory Guides 1.227 and 1.228 were also discussed. The meeting transcripts are attached and contain an accurate description of the matters discussed during the meeting. The presentation slides and handouts used during the meeting are attached to these transcripts.

SIGNIFICANT ISSUES	
Issue	Reference Pages in Transcript
1. M. Shams of NRR made an introductory statement.	9
2. Member Bley asked if the tallies of plants for each of the five seismic assessment alternatives are based on the licensees' intention or eligibility.	15
3. Member Riccardella asked about Path 3 that relies on Individual Plant Examination of External Events work to show two safe shutdown paths and whether the safe shutdown paths were consistent with a loss of AC power and loss of ultimate heat sink.	17
4. Revision 2 of NEI 12-06 states, "The spent fuel pool makeup capability and spent fuel pool level instrumentation equipment needed to accomplish this spent fuel pool cooling function should be evaluated." Chairman Stetkar questioned why spent fuel pool level instrumentation had been removed from the statement in Revision 3.	21
5. Member Bley asked about the core damage frequency range over which the risk-informed Path 5 may be performed and whether or not it was too narrow.	32
6. Chairman Stetkar asked about what exceedance frequency should be used when using the three possible ground accelerations of, "the 1e-4 Uniform Hazard Response Spectra (UHRS), the Ground Motion Response Spectra (GMRS) or the 1e-5 UHRS."	38
7. Chairman Stetkar asked about the "inherently rugged" screening criterion.	48

8. Member Bley asked about potential interactions between inherently rugged structures.	53
9. Chairman Stetkar asked about the statement, "Where other scenarios are more significant, enhancement to mitigating strategies Systems, Structures and Components will be less effective in reducing seismic risk." He also questioned if those other scenarios are more important to seismic risk than the normal ELAP/LUHS scenario, then why aren't we looking at mitigating strategies for those scenarios.	62
10. D. True discussed the stylized beyond-design-basis accident for evaluating FLEX equipment in relation to how the FLEX equipment is modeled in the seismic PRA developed in response to the request for a reevaluated seismic hazard. This discussion was in response to questions from various Members.	67
11. Chairman Stetkar pointed out that the main difference between reevaluated flooding and seismic evaluations is the existence of the seismic PRA.	73
12. Member Bley commented that it was counter intuitive to preclude plants with risk greater than a proposed threshold. He proposed that these should be the plants that ought to use the approach to reduce the risk at those sites.	82
13. Member Riccardella clarified with the presenters that licensees implementing the risk-informed Path 5 could credit FLEX equipment but did not have to.	94
14. Chairman Stetkar asked for further clarification concerning the statement in NEI 12-06: "The licensee may elect to maintain the seismic PRA; however, it is not necessary to maintain the seismic PRA model."	97
15. Member Corradini asked what was meant by the most limiting SCDF or SLERF controls approach. He also asked if the guidance used a best estimate or some sort of upper bound value.	103
16. E. Bowman began the discussion of the staff's draft regulatory guides in support of the draft final MBDBE rule. He began with RG 1.227 on spent fuel pool instrumentation.	105
17. Chairman Stetkar asked why in Revision 3 of NEI 12-06 the need to look at the level instrumentation was removed. Members Corradini and Remppe followed up with questions on the basis for instrumentation requirement.	107
18. Chairman Stetkar asked about the recommendation that the portable instrument channel component should be designed as hand-held devices, such as commercially available smartphones or similar rugged components.	111
19. Chairman Stetkar questioned why RG 1.226 does not sunset the interim staff guidance in JLD-ISG-2012-01.	121
20. Chairman Stetkar asked the staff to explain how the seismic PRAs being performed in response to NTTF Recommendation 2.1, the staff's evaluation of those PRAs with regard to Phase II regulatory decision making, the evaluations of seismic capability according to Appendix H of NEI 12-06, and Regulatory Guide 1.226 all fit together.	127
21. S. Schultz commented that the flow chart could be improved by including arrows to show the integration of the blue and green paths as described in COMSECY-15-0019.	138

22. Chairman Stetkar questioned how the interim staff guidance and draft regulatory guidance for FLEX equipment unavailability controls could be the same if the interim staff guidance is still out for public comment.	143
23. E. Bowman explained potential changes to the guidance to allow for the repositioning of FLEX equipment to reduce shutdown risk even though the equipment may be in an unprotected area.	151
24. Member Bley questioned whether the deterministic Path 5 should be allowed if the risk-informed Path 5 is more thorough.	154
25. Chairman Stetkar asked for public comments. There were no public comments.	159
26. Chairman Stetkar asked the subcommittee for final comments.	160
27. Chairman Stetkar adjourned the meeting.	167

ACTION ITEMS	
Action Items	Reference Pages in Transcript
1. E. Bowman mentioned the next scheduled meeting on the draft final rule and associated guidance on November 16, 2016.	148

Documents provided to the Subcommittee

- I. NEI, "Request for NRC Endorsement of NEI 12-06 Revision 3, 'Diverse and Flexible Coping Strategies (FLEX) Implementation Guide,'" September 22, 2016
- II. NEI, NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 3, September 22, 2016
- III. U.S. Nuclear Regulatory Commission, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-Ichi Accident," March 12, 2012 (ML12053A340).
- IV. U.S. Nuclear Regulatory Commission, COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," November 21, 2014 (ML14238A616).
- V. U.S. Nuclear Regulatory Commission, SRM-COMSECY-14-0037, "Staff Requirements – COMSECY-14-0037 – Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," March 30, 2015 (ML15089A236).
- VI. NRC, COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants," June 30, 2015 (ML15153A105)
- VII. NRC, COMSECY-15-0019, Enclosure 1, "Mitigating Strategies and Flooding Hazard Reevaluation Action Plan," June 30, 2015 (ML15153A110)

- VIII. NRC, SRM to COMSECY-15-0019, "Proposed Rule: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)," July 28, 2015 (ML15209A682)
- IX. NRC, Regulatory Guide 1.226, "Flexible Mitigation Strategies for Beyond-Design-Basis Events," Draft to Support ACRS Meeting, October 6, 2016 (ML16287A429)
- X. NRC, Regulatory Guide 1.227, "Wide-Range Spent Fuel Pool Level Instrumentation," Draft to Support ACRS Meeting, October 6, 2016 (ML16287A429)
- XI. NRC, Regulatory Guide 1.228, "Integrated Response Capabilities for Beyond-Design-Basis Events," Draft to Support ACRS Meeting, October 6, 2016 (ML16287A429)

**Official Transcript of Proceedings**  
**NUCLEAR REGULATORY COMMISSION**

Title:                   Advisory Committee on Reactor Safeguards  
                              (ACRS) Fukushima Subcommittee

Docket Number:       N/A

Location:               Rockville, Maryland

Date:                    October 19, 2016

Work Order No.:       NRC-2683

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

+ + + + +

FUKUSHIMA SUBCOMMITTEE

+ + + + +

WEDNESDAY,

OCTOBER 19, 2016

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., John W. Stetkar, Chairman, presiding.

SUBCOMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR., Member

MARGARET CHU, Member

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WALTER L. KIRCHNER, Member

JOSE A. MARCH-LEUBA, Member

DANA A. POWERS, Member

HAROLD B. RAY, Member

JOY REMPE, Member

PETER C. RICCARDELLA, Member

GORDON R. SKILLMAN, Member

MATTHEW W. SUNSERI, Member

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ACRS CONSULTANT:

STEPHEN SCHULTZ

DESIGNATED FEDERAL OFFICIAL:

MICHAEL SNODDERLY

ALSO PRESENT:

ERIC BOWMAN, NRR

MIKE FRANOVICH, NRR

CJ FONG, NRR

GREG HARDY, SGH\*

ANDREW MAUER, NEI

JOHN RICHARDS, EPRI

MOHAMED SHAMS, NRR

DOUG TRUE, Jensen Hughes

MIKE TSCHILTZ, NEI

\* Present via telephone

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

8:30 a.m.

CHAIRMAN STETKAR: The meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Fukushima. I'm John Stetkar, Chairman of the Subcommittee.

Members in attendance today are Ron Ballinger, Margaret Chu, Harold Ray, Dick Skillman, Matt Sunseri, Dennis Bley, Pete Riccardella, Jose March-Leuba, Walt Kirchner and Joy Rempe.

The purpose of -- and Charlie Brown and Dana Powers may be joining us. I know that he is somewhere here and of course, I have lost my place here.

We are also joined by our consultant, Dr. Steve Schultz. Hi, Steve.

The purpose of today's meeting is to discuss draft regulatory guides in support of the

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mitigation of beyond design basis events rulemaking. The majority of the meeting will focus on Revision 3 to NEI 12-06.

Revision 3 includes guidance for mitigation strategy assessments for the new seismic hazard information that applies to all plants where the ground motion response spectrum is greater than twice the safe shutdown earthquake within 1 to 10 hertz frequency range. And that was under development at the time NEI 12-06 Revision 2 was submitted for endorsement.

So in particular in NEI 12-06, we are going to focus almost all, if not all, of our discussion on Appendix H. So please keep that in mind.

Regulatory guides are -- or Regulatory Guide 1.226, which addresses the seismic and flooding reassessments and we will spend most of our time on the regulatory guides there.

I understand that the staff is also prepared to discuss Regulatory Guides 1.227 and 1.228, which are the companion regulatory guides, which will be issued with the rulemaking package. We will discuss the entire rulemaking package at our

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Subcommittee meeting in November. And I have forgotten the date, but it's -- you can look it up.

The meeting is open to the public. This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act Rules for the conduct of and participation in the meeting having been published in the Federal Register as part of the notice for this meeting.

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

Mr. Michael Snodderly is the designated federal official for this meeting.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register notice. Therefore, it is requested that all speakers first identify themselves and speak with sufficient clarity and volume, so that they can be readily heard.

I'll remind everyone to turn off your little communication devices. If you have a Samsung Note 7, please, take it out and submerge it.

Also, for anyone up at the front, please,

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make sure that your microphone is turned on, there is a little push thing at the base of it, when you are speaking and, please, keep it turned off when you are not speaking, because they are really, really sensitive and they pick up extraneous noise.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's meeting.

I understand there may be individuals on the bridge line who are listening in on today's proceedings. The bridge line will be closed, on mute, so that those individuals may be listen in -- may listen in. At the appropriate time, later in the meeting, we will have an opportunity for public comment from the bridge line and from members of the public. And I will open the bridge line, at that time.

We will now proceed with the meeting. And I'll call upon Mohamed Shams of the NRC staff for any introductory comments. Mohamed?

MR. SHAMS: Thank you, Mr. Chairman. Good morning. Good morning, everyone, distinguished Members of the Committee.

Mr. Stetkar captured the purpose of the

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meeting well for us, so we are here to talk about the guidance supporting the mitigating and -- Mitigation Beyond-Design-Basis Rules.

The industry will lead off with talking about Appendix H, which represents the guidance for the assessments of the mitigating strategies in relation to seismic. We will cover the regulatory guide that endorses, potentially would endorse, this guidance as well as the other guidance.

I just wanted to start by acknowledging the extraordinary efforts that the staff has put to get to here in implementing the Fukushima actions. As you recall, the Commission had directed us to follow-up on 12 recommendations from the NTF and this was one of them that the Mitigating Beyond-Design-Basis Rule was -- it accommodated a few recommendations.

So a lot has been done. We have made extensive progress or significant progress in the development of the rule package. We will be talking to the Committee about that in November.

So today is just looking at the guidance that is supporting the rule. So we look forward to your comments and insights on the topics that we are discussing with you today. Thank you.

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CHAIRMAN STETKAR: And I'll turn it over to whoever. Mike, you have it.

MR. TSCHILTZ: Good morning. I would just like to acknowledge the people that are up here with me. We started working on NEI 12-06, Appendix H, which deals with the seismic mitigating strategies, quite a while ago. And we started with the deterministic approaches, which are reflected in Path 1 through 4 of the guidance document.

And Greg Hardy, who is on the phone, I need to acknowledge him, because he will be available to answer any questions that come up and John Richards played a principal role in developing the deterministic approaches for evaluating mitigating strategies against the new hazards.

And then for Path 5, for the plants that are developing SPRAs, Barry Sloane, Andrew, Doug True and myself were the core team that were developing approaches that would, you know, take into consideration the information, the effort that was put into the development of the SPRAs and the insights that came out of that in development of mitigating strategies.

So you have the core team of people here

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that were involved, so we should be able to answer questions as they arise and I'll turn it over to Andrew to proceed with the presentation.

MR. MAUER: All right. Good morning, Mr. Chairman and Subcommittee Members. I'll just start with a little background this morning before we get into the presentation, some of which the Chairman mentioned in his opening remarks.

So back on September 22<sup>nd</sup>, we submitted Revision 3 to NEI 12-06 to the NRC staff for review and endorsement. And we understand that there is now a Draft Regulatory Guide that will be discussed later on this morning by the staff that reflects proposed endorsement of Revision 3 to NEI 12-06, so we will get into that separately.

Obviously, Appendix H, hotel, to NEI 12-06 includes the approach for mitigating strategy assessments for seismic. When we talked with the Subcommittee back on April 22<sup>nd</sup>, we went through what we referred to as the first four paths of Appendix H, hotel, which were developed and endorsed at the time.

And those paths addressed all the plants where the ground motion response spectra was below two times safe shutdown earthquake between 1 and 10 hertz.

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Those mitigating strategy assessments are underway, many have been submitted, many have been reviewed and the remainder will be submitted by August of 2017.

What we are here to talk about today is Path 5, which is the completion of Appendix H, hotel. That brings in the remainder of the fleet basically. So that's what our presentation will go through.

What I wanted to start with before we get into Path 5, going through it, was just to provide a little bit of perspective.

CHAIRMAN STETKAR: Andrew?

MR. MAUER: Yes, sir?

CHAIRMAN STETKAR: Let me fire a couple of warning shots over your bow, because when I reread Appendix H, I had some questions on Path 3 and Path 4 also. So I know you are prepared to discuss Path 5, because that's the primary focus of this, but -- and I'll make sure any Members if you have question on any of the other paths, because it's a lot easier when you have everything together to see how the bits and pieces fit together.

So be prepared, you might get some questions. Well, you will have some questions.

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MR. MAUER: I appreciate that. Do we still plan to go through Path 5 first?

CHAIRMAN STETKAR: Yes.

MR. MAUER: Is that what you are saying? Is that what we are doing?

CHAIRMAN STETKAR: It -- I would actually rather -- you don't have any material prepared on the other paths, so I think if we have questions on the other paths, as kind of an introduction, we should probably get those out of the way first, so that we don't jump back and forth, because they do sort of funnel into Path 5 eventually to some extent.

So give this one and then I'm going to open it up to questions on the other paths.

MR. MAUER: Okay. So just as a brief refresher for the different paths that we have, Path 1 through 5, they are defined from different relationships between the ground motion response spectra and the safe shutdown earthquake. I'm not going to go through those. You can see them on the slide here.

Obviously, the way the path -- the way that Appendix H is structured is such that you can always move, if you choose to, to the next path. You

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can go up. So if you are in Path 3, based on what you see there, you can go to Path 4 or you can even go to Path 5, if you have a seismic PRA and so forth. So it's structured that way.

And I note that because when we look at the number in the third column, that's what I have as the approximate number of sites following each path. So those are approximations just to give you some perspective.

MEMBER BLEY: Just a question about that.

MR. MAUER: Yes, sir?

MEMBER BLEY: Because of what you said just before it, is that based on what they have told you or is that based on their eligibility for Path 1, 2, 3, 4 and 5?

MR. MAUER: I'm just getting to that. Perfect. So there is --

(Laughter)

MR. MAUER: -- the numbers are based on a combination, essentially, of information that we have been provided and where we hadn't been provided information, it is based on where they fall in the middle column. So those are not hard numbers. I would say especially for the last two paths. It might

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be, you know, as we get Path 5 finalized, but I will tell you that for Paths 1 through 3, those are pretty good numbers in terms of what we are seeing and what we are expecting as of today. That's what we know today.

CHAIRMAN STETKAR: Andrew, I just want to make sure. I think I'm pretty sure now I know the answer to this one. In -- within Path 5, do you have any notion at all about how many plants will take each of the four options, if you will, within that path?

MR. MAUER: It -- I think that would probably just be speculation, at this point.

CHAIRMAN STETKAR: Okay.

MR. MAUER: Primarily. I would just add to that for a second. I say primarily, because we are still working through the seismic PRAs and that's a key part of the decision making there for the licensee. So we are still working through that.

CHAIRMAN STETKAR: Okay.

MR. MAUER: And we are still waiting for, you know, final endorsement of the product here.

CHAIRMAN STETKAR: I understand.

MR. MAUER: Yeah.

CHAIRMAN STETKAR: Understand. Thank you.

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MR. MAUER: Sure. All right. So is it my understanding that you would like to pause here?

CHAIRMAN STETKAR: It is. So I'll open it up to any of the Members who have any questions on Paths 1 through 4. I would like to get those out of the way before we then start the more detailed focus on Path 5.

MEMBER RICCARDELLA: Yeah, this is Pete Riccardella. I have a question on Path 3. With all the other paths I see the connection to the mitigating strategies. But with Path 3, you rely on the top or the former PRA work to -- or IPEEE work to show that you have two safe shutdown paths.

But what I don't see there, or maybe I just don't understand it, are those two safe shutdown paths consistent with a loss of AC power and loss of ultimate heat sink? Do they -- do any of -- do they assume that?

MR. RICHARDS: So what is happening in Path 3 is that the plants have previously evaluated the seismic capability of the plant.

CHAIRMAN STETKAR: John? Just for our recorder, take Greg's and turn it upside down, so that we know who you are and that you are not Greg.

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MR. RICHARDS: Yes, thank you. John Richards with EPRI. And --

CHAIRMAN STETKAR: I'm sorry.

MR. RICHARDS: -- Greg Hardy should be with us actually --

CHAIRMAN STETKAR: He should be with us.

MR. RICHARDS: -- on the phone out there--

CHAIRMAN STETKAR: He is out there somewhere.

MR. RICHARDS: -- in California. So in Path 3, plants are crediting the previous seismic evaluation that they have done to ground motions that exceed their GMRS. And they have essentially demonstrated that they have adequate capacity to shut down the plant to -- and in truth, in truth, they will maintain AC power as well as open a heat sink.

The FLEX strategy then is an additional defense-in-depth that is available.

CHAIRMAN STETKAR: Excuse me. According to this slide, I had several questions about the quality of the supporting IPEEE studies to support a Path 3 analysis. And we raised some of them in the previous Subcommittee meeting and we were told well, the staff had looked at them and were reasonably

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confident.

But when I probed a bit, they said well, yeah, some of them weren't quite as good as we would have liked and things like that.

I'm going to -- I plan to ask the staff about this. This is also a warning shot across the staff's bow. I think for the purposes of this discussion, since apparently only three sites have elected to take the Path 3 assessment, in the interest of time, I guess we will -- I will save my questions for the staff and let you focus on Path 5, from my perspective.

Anybody else have any questions on 1, 2, 3 or 4? Because as I said, I want to get those out of the way. If not, we are on Path 5.

MR. TRUE: Okay. This is Doug True from Jensen Hughes. I'll be taking you through the next batch of slides.

So just to set the stage on Path 5, the Path 5 plants are those that will be performing seismic PRAs as part of their response to Near Term Task Force recommendation 2.1. Those -- by the time they get to the mitigating strategy assessment, those periods will be completed. They will have been

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submitted to the NRC staff and there is a whole separate process for looking at the results of the seismic PRA and making decisions about whether there is a need for plant-specific backfit. That's outside of what is being done, separate from the mitigating strategies violation.

CHAIRMAN STETKAR: Doug, let me interrupt you just a second.

MR. TRUE: Yes.

CHAIRMAN STETKAR: Because I think this applies across the board and I missed it in my notes.

I noted when you made the change from Rev 2 to Rev 3 of the guidance and it appears first in the Path 3 discussion, but I'm assuming it applies elsewhere. You -- Rev 2 of the guidance regarding the evaluation of spent fuel pool cooling said something to the effect that licensees following this path need to ensure the credited spent fuel pool cooling capability is maintained.

The spent fuel pool makeup capability and spent fuel pool level instrumentation equipment needed to accomplish this spent fuel pool cooling function should be evaluated using the criteria in H-5, but H-5 has all of the spent fuel pool stuff in it.

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In Rev 3 you remove that little statement about spent fuel pool level instrumentation. So apparently, it doesn't need to be evaluated. Why is that?

MR. MAUER: So that's correct. In terms of -- there is two things going on here. One is based on the rulemaking progressing and some of the previous discussions that the Committee has had with the staff on that, there is a decoupling going on between the spent fuel pool level instrumentation order and Order 049.

So there is a decoupling going on there. In addition, if the strategies that are in place don't involve the level instrumentation to accomplish cooling, which there are other ways to provide makeup, you know, the level instrumentation doesn't necessarily do that. It wasn't -- it's not a part of the mitigating strategy assessment for this purpose.

CHAIRMAN STETKAR: Okay. I'm glad you said that on the record, because I'm going to have to really study this transcript to see what all that meant.

I don't care what the attorneys have done in terms of parsing things up. I care about whether

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an assessment of the plant's response to a seismic event accounts for a level instrumentation. And if it doesn't need to account for the level instrumentation, what is the technical justification for that? Anybody?

MR. TSCHILTZ: Well, I think --

CHAIRMAN STETKAR: Okay. I'll ask the staff because they have apparently read this stuff, too, if you don't want to answer.

MR. TSCHILTZ: No, I think we can answer it. I think that the strategies to maintain level and the pupil don't need to exclusively rely on that instrumentation that is provided. You know, I think--

CHAIRMAN STETKAR: Okay.

MR. TSCHILTZ: -- when you look at the loss of inventory in the spent fuel pool, it's not something that happens so quickly that people can't anticipate and respond to it using the temporary systems that are installed for mitigating strategies.

So I think there was a hard look taken at whether there was the extra effort needed to go through and do the analysis or additional modifications to that equipment based upon the impact on safety and the determination was it didn't need to

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be included in that.

CHAIRMAN STETKAR: Okay. Thank you. I'll ask the staff about it. Be prepared. I'm sorry, Doug. I should have asked it on the previous slide before you were on a roll.

MR. TRUE: No, I'm good. So the context, in essence, we have SPRAs that have been completed and submitted. And I think I'll just stop there for a second and say part of the challenge that we have had over the last couple of years working on Path 5 is that those PRAs aren't done and so we don't exactly know how all the plants are going to fall out.

So we have tried to create a process that has different paths that make different plants' situations and that's why Path 5 is actually, as you referred to earlier, comprised of a number of some paths or options that the utilities can go through.

CHAIRMAN STETKAR: Doug? As an introduction and I didn't look far enough ahead, but you said that the seismic PRAs aren't done and yet one of the options in Path 5 basically says well, if your peer reviewed seismic PRA shows a core damage frequency due to seismic events of less than  $5e^{-5}$  and a large release frequency of less -- e- --  $5e^{-6}$ .

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You just have to go out and look at the spent fuel pool because you probably didn't do that in your seismic PRA. That to me implies that that is already done, because it says that those are the PRAs that have been submitted.

MR. TRUE: At the time the Path 5 is actually used, which is going to be out, you know, a number of years from now --

CHAIRMAN STETKAR: Oh, okay.

MR. TRUE: -- seismic PRAs will be completed.

CHAIRMAN STETKAR: Okay. I thought -- I interpreted that as seismic PRAs in the context of IPEEE --

MR. TRUE: No, no, no.

CHAIRMAN STETKAR: -- submittals that --

MR. TRUE: No.

CHAIRMAN STETKAR: -- check off the box that said this is a seismic PRA. This is to be done yet.

MR. MAUER: Yeah. And just to sort of add, just under 2.1, we have a staggered schedule for submission of the seismic PRAs. They start in March of 2017 and they go through the end of 2019.

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CHAIRMAN STETKAR: And to be very clear, those are the seismic PRAs --

MR. MAUER: Yes.

CHAIRMAN STETKAR: -- that are referred to in Appendix H?

MR. MAUER: Correct.

MR. TRUE: Correct.

CHAIRMAN STETKAR: H-5.

MR. TRUE: Yes.

CHAIRMAN STETKAR: H --

MR. MAUER: 4.5.

CHAIRMAN STETKAR: -- 4.5.

MR. TRUE: Yeah, they will be done to the --

CHAIRMAN STETKAR: Thanks. That -- you have answered a few questions. Thank you.

MR. TRUE: Yes, they will be done to the modern standards, the SPID --

CHAIRMAN STETKAR: Yes, great.

MR. TRUE: -- and all the guidance that applies to the recommendation 2.1. Sorry.

CHAIRMAN STETKAR: Thank you.

MR. TRUE: Okay.

CHAIRMAN STETKAR: Thank you.

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MR. TRUE: So within Path 5, we have options for deterministic and risk-informed assessments. And even within the deterministic assessment, there is an option to just -- per -- do what Path 4 involves which is strictly deterministically demonstrating that mitigating strategies capability.

But there is also a sub-option in that path that allows the plant to use results and insights from the plant-specific seismic PRA that we will have just completed.

The risk-informed assessments, both the one that is part of the deterministic path and the one that is just strictly risk-informed take advantage of those insights to look at how to address the impacts of the new seismic hazard for that plant.

And the -- so the idea is that the plant has spent a lot of money understanding the safety profile of the plant through the seismic PRA. We want to use that seismic PRA to help us -- help guide us to the smartest and the best ways to address the seismic hazard.

And as you already covered this, spent fuel pool assessment is not generally part of the

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seismic PRA. And so those plants -- every plant that has a seismic PRA also has to do with separate spent fuel pool evaluation.

So going into this, we -- I thought it would be useful to sort of say let's talk about just the basis for plant safety. So by the time we get to be applying Appendix H, the Path 5 plants will have completed their seismic PRAs and submitted those to the NRC for review.

There is a decision making process called the Phase II part of the Near Term Task Force Recommendation 2.1, then local safety enhancements and the potential for a plant-specific backfit on those -- based on those results.

So NRC will have already sort of come through or be in parallel coming to a conclusion about the overall safety of the plant.

I also pulled a statement out of the Safety/Risk Assessment Report for generic issue 199 that ties back the staff position on the new seismic hazards to the seismic core damage frequency at  $10^{-4}$ . And you will see that show up in the guidance, just so you understand kind of where we came into this.

We think the seismic PRAs provide a very

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valuable tool to confirm that the plant is safe and provide insights on what the key contributors are to that plant-specific result. And we are trying to focus the plant on the most risk significant to introduce the seismic safety and not just kind of blending going down this path.

So I imagine we will spend a few minutes on this slide. I wanted to -- I figured I would just get it out of the way. This is not from the guidance.

In fact, the staff hasn't seen it until we had submitted the slides. But the idea behind this is as we go into Path 5 -- well, first of all, we are going to use both seismic core damage frequency and seismic LERF.

A lot of times we have sort of given LERF less attention. It turns out in the seismic PRAs we are finding that there are some plants where LERF is a much more controlling contributor and so we are bringing that balance into the process.

And so I referred back to that  $10^{-4}$  core-- seismic core damage frequency level, so any plant with a seismic core damage frequency greater than  $10^{-4}$  or seismic LERF greater than  $10^{-5}$ , although the only option is to do deterministic compliance, demonstrate

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that there are mitigating strategies implementation to meet the new seismic hazard.

As we move down in this level back into the regime of more acceptable risk, they -- the two options are presented for deterministic and the risk-informed path. And then as you pointed out, John, the -- once you get down below  $5 \times 10^{-5}$  or  $5 \times 10^{-6}$  LERF, there is -- all you have to do is the spent fuel pool evaluation.

You might ask where did the 5 minus 6 come from and 5 minus 5. You might ask that. And I think the context of this is, look, we have already demonstrated the plants are safe for doing the seismic PRA. We want to focus our efforts on the plants that have the greatest opportunity for seismic benefits from mitigating strategies.

As the risk levels will go down, the amount of benefit you are going to get is reducing. And so we want the focus to be on those plants that fall in this category so that the resources industry and the staff resources are focused on the plants without the greatest opportunity to influence safety by enhancing mitigating strategies.

CHAIRMAN STETKAR: Now, Doug, in -- I like

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this picture, because I had to do the same thing myself. In this context, just to make sure I understand, when you talk about these absolute or relative risk levels,  $10^{-4}$ ,  $5 \times 10^{-5}$ , if I characterize those as absolute risk from seismic --

MR. TRUE: Um-hum.

CHAIRMAN STETKAR: -- events. Is that the risk from a full scope seismic PRA that considers the full spectrum of ground motions from -- you have peak ground acceleration of .001G up to 2 or 3G for their associated frequencies?

MR. TRUE: Yes.

CHAIRMAN STETKAR: It is.

MR. TRUE: Full of -- full spectrum of the seismic event.

CHAIRMAN STETKAR: Full spectrum. Okay. Because --

MR. TRUE: And John -- I'll let John chime in because he was one of the authors of the SPID, which defined all the requirements for the seismic PRA.

CHAIRMAN STETKAR: We had a briefing on the SPID a long time ago actually. It was a long time ago. I would have to look at my notes on it. Because

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it is a little bit relevant, I need to understand, and I don't know whether you are going to get into it, and I'll call these options rather than paths.

On 4.5.2 where you are doing the logical equivalent of a Path 4 --

MR. TRUE: Um-hum.

CHAIRMAN STETKAR: -- type assessment --

MR. TRUE: Right.

CHAIRMAN STETKAR: -- but for the greater than twice say shutdown earthquake --

MR. TRUE: Right.

CHAIRMAN STETKAR: -- ground motion, are you going to -- I know you are --

MR. TRUE: I'm going to walk through this.

CHAIRMAN STETKAR: Okay. Okay. I'll wait. I'll wait at that time. I mean, this slide is somewhat relevant, because I wanted to talk about exceedance frequencies, but I'll wait for the -- to get into that context then.

MR. TRUE: Okay.

MEMBER BLEY: Before you go on --

MR. TRUE: Yes?

MEMBER BLEY: This just begs the question, I mean, the range over which you can do the risk-

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informed path is only a factor of 2. It's pretty narrow. Either you do deterministic or you don't have -- do anything or if you are in this little bitty band, you can do both. It seems odd to me. Is there a footnote that's into something that has got such a narrow band.

MR. TSCHILTZ: Great. Anything that --

CHAIRMAN STETKAR: If you use the mouse actually --

MR. TSCHILTZ: Path 5 allows you to go -- I mean, you are not bound into this  $5e^{-5}$ ,  $5e^{-6}$  to use Path 5, that's just your initial value to look at where you fall into the spectrum, where you go down, which path you go down. So you are not limited. And I think Doug will get into that when he explains the flow chart on the next slide.

MEMBER BLEY: Okay. I'll wait.

MR. TSCHILTZ: But I want to challenge that a little bit. I mean, I think that turns to its factor 2, but it is actually half of the objective, right? So it's a big chunk of the risk that -- and it's the greatest part of the risk that we are focusing on. So it's a  $5^{-5}$  chunk of risk, which anybody would say is a big chunk of risk that we are

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focused on. And between  $5^{-5}$  and 5 minus -- or  $1^{-4}$ .

MEMBER BLEY: Uncertain does come to mind.

(Laughter)

CHAIRMAN STETKAR: There is -- that word would come to mind. You are uncertain plus or minus a factor of 10. When I looked at it, I had the same question and I kind of resolved it in my personal mind by the fact that the analyses below that  $10^{-5}$  are risk-informed also. They are doing a full scope. That's why I asked them about the scope of the PRA that they are submitting and whether it is a full scope --

MEMBER BLEY: No. In fact, when you did the PRA you left it --

CHAIRMAN STETKAR: Yes.

MEMBER BLEY: Yes.

CHAIRMAN STETKAR: And that if, indeed, the full scope PRA shows your risk is below  $5^{-5}$ , you use that by saying you don't need to look at any potential enhancements to equipment, that it is, in effect, small enough.

So in a sense, I look at everything below the  $10^{-4}$ ,  $10^{-5}$  line as kind of a risk-informed approach, which that's the only way I could get out of that factor, that factor of 2.

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MEMBER BLEY: Right. It just smells like very few people will use the middle piece, but I don't know.

MR. TRUE: We don't have enough results to be able to -- I know we are -- there are some plants that are in that category now as they are in process and you go through successive --

CHAIRMAN STETKAR: The sense I get reading things is that they are mostly in on the LERF side of things, because the conditional containment failure probability looks like 1.

MR. TRUE: I would say there are more from LERF.

CHAIRMAN STETKAR: Yes.

MR. TRUE: But there are -- in fact, there are some that are in --

CHAIRMAN STETKAR: Even in core damage?

MR. TRUE: -- apparently in for the CDF as well.

CHAIRMAN STETKAR: Okay.

MR. TRUE: I mean, those are still -- those numbers are still moving, so just because more analysis is being done.

MR. SCHULTZ: And, Doug, the uncertainty

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was brought up, so in terms of the breakdown that you are describing, those plants that are affected by the LERF results versus those that are concerned with core damage, how does uncertainty affect that in terms of causing an evaluation to fall into the LERF category?

MR. TRUE: I'm not sure I know exactly how to answer that, other than as part of going through the seismic PRA in the peer review, there are requirements to look at the uncertainties, understand, and characterize those as part of what is being reported to the NRC as part of the standard and part of what we would always do and do in the seismic PRA.

MR. SCHULTZ: Does the consideration of -- I mean, you can look at mean value associated with each of the analysis.

MR. TRUE: Um-hum.

MR. SCHULTZ: And you can look at the effect of uncertainty in the evaluation and see whether it changes the result that you are getting in terms of which bucket you fall into. Is uncertainty driving the risk that is associated with regard to LERF?

MR. TRUE: Is it driving it? I don't think so. I think that the mechanisms that are

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leading to the -- to LERF values in that range are things that have been pretty well-studied by the staff and the industry over the years. So I don't think there are large uncertainties there, but certainly there are uncertainties in the LERF.

MR. SCHULTZ: Okay. That's what I was looking for. Thank you.

MR. TRUE: Yeah. You want to say something? Okay. I'll forge ahead. I'm going to walk through this diagram and I'm going to do it by breaking it into pieces, so that we can focus on parts.

The front end didn't indicate that this was the case, because I hit all this, but I think it is the best way to try and walk through this. I sat down to make the presentation and I'm like we are going to die. But I hope it will make us focus.

Okay. So let's start with the deterministic path. I think this will be pretty straight forward. It is basically the plant -- you start with your seismic PRA result. The plant can choose, based on the work they have done on their seismic PRA, whether they would like to go on a deterministic path or a risk-informed, fully risk-

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informed path.

And if they choose this first kind of bluish/purple path, then they are basically applying Path 4 to their Path 5 plant. So it's a simple term.

You can, you know, look at it. They are going to show that the mitigating strategies system structure and components have a HICLIF C10 that exceeds the GMRS for that particular site.

CHAIRMAN STETKAR: Now --

MR. TRUE: And then they move on to the spent fuel pool assessment.

CHAIRMAN STETKAR: -- here I am going to ask you about the frequency, Doug, because in the guidance for this option or this path, whatever you want to call it, 4.5.2, I understand that you are evaluating the, I'll call it, C10 percent capacity. The equipment has sufficient capacity such that there is less than 10 percent probability of its failure at the assessed reevaluated seismic hazard, right?

MR. TRUE: Um-hum.

CHAIRMAN STETKAR: Okay. I've got that.

MR. TRUE: Right.

CHAIRMAN STETKAR: In the guidance it says plants using this path will use the ISRS from

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structural dynamic analyses based on the MSSHI based on a reference earthquake. It's a lot of acronyms, but we will get to that. And then in parentheses it says "typically the  $1e^{-4}$  UHRS, the GMRS or the  $1e^{-5}$  UHRS."

So my question is in these analyses, the MSSHI, I think that's the reevaluated seismic hazard, at what exceedance frequency are people evaluating that hazard? Because the exceedance frequency affects my overall risk information and it affects the ruggedness or the capacity of my equipment to have that C10.

I mean, I fix, you know, an acceleration, but that acceleration must be associated with a particular exceedance frequency. And this parenthetical expression seems to tell me that it is somewhere kind of in a range of a factor of 10 or so.

A factor of 10 is a lot bigger than factors of 2. So what are people using?

MR. TRUE: Right. We will let John answer this.

MR. RICHARDS: Yeah, so this is John Richards with EPRI. I'll take my shot at this answer and then hopefully if Greg Hardy is out there, on the

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phone, can chime in also. So --

MR. HARDY: I'll come on whenever you want.

MR. RICHARDS: Thank you. Perfect. What is happening in there is that the people in this path are typically doing seismic PRAs, so they have updated calculations for instructor spectra that they needed to do for their seismic PRA. When they do that, they are choosing an input level and you have several input levels that are identified there:  $10^{-4}$ ,  $10^{-5}$  as well as the possibility of the GMRS.

What is key in the middle of all those calculations for a PRA is the shape, the response spectra shape of the input motion. And those are, all three of those, relatively the similar shape, although they do have different amplitudes.

By the time you run that through the billing analysis and come up with a fragility estimate for that, you are effectively ending up with almost like a margin assessment between the capacity of equipment and the input level.

The input level actually gets divided out and so when you end up with a meeting capacity for the item, it is somewhat independent of the specific input

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level that you choose, because it comes back out in the equations.

So in this case what it is saying is you estimate your -- calculate your fragility and offer that fragility curve you can back up to your C10 capacity. And you are back, in this case, at a deterministic evaluation to prove that you have got a capacity that equals the C10 demand, the GMRS demand. That's the essence of it.

Now, Greg, go ahead and you can really fill in the math beyond all that.

MR. HARDY: No, I think you did a good job. I guess the guidance I would give --

CHAIRMAN STETKAR: Greg? Just for the record, say your name.

MR. HARDY: Sorry. Greg Hardy. I'm with SCH and a consultant with EPRI and NEI on this topic.

CHAIRMAN STETKAR: Thank you.

MR. HARDY: The guidance we put in there really is to make sure that the users use it properly and it's not specifically for this purpose. It's really for the whole FDRA. So what we find is that particular shape of the curve whether it is  $10^{-4}$  or  $10^{-5}$  or something in between, like the GMRS, you are trying

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to shoot for something that is at about the mid-range of where your risk is kind of dominated.

So you don't know that until the end of the PRA and you have got to end up choosing. And there are processes we put forward to do that. But as John said, what you find as you plot the GMRS,  $10^{-4}$ ,  $10^{-5}$  for these plants, fortunately, they are all pretty much similar shapes, so they are scalable. In which case, if you are off and indeed you didn't choose the midpoint of where your risk kind of contributes from these different earthquake levels, it is not far off at all.

The only reason you choose a correct at that level is it makes a difference in any nonlinearities which may be something like concrete cracking, which affects your structure response. So it is not like a margin assessment where you are choosing a  $10^{-4}$ ,  $10^{-5}$  that has a big difference.

You are exactly right, John Stetkar. You are not trying to show you are exceeding the capacity exceeds that demand. This is just to give you your input at which you are going to get your structure response. It tells you how much structural cracking there is, how much damping there is, such that you

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have equal risk above and below it, so you kind of split the difference in that particular non-linearity.

CHAIRMAN STETKAR: Greg, I guess I think I hear what you are saying. I certainly know how it is done if I'm going to do a full scope risk assessment.

That's not -- but what I'm questioning now is this is the so-called deterministic path. I'm selecting some ground motion and asserting that all of my, I need to be careful about using the terms, mitigating strategies, SSCs have capacities such that there is less than 10 percent chance of failure at that particular ground motion.

And you were using an awful lot of terms like sort of average of the seismic risk and all of those things. This is not a risk analysis. This is like my Path 4 evaluation that didn't have any notion of exceedance frequencies or anything.

MR. RICHARDS: This is John Richards again. The acceptance threshold is identical to Path 4. C10 capacity has to be above GMRS.

CHAIRMAN STETKAR: But in Path 4, I know that my GMRS is within a factor of 2 of my current safe shutdown earthquake, so that in terms of ranges of uncertainty or exceedance frequencies, I'm pretty

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well constrained on that Path 4.

MR. RICHARDS: Yes.

CHAIRMAN STETKAR: Here I'm not constrained. All I know is it's greater than a factor of 2.

MR. RICHARDS: Yes. But it's --

CHAIRMAN STETKAR: It could be --

MR. RICHARDS: -- while I have --

CHAIRMAN STETKAR: So if I had -- well, let me put it this way. If I had a  $10^{-7}$  exceedance frequency of like 2G, I couldn't get any of my stuff to have -- very little of my stuff, if any, to have a 10 percent chance of -- less than 10 percent chance of failure of that acceleration.

MR. RICHARDS: Um-hum.

CHAIRMAN STETKAR: So there has to be some frequency information, exceedance frequency information being used here, in my mind, unless I'm not understanding the process.

As I said, I understand how it is done if I'm going to do any of the other options, H3., you know, 453, 454, 455.

MR. HARDY: Let me take a shot at that and maybe this will help. If you can picture, and I'm

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sorry I'm not there to draw one, but if you can picture a fragility curve --

CHAIRMAN STETKAR: Yep.

MR. HARDY: -- in this case, a plant level fragility curve.

CHAIRMAN STETKAR: Any fragility curve though?

MR. HARDY: Any fragility curve.

CHAIRMAN STETKAR: Because we are looking at SSCs here not the plant.

MR. HARDY: Fair enough. So any fragility curve. But the process that we are using is a review of all of the whole hazard and the whole capacity of these particular SSCs. And it's similar to developing a full fragility. What we are doing really is -- if you -- you know, we use the term HICLIF, which is a 1 percent probability on that, you know, combined curve, you can pick off that particular 1 percent probability of failure.

You can pick off any percent probability of failure off that fragility curve for that component, but when you generate that fragility, you are not looking at one specific area of the hazard. That fragility incorporates all the hazards. So it's

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a shape that you pick that, as I say in a PRA, is based on where this risk is dominated and that's how we would generate fragility for everything in a PRA.

When you pull down and generate what that C10 percent probability of failure is, it's on your fragility curve, which indeed should be based on, as I, you know, it's nothing different than you do in the PRAs.

CHAIRMAN STETKAR: And they should be based on is what I'm trying to make sure that people who are doing this understand.

MR. HARDY: Yes, right.

MEMBER BLEY: And just something that might help. If you are doing different components, each one of which has a different fragility curve, C10 will occur at different accelerations.

MR. HARDY: That's exactly right. That's exactly right, it will.

MEMBER BLEY: Yeah, and I think that's --

MR. RICHARDS: They will.

MEMBER BLEY: -- the crux of this thing.

MR. RICHARDS: But what this has -- if you -- you can consider the C10 capacity almost like an allowable that has to be compared deterministically to

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your GMRS.

CHAIRMAN STETKAR: Well, but this says do all mitigating strategy SSCs. That, to me, implies individual -- I have a box of SSCs and for each SSC in that box I have, in principal, a different fragility curve.

MEMBER BLEY: And a different C10.

CHAIRMAN STETKAR: And a different C10, correct?

MEMBER BLEY: Right, yeah.

CHAIRMAN STETKAR: And that all of those have to be -- all of the C -- well, the worst of the C10s --

(Simultaneous speaking.)

MR. RICHARDS: The worst of the C10s or the so-called --

CHAIRMAN STETKAR: -- has to meeting the criteria.

MEMBER BLEY: Yes.

MR. RICHARDS: Just like the Path 4 threshold.

CHAIRMAN STETKAR: Yes, okay.

MR. RICHARDS: Identical. The tools you use to get there are a little different because you

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have a full PRA instructor prompt response record calculations available. You have those smarter more detailed tools, but you are essentially getting down to an allowable deterministic allowable.

CHAIRMAN STETKAR: Got it. I mean the things that you said orally didn't necessarily come out of my reading of the words in the guidance, so I wanted to try to probe to see a little bit that the people actually doing this work that the list of how many people you had up there taking a Path 5 approach or perhaps a Path 4 that morphs into a Path 5 that get into the so-called deterministic, either strictly a Path 4 or a 4.5.2 deterministic approach are evaluating those fragilities looking at that full spectrum of the hazard.

And then looking at the most limiting of those C10 capacities to make that determination you have highlighted here that everything is okay according to 4.5.2.

MR. RICHARDS: Correct.

CHAIRMAN STETKAR: Okay. Thank you.  
Thanks, Greg.

MR. HARDY: Sure.

MR. TRUE: Okay. So the path that is

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shown here is a path where the plant did demonstrate that all mitigating strategies SSCs had a C10 value greater than GMRS.

The path, the next path focuses on a case where there are one or more SSCs that don't meet that C10 exceeding the GMRS. And one of the options there is to update the FLEX strategies or establish FLEX strategies that do meet that. So you can go back and fix the components, demonstrate that they exceed the-- the C10 exceeds the GMRS. And you basically moved yourself back to the left hand path and you are back to doing the spent fuel pool evaluation.

So that's just basically deterministically modifying the mitigating strategies approach from the plants to bring it all into conformance with that.

CHAIRMAN STETKAR: Doug, this is probably a bit for Greg also. There is a lot of discussion about the fact on this path that I don't need to look at SSCs that are "inherently rugged." And it is stated, essentially, that everybody knows an inherently rugged SSC because people have screened those out for a long time.

Well, you know, I haven't screened them out for a long time. I typically will say that they

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fail at the highest acceleration on my input hazard spectrum. So -- and at some times they -- you know, failures of robust structures, let's say, are visible contributors to the risk.

So and there is -- they are kind of examples of what people consider to be inherently rugged SSCs. How do I know that an inherently rugged -- I design my SSCs at my site, whether it's a building or an anchorage of a particular equipment or a support for a piping system according to my nominal design basis, seismic acceleration. I don't design my plant down under, what's called, South Texas to look like Diablo Canyon.

So what is inherently rugged kind of depends on where you are and how much margin you have built into particular equipment above your nominal design basis seismic accelerations.

What we know here going in is that, or at least all I know from the guidance, my reevaluated seismic hazard is at least twice or more than twice my design basis hazard. So how do I know that that equipment that I designed and installed based on my nominal design basis hazard is now inherently rugged relative to my reevaluated hazard, such that I don't

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need to look at it? It's so much rugged that it's -- well, it's capacity is so far above that I don't even need to look at whether there is a 10 percent chance of it failing.

MR. RICHARDS: Okay.

MR. HARDY: I'll take a shot at it unless you want to, John.

MR. RICHARDS: Go ahead, Greg.

MR. HARDY: All right. So inherently, the word inherently is meant to imply exactly that and, John Stetkar, you're exactly right. If something is a function of the seismic design level that a low seismic design plant would have a different component than a high seismic design plant, then you are exactly right.

These components though even for facilities, non-nuclear facilities where there is no seismic design, perform very well in real earthquakes.

So I'm talking earthquakes, huge earthquakes in Japan, etcetera. And so we have done this Seismic Qualification Utility Group that John and I are part of follow those earthquakes and these are the elements that fall out of there that basically we use the word inherently, because without any seismic design, the

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design of this component is governed by something like pressure or whatever it is, it is so rugged that even in these non-nuclear facilities that have similar components, we see no failures.

So that's where we decided it doesn't pay to spend a lot of money to go through that, since it is kind of -- we have never -- we don't see problems in any of these earthquake results, even when there is no seismic design for these components. And that we have done the study to co-similarity and that kind of thing over the years.

We have a whole program in place. Now, there aren't that many components in that list that are inherently rugged because of exactly the reason you stated. Now, when you follow the components that actually change because of the design level of a particular site, then you find, indeed, you cannot make that statement on the inherently rugged.

CHAIRMAN STETKAR: How do -- Greg, again, I'm trying to read past the guidance in NEI 12-06. Think about how people will actually apply this guidance. Everything I hear orally sounds good. It says you have got to be really careful. You need to look at your plant. All that kind of stuff.

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It's really easy for people to say well, NEI told me that I didn't need to look at motor operated valves.

MR. TRUE: That don't change state.

CHAIRMAN STETKAR: That don't change state.

MR. TRUE: Yes.

MR. RICHARDS: It's not just -- you know, it's not actually NEI. You go all the way back to EPRI NP 6041, which is the margin stuff and other guidance. So there is a long history, but just understand there are things. There is a few thresholds I think you are talking about. You're talking about some things that are pretty good, but maybe not inherently good.

And those are things that would be included in an SPRA model. These are the kind of things that really are -- they don't -- they are so rugged that you don't even put them in the model.

CHAIRMAN STETKAR: That's exactly my point is you don't put them in the model, but I have in seismic models that I have developed, for example. And occasionally I have found those things showing up. Not necessarily big, but showing up.

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There was one seismic study done once about 35 years ago that showed interactions between two seismically robust buildings were important, buildings banging against one another. People typically don't put those buildings in their models traditionally. This study happened to put them in there and discovered something.

MEMBER BLEY: I don't see anything in the guidance that brings you to a point where you would pick that up. I'm familiar with the one you are talking about. But the seismic walk-down identified, this was an unusual construction and we ought to look at it. It -- there is nothing here that hints that there might be some unusual positioning of these things that would set UTs, although these are inherently rugged, we have put this one in a spot that it is going to get different excitation than it normally would.

So there is nothing here telling us to be careful about that sort of thing, that I see. I might be wrong.

MR. RICHARDS: I would say that these plants are getting seismic PRAs. They are getting those reviews already separately under NTTF 2.1. So

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if there is some funny, I mean, situation --

MEMBER BLEY: But you just said --

MR. RICHARDS: -- at the plant --

MEMBER BLEY: -- the seismic -- we don't put these in seismic PRA models. And the thing I was raising is normally you might not, but there might be cases where you ought to. And that ought to be somewhere in guidance to make sure people are looking for it.

MR. RICHARDS: Fair enough.

MEMBER BLEY: We never --

MR. RICHARDS: The seismic PRA does -- when you implement a seismic PRA, you do have to do a walk-down. And you do have to look for ought conditions. The PRA Team needs to do that themselves. The Peer Review Team actually does a walk-through also. And they study the walk-down conclusions. So that's a whole separate effort that is going on.

The kind of things that are listed here though welded piping and manual valves, they are very, very rugged components and to -- and they are not typically put into the PRAs. They tend to pollute it because you get so many calculuses that are pointless because the fragilities are -- they are so rugged that

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you are wasting time on them.

MR. RICHARDS: We --

CHAIRMAN STETKAR: We used to never quantify the risk from shutdown mode, because everybody knew it was completely important, so nobody put shutdown modes in their PRAs, because everybody knew it was not important until people started to put them in and then suddenly then we knew it was important.

Have carte blanche guidance that just says if you have something that is in a particular box, you don't need to put it in your PRA because nobody has ever put that in the PRA before without doing some -- without having guidance that says you better take a good strong look at these particular pieces of equipment.

And I would look at stuff that is excluded cart blanche from my PRA much more carefully than the stuff that is in there. I have some confidence that what is in there is being evaluated and it falls out as it falls out.

I would really have guidance that says well, if you are going to exclude something, not put it in there at all, you really need to have good

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justification. Not just words in some NEI guidance that nobody ever puts this stuff in their PRA, so it's okay.

And I think that is what Dennis was asking about, do the -- does the walk-down guidance tell you to look specifically at that rugged stuff to confirm that it ought not to be included in the PRA? I don't think so. I think that it just says well, you don't need to look at inherently rugged stuff. You need to look at things that are susceptible to seismic 2/1. You need to look at anchorages of your safety-related equipment, things like that.

MR. HARDY: So this is Greg, Greg Hardy again. I'll take one more shot at it, John.

If you think back to all the PRAs that have been associated with the seismic, which is back to the days we worked together, we never included some elements that we would call inherently rugged and that would include something like a check valve. We never walked it down. We never even looked for each one and listed it on the SEL. And why is that?

Because, as I said, we have many, many of those and non-nuclear facilities have undergone very high-level earthquakes and never had a problem. So

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the idea that there is a failure mode that was missed somehow, we don't believe that there really is one, short of a building collapse, something like that, which is modeled in the PRA and then everything goes.

So I guess it is, to me, maybe a level of what you consider to be in this inherently rugged category. And it should not be, as you say, what has been modeled in past PRAs. It should be what you can justify and what has inherent ruggedness and we don't think will eventually show up.

CHAIRMAN STETKAR: Greg, that's -- you are right. In the past what has typically -- has often been done, let's just -- I don't say typically, that's a bad word. The ones I'm most familiar with often had -- you looked at fragilities of things that were explicitly evaluated. And then we finally -- and did that, informed our subdivision of the seismic hazard according to that, so that we captured the range of the hazard over the range of the fragilities.

And then we usually had an end seismic hazard then with an exceedance frequency of X, pretty low, pretty high seismic acceleration where we failed everything. It was a really bad day in the plant. It was core damage and large early release. And that's

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the way, at least in the past and this is years and years ago, we got around this notion of not having to do explicit fragility evaluations for these so-called rugged pieces of equipment.

As long as that type of notion is being included in the seismic PRAs, because again we are doing screening based on absolute risk levels now and personally I could live with that. But I would really like to also make sure that the walk-down guidance, which I don't know if we have seen, emphasizes to the people that if you are going to screen something out as inherently rugged, you had better have taken a look at it to justify that.

MEMBER SKILLMAN: John, I would like to -- this is Dick Skillman. I would like to offer a comment here. I recognize that there is equipment that can be classified as rugged. What this guidance does not recognize, and I'm not sure that it needs to, but strainers, check valves, MOVs and AOVs that were procured by the NSSS vendors years and years ago at the time Reg Guide 1.29, 1.60, 1.48 and 1.61 were promulgated were figured to some seismic level.

And so one of the reasons this equipment is as rugged as it is is it was designed, built, in

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some cases tested to seismic levels that would let it be classified as rugged today. And so a walk-down wouldn't recognize that. But those who had been around for many years or who were part of the construction, the design construction team could actually produce documentation that showed that these components are rugged based on their procurement specifications.

And so there is hiding within this probably some conservatism that is not easily recognized, but it's in the documentation. A lot of this equipment was procured seismic, although the people who did that are, in many cases, long gone.

MR. RICHARDS: This is John Richards. What I would say, and Greg alluded to this, is that for the limited number of things that are here, real earthquake performance in commercial facilities where this is not seismically designed and not procured with any seismic requirements shows that these things don't fail.

You know, things like welded piping, you can go through commercial facilities that have experienced big earthquakes and the piping is holding up things that are starting to collapse. You know,

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the welded piping, you know, is very, very rugged.

So the limited number of things that are on this list are the kind of things that have demonstrated very, very high seismic capacity and seismic performance. And so I do think that paying too much -- pay an inordinate amount of attention to the things that have this kind of performance history tends to take away from paying attention to the things that do fail, to the things that do control the response of the facility, to the things that do contribute to potential core melt frequencies or, in this case, possible areas that might not achieve a C10 capacity.

MR. TRUE: Okay. So we'll move to the next path. So the first of these orange paths, I guess, is still a deterministic-based path in that it focuses on mitigating strategies SSCs, but then a lot of them use the seismic PRA to determine -- to help guide where the significant changes in risk could be accomplished by making components more robust.

One note I should say, a couple of things. First, no one is in the first box, which this obviously doesn't apply if the core damage frequency is above  $10^{-4}$  or seismic order is above  $10^{-5}$ .

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Another thing is that in order to follow this path, the mitigating strategies SSCs would have to be modeled explicitly in the seismic PRA. So that would include modeling of your FLEX equipment, the FLEX structure, evaluation of the -- all paths, all that -- those things would have to be in the seismic PRA in order to be able to use this orange path.

And the focus here is to look at the results of the seismic PRA and to identify planned changes that can bring the risk down to the point where any residual difference between the risk of the plant and the C10 level is small. And we will talk about that, the whole notion a little bit later over the graph that describes the comparison of the risk results to the C10 results.

CHAIRMAN STETKAR: I don't know what is the best time to ask it, so I'll ask it now.

In the Section H.4.5.4 that describes this approach, there is a paragraph that gave me pause and it says "Since ELAP/LUHS scenarios are the focus of the mitigating strategies and are significant contributors to seismic risk, improvements to mitigating strategies SSCs targeted to address ELAP/LUHS scenarios will be most effective in reducing

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seismic risk. Where other scenarios are more significant, enhancement to mitigating strategies SSCs will be less effective in reducing seismic risk."

That to me when I read it says suddenly we seem to be telling people in this Path H.4.5.4. to only look at SSCs that are targeted at that stylized coincident complete loss of AC power and loss of ultimate heat sink scenario. Are we?

MR. RICHARDS: Go ahead.

MR. TRUE: Yes.

CHAIRMAN STETKAR: We are?

MR. TRUE: We -- the scope of this path, just like it is on all the other paths, is focused on mitigating strategies itself and the requirements related to bringing mitigating strategies --

CHAIRMAN STETKAR: Now I need to better understand this, because I had the same question that is even more explicit over in H.5.

MR. TRUE: Yes.

CHAIRMAN STETKAR: Whatever it is, H.5.5.

MR. TRUE: Um-hum.

CHAIRMAN STETKAR: Or 5, whatever, yes, H. 4.5.5 to be specific for the record. What are we doing here? I mean first of all, ELAP/LUHS was a

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stylized thing that was thrown out, in my opinion, for people to develop some strategies that were intended to mitigate risk from the plant.

And it was something that, you know, was something convenient for me to think about that is a pretty severe event. And if I can demonstrate that my FLEX strategies, the equipment, the timing, coping periods and things like that can mitigate that, that gives me confidence that those strategies can probably mitigate a whole host of things that I haven't really thought about.

And now suddenly, we are talking about mitigating strategies with respect to seismic accelerations that are more than twice the design basis safe shutdown earthquake for my facility. I didn't hear anything -- though seismic accelerations don't know anything about ELAP or an LUHS. They only know that it's an earthquake.

And the seismic risk assessments that I have done, a lot of the risk comes from things like some seismic failures of some equipment and some independent failures of other equipment that doesn't necessarily look like an ELAP and an LUHS. The turbine-driven pump might be out of service for

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maintenance, you know, that's outside of my FLEX strategy or my nominal FLEX strategy.

So now why are we suddenly telling people to focus only on that selected set of stuff and only in the context of this stylized ELAP/LUHS scenario? Why aren't we looking at mitigating strategies for seismic risk?

MR. TSCHILTZ: So there are two things here. And you can't look at them separate and apart from one another because the combination of the two provides a total answer.

I mean, the seismic PRAs and the Phase II decision making process to evaluate the adequacy of the seismic capacity of the plant is still in the tool bag. And it looks at everything. It looks at all the scenarios.

What we are looking at here with the mitigating strategies is compliance with the rule and compliance with what the equipment was designed to cope with, the events they were designed to cope with and that's why we are focused on those specific events. We are looking at -- okay, we are not looking at overall seismic capacity of the plant. That is done under SPRA and the Path 2 or Phase II decision

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making process.

So we are looking at the ability to comply with the rules, so that's the focus, that's why it is limited on we are evaluating what the plant -- what the equipment was designed to cope with. And that's the logic for why it is divided that way.

Otherwise, you would be looking at, in effect under the compliance with the rule, the seismic capacity of the entire plant and that wasn't what the rule was designed to be able to deal with.

MEMBER RICCARDELLA: Yes. As I understand it, Appendix H that's all it's about is ELAP and hell, I don't have the acronym. That's all it's about. There is a whole other program, but that's what bothers me about Path 3, because it seems to me that Path 3 doesn't really consider that.

CHAIRMAN STETKAR: I'm really struggling here because I hear people pointing at rule language to make technical decisions about risk and that starts to bother me an awful lot. I thought that the intent of what we are doing here is to have reasonable assurance that the plants are safe with regard to their reevaluated seismic hazard.

How -- well --

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MR. TRUE: That's not -- no.

CHAIRMAN STETKAR: Okay. I'm sorry, let them answer on the record.

MR. TRUE: That's not what the focus of Appendix H is.

CHAIRMAN STETKAR: I understand that that's not what the focus of Appendix H of the NEI Guidance in NEI 12-06 Revision 3 is. I'm questioning whether or not that focus as elaborated in that guidance is consistent with what we, as an industry and a set of regulators are trying to achieve.

MR. TRUE: But --

CHAIRMAN STETKAR: Is -- are the plants -- is there reasonable assurance that the plants are safe with regard to their reevaluated seismic hazard? And I can demonstrate that safety either by having a plant that is so rugged with its installed equipment that it's risk is very low, lower than the structurals that you had up there or I might have mitigating strategies that help me to demonstrate that that risk is adequately low and those mitigating strategies might involve stuff that are stored out in sheds that are located around the plant site.

And some people might have given that

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stuff the name FLEX or it might involve other stuff.  
I don't know.

MR. TRUE: Right.

CHAIRMAN STETKAR: So I'm really bothered if -- by your confirmation of my suspicion that we are now suddenly focusing only on that stylized scenario that I thought people were just using as general guidance for something to think about when they think about developing that equipment that is out there in, what I characterized as, the sheds.

MR. TRUE: Right.

CHAIRMAN STETKAR: And the strategies for using that equipment and any -- also equipment inside the plant for the initial coping period.

MR. TRUE: This is helpful because it helps me understand some of the questions you were asking, because I was kind of confused about why some of the questions you were asking applied even to why we are here.

So I'm going to go back to the first two bullets that I presented that talk about this in the context of the larger seismic issue.

I think the seismic issue and the concerns you have about can we demonstrate that these plants

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are safe in light of the new hazard is under the purview of Recommendation 2.1. And the evaluation of that full scope PRA offered a full spectrum of the hazard to determine whether that plant is safe, including all those uncertainties, including the sensitivity studies, including all the things that are required under the SPID and the applicable portions of the standard.

The staff is then going to go through and assess that result, make a judgment on whether plant-specific backfits that could involve changes related to FLEX, could involve changes related to other parts of the plant are necessary or are recommended.

We are now in a -- so that's all happening in a separate box. Now, we are over here saying okay, we have the seismic PRA. We have a rule that says we have to have a mitigating strategy. How do we use that PRA to decide whether we need to incrementally improve our mitigating strategies or not? Is there a risk benefit to those incremental improvements that we could make to our FLEX capability outside of having decided the plant is safe?

We are not trying to demonstrate it is safe here as part of Appendix H. That's part of a

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whole separate program.

CHAIRMAN STETKAR: Okay. Thanks. That helps. I'll go back and read the record. I'm going to ask the staff, because I wonder -- I'm really curious about how they are going to be looking at all of the pieces here, because I thought that the Path 5 assessments were going to be used by the staff to inform their decision making about whether there might be regulatory action required for a particular site.

MR. TRUE: Okay.

CHAIRMAN STETKAR: So I -- and you are saying no that --

MR. TRUE: Well, no, but only related to regulatory actions --

CHAIRMAN STETKAR: On?

MR. TRUE: -- mitigating strategies.

CHAIRMAN STETKAR: Okay.

MR. TRUE: Not on --

CHAIRMAN STETKAR: And not on the whole plant.

MR. TRUE: Not on the whole plant.

CHAIRMAN STETKAR: Okay.

MR. TRUE: That's a separate --

CHAIRMAN STETKAR: Okay.

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MR. TRUE: -- effort.

CHAIRMAN STETKAR: Thank you.

MEMBER RICCARDELLA: I'll comment that, you know, I don't think ACRS has ever reviewed the actions with regard to 2.1. Maybe we need to have a separate on that.

CHAIRMAN STETKAR: Well, we --

MEMBER RICCARDELLA: And it's not in my--

CHAIRMAN STETKAR: -- haven't in the seismic area. We are -- we sort of have gotten into it in the flooding area, because --

MEMBER RICCARDELLA: Flooding, yes.

CHAIRMAN STETKAR: -- we had the last Subcommittee meeting on the staff is approaching the whole integrated assessment for flooding.

MEMBER RICCARDELLA: Um-hum.

CHAIRMAN STETKAR: And I had naively been thinking that the Path 1, 2, 3, 4, 5 through NEI 12-06 was the analogy of that, that in the seismic world, but apparently it isn't. At least it is part of the story, but only part of the story. So we will ask the staff when they come back. And you are right, I -- we haven't really seen anything on Entity F Recommendation 2.1 with specific regard to seismic.

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MEMBER RICCARDELLA: Yes, yes.

MR. TRUE: Okay. One other point that I want to bring up on this orange box, because it will come up on the next path as well, is that when it -- when you are on this risk-informed path, the focus broadens a little bit from just the mitigating strategies -- can broaden from just the mitigating strategies SSCs, the FLEX itself and that the plant changes that were referred to in that bottom box could actually be outside of that and -- but related to the FLEX capability.

CHAIRMAN STETKAR: That's where I started to really get more confused, because the discussion of H.5 -- 4.5.5 -- 4.5.5 is a little more explicit. It says well, if you have got other -- let's say I have a seismic-induced ELAP and LUHS sequence, so I've got that sequence in my risk model that comes out and lo and behold the frequency is higher than I think it ought to be, so maybe I want to improve anchorage of some piece of equipment.

It also says well, oh, gee, you ought to go out and look at other sequences because there might be other sequences in your risk model that are not that ELAP/LUHS but also include that particular

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component. So let's call that component turbine-driven emergency feedwater pump, for example.

MR. TRUE: Good example.

CHAIRMAN STETKAR: And yeah, it would show up in ELAP/LUHS sequences. It would also show up in other sequences in my PRA that don't quite look like an ELAP, but, gee, if I really improve that turbine-driven emergency feedwater pump, I get risk benefits in both of those sequences.

MR. TRUE: Um-hum.

CHAIRMAN STETKAR: And I get that. That's starting to sound like more of an integrated risk assessment. And yet, if my seismic risk is driven by scenarios that don't have either the turbine-driven aux feedwater -- emergency feedwater pump in it or any other of that set of things in a box that I'm calling my mitigating strategies equipment, I don't even look at them, because you are telling me that --

MR. TRUE: Yes.

CHAIRMAN STETKAR: -- I look at them elsewhere.

MR. TRUE: Correct.

CHAIRMAN STETKAR: So if I have a -- I don't -- you know, a component X that is really,

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really important to my seismic risk at the reevaluated seismic hazard, but it is not part of that box of mitigating strategies equipment, the thing I have hung that name on, then the staff's evaluation of whether regulatory action is needed for that component X is done outside of the context of anything that is submitted under these Path 1, 2, 3, 4, 5 assessments.

Have I got that right?

MR. TRUE: You've got it right.

CHAIRMAN STETKAR: Okay.

MR. TRUE: And I think the difference between seismic and flooding is that in seismic we have a PRA. In flooding, we didn't have PRAs to make those judgments. So the path we went down on in flooding was to focus on mitigating strategies for the flooding.

But here, we have a set of plants that are going to have the complete seismic PRA, will have made their judgment about, the staff will have made their judgment on the adequacy of the safety of that plant and now we are talking about how much further do we optimize the mitigating strategies capabilities, given that we have already determined the plant is safe?

MR. SCHULTZ: So, Doug, Steve Schultz. So

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what you are saying -- what I hear you saying is that the risk-informed approach is here specifically being applied to the mitigating strategies. It's not, as John would hope, being applied to the whole situation in terms of plant improvement, overall plant improvement.

CHAIRMAN STETKAR: Correct, correct.

MR. TRUE: Yes, yes.

MR. SCHULTZ: Okay.

MEMBER BLEY: Now, I've got to take you back, way back to the beginning of all this when you came up in the front end of this report with the five strategies. You get down to a point where you go to a risk-informed approach and sometimes you might have to come up with new strategies to make that work.

In the case that we do go into the risk-informed approach here, and it is because of the seismic issue, if those strategies don't do anything, but some other strategy would that you see from the PRA, I don't see what that doesn't fit within the whole framework you have built here. And it won't be one of the original mitigating strategies that you see from the seismic PRA, there is this other component that is contributing to risk and we can do something

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about that with equipment we already have and will modify a strategy or come up with a new one.

MR. RICHARDS: So --

MEMBER BLEY: That seems to fit the whole structure I have been hearing for a long time.

MR. RICHARDS: It does.

MEMBER BLEY: Tell me why it doesn't.

MR. RICHARDS: No, no, no, it does. The concept is under any of the strategies that the original FLEX strategy may have selected some path or some equipment that --

MEMBER BLEY: Yeah, and it did that sort of stylized scenario we laid out --

MR. RICHARDS: Right.

MEMBER BLEY: -- to measure this whole --

MR. RICHARDS: Right. To meet the higher seismic demand.

MEMBER BLEY: Yeah.

MR. RICHARDS: You have the opportunity --

MEMBER BLEY: Yeah, exactly.

MR. RICHARDS: -- to change your success strategy, to change your mitigation strategy staying within the bounds of everything you are trying to do already under the FLEX strategy, you could just -- you

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could elect a different path. That is always possible as a solution if you bump into something that is a weak item.

MR. TSCHILTZ: So --

MEMBER BLEY: And have the discussion.

MR. RICHARDS: So one of the discussion I heard going this way seems setting up walls that aren't -- don't need to be there.

MR. TSCHILTZ: So the -- one of the issues was that we wanted to enable a plant to be able to make a risk-informed decision about where it could get the most reduction of risk for modifications, that we didn't want to limit it strictly to looking at mitigating strategies because you could look at mitigating strategies exclusively in a deterministic way and spend a lot of money and not really reduce risk.

So we were going to basically -- we were trying to say okay -- and this approach allows this, you can look at changes to the plant outside of the scope of mitigating strategy SSCs. You can make changes to the other systems that reduce risk that gets your delta risk down to the acceptable level and that's an acceptable approach for doing this. And

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that's what we were trying to achieve to allow people the flexibility to make changes that get the most bang for the buck to reduce risk at the plant.

CHAIRMAN STETKAR: Mike, I'm glad you said that because that is absolutely consistent with what I thought we were trying to accomplish. It does not seem consistent with saying that I am going to only focus these assessments on possible improvements to the mitigating strategies equipment, whatever that box of equipment is, which is what I heard earlier and which is what, when I read the guidance, seems to focus me on that. Especially partially under this H. 4.5.4 and even more explicitly under the H.4.5.5.

MR. TSCHILTZ: So if you look at the scope of what is required to be looked at from a deterministic basis, you have a set piece of equipment -- set of equipment that you look at and from the deterministic basis you do an analysis that shows everything has the appropriate capacity.

CHAIRMAN STETKAR: Yes.

MR. TSCHILTZ: For the SPRA, as soon as you take the risk-informed approach, if you don't limit the scope of things that you look at, you bring the whole plant into the scope of what is considered.

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That is the Phase II decision making process, that's not compliance with the mitigating strategy rule.

So that's why we have, you know, bifurcated it in two sets to look at mitigating strategy SSCs and then look at the overall SPRA and the results of that. That -- and I understand your concern. You can't look at the two in isolation. You have to look at the two in combination and that's how the staff is going to make a safety decision.

CHAIRMAN STETKAR: And now I -- now from your perspective, I understand that much better. I want to make sure that I hear how the staff is going to address this, that they are not suddenly getting focused only on whatever that box of mitigating strategies equipment is and how they are going to do their regulatory decision making now at the broader level that I was talking about before.

Does -- is there -- does -- how does the staff reach that reasonable assurance that the plant is adequately safe at the reevaluated seismic hazard?

Regardless of how the plant achieves that level of safety, whether it is in mitigating strategies equipment box or whether it is different equipment in the plant or different -- perhaps modifying the

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strategies.

MR. TSCHILTZ: Okay.

MR. TRUE: I don't want to leave you with a misunderstanding. So let me walk you through a couple of scenarios, which I think you will follow pretty smoothly.

Within this path here, I found that, you know, I have some mitigating strategies SSCs that don't meet the C10, I go to my seismic PRA and I find that my air receiver tank for the diesel generator is my weakest component, which is increasing my ELAP risk.

Now, it's not a mitigating strategy SSC because it's -- we have given that -- we know we have a blackout, right? What we don't have is AC power. But if I were to improve the capacity of that air receiver tank, I could lower the frequency of getting into an ELAP condition and that would reduce the risk.

And that might reduce the risk so much that now my change in risk for my meeting C10 is very, very small.

CHAIRMAN STETKAR: But --

MR. TRUE: So you are allowed in that bottom box, the bottom orange box, to go fix the air receiver tank as a means to reduce risk, right?

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CHAIRMAN STETKAR: Yes.

MR. TRUE: So that's what the FLEX or other might mean the air receiver tank. So that's one scenario.

Another scenario is all the seismic PRA and it's 99.9 percent ATWS, some of the FLEX does not provide you any capacity do deal with it. We are not going to focus on how do I make mitigating strategies address the ATWS, that's part of the 2.1.

CHAIRMAN STETKAR: But --

MR. TRUE: That's a separate evaluation.

CHAIRMAN STETKAR: -- to make sure I understand it, in that context though, the staff would need to look at the ATWS issue and make a determination about does - are improvements needed? Because they are not going to learn anything about potential improvements as part of this effort.

MR. TRUE: Correct.

CHAIRMAN STETKAR: That -- the effort that is in front of us right here.

MR. TRUE: Correct. That would be as part of the 2.1 decision making.

So and then there is some of the crossover ones like the turbine-driven aux feed pump which plays

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both in the ELAP space and in the non-ELAP space. And that's why on the right hand path, we took a little bit broader view in looking at what is the delta risk associated with those.

CHAIRMAN STETKAR: And in -- let me give you one from my own personal experience without naming the plant and it is not in the United States, on the record.

Is if you had weakened interior walls in the plant that could collapse under a seismic event that gave you something like loss of half of the plant power --

MR. TRUE: Um-hum.

CHAIRMAN STETKAR: -- and had failures, independent hardware failures and unavailability of other equipment that got you -- and that was an important contributor of risk, the staff would have to pick that up under the NTTF 2.1 activity.

MR. TRUE: Correct.

CHAIRMAN STETKAR: And they -- okay. So I'm curious now to understand how the staff is going to do all of this integration. But we will get to that. Thanks.

MR. TRUE: Okay.

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MEMBER BLEY: So since we have a little interlude and you are about to go to what is still grayed out, I have something I don't fully understand.

And it deals with the picture Doug showed us earlier, but that is also Footnote 1 in what you have up here.

MR. TRUE: Um-hum.

MEMBER BLEY: I thought in principle all of this Path 1, 2, 3, 4, 5 stuff always said no matter what you can always go to a risk-informed assessment.

But that footnote in Doug's picture says no, if your risk is -- if your core damage is over  $10^{-4}$ , or it's over  $10^{-5}$ , you've got to do deterministic, which seems out of kilter with this process.

I do recognize that in your guidance you say if you are above that and you want to do risk-informed, you've got to get approval first from the NRC. I'm not quite sure why this special case here. Is it -- can you explain it to me?

MR. RICHARDS: I'll take a shot at that. And what I would say is Path 5 is effectively the only path that is really risk-informed.

MEMBER BLEY: Yes.

MR. RICHARDS: 1, 2, 3, 4, they are just deterministic evaluations.

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MEMBER BLEY: Yeah.

MR. RICHARDS: And what -- part of what is going on here in Path 5 are these are the plants that are doing seismic PRAs in order to resolve NTTF 2.1.

MEMBER BLEY: Yeah.

MR. RICHARDS: They now have, at their disposal, this much more complete tool to evaluate the plant.

MEMBER BLEY: But that was --

MR. RICHARDS: And this --

MEMBER BLEY: -- blocking them from using it.

MR. RICHARDS: -- becomes -- well, this becomes a risk-informed application of the PRA.

MEMBER BLEY: Yeah.

MR. RICHARDS: But what we are arguing is if your risk is above either  $20^{-4}$ , then you are going to have to go just do your deterministic evaluation on it. You are right, it's being blocked.

MEMBER BLEY: Um-hum, I --

MR. RICHARDS: The idea is --

MEMBER BLEY: You don't anywhere give the basis for that argument and I don't understand it. But you do give an out. You say you can go tell the

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NRC you want to do a risk-informed and they might agree with you.

MR. TSCHILTZ: So I think there were concerns about how this would be applied. And one of the ways that we address this was to put that constraint on here and the intent was not to necessarily limit it to plants if they were above that level, but if they were above that level, they would have to go in and understand and have a dialogue with the NRC prior to going through that approach. And --

MEMBER BLEY: If this is a negotiated position with NRC, just that's fine. But if it's -- if you guys came to this conclusion, I'm really trying to understand why where everywhere else we say that the best path forward is using the risk-informed approach.

MR. TSCHILTZ: We added that in there to address some concerns about this from the staff about how this was going to be used. So we added the constraint in there and it is not necessarily would prevent people from doing that, but they would have to have a dialogue as to what maybe -- what were the drivers that were causing them to exceed that level.

MEMBER BLEY: Ask them about this one.

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It's their turn.

MR. TSCHILTZ: Yeah, that --

MEMBER BLEY: Everywhere else this is the best thing you can do. It's where you go with -- if you can't do anything else or if you have that capability, but here we say oops, if your results aren't so good, you can't use it.

MEMBER RICCARDELLA: But if you do risk-informed, aren't you just moving the point down below the line?

MR. TSCHILTZ: Yeah. You have done --

MEMBER RICCARDELLA: Right?

MR. TSCHILTZ: -- an analysis.

MEMBER RICCARDELLA: It's sharpening the pencil.

MR. TSCHILTZ: Yes.

MEMBER BLEY: No, no, it's not. It's -- you -- the end result might be that -- from their analysis you might end up making changes of some sort.

No, it's not just that. It's this idea that usually the best thing you can do and what you go to if you can't find an easier way out is the risk-informed path.

But here we are saying yeah, but if your

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results came out high, don't do that. And I don't get it.

MR. TRUE: But again, 2.1 will have its own evaluation. Any plants in that category --

MEMBER BLEY: I don't get it here.

MR. TRUE: -- are going to get plenty of -

-

MEMBER BLEY: I don't know why risk-informed isn't better than deterministic.

MR. TRUE: Well, you don't know. We can't know in the abstract why a plant is above  $10^{-4}$ , right?

MEMBER BLEY: Well, we can --

MR. TRUE: That's assuming --

MEMBER BLEY: -- for that specific plant.

MR. TRUE: We can. But to -- but as we write this guidance, we can't. So there is a rulemaking on compliance related to the mitigating strategies capability with respect to the new seismic hazard. So sort of the going in position would also be deterministic compliance for that is required. If the risk is high, those plants would be expected to prove that that mitigating strategy complies with the new seismic hazard.

What to do about the risk contributors on

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the other side, that's part of the 2.1 decision. So we are putting the most stringent requirement --

MEMBER BLEY: I hear the words. They don't make any sense to me, Doug, but go ahead. I'll ask the staff about this later.

MR. TRUE: Okay. We -- I thought you were going to ask for a break. We can keep going? I'm fine.

CHAIRMAN STETKAR: I don't know how you have -- let me turn my mike on. Turn your mike off.

MR. TRUE: The word slides are all pretty fast.

CHAIRMAN STETKAR: The word slides are fast. You are going to get into H.4.5.5. We are done with 4.5.4, right?

MR. TRUE: I think so.

CHAIRMAN STETKAR: Let's take a break now, because 4.5.5 and the remainder of the slides will probably be longer than we can stand it. So let us take a break until, I'll be mean, 10:25.

(Whereupon, the above-entitled matter went off the record at 10:11 a.m. and resumed at 10:25 a.m.)

CHAIRMAN STETKAR: We are back in session.

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Doug, you've got it.

MR. TRUE: Okay. Okay. All right. So we are going to go to the far right path of this, which is the risk-informed assessment.

Again, as we just discussed before the break, this only applies to the plants that have core damage frequencies below  $10^{-4}$ . So and as we got through on the prior region chart or regime chart, the first question that -- the plant we look at is, you know, what is my total seismic core damage frequency? What is my total seismic LERF?

And if the value is less than  $10^{-5}$ , then no additional analysis would be done on the mitigating strategies capabilities beyond the evaluation of the spent fuel pool.

If the risk is then between that  $5 \times 10^{-6}$  and  $1 \times 10^{-5}$  LERF and  $5 \times 10^{-5}$  and  $1 \times 10^{-4}$  for CDF, then H.4.5.5 lays out the process for going through that.

One point I want to make here is that coming into this, it may not be -- it may be that the plant has not credited FLEX in their PRA at all. This is another one of those variants that as we were putting this process together, we weren't -- we didn't know exactly how each plant was going to go after

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incorporating FLEX line and incorporating FLEX. So that does change a little bit of this path as compared to the one we just talked about, in that one of the options for the plant is to look at what is our capacity, actual capacity of our FLEX capabilities and does that provide a substantial reduction in risk?

CHAIRMAN STETKAR: And just for the record, our Reliability and PRA Subcommittee in the near past, I can't remember passed yesterday, but in the near past, had a briefing by both the staff and the NEI Working Group on integrating mitigating strategies equipment into PRAs.

So we are --

MR. TRUE: Sure.

CHAIRMAN STETKAR: -- at least the PRA Subcommittee is aware that there is motion in that regard about how it can be factored in and it's timely to support these types of analyses.

MR. TRUE: Yep, that's one of the reasons that we wanted to get it done.

CHAIRMAN STETKAR: Yes.

MR. TRUE: So maybe the best way to go through this is the next step is to consider plant enhancements that can reduce your risk focused around

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the scenarios that involve ELAP, loss of ultimate heat sink.

And so I'm going to move -- I'm going to jump forward to another graphic, because I think it will help us and then we can come back to talk about this. A couple of slides forward.

So you come in and you have done a seismic PRA. You have a core -- seismic core damage frequency and seismic LERF that represents the as-built as-operated plants. If under the rule you enhanced all of your mitigating strategies SSCs to the C10 capacity, that risk might be lowered by some amount. No value on this graph, so -- but there is a margin there.

And through some enhancement, you could get it down to that case. Maybe by making a single change, you could get it down some portion of that by other -- a set of changes you can get it down further or you might have a plant where the base case and the reference case are extremely close together. And so the question becomes how far do we need to go in implementing these changes to enhance the mitigating strategies capability based on the fact there could be a lot of different variables?

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And so this graph that is in the guidance is intended to sort of capture that whole -- how that would work. That you start out with a base case value. You identify changes that could achieve a risk improvement. And once you have gotten yourself within a delta  $1^{-5}$  CDF and  $1^{-6}$  on LERF, you have essentially reached a point where the -- any additional risk benefits are considered small and, again, since -- you are into the diminishing returns point of making enhancements.

So that's how this delta CDF and delta LERF thinking is employed in this. I'll go back to that -- to the diamond on the right hand path. And so when we say small is it within that -- if you guide yourself within the factor of  $1^{-5}$  or  $1^{-6}$  of the C10 value. But, and I think this came up earlier, the delta that we are looking at there is the equipment or it's enhancements that are related to what FLEX was intended to mitigate, which was the ELAP loss of ultimate heat sink.

But the actual calculated delta we are looking at is actually based on all the contribution of risk to those components. Rather than just narrowly focusing it on what is the delta risk on loss

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of ultimate heat sink plus the ELAP situations, we are saying let's look and make sure that we have, for these pieces of equipment that come into this process --

CHAIRMAN STETKAR: But that's important. That caveat is somewhat important. It's -- in the sense of a risk assessment, it is all of the sequences that are initiated by a seismic event that include that equipment and only -- not -- and only that equipment, but then include that equipment. It's not any other -- the delta risk ignores any other seismic induced sequences that do not include any of that equipment, I guess is a better way to put it, right?

So my motion of a block wall falling over and hitting something that -- if that sequence doesn't include any of my mitigating strategies equipment, that is not in the mix for this delta calculation. Is that right?

MR. TRUE: The consequences of a block wall falling down was the impact on your mitigating strategies capability.

CHAIRMAN STETKAR: No, no, no. It didn't in my --

MR. TRUE: It didn't?

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CHAIRMAN STETKAR: -- Gedankenexperiment here it didn't.

MR. TRUE: Okay. Right. Or my previous example of that with scenarios was --

CHAIRMAN STETKAR: Right, right. So the ATWS is yeah, right. Okay.

MR. TRUE: But and to use your turbine-driven aux feed pump or RIC-C pump example, it has a delta risk in the ELAP area and it has a delta risk associated with loss of feedwater scenarios --

CHAIRMAN STETKAR: Right.

MR. TRUE: -- for example, that we would account for both of those changes in risk. And it is, you know, by the letter of the scope of the mitigating strategies is probably beyond what we had to do, but since it's the same equipment affecting risk, we felt like that was an appropriate consideration, mindful of the scope of equipment that we are focused on.

And then the last box the plant changes. Similarly, we would be focused on whatever things could affect those scenarios, such as that delta risk is reduced. So my air receiver example for the diesel generator would also apply here.

So I think that's my run-through of this

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path. We have covered a lot of the same concepts previously, so we're good?

MEMBER RICCARDELLA: So no, go back up to the diamond just above that box.

MR. TRUE: Uh-huh.

MEMBER RICCARDELLA: You say that the delta is small, is that with the FLEX equipment?

MR. TRUE: It's the delta between your -- where you be -- where you are and where you would be if you had everything at C10 for the GMRS.

MR. TSCHILTZ: So but in this path, in this path we allow plants the option to not include FLEX in the model or include FLEX in the model. And the difference would be that -- its impact on risk.

MEMBER RICCARDELLA: I see.

MR. TSCHILTZ: So plants where FLEX has a big impact on risk where risk is above the thresholds that we consider to be acceptable, it would be to their advantage to --

MEMBER RICCARDELLA: Then you have got to do something to make sure FLEX works.

MR. TSCHILTZ: Yes.

MEMBER RICCARDELLA: If it makes a big difference.

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MR. TRUE: Yes. To get it to -- and the small is this difference between where you would be if you came into full compliance versus the changes that you made. As long as you were within that region you are considered done. Okay?

I think we can go through the -- we are done with that. We can go through the word slides, but I think we have pretty well hit all of those issue in the previous discussions.

Maybe so the -- for the deterministic path, so we are above the 2 x in the SSE. It's -- we are sort of building off of the whole expedited seismic evaluation process, ESEP, but we are updating that for that plant to the full GMRS.

As we talked about earlier, there are some sort of qualitative considerations on these inherently rugged SSCs for the purposes of this evaluation. And then there is a quantitative assessment meaning the HICLIF at C10 is required for each of the pieces of equipment that wasn't part of the ESEP. So that would include, for example, the storage structure for the FLEX equipment, hall paths. Primarily those are the main gaps, I think.

Also, of course, we have mentioned the

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spent fuel pool cooling, but there is also in this category -- this path a consideration of the high frequency consistent with what we did for the high frequency exceeding plants in Path 2.

CHAIRMAN STETKAR: High frequency in this context just for the record meaning hertz and not events per year?

MR. TRUE: Correct. And then so this -- the purpose of this process is to figure out where we would need to enhance the FLEX strategies.

Okay. I'll go through my rule again. So the deterministic was risk insights. This was the first orange path that we talked through. I think we pretty well hit on all of this and are focused on this delta risk and how you can reach the point where you sufficiently enhance the mitigating capabilities of the plant for the -- in light of the new hazard.

And I think we have pretty well covered these as well.

CHAIRMAN STETKAR: Before you get to the summary slide, I have one more question.

MR. TRUE: Yes, yes, okay.

CHAIRMAN STETKAR: And that is in the guidance if I'm going to do 4.5.3, 4.5.4 or 4.5.5, any

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time I use risk information, the guidance says "The licensee may elect to maintain the seismic PRA; however, it is not necessary to maintain the seismic PRA model."

Well, why?

MR. TRUE: For the purposes of this rulemaking, you are asking why? I mean, you --

CHAIRMAN STETKAR: Yes.

MR. TRUE: -- is there a reason why you--

CHAIRMAN STETKAR: It just says -- I didn't want to read the whole quote. It just tells me that this is a one-off thing. I do this. I check-off the box. I submit the stuff to the staff. They check-off their box. And I throw everything in the trash can. I can do that.

Why in heck would anybody do that?

MR. RICHARDS: That's not exactly --

CHAIRMAN STETKAR: There is a --

MR. RICHARDS: Why --

CHAIRMAN STETKAR: Why even mention it?

MR. RICHARDS: Why even mention it? There is a "but" provided that you maintain the seismic capacity of the things that you are crediting.

CHAIRMAN STETKAR: But there is another

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"but," that this is now an evaluation of one contribution to my overall plant risk. It's what I am hanging my hat on. It's what I am claiming to the regulator is justification that my seismic risk is low enough. Wherever I am on those horizontal thresholds, whatever I have done to get to the point where it is low enough that I don't need to do any more improvements, that is what I'm left with. That is now my seismic risk of the plant at my reevaluated seismic hazard for my site.

Now, that seismic risk contributes to the risk of my plant. I might need to use the risk for my plant in other risk-informed evaluations. For example, and therefore, you know, ought not I have this as part of my risk model for my plant? Why am I allowed to throw this in the can?

MEMBER BLEY: I would come at it from a different view. This guidance is an application that uses the seismic PRA. Why in an application that uses something else would you give guidance about what to do with the something else? It doesn't belong here.

MR. TSCHILTZ: I think the intent of what we were trying to achieve by putting it in there is that the capacity of the plant is controlled by the

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design and the capacity of the components. So if there were like a design change to something, people would need to consider, you know, it's -- whether it impacted the seismic capacity to, basically, perform this function.

So rather than memorializing the SPRA and making it part of the compliance with the rule or, basically, putting the seismic capacity of the components that was a part of this evaluation is what demonstrates the compliance with the rule.

CHAIRMAN STETKAR: Suppose I want to make some other change in the plant, it has nothing to do with seismic capacity, everything is seismically as rugged as it ever was, but I never want to do maintenance on a diesel generator ever again in my life. May be a bad example because of the targeted approach. I never want to do maintenance on a turbine-driven pump ever again in my life, despite the fact that it is as seismically rugged as I can get it.

And I want to submit something that says I have risk justification to do that. Wouldn't the seismic risk be part of that risk-informed justification?

MR. TRUE: True.

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CHAIRMAN STETKAR: And wouldn't I need an adequate, a technically adequate seismic PRA? In a sense, this technically adequate seismic PRA to support that?

MR. TRUE: So --

CHAIRMAN STETKAR: And why wouldn't I maintain that? I mean, why does NEI have guidance that says don't maintain this thing that you have developed and that is adequate to support risk-informed decision making?

MR. TRUE: I think -- let me try and take what Mike said and say it a different way. I don't think any of us actually disagree with the notion that once you have invested in doing seismic PRA, maintaining it and using it for other purposes is definitely something that a licensee should seriously consider, because there are other values in having it.

The issue is that I've done a seismic PRA. I did a calculation. I decided I needed to make this plant change. Do you carry along with you in perpetuity seismic PRA as the way you make a decision every time in the future about that piece of equipment or do you use this analysis and say I'm going to change the capacity to this. And then that capacity

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goes forward as I'm modifying the plan and enhancing my FLEX -- continuing my FLEX strategies, whatever else it is.

And so what we didn't want to have a hope to drag this SPRA into the long-term for every design consideration. We wanted to make it be tied to the capacity decision we made, not the risk decision. Not the risk information.

MR. TSCHILTZ: So the other, I think, piece maybe to address your question is, as you are aware, a number of people in the industry are interested in going forward with the 10 CFR 5069, the risk-informed special treatment. So the sites that have developed SPRAs as a part of this effort will undoubtedly take advantage of those SPRAs in their 5069 application.

So once the investment is made for risk -- future risk applications, you know, there is benefit to maintaining the SPRA. And I don't see that there is any movement that people wouldn't want to do that.

CHAIRMAN STETKAR: Okay. Thanks. We have to be a little bit cognizant of time here. So get to your summary slide, because I have a couple of other things to do before I let you guys off the hook.

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MR. TRUE: Okay. So what we tried in Path 5 is to provide an approach that addresses the reevaluated hazard consistent with the rulemaking for mitigating strategies. And used where we were provided the option to use, a risk-informed approach, to have smarter plant improvements and to create both a permanent plan improvements that are focused specifically on mitigating strategies as well as on other aspects to make sure that we have optimized that.

CHAIRMAN STETKAR: Now, one of our Members couldn't make it to the meeting today, but has been listening in on the public line. And I understand that he has some questions.

MEMBER CORRADINI: I am on the other line.

CHAIRMAN STETKAR: You are on the other line. I didn't know that. So, Mike, had I known, you should have just spoken up.

MEMBER CORRADINI: Well, you were having so much fun, I didn't want to stop you.

CHAIRMAN STETKAR: Well, speak.

MEMBER CORRADINI: Okay. So just on -- Steve Schultz asked a question and I was muted at that time, I was on the other line at that time, on Slide

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6. And I guess if -- I think Doug was speaking to the slide.

Explain to me, since I'm not an expert on all of this, what you mean by most limiting SPDF or SLERF controls approach, because I don't understand that comment relative to Steve's question about uncertainty.

MR. TRUE: Okay. So let's -- we will use the  $5e$  minus something threshold as the example. So if I have a plant that has a seismic core damage frequency that is less than  $5e^{-5}$ , but its LERF is greater than  $5e^{-6}$ , then I would be in the more limiting of those cases, so I would have --

MEMBER CORRADINI: Okay.

MR. TRUE: -- to either go through the deterministic or risk-informed path. And likewise if I had a LERF that was less than  $10^{-5}$  --  $5 \times 10^{-6}$  but a seismic CDF greater than  $5^{-5}$ , has the same outcome.

The only way you get --

MEMBER CORRADINI: Okay. No, no, you have answered it.

MR. TRUE: Okay.

MEMBER CORRADINI: I misunderstood when you were answering Steve's question, I took it to mean

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something different. Let me -- one follow-up question. So that means you are taking -- now, again, I'll use the wrong risk jargon and John will correct me, but you are taking a best estimate or you are taking some sort of upper bound value of the seismic risk that controls these lines?

MR. TRUE: The mean value from the seismic PRA.

MEMBER CORRADINI: All right. So that kind of goes back to Steve's original question about uncertainty. Okay. I get it now. Thank you.

MR. TRUE: Okay.

CHAIRMAN STETKAR: Thanks, Mike. Sorry, I didn't know where you were.

MEMBER CORRADINI: Well, thank you, John.

CHAIRMAN STETKAR: You're welcome. Do any of the other Members have any more questions for the industry? If not, thank you very much. We covered a lot of ground. Doug, thanks a lot for organizing it the way you did. It was the only way to get through it. And we will have the staff come up.

I always have these esteemed people in front of me. Mo, are you going to start or Eric?

MR. SHAMS: I'm going to start here. I

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just want to reiterate, thank you for the opportunity to be here to talk to you. And I think we are ready to go. We have already, you know, gone midway down this road, so we know you have questions for us, so we will start with what Eric has prepared for you and then we will go through the questions. Thank you.

MR. BOWMAN: Okay. Thank you and good morning to all of you. I have put together slides on all of the regulatory guides recognizing that you have a number of new Committee Members from when we talked about the draft regs in the past.

One thing that I found very helpful when we were going through the front end action plan was a diagram of how things are interacting. So I have got one of those diagrams for each of the regulatory guides that you will be taking a look at.

I'm starting with the Reg Guide 1.227, which is the regulatory guide on the spent fuel pool, the reliable spent fuel pool instrumentation. This carries forward the guidance that we endorsed previously with an interim staff guidance that is contained in NEI 12-02, which was a document that was developed back in 2012 for the spent fuel pool instrumentation order, EA-12-051.

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As you can see in this diagram, both the spent fuel pool instrumentation order and the mitigating strategies order were issued concurrently.

And the guidance for the two orders interlocks, if you will. In particular, there was one area where I had an IOU from, I believe it was, the April meeting with the Subcommittee on some statements in the NEI 12-02 on the shock qualification of batteries and chargers.

And I have copied in the next couple of slides where it -- where the spent fuel pool instrumentation guidance borrows from the NEI 12-06 guidance for the reasonable protection of spares.

There are other areas where the guidance between the two orders interlocks. NEI 12-06 points to the wide range spent fuel pool level instrumentation as a set of instrumentation that can be used for guidance on what to do for the spent fuel pool cooling strategies.

I believe that you had a question on the seismic qualification of the spent fuel pool instrumentation that you had promised to ask us.

CHAIRMAN STETKAR: Yes.

MR. BOWMAN: So this might be an

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appropriate time for it.

CHAIRMAN STETKAR: I was going to do that.

Consider it -- the guidance -- to reiterate, the change between Revision 2 and Revision 3 of the 12-06 guidance, basically, said that I need to -- in Revision 2 I needed to look at both the spent fuel pool cooling and makeup and level instrumentation with regard to the reevaluated seismic hazard.

In Revision 3, that need to look at the level instrumentation was removed. So from what I heard NEI say is they feel that the level instrumentation is not necessary for the mitigating strategies. So how does the staff -- what is the staff's position in terms of the need for the level instrumentation to be able to survive at the reevaluated seismic hazard?

MR. BOWMAN: That would be very much dependent on the licensee's reliance on the level instrumentation in their own specific strategies for the spent fuel pool cooling. There are alternate means that they could use for spent fuel pool level indication. We have some licensees that developed portable spent fuel pool instrumentation that is not relied on for the spent fuel pool instrumentation

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order and wouldn't really meet the requirements. It might meet the requirements for what is going in the version of the final rulemaking that will be presented to the Commission in December.

But it is not exactly the same as the EA-12-051, the spent fuel pool instrumentation order instruments. If a licensee relies on something else for decision making on what they need to do for spent fuel pool level makeup and cooling of the spent fuel pool, they would have to look at verifying that whatever it is their strategy relies on will be usable in light of whatever the seismic hazard is for the mitigating strategy assessment hazard information. And --

MEMBER CORRADINI: Can you just clarify what you just said, just so I can get it? So you are telling me that what they were --

CHAIRMAN STETKAR: Mike, unfortunately, you are going to have to identify yourself, so we have you on the record, because --

MEMBER CORRADINI: I'm sorry. So this is Corradini, Member of the ACRS.

CHAIRMAN STETKAR: Sorry.

MEMBER CORRADINI: That's okay. So, Eric,

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so let me make sure I understand what you just said. So if the order tells me to put in some spent fuel pool level indication, it may not be robust enough for this seismic event. So it's usable per the order for everything but that, but then the licensee may have a portable device or some other device that is seismically acceptable or they have an approach, but it doesn't meet the order.

Am I understanding what you just said?

MR. BOWMAN: You are. And part of it is a result of how the different orders were written. The spent fuel pool instrumentation order had specific seismic levels that -- for the ruggedness, if you will, of the instrumentation that would be responsive to that order.

MEMBER CORRADINI: And now with the new GMRS for a particular site, it might be -- it might break.

MR. BOWMAN: It might break, but we would look at what a licensee has done for their strategies for spent fuel pool cooling. And if their strategy says go look at the wide range spent fuel pool level instrumentation, but if you don't have an instrumentation reading there because it broke, go

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look at this other thing. We would be looking to whatever it is that the licensee is relying on in order to come to a conclusion that they can rely on it.

It could be some other instrumentation, such as a portable instrument that is placed into the spent fuel pool after the event has happened or it could be some other approach. But it would wind up being a very licensee-specific consideration as to what they need to demonstrate to show that they can accomplish the spent fuel pool cooling strategy given the impact of the mitigating strategies seismic hazard information that came up from that.

MEMBER CORRADINI: Okay. All right.

MR. BOWMAN: And verify.

MEMBER REMPE: So I think about what happened, there were concerns about a combustion event occurring, so a portable instrument may not be the best thing to do unless you have a robot around. I mean, are those kind of scenario-specific considerations given as the staff evaluates this?

MR. BOWMAN: We will have to take a look and see what they do for their evaluation of the strategies in particular. And it may wind up being

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looking at the strategies. And if, at that point, what the level of reading wound up being had no impact on what the course of action would be, it may not make that much difference. Because you may wind up with a proceduralization that says if you don't get a reading, start filling or initiate spray, but it would be on a very site-specific procedure or strategy-specific basis that we would have to take a look.

CHAIRMAN STETKAR: On a related note, as I read the graph version of the guidance, there is a statement in Section 3.4 that talks about qualification of the stuff and I won't read the whole quote, but it says "Recommending the portable instrument channel component should be designed as hand-held devices, e.g., commercially available smartphones or similar rugged components."

Well, why is it necessary to give an example of a commercially available smartphone? I mean, I understood the intent of a hand-held device without that. I mean, are you talking about people taking pictures and running to the control room and saying see, see, the water isn't here?

MR. BOWMAN: No, I'm not. When we published the Draft Regulatory Guide, we did not

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include that parenthetical example.

CHAIRMAN STETKAR: That's right.

MR. BOWMAN: It was added as a result of stakeholder input. I believe this input was from NEI saying it would be better understood by the reader to include an example of what a hand-held --

CHAIRMAN STETKAR: Well, I'm trying to think of how I am going to use a smartphone. Am I going to text message to the control room standing out there next to the spent fuel pool that, indeed, everything is hunky-dory? Am I going to take a photograph and email it to them? You know, what? How do I use -- I don't get it.

MEMBER REMPE: He doesn't have --

CHAIRMAN STETKAR: I get the input.

(Simultaneous speaking.)

MR. BOWMAN: No, it's fine.

CHAIRMAN STETKAR: I get the intention.

MR. BOWMAN: There is a knack for that.

CHAIRMAN STETKAR: I get the intention.

All right. I get the intent of having flexibility in portable held -- hand-held devices. I just hope that people aren't going to so narrowly interpret this as saying look the regulatory guidance says I can have

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somebody go out there and take a picture and run to the control room, because maybe that's not what --

MR. BOWMAN: No, that is -- that would not be the --

CHAIRMAN STETKAR: -- the intent is.

MR. BOWMAN: -- intent.

CHAIRMAN STETKAR: Okay. So I'm curious why if this was added as a really big concern from the industry what people are up to. I'll just leave that on the record. I just found it as sort of very curious. Okay?

MR. BOWMAN: Yeah.

MEMBER BLEY: Not all of us are as bothered by that, just some of us.

CHAIRMAN STETKAR: Okay. No, that's fine. I just don't know why it's necessary. Do you have more?

MR. BOWMAN: On this one there was a question from the April 22<sup>nd</sup> Subcommittee meeting on the parenthetical exception for battery chargers in the place of old batteries for the shock and vibration section and the seismic section in NEI 12-02 Section 3.4. And those are covered in the power supplies guidance in Section 3.6 of NEI 12-02, which points to

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follow the guidance for reasonable protection that is in NEI 12-06.

And I merely copied this as a -- we took the question and I wanted to close the circle on that with you.

CHAIRMAN STETKAR: Okay. Good. Thank you.

MR. BOWMAN: For the next Regulatory Guide, this one is Regulatory Guide 1.228. Reg Guide 1.228 deals with enhancement to the emergency response capabilities. Part of this covers the request for information that went out on staffing and communications assessments.

We had endorsed the industry guidance on the subject in NEI 12-01. It was endorsed by letter, rather than interim staff guidance because it was guidance on responding to a request for information. In Reg Guide 1.228, we carry forward unchanged that guidance on the performance of the staffing and the communications capability enhancement assessments that were accomplished.

I also note on this slide COMSECY-13-0010, I believe, Mr. Schneider provided a copy to the Members of the Committee. This was a COMSECY that

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went up to the Commission regarding the integration of certain aspects of the emergency preparedness recommendations of the Near Term Task Force with the actions we have been taking on recommendation 4.2 and 4.1, which were the rulemaking and the mitigating strategies order. In the other order though, 4.1 and 4.2 would be the rulemaking in the order.

In addition to the staffing and communications, Reg Guide 1.228 endorses a couple new NEI guidance documents, NEI 13-006, which covers accomplishment of training and drills and NEI 14-001 that covers integration.

As I show on the diagram here, the information that we gathered with regard to the staffing and communications assessments, we have already essentially completed the Phase II decision making and that's why you see the staffing and communications requirements in the draft final rule in 50.155.

CHAIRMAN STETKAR: And those are the final -- the draft final guidance here endorses Rev 1 of those two NEI 13-06 and --

MR. BOWMAN: That's correct.

CHAIRMAN STETKAR: -- 14-01, right? There

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-- I have read through them, the small changes from --

(Simultaneous speaking.)

MR. BOWMAN: Various small changes. It's Rev. 1.

CHAIRMAN STETKAR: It's real brief. Again, some time in the last millennia.

MR. BOWMAN: Yeah. I believe there were minor changes from the Draft Regulatory Guidance. A lot of it had to do with eliminating discussion of the interim staff guidance documents that have been issued previously, because they aren't really appropriate in the related guidance section, because they will no longer truly be necessary. And the other item is in the staff requirements memorandum for the proposed rule.

The Commission directed us to ensure that we have included in the guidance appropriate coordination of the resulting strategies and guidelines with the voluntarily maintained severe accident management guidelines. And we are answering the mail on that with this.

And finally, this is a version, if you will, of the slide that I showed you previously when we were discussing the Flooding Action Plan showing

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the relationship between the reevaluation of the hazards request for information and the mitigating strategies order and the current rulemaking.

One thing that I would point out that is probably worth considering when you are contemplating the Path 5 version for the mitigating strategies assessments what Path 5 and what the remainder of the mitigating strategies assessments are supposed to accomplish was laid out in a number of presentations that NEI provided to the Commission as well as to the Joint Steering Commission -- Joint Steering Committee.

The output of the mitigating strategies assessment is supposed to be a demonstration that either FLEX will operate as it was implemented in light of the reevaluated hazard or the FLEX strategies can operate in a modified form in order to work during the reevaluated hazards.

And alternatively, there is the two different concepts that were introduced: The alternate mitigating strategy or the target hazard mitigating strategy. And essentially what happens in the mitigating strategies assessment, if you demonstrate that FLEX works as it was implemented or modified, you continue to assume the stylistic or

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deterministic approach that assumes an extended loss of AC power coupled with the loss of normal access to the ultimate heat sink.

In the alternate mitigating strategy or targeted hazard mitigating strategy area, what is involved in that is the demonstration that either the flooding or the seismic event does not cause a loss of all AC power and it does not cause a loss of normal access to the ultimate heat sink or perhaps it does, but it does at the time in which the sequence of events shows that the flooding would cause a loss of off-site power or whatever the event is.

So the alternate mitigating strategy or targeted hazard mitigating strategy would be mechanistic rather than a stylistic or deterministic approach to the problem.

One of the fundamental things under the mitigating strategy order was that we are not contemplating concurrent unrelated events. So we don't -- we aren't postulating that a meteor is going to hit the site at the same time as an earthquake.

CHAIRMAN STETKAR: But a meteor could cause an earthquake and could cause flooding.

MR. BOWMAN: Right.

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CHAIRMAN STETKAR: Okay. So we have had this discussion before, I think, in particular in the context of an earthquake near the plant that causes damage at the plant and damage to nearby water impoundment structures, I'll call it a damn, that could then result in flooding at the site. So that I now have a coincident event that involves seismic damage and flooding from a single initiator, that earthquake.

MR. BOWMAN: Um-hum.

CHAIRMAN STETKAR: And we have been told that people are addressing those. It's not clear to me. I can read the guidance that if that's the way I want to organize my life, I will organize it. I can also read the guidance to say that I don't need to do it.

So I was curious in the guidance whether or not there should be more explicit elaboration of the staff expectation in that regard? And I don't know what section it is. I highlighted Section 3.1 and 3.2, which is where you kind of talk about the scope of the hazards.

It doesn't explicitly say don't do it. But on the other hand you endorse NEI 12-06 and we, on

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the Subcommittee and I believe the Full Committee, have had presentations from the industry that said no, we don't have to evaluate those, because they are considered to be coincident hazards that are outside the scope.

So as I read through the guidance, you know, in terms of formalizing staff expectations for the industry and for staff reviewers, unfortunately we all walk out and get hit by a truck, there will be other reviewers who will take this guidance and use it. It would be nice to have staff expectations written down.

So that's just a comment that --

MR. BOWMAN: Yes.

CHAIRMAN STETKAR: -- I know what we have been told in the past that everybody who is vulnerable to this thing is already looking at it, but we have been told a lot of things orally. So now we have got guidance. So again, I -- it was just a comment.

MR. BOWMAN: Okay. Okay. Regulatory Guide 1.226, which the Committee saw as Draft Guide 13-01, is the guidance that carries forward the endorsement of NEI 12-06.

CHAIRMAN STETKAR: Now --

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MR. BOWMAN: In parallel with the regulatory guide, we are getting ready to publish for comment Revision 2 to the interim staff guidance document that -- did you have a question?

CHAIRMAN STETKAR: Yeah, I did, because now I'm really confused. I get the other 1.227, 1.228, sunset NE interim staff guidance. 1.226, I read through JLD-ISG-2012-01 Rev 1. I haven't seen Rev 2. But it seems to me that 1.226 ought to sunset that interim staff guidance. Ought it not? So why are you proceeding in parallel with Rev 2 to that interim staff guidance? Where is there a divergence between these two or why do we need?

MR. BOWMAN: There will not be much of a divergence. The rulemaking's intent is to make generically applicably -- applicable the requirements of the mitigating strategies order. Where you do see and will see divergence between the two may be at some of the wording because we have changed some of the wording of the requirements and it will definitely be in -- the interim staff guidance speaks to what is necessary or what is acceptable in order to comply with the order.

And so long as the order is -- has affect,

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the interim staff guidance will have meaning. Until the rulemaking is in effect and the implementation time period for the rulemaking is past, the regulatory guide does give a good indication for what licensees will need to do once the rulemaking comes into effect and compliance is necessary. But it has to point to the rulemaking.

CHAIRMAN STETKAR: So if I understand, let me make sure. You are saying you essentially need that Rev 2 of the interim staff guidance as a stopgap until --

MR. BOWMAN: Right. Where the --

CHAIRMAN STETKAR: -- the rulemaking is --

MR. BOWMAN: -- rulemaking --

CHAIRMAN STETKAR: -- approved and the final -- the regulatory guidance is actually issued --

MR. BOWMAN: That's correct.

CHAIRMAN STETKAR: -- relative to --

MR. BOWMAN: We have a great deal of work still ongoing for the licensees coming into compliance and performing the mitigating strategies assessments in order to determine whether or not they will need to make any changes for the rule, once the rule comes into effect.

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As I mentioned earlier, the final rule is due to the Commission in December. We anticipate briefing the Commission on the rule probably in the February or March time frame and then however long it takes the Commission to provide a staff requirements memorandum to direct the staff to publish it as a final rule.

And there will be some time period in there for us to make any necessary changes to the rule before it gets published and becomes effective.

So I would anticipate probably somewhere around the summer or fall as a potential effective date for the rule. We need to continue with the interim staff guidance for the order in order to provide guidance for licensees on what to do until then.

MEMBER BLEY: Because the reg guide refers to the rule, you can't issue the reg guide until the rule is out.

MR. BOWMAN: Until the Commission tells us what the rule is going to be and we finalize the rule, we can't really issue the reg guide until then.

MEMBER BLEY: Okay.

MR. BOWMAN: And if we did issue it before

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then, it wouldn't have any effect because that's not the current existing requirement.

CHAIRMAN STETKAR: Um-hum. Now, so I think I understand JLD-ISG-2012-01, Rev 2. How does the interim staff guidance related to the seismic -- I'm sorry, the reevaluated flooding hazard fit into all of this? In particular, JLD-ISG-2016-01, which is written for the integrated flooding assessments, which are, in my mind anyway and my mind might not be correct, part of the alternate strategies, the AMS/THMS that you have correctly drawn up down in that lower left hand corner of that blue box.

MR. BOWMAN: Okay. If you follow along the blue boxes on the left side of the slide, that is what is required by the order for the upper boxes and what we anticipate will be required by the rule for the lower blue boxes.

CHAIRMAN STETKAR: Um-hum.

MR. BOWMAN: These -- the justification for the requirement was the adequate protection exception that backs the rule. On the right hand side in the green boxes, we have the request for information, the letter that was issued concurrently with the order to drive the reevaluation of the

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seismic and flooding hazards.

For the flooding hazard, we had interactions with the Commission in COMSECY-14-0037 and COMSECY-15-0019 to lay out what our action plan for dealing with the information not in the context of what licensees have to do to comply with the order and the rule, but instead what other regulatory actions might be necessary.

So JLD-ISG-2016-01 provides the guidance to the staff on how to review licensee submittals in support of the Flooding Action Plan and those submittals would be either focused evaluations or integrated assessments. And I believe you were also briefed on the Phase II decision making process for the flooding. And that -- the letter for the flooding Phase II decision making process also included what to do with the information on the seismic reevaluation.

That will go into a regulatory decision on whether or not changes to the licensing or design basis for the licensees should take place, which could take the form of requests for additional information, demands for information or orders to modify the licensing basis. And there will also be a closure of the 50.54(f) letter in parallel with whatever

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regulatory actions need to take place.

So everything that is in the blue boxes, the best way to think of it is probably this is what is required or will be required for the treatment of beyond design basis events that deal with, in this case, the flooding of the seismic hazard.

The stuff in the green boxes is -- this is the information that may, in fact, change what we think of as being the design basis or the licensing basis for the licensees. So there is clearly an interaction between the two, because what we do for the treatment of the beyond design basis flooding or seismic will have an effect on the risk of what the hazard is on the green side and then it will have an input into the regulatory decision making process, but it doesn't immediately affect the licensing basis or design basis for design basis events for the licensees.

By licensing basis I mean as it would affect that is considered design basis events for the safety-related analyses, etcetera. Is that clear?

CHAIRMAN STETKAR: Oh, heck no, but it is clearer.

MR. BOWMAN: Then I've got job security.

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CHAIRMAN STETKAR: The picture kind of helps, I think.

MR. BOWMAN: It does.

CHAIRMAN STETKAR: So now let me ask you, given the discussion that we had with the industry earlier, explain to me how the seismic PRAs being performed in response to NTF Recommendation 2.1 and the staff's evaluation of those PRAs with regard to, I'll call it, Phase II regulatory decision making and the evaluations of seismic capability being performed according to Appendix H of NEI 12-06 and Regulatory Guide 1.226 all fit together.

In other words, what are you now, the staff -- I understand what you are doing for Phase II regulatory decision making on the flooding. I think I have got that.

The seismic stuff, I thought I had, but I don't think I have it any more. So if you can explain to me how all those pieces fit together to get to your Phase II box on the green side, I would appreciate it.

MR. BOWMAN: Okay. I should have included SPRAs in the focused evaluation integrated assessment block there, that is another activity that is having an input to the Phase II decision making, particularly

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for the seismic hazard. And I apologize for not putting it on the slides.

CHAIRMAN STETKAR: Well, it's --

MR. BOWMAN: Let's just --

CHAIRMAN STETKAR: -- below your sense.

MR. BOWMAN: It is existing in there and that goes into the Phase II decision making. These are two separate interconnected decision making processes that we have to go through. The blue boxes are deciding whether or not a licensee has met an obligation that has been imposed under the adequate protection exception to the backfit rule saying they have to have mitigating strategies. And in the rulemaking that they have to address the reevaluated hazards.

That was the output of the SRM we got on COMSECY-14-0037 was the thought that the staff needs to ensure that licensees address the reevaluated hazard, that's where we get the acceptability of the alternate strategies, the alternate mitigating strategies and the target hazard mitigating strategies.

CHAIRMAN STETKAR: And that's on the left side to help me out. It's color coding, it's on the

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left side and it has everything to do with what we were briefed on by the industry this morning. Is that correct?

MR. BOWMAN: That's correct.

CHAIRMAN STETKAR: Okay.

MR. BOWMAN: The industry didn't really brief you on which bins things fall into, in particular, for Path 5. A licensee that does the deterministic approach is demonstrating that FLEX, as it is or as it has been modified, can operate in the context of the reevaluated seismic hazard.

If a licensee uses a risk-informed approach that includes a characterization of the FLEX buildings, haulage pathways, etcetera, that also would be a demonstration that they have addressed the reevaluated seismic hazard with the FLEX strategies including the assumptions, the deterministic stylist assumptions that then extend loss of AC power or loss of normal access to the ultimate heat sink is taking place.

If they have not built the FLEX strategies into the SPRA, it would wind up really being an alternate mitigating strategy rather than a FLEX strategy because in that context, they would be

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attempting to show that they have a safe shutdown path that does not make the assumption of the occurrence of a loss of all AC power and a loss of normal access to the ultimate heat sink.

CHAIRMAN STETKAR: Let me just make sure, because I'm kind of specific-example oriented and I think the example of an ATWS is probably the easiest one to think of conceptually.

So suppose that a particular licensee does an assessment of the risk at the reevaluated seismic hazard and suddenly discovers that ATWS events are an important contribution to the seismic risk. Obviously, the FLEX equipment and the mitigating strategies have nothing to do with ATWS events.

And we were told this morning that nothing in the guidance of 12-06 and, by implication, nothing in the guidance of 1.226 addresses that. Where and how does the staff take those events into consideration? Because that would be, in principle what I heard this morning, part of your Phase II decision making that you have to make your, your know, reactor trip switchgear or something more robust.

MR. BOWMAN: I will let Mo answer that. But I would like to start out by pointing to we have

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the existence in the NEI guidance of the ceiling on what the risk can be at  $1e^{-4}$  or  $1e^{-5}$  for SLERF, which is essentially a come back and talk to us point and then we will figure out where we need to go from there.

CHAIRMAN STETKAR: So it's  $9.7 \times 10^{-5}$ . And it's  $9.7 \times 10^{-6}$ . So I just squeezed in under. I did all the pencil sharpening.

MR. BOWMAN: Sure.

CHAIRMAN STETKAR: And yet, it is much higher than those five numbers that were in there and much higher than deltas. Maybe I could make the ATWS risk  $10^{-30\text{th}}$  if I made a particular piece of equipment a little bit more rugged. I don't know, because I haven't seen any of these.

My question to you is how does that type of contribution to the seismic risk at the reevaluated hazard get into your purview? And I don't want to talk about  $10^{-4}$ , 1.01 versus 9.98, numerical screening criteria.

MR. SHAMS: Let me take a shot at that. So as Eric laid out and maybe -- on the figure and maybe I'll take another just simplification, you know, comment to it.

The blue boxes represent what we need to

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do for mitigating strategies. The green boxes represent what we need to do in general for the plant.

We are evaluating the hazards for the plant being flooded or seismic and we ought to deal with the consequence of the flooding or the seismic being higher than what the plant was originally designed for. So we needed an approach or a process for that.

And we had one laid out in the 50.54(f) letter. Calculate your hazard. Then the hazard is compared to -- the reevaluated hazard is compared to the current design basis. And it depends if you are in the flooding, there are processes there, you fit in a focus evaluation, perhaps you fit in an integrated assessment. It depends on what hazard that is causing the exceedance. Perhaps even the magnitude exceedancy, you know, would lead you down that road.

The outcome of that process, and again, I'm following flooding, I'll step back to seismic in a second, but just kind of finish.

The output of that process of a focused evaluation or an integrated assessment would essentially say that integrated assessments would go into a Phase II process, which we have laid out in the guidance for you a couple of months ago about how we

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are going to look at the results. Again, there is a lack of a mature probabilistic framework in that area, so we have a number of qualitative factors that we will be looking at.

We would assemble a staff senior review panel to be able to look at the results and look at the different factors warning time versus the nature of the hazard. So and from there comes an outcome again as a judgment on the plant current for safety, if you would, current adequacy of the current design base of the adequacy of the current design basis.

It would be either a closure of the letter, at this point, or there is a need to do more, be it an order for certain modifications or requests for decisions. So that's kind of describing the path for flooding.

For seismic it's, essentially, the same way. We have described as part of the 50.54(f) letter a number of scenarios as we see the hazard. The new hazard, reevaluated hazard exceeding the current design basis. If there is an exceedance -- I was going to get to SPRA.

CHAIRMAN STETKAR: Go ahead.

(Simultaneous speaking.)

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MR. SHAMS: I just wanted to --

CHAIRMAN STETKAR: You keep going. Keep going.

MR. SHAMS: Yes. You know, sort of to clarify this a little bit. So it depends on where the exceedance is over the spectrum of frequencies for the hazard. If it is from 1 to 10, there is an answer for it. If it's above 10, there is another answer for it. You know, if it's above the frequency of 10 hertz, then the licensee would need to do a high frequency. If it's above a frequency of 1 to 10 hertz, then the licensee is looking to do spent fuel pool evaluation as well as an SPRA.

We, about a year ago, went back and went from just a binary -- you know, if you are just a millimeter above your current hazard, you need to do an SPRA. Well, we have looked a little more closer or closer to the information we have, IPEEEs, the number of things that we have and then we sorted out that only 20 sites that would benefit from an SPRA, there is a potential for enhancements coming out of that study for these sites.

So that addresses those sites. They will be the ones that are doing a full scale, according to

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industry standard, according to consensus standards, on SPRA addressing all scenarios, addressing all equipment that comes out of the SPRA, the SPID lays out information to be submitted. And it's SCDF, SLERF, the contributors to risk and that's all target risk. It has nothing to do with ELAP or ultimate heat sink loss. It is ATWS, it's everything.

So the staff will have that in their hand.

And taking ATWS results, we have tools already in place in terms of backfit guidance, in terms of the Commission safety goals that we would take into the Phase II process just as we did for the flooding and we would make a decision on if that licensee is an appropriate region, if you would, or there is more to be done in there and that will be the outcome of a Phase II guidance. Closure of the letter or more to be done.

That's how an SPRA is -- or that's how the seismic is addressed, you know, in -- under 2.1, that's how it is addressed for the plant risk in general from seismic, not specifically from mitigating strategies.

What happens on the mitigating strategy side is just industry felt that as they described this

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morning, they have a sophisticated tool for these plants that had the highest hazard and they wanted to use that tool to inform what they need to do for that specific set of equipment. I wrote down the terminology used today.

The box that constitutes mitigating strategy, that was just an added bonus from the SPRA.

The SPRA has its own function that we know what it is going to be and what it is going to lead us down. They are using it for another, if you would, activity, another function. And therefore, that function is being well-designed to just suit what they need it to do.

Mitigating strategies, what do I need to do for mitigating strategy? So that's how -- and they are connected, but not necessarily one sort of takes over the other, that's not the case.

CHAIRMAN STETKAR: Mo, that, I think, helped me a lot. So make sure -- just to make sure I have got it here, I think what I heard you saying is that -- and I understand anyway or I think I understand the flooding thing.

So for seismic events, I thought I heard you say that every site that performs -- well, every

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site for which a seismic PRA is needed, and we have that list, will be subject to your Phase II decision making process.

MR. SHAMS: That's correct.

CHAIRMAN STETKAR: Regardless of what is going on, let's say, on the blue side. I mean, the information on the blue side can help that, but it -- by definition, if they do a seismic PRA, they will -- you will evaluate them according to your Phase II regulatory decision making guidance. Is that correct?

MR. SHAMS: That is correct, yes.

CHAIRMAN STETKAR: That is correct.

MR. SHAMS: Yes. And the first step of that would be just appropriate or the adequacy of the SPRA is looked at.

CHAIRMAN STETKAR: That's --

MR. SHAMS: And so on.

CHAIRMAN STETKAR: -- I don't care about the detail. I just want to make sure where you capture those scenarios that have nothing to do with--

MR. SHAMS: Yes.

CHAIRMAN STETKAR: -- the mitigating strategies, but that might be important seismic contributors to the overall risk.

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MR. SHAMS: That is true and they are not overlooked, yes.

CHAIRMAN STETKAR: Thank you.

MR. SCHULTZ: Mo?

CHAIRMAN STETKAR: Thank you.

MR. SCHULTZ: Just one question, because I think the diagram ties it together, but it might be missing one tip of the arrow. The COMSECY-15-0019 --

MR. SHAMS: Um-hum.

MR. SCHULTZ: -- you show it coming down, the line coming down and affecting mitigating strategies, but I think it is meant to show also that it ties into the green side of the chart with the little arrowhead up there.

MR. BOWMAN: It actually shows up in two spots on the chart.

MR. SCHULTZ: I know.

MR. BOWMAN: Because it has two above there.

MR. SCHULTZ: Yes, I see it over on the right hand side, too.

MR. SHAMS: Um-hum.

MR. BOWMAN: Yes.

MR. SCHULTZ: But I think it would help if

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it just demonstrated that there is one thing that ties things together in terms of demonstrating that it is-- you are asking the licensee to perform this. With both tracks of the evaluation, there is interaction with the staff on each one.

MR. SHAMS: Um-hum. Well, yeah. COMSECY-15-0019 was the beginning of integrating the two sides. For the longest time, the green side and the blue side were separate. And at a certain point, it became evident to us that they need to be integrated.

So COMSECY-14-0037 was the beginning of the question in the dialogue with the Commission and COMSECY-15-0019 was now the plan that the Commission asked us to lay out for ourselves and the licensees on how this is going to be done.

So you are absolutely right. It does impact both colors.

CHAIRMAN STETKAR: Thank you.

MR. SHAMS: Sure.

MEMBER RICCARDELLA: But I guess there is no arrowhead there because the flow is going the other way from that line, right? From the green to blue.

MR. SHAMS: We can make that graph next time, yes.

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MEMBER RICCARDELLA: No, no, I'm just clarifying.

MR. BOWMAN: It's just my attempt to try and lay out the -- where it affects things and I put it in there in two places instead of having --

MEMBER RICCARDELLA: Okay. I understand.

MR. BOWMAN: -- a two headed arrow. Okay.

In addition to the Path 5 in Appendix H, NEI 12-06 makes a few other editorial changes. There are two areas that we are currently including in the notice for the availability of the interim staff guidance document specific request for comment.

They have to do with the unavailability controls for the FLEX equipment. In one instance, it is the unavailability of FLEX equipment such that the site capability would be lost. That is to say if they need -- if they have got three pumps and they need two pumps, but they have two of them out of commission for some reason or unavailable for some reason, in prior versions of NEI 12-06, the specification was initiate action within 24 hours and complete compensatory measures within 72 hours.

In Revision 3, it is changing the initiation and completion times to 72 hours and seven

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days. Both of those sets of time frames are comparable to what we have for safety-related equipment like the turbine-driven auxiliary feedwater pumps and, frankly, they may be acceptable time periods, but we are seeking stakeholder input on formulating a good rational basis for why we are changing from what is in the current interim staff guidance and the underlying industry guidance document to what they have proposed in the new guidance document.

CHAIRMAN STETKAR: But in effect, and I read all these things, I originally had questions about the changes as I read 12-06. Then I read 1.226 and I said okay, the staff has sort of figured this out. And you have a -- there is a strategy in there that says you propose -- the staff is proposing, I guess, the limits that are up here somewhere in the -- well, in the text, but the staff is essentially saying go with the 70 --

MR. BOWMAN: What I said in the draft version of the interim staff guidance is continuing to use --

CHAIRMAN STETKAR: Not the interim staff guidance. Let me focus on the regulatory guide first.

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In the regulatory guide it says, basically, that the 14 day for non-protection and the, let me see if I can get it correct here wherever the heck my notes are, correct me if I'm wrong, because I'm -- we are doing -

MR. BOWMAN: Well, the 14 day one I cover on the next slide.

CHAIRMAN STETKAR: Oh, yeah, okay. I'll let you do that.

MR. BOWMAN: This is the --

CHAIRMAN STETKAR: You are essentially going to the 14 day for the inadequate protection, if I'll call it that, and the seven day for the -- is it seven day or shorter than that? I can't remember.

MR. BOWMAN: The way I have treated it in the draft version of the reg guide, which will be influenced by stakeholder feedback I get on the publication of the interim staff guidance document, of course, is to continue using the 24 hours and 72 hour initiation and completion times, unless there is a justification for the change.

What I'm looking for is do we have a reason based on operating experience or something like that, time frames that are actually necessary to do

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maintenance on the equipment, efficiency of performing the maintenance? Because we didn't have a -- we haven't yet had a public dialogue on the appropriateness of making this change.

CHAIRMAN STETKAR: But where --

MR. BOWMAN: Okay. In the end, what it says will be influenced by what we get from our stakeholder input.

CHAIRMAN STETKAR: I was going to say, but in the end, this is one of those areas where the interim staff guidance and the reg guide ought to be in lock-step, right?

MR. BOWMAN: And they will be.

CHAIRMAN STETKAR: They will. They can't -- you can't have these --

MR. BOWMAN: They will be.

CHAIRMAN STETKAR: -- times endorsed in different sets of staff guidance. But where are you on that? I mean, you haven't issued the interim staff guidance for comments yet. You haven't issued the reg guide for comments yet, right?

MR. BOWMAN: Um-hum.

CHAIRMAN STETKAR: So this is still up in the air in terms of interaction?

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MR. BOWMAN: We are at a -- I don't know where I am yet, because I haven't gotten the stakeholder input and I haven't gotten feedback from the Committee. If the Committee has input on it, well, I would appreciate it. And if the -- if I get-- depending on what input I get from public stakeholders, then we will, as a staff, come to a conclusion on whether or not the new time frames are appropriate.

CHAIRMAN STETKAR: On that feedback from the Committee, until --

MR. BOWMAN: I know.

CHAIRMAN STETKAR: -- the Committee decides to write a letter and if they decide to include this in their letter --

MR. BOWMAN: Oh, yes.

CHAIRMAN STETKAR: -- so that's speculation. Curiosity, my curiosity is how do you get around this? I mean, these are all, in my mind, arbitrary times. They are just arbitrary times. So how -- what sort of dialogue now are you looking for in terms of feedback from stakeholders, from the industry to say that, you know, one set of arbitrary times is any better or different than another set of

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arbitrary times? They are obviously different.

MR. BOWMAN: Well, what I'm looking for is potential benefits of extending the time limits taking into account any operating experience that licensees that have come into compliance have. Are there any problems out there? You probably -- you have seen some of the buildings that the licensees have. Are there benefits to being able to more efficiently perform maintenance on the equipment at the same time? Things like that.

Whatever -- the full gamut. I need to be able to form a rational basis, because I'm not allowed to do arbitrary things.

CHAIRMAN STETKAR: Well, okay. Then what is your, as a member of the NRC staff, basis for 24 hours and 72 hours? What's the technical basis for that?

MR. BOWMAN: The 24 hours and the 72 hours was a proposal that industry made. I judged it by comparing it to allowable outage times for equipment in technical specifications that have been developed. The standard technical specifications, for example, turbine-driven aux feedwater pumps and RIC-C are on the order of 72 hours to seven days in length and we

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have the existing staff positions that that is an acceptable amount of time for that type of piece of gear to be unavailable to perform a safety function.

CHAIRMAN STETKAR: And many people are proposing to do plant-specific risk-informed applications to alter that.

MR. BOWMAN: Right.

CHAIRMAN STETKAR: Because those times might not have any technical basis whatsoever. They are simply numbers that are historically in technical specifications.

MR. BOWMAN: Right.

CHAIRMAN STETKAR: So my question is in today's day and age, in 2016, and I was going to ask the industry on this, but I didn't have time, because I needed to understand the paths, what sort of basis did the industry have originally? I don't -- they have now proposed a couple different sets of times. And you know, there are dramatic differences in some of those times. There must be some basis, not just that it's sort of oh, yeah, we thought about it and these sound better to us today.

MR. BOWMAN: Um-hum.

CHAIRMAN STETKAR: Did people use risk

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information? Do they think about this or is it just throwing numbers out there and saying well, other people have used these numbers and tech specs, so why can't we? I'm really curious about how you are going to get this resolved, because in the current Draft Regulatory Guidance, at least for the 24/72 versus 72 and seven days, the subject of this slide here, the regulatory guidance says well, you are proposing the 24 and 72, but a specific licensee can come back and try to justify longer times. And that's okay.

You know, I want to do a risk-informed tech spec submittal or if I want to do a risk-informed change to my unavailability times for my FLEX equipment, you know, I have to be able to do that. So I thought that that caveat in there was fine. You know, regardless of what number you had in there.

MR. BOWMAN: Well, there are some things that may not be necessarily risk-informed. Like the 24 hours or 72 hours, other things that, frankly, I would take into account would be operational and engineering judgment. Somebody notices a problem, initiation of actions to correct the problem and take the form of putting in a corrective action to have the problem addressed.

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And if that individual is only working 8 to 12 hours a day, maybe 24 hours is long enough. Maybe we don't need 72 hours in order to go on a corrective action item. There may be other considerations that I'm unaware of. Benefits can have something to do with how much of a burden it imposes on licensees.

So frankly, that's why we have the request for information and will, as the staff, get a multi-disciplinary review of it and figure out what we feel is the appropriate answer.

CHAIRMAN STETKAR: That's fair. I just wanted to make sure of that.

MR. BOWMAN: Yeah.

CHAIRMAN STETKAR: So basically, it's to be determined yet.

MR. BOWMAN: Right. For the second request for --

CHAIRMAN STETKAR: When by the way, since you mentioned the ACRS?

MR. BOWMAN: We are currently planning. We will have. We are going to have a subcommittee meeting, as you are aware, in November 16.

CHAIRMAN STETKAR: Thank you.

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MR. BOWMAN: Got it on my calendar.

CHAIRMAN STETKAR: On the rulemaking. And we are tentatively planning to write a Committee letter at our December Full Committee meeting on the rulemaking. And we were planning to write that letter to include the supporting regulatory guidance. It doesn't sound like Regulatory Guide 1.226 is going to be ready by that time. Is it?

MR. BOWMAN: It may or it may not. It depends on the time frame for getting it published into the Federal Register.

CHAIRMAN STETKAR: Well, but you still have to have stakeholder interaction?

MR. BOWMAN: Oh, yeah.

CHAIRMAN STETKAR: You've got --

MR. BOWMAN: Yes.

CHAIRMAN STETKAR: It will be a 30-day comment period.

MR. BOWMAN: We're out there against it.

CHAIRMAN STETKAR: That's right. Okay. Thank you.

MR. BOWMAN: The second request for stakeholder input had to do with the -- what you characterize as the inadequate protection provision.

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The current version allows 45 days for an unprotected, but available set of equipment. The new version -- and essentially, there was a misunderstanding, not a full meeting of the minds on how many pieces of equipment could be unprotected.

In the new version, the time frame is tightened up to 14 days and it is allowed to be multiple sets of equipment that are in an unprotected condition.

CHAIRMAN STETKAR: Can you get that? So in the new version, can you get down less than N?

MR. BOWMAN: Right.

CHAIRMAN STETKAR: For 14 days. Regardless of how many N is.

MR. BOWMAN: Right.

CHAIRMAN STETKAR: You can be -- oh, okay. I missed it.

MR. BOWMAN: There is an interaction with some things that licensees have been doing for shutdown risk management, repositioning equipment so that it is available. For example, repositioning a core injection pump so they can rely on it for shutdown risk management in the event something happens during a shutdown period.

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But the areas where they get preposition can be in a -- not 100 percent protected location. The stakeholder input we are seeking is how should we treat that? Is it appropriate to have another criterion, say a different time frame for which we can have prepositioning in an unprotected location for the purposes of shutdown risk management, because 14 days may not be long enough for a refueling outage in order to capture the safety benefits of prepositioning the equipment.

MR. SHAMS: So, Mr. Stetkar, I need to pause here for a second and indicate that due to a late emergent items related to the ISG, we are actually contemplating having a different -- an additional input item for stakeholders. So I'm going to have Mike Franovich share with you, he is the Director for JLD, the context of what I'm talking about.

MR. FRANOVICH: Thanks, Mo. In the sense of openness and full disclosure, I did receive a nonconcurrency on NEI 12-06, Appendix H, hotel. That nonconcurrency was sent to me last night from two staff members from the Division of Risk Assessment. It is not a public document at this stage in our

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process, so I'm not in a position to disclose the details, at this point, but when we are at the appropriate point when we have done the evaluation of the concerns that were raised, we will share those with the Committee.

Regarding the FRN, the Federal Register Notice that would be going out for the comment, the public comments on the ISG 120 -- regarding 12-06, we will frame a question, express a question asking for stakeholder views on the nonconcurring views and the evaluation from the staff regarding those views. So that's the third item that will go in the package.

So that will delay issuance of the Federal Register Notice for the 30-day comment period.

The general theme, I can talk about. It's regarding application or applicability of Reg Guide 1.174, principles, and the context of what is being done to support the rulemaking. And then there are some alternatives proposed in the conceptual alternatives proposed in these issues raised by the two staff.

So I'm going to leave it at that.

CHAIRMAN STETKAR: Thanks, Mike, that helps. I'm hoping that by the time of our November

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16th Subcommittee meeting, you might have a little bit more information than that, because that Subcommittee meeting addresses the rule and the three reg guides. So you know, that --

MR. FRANOVICH: I'm probably going to be in opposition, because we don't typically sit on responding to nonconcurrences since it's a critical path issue --

CHAIRMAN STETKAR: Yeah.

MR. FRANOVICH: -- for us.

CHAIRMAN STETKAR: Yeah. Thank you. Anything more? I know you have one closeout slide. We are getting close to --

MR. BOWMAN: That covers the --

CHAIRMAN STETKAR: -- reaching our --

MR. BOWMAN: -- substantive material I had for you. I'm ready for any questions you have got.

MEMBER BLEY: Yeah, I want to ask you the same thing I asked the other guys. You sort of hinted at it, but I didn't get it clearly.

Typically and in the flooding that was the case and here the way it is posed, Path 5 getting down to a risk-informed integrated assessment is the most thorough thing one can do. Yet, here, if the risk is

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above a certain threshold, instead of doing the more powerful thing, the guidance says to do the deterministic thing unless they come and work with you. Can you explain the logic behind that from your point of view?

MR. SHAMS: Let me take a shot at that. So I believe you are -- we're talking about this slide.

MEMBER BLEY: The top line on that slide.

MR. SHAMS: Yes, yes.

MEMBER BLEY: And the note -- and the guidance that says the same thing.

MR. SHAMS: Sure.

MEMBER BLEY: Yeah.

MR. SHAMS: So just addressing, addressing this slide and the top note on it, as far as the deterministic path only, I believe in our view that this is more of a hypothetical situation than an actual one. We are not particularly aware from just a seismic SCDF perspective that we will be dealing with plants that have a higher risk than  $1e^{-4}$ .

Part of the reason we have introduced or we give comments to the industry in developing their guidance on the need to introduce the threshold of  $1e^{-4}$

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is well, you have noticed this morning that the guidance is laid out to a specific set of equipment called mitigating strategies, SSCs.

So trying to make that or trying to have this approach similar to the broader approach of addressing mitigating strategies, we have indicated that you have to address other failures other than what is actually happening just with the mitigating strategies equipment.

If we look at NEI 12-06, there are inherent assumptions associated with consequential failures are not -- you know, are assumed not to happen. You know, every piece of equipment that I am going to put in the mitigating strategy is not assumed to be failed by something else.

So to go with the SPRA, we felt that you have to demonstrate that early on before you start narrowing down the SPRA study to just that set of equipment that is related to mitigating strategies.

So the  $1e^{-4}$  knowing that we would already have looked at that as part of 2.1, I just laid out that the entire information is available to us. The entire SPRA with all sequences and all inputs is available to us and the licensee that has a high risk

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would be having dialogues with us about what mods that you need to do to improve your risk.

I would reiterate that I don't believe that we are going to be in a place where we are going to have the licensee that has a  $1e^{-4}$  and we will tell the mitigating strategy will be fine, just go make sure that it meets, you know, a particular capacity criteria and you are fine.

So again, the way it is presented on the slide, I think it is implying --

CHAIRMAN STETKAR: But the guidance says if you are above  $1e^{-4}$ , you can take the deterministic path and show the mitigating strategies.

MR. SHAMS: Well, that's the industry's position on it. We are still reviewing that guidance and we are looking at it. And we will again dialogue with them on it. But that's -- that cannot be done in -- I would take it on its face value, but I would say that from the staff's perspective, that deterministic evaluation is not done, absent that, you know, what we are learning from 2.1. What we are learning from the remaining, you know, sequences of --

(Simultaneous speaking.)

CHAIRMAN STETKAR: See that makes sense to

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me, but when you get to that point, taking the risk-informed path seems to be the more thorough one, so I'm not sure why. I'm not -- you guys say you can come to us and talk to us or they say that.

MR. SHAMS: Yes.

CHAIRMAN STETKAR: Which I guess came from some negotiation.

MR. FONG: Dr. Bley?

CHAIRMAN STETKAR: Not quite.

MR. FONG: I just wanted to weigh in. This is C.J. Fong with NRR Division of Risk Assessment. You know, you described the risk-informed path is the more powerful path. Coming from a risk background, I like that choice of words, but I think if you look at the way the delta is calculated, at least in what the industry is proposing, the risk-informed path would allow a lower reduction in risk than the peer deterministic compliance.

So I think looking at it from that perspective, we felt like those plants in the higher risk category with seismic CDF by itself in excess of the subsidiary risk goals, we didn't want to extend them the flexibility to allow a lesser reduction in safety.

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MEMBER RICCARDELLA: Let me try something.

MR. FONG: Sure.

MEMBER RICCARDELLA: Dennis, maybe this will help. I view that the deterministic path only as saying go out and fix that FLEX equipment so it can withstand the higher GMRS.

MR. SHAMS: Correct.

MEMBER RICCARDELLA: And if you are above that -- and this is strictly in the context of Appendix H and the FLEX equipment, if you are below that line, you can say well, my delta risk is small, so I don't have to fix the FLEX equipment.

MR. SHAMS: Right.

MEMBER RICCARDELLA: I can -- I don't have to make it withstand the GMRS, the higher GMRS. Okay?

MR. SHAMS: But that's --

(Simultaneous speaking.)

MEMBER RICCARDELLA: That's how I view that.

MR. SHAMS: But we are not abandoning the risk thinking --

MEMBER RICCARDELLA: No.

MR. SHAMS: -- for that set of plants. But that is being done at 2.1.

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MEMBER RICCARDELLA: On the green side.

MR. SHAMS: You know, we are not ignoring it. It is happening, but it is happening on the green side.

MEMBER RAY: Well, I think Pete -- well, I agree, but that's at least what I take away from it.

UNIDENTIFIED SPEAKER: I feel that's more conservative.

MEMBER BLEY: I hear what you say.

MR. SHAMS: I hope that was satisfying.

CHAIRMAN STETKAR: Any more questions for the staff? Mike Corradini, any questions for the staff?

MEMBER CORRADINI: No, I'm just listening, John. This -- the folks in the room are much more expert on the details of this, so I'm just listening.

CHAIRMAN STETKAR: Thank you. If not, thank you very, very much.

What I would like to do now is ask if there are any members of the public or anyone else in the room here who would like to make a comment? And if not, then I'll ask -- I understand that the bridge line is open. I'll ask if there is any -- if there are any members of the public on the bridge line who

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would like to make a comment? Please, identify yourself and do so.

Hearing none, we will do one final thing, as we always do in a Subcommittee meeting, is go around the table and see if any of the Members have any final comments that you would like -- that they would like to make. And I'll first extend the table out there to Wisconsin. Mike, do you have anything, final comments?

MEMBER CORRADINI: I've been listening to the discussion by you and Dennis and Pete, in particular, about how all this fits together. I guess I don't completely see how it all fits, but I'm going to rely on you guys to kind of come back to it. But I think that's where I am. Because if I ask enough questions, it will just confuse the hell out of it. So I guess I'm going to say that I don't have any additional comments.

I would appreciate -- I appreciate NEI and the staff taking us through the document and explaining how they view things, but some of the connection points to me are still not connected. So I'm going to have to talk with you guys when we are discussing whether or not to move forward with the

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letter and what to discuss in the letter. That's it for me.

CHAIRMAN STETKAR: Thanks, Mike. Ron?

MEMBER BALLINGER: Nothing further.

CHAIRMAN STETKAR: Harold?

MEMBER RAY: No. I just made one statement which was to agree with Pete and it's the one thing I have taken away as a key element of what has been presented, as far as I'm concerned. So I don't have anything else to add.

I just think that the FLEX equipment in those circumstances, taking a deterministic approach to complying with the higher seismic requirement is the right thing.

CHAIRMAN STETKAR: Okay.

MEMBER SKILLMAN: No further comment.

CHAIRMAN STETKAR: Matt?

MEMBER SUNSERI: Well, I found the presentations helpful for understanding. Likewise, like Mike, I still have some questions about how it all connects together.

CHAIRMAN STETKAR: Dennis?

MEMBER BLEY: Nothing more. Thanks.

CHAIRMAN STETKAR: Pete?

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MEMBER RICCARDELLA: You know, returning to my concern about Path 3 and the fact that that doesn't address the -- I think maybe it is being answered. Can I assume that Path 3 kind of consists of being below this line and either the risk is so small or the delta risk is small enough that you don't need to fix the FLEX equipment, so that logic seems --

MR. BOWMAN: Path 3 winds up being --

MEMBER RICCARDELLA: -- to avail --

MR. BOWMAN: -- another --

MEMBER RICCARDELLA: -- and maybe you could argue that it's only three plants, so we don't need it.

MR. BOWMAN: It winds up being one that we categorize as an alternate mitigating strategy. They have demonstrated a safe shutdown path, two safe shutdown paths.

MEMBER RICCARDELLA: But then I guess my colleagues will have some questions about the quality and the thoroughness of those IPEEE.

CHAIRMAN STETKAR: And we raised that concern on -- I think in the preceding Subcommittee meeting on this topic or some other topic. And we were assured that the staff has taken a good hard look

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at those -- at the IP -- either has taken or will take a good hard look at those IPEEEs that were submitted, you know, apparently for those three plants.

MR. SHAMS: Yeah, it's a good opportunity to respond to that. Yes, we have and the SPID laid out in it the different types of IPEEEs and what needs to be done to bring an IPEEE that was not a full scope IPEEE to be such that.

And also, part of the 2.3 walk-down was to assure that any corrective actions that were identified as part of the IPEEE or otherwise were implemented, done or at least, you know, timely being done.

So we have done an earnest job to make sure that the IPEEEs coming to us were of the appropriate quality.

CHAIRMAN STETKAR: And essentially, only three of them passed the mustard for whatever reason.

Jose?

MEMBER MARCH-LEUBA: No comments.

CHAIRMAN STETKAR: Walt?

MEMBER KIRCHNER: Just a small comment on this chart that we have discussed previously. Really that middle band, isn't that a PRA-informed path?

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Because you use the risk-informed methods to get to this SCDF and SLERF. Is that the acronym?

So I just wanted to concur with Pete. I felt that if you had such a high, a relatively high frequency for those two categories, then going to deterministic path represented a more conservative approach actually.

MR. SHAMS: It is. We agree. And I think Pete said it well for us. It's a combination of being more conservative on how we address FLEX plus what we are going to do in 2.1 on how to make sure that the risk is appropriately at rest, the broader contributor to risk.

MEMBER KIRCHNER: And then my other comment or request would go back to John's queries about the time change. Can we ask NEI to tell us why they are proposing to go from this 24 hour and 72 combination to 72 and seven days?

CHAIRMAN STETKAR: We can. We have to be cognizant -- we have another Subcommittee meeting at 1:00 and I'm not going to sacrifice that. So --

MEMBER KIRCHNER: All right. Thank you.

CHAIRMAN STETKAR: Yes. You can ask that now or we can wait to see what shakes out of the next

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round on the timing. Charlie?

MEMBER BROWN: No comments.

CHAIRMAN STETKAR: Joy?

MEMBER REMPE: No comments. Thank you.

CHAIRMAN STETKAR: Thanks again to NEI, industry. This wasn't just NEI. There were a lot of folks up there, and the staff.

I think that you have heard kind of our questions and comments, the areas where there is still a little bit of confusion, some of it is the deterministic requirements and the threshold, you know, why the threshold is where it is and what's the basis for that.

Some of it is on the timing, which is just part of the guidance, you know, coming to some agreement and some basis for an acceptable -- a mutual acceptable set of unavailability times.

And I think still you hear a little bit of, more than a little bit, uncertainty among us about how the entire staff decision making process will move forward. How you will consider the bits and pieces and, essentially, how you will consider the -- it's a nice graphic. I like it.

The green side, how you get to a Phase II

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regulatory decision on the seismic, in particular, because I think the flooding is better laid out in my mind, at the moment, and how that process relates to, in particular, the guidance in NEI 12-06, Appendix H and Regulatory Guide 1.226.

Because I think that the ACRS will need to be very clear on that by the time the ACRS writes a letter on -- not so important to hear the rule language, but in particular the guidance in 1.226 endorsing NEI 12-06, appendix -- you know, in its entirety basically.

We want to make sure that there isn't any -- there aren't any holes out there. There isn't anything that is kind of somehow subtlety slipping through a gap.

So if in our November Subcommittee meeting, this is to both the industry and the staff, if you can help us a little bit better understand that the integrated evaluation of seismic events, I think it would help us.

Anything else? Walt, I'm sorry to cut you off, but whatever they answered, it would only come back after the stakeholder interaction anyway, so we will hear about that hopefully in November.

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And with that, we are adjourned.

(Whereupon, the above-entitled matter went  
off the record at 12:08 p.m.)

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# Revision 3 to NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide

October 19, 2016  
Andrew Mauer  
Sr. Project Manager, NEI



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# Status

- NEI 12-06, Rev. 3 submitted for NRC Staff review and endorsement on 9/22/2016
- Appendix H contains guidance for seismic mitigation strategy assessments (MSA) for all plants
- April 22 briefing provided overview of MSA for plants where the  $GMRS \leq 2xSSE$ 
  - These MSAs will be submitted by August 2017
  - JLD-ISG-2012-01 endorsed the guidance on January 22, 2016
- This revision contains seismic MSA guidance for plants where the  $GMRS > 2xSSE$

# Seismic MSA Paths

Appendix H MSA Path	Relationship between Reevaluated Seismic Hazard and Seismic Design Basis	Approximate number of sites following each Path
Path 1	GMRS < SSE	10
Path 2	GMRS > SSE only > 10 Hz	11
Path 3	GMRS > SSE but < IPEEE (1-10 Hz)	3
Path 4	GMRS ≤ 2xSSE (1-10 Hz)	24
Path 5	GMRS > 2xSSE	12

# Path 5 Overview

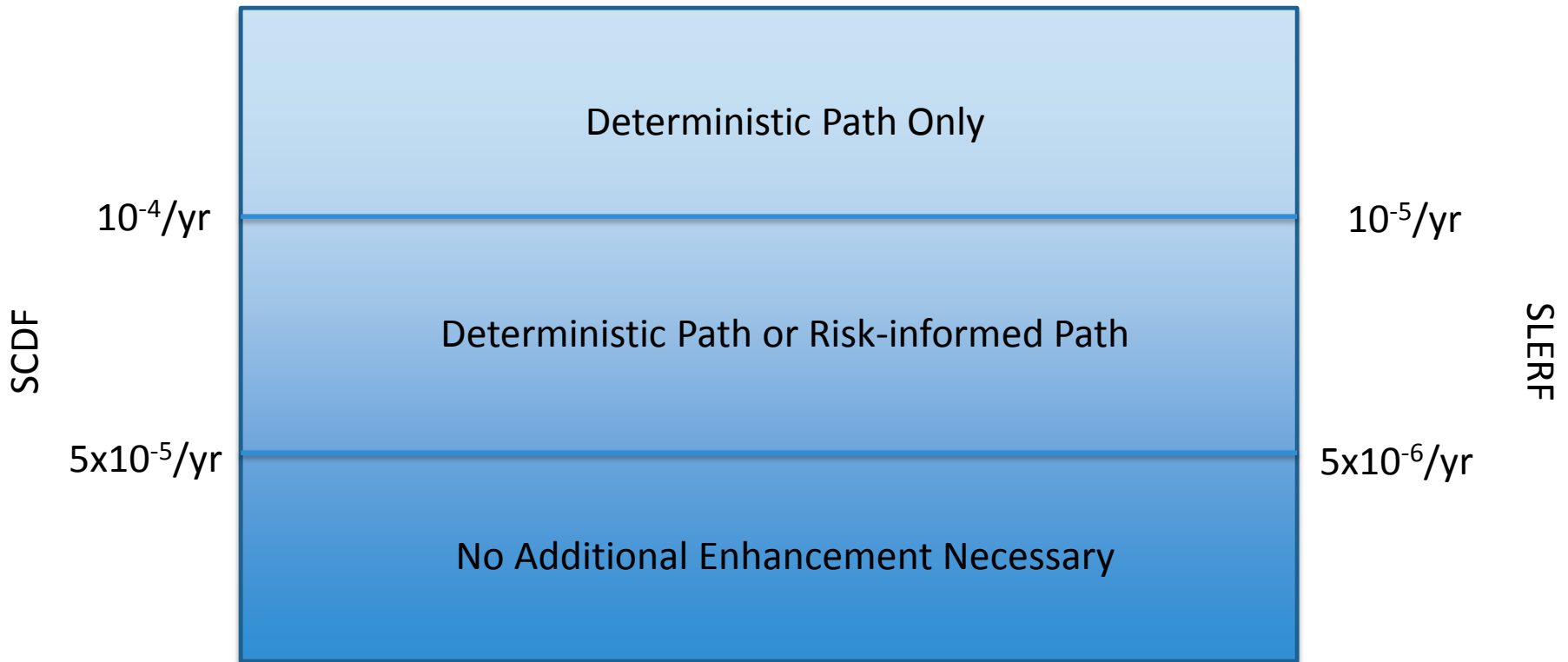
- Path 5 applies to plants that have already completed SPRAs under NTF Rec. 2.1
- SPRAs will have undergone NRC staff review and the potential for plant-specific backfit will have been assessed
- Path 5 provides options for deterministic and risk-informed assessments
- Deterministic assessment includes:
  - An option that is consistent with that used for Path 4
  - An option that uses results and insights from the plant SPRA
- Risk-informed assessments take advantage of the safety insights gained from seismic PRAs to address the impacts of the MSSHI as an AMS.
- Since the SPRA does not include the spent fuel pool (SFP), a separate deterministic evaluation of SFP cooling is needed

# Basis for Plant Safety

- Path 5 plants will have performed SPRAs and submitted results to NRC prior to performing MSA
  - NRC's Phase 2 decision-making process will consider safety enhancements
- The Safety/Risk Assessment Panel for GI-199 concluded:

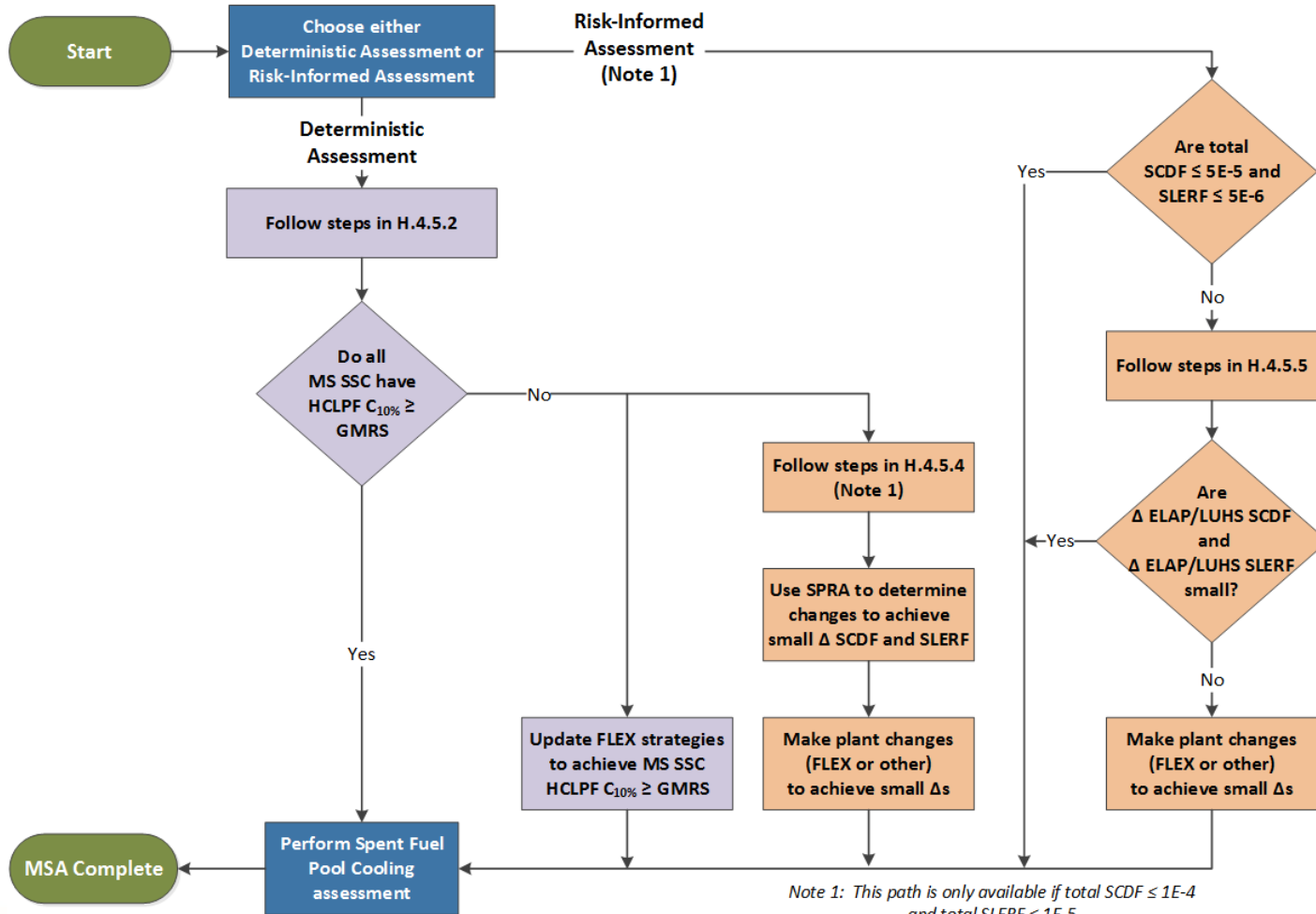
*“Overall seismic core damage risk estimates are consistent with the Commission’s Safety Goal Policy Statement because they are within the subsidiary objective of 10-4/year for core damage frequency. The GI-199 Safety/Risk Assessment, based in part on information from the U.S. Nuclear Regulatory Commission’s (NRC’s) Individual Plant Examination of External Events (IPEEE) program, indicates that no concern exists regarding adequate protection and that the current seismic design of operating reactors provides a safety margin to withstand potential earthquakes exceeding the original design basis.”*
- SPRAs provide a robust tool to confirm this for the Path 5 plants and to provide insights on key contributors
- Decision-making for Path 5 plants is focused on most significant risk contributors to seismic safety

# Risk Regimes for Path 5\*



\* - Most limiting of SCDF or SLERF controls approach

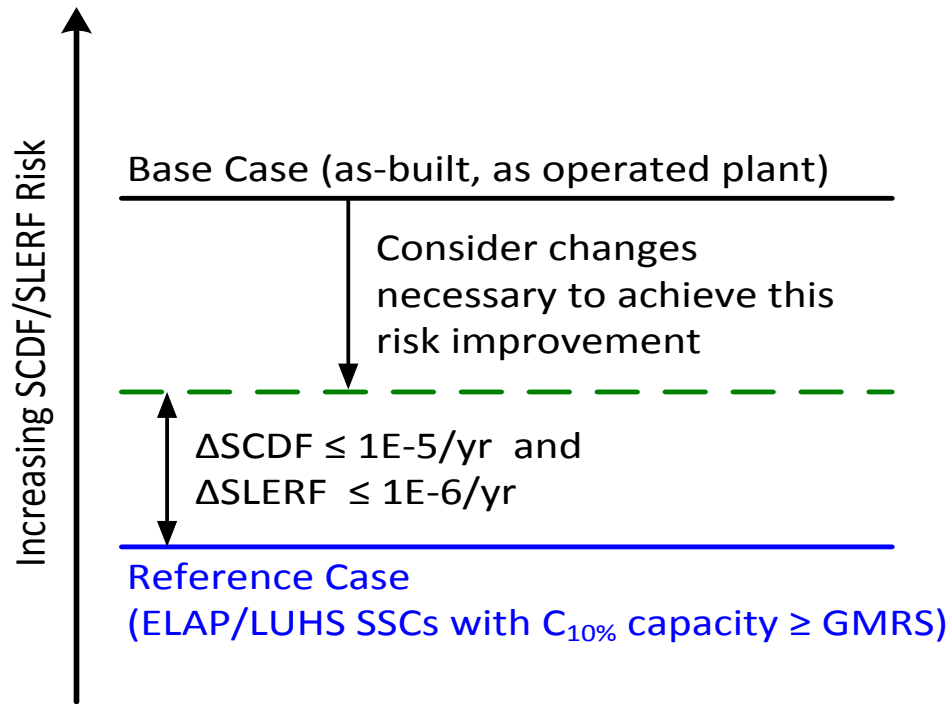
# Path 5 Illustration



# Deterministic Assessment for Path 5

- GMRS exceeds the SSE between 1-10 Hz by more than 2 times
- Relies upon:
  - Expedited Seismic Evaluation Process, with updated seismic evaluations to the full GMRS
  - Qualitative assessment of inherently rugged SSCs based on seismic experience
  - Quantitative assessment of remaining FLEX SSCs
- The MSA will also address spent fuel pool cooling and include a high frequency evaluation consistent with Path 2
- The MSA will confirm that the FLEX strategies can be implemented as designed or identify where plant modifications may be needed

# Illustration of Risk-Informed Approach





# Deterministic Approach with Risk Insights

- SPRA can be used to determine whether modifications to mitigating strategies SSCs that do not meet the Appendix H performance criteria would provide a significant impact on safety
- Approach is to determine the potential risk reduction (relative to the base SPRA results) that would be obtained by modifying mitigating strategies SSCs so that their capacity meets the performance criteria
  - May only be used if the overall SPRA results are less than  $1 \times 10^{-4}$ /yr SCDF and  $1 \times 10^{-5}$ /yr SLERF
  - If this risk reduction (delta-risk) potential is low, the likelihood of maintaining the key safety functions of core cooling and containment integrity is high
  - If delta risk is not low, modifications can be defined and evaluated to reduce the base SPRA results until delta risk is acceptably low; consider
- Separate evaluation of SFP cooling

# Risk-Informed Approach [SPRA]

- Overall plant seismic risk results from peer reviewed SPRA must be less than  $1 \times 10^{-4}$ /yr SCDF and less than  $1 \times 10^{-5}$ /yr SLERF
- Assessment uses delta risk based upon ELAP/LUHS SSCs, accounting for the contribution of ELAP/LUHS SSCs to other seismic scenarios
- Approach is to determine potential risk reduction (relative to the base SPRA results) that would be obtained by modifying ELAP/LUHS SSCs (or other plant SSCs) to improve their seismic capacity
  - If delta risk (relative to a reference case where all ELAP/LUHS SSCs meet the performance criteria) is low, there is high likelihood that key safety functions for core cooling and containment are maintained for ELAP/LUHS – FLEX continues to add defense-in-depth/safety margin, and the existing plant design provides the high likelihood of maintaining safety functions
  - If delta risk is not low, consider plant modifications (not limited to ELAP/LUHS), or model updates to credit FLEX, or procedure changes and re-perform delta risk calculation until delta risk is acceptably low
- Separate evaluation of SFP cooling

# Summary

- Path 5 approach addresses the reevaluated hazard information consistent with the NRC rulemaking for mitigation of beyond-design-basis events
- Risk-informed approach facilitates smarter plant improvements by allowing plants to credit permanent plant improvements rather than focusing solely on mitigating events after they happen



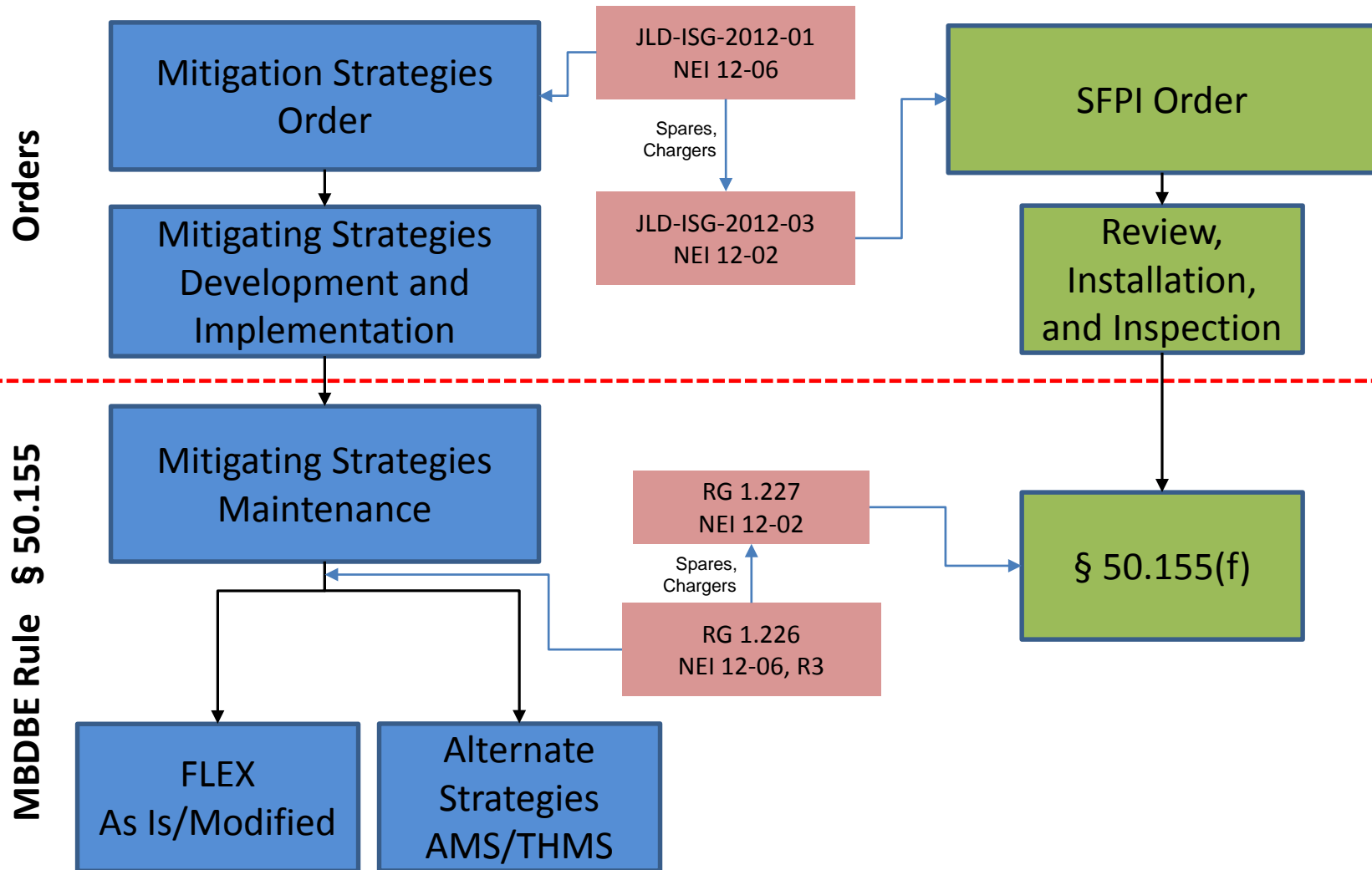
# **Regulatory Guides for the Mitigation of Beyond-Design-Basis Events Rulemaking**

ACRS Fukushima Subcommittee

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# Interaction of Mitigating Strategies Order, Rule and SFPI Order



# **RG 1.227: Wide-Range Spent Fuel Pool Level Instrumentation**

- Carries forward JLD-ISG-2012-03 endorsement of NEI 12-02, Revision 1
- No substantive changes are intended
  - Edits to background section
  - Removal of ISGs from related guidance section
  - Addition of parenthetical example in section 3.4
  - Clarifications of purpose of SFPI

# April 22 Fukushima Subcommittee

## NEI 12-02, Section 3.4

### Shock and Vibration

For the effects of shock and vibration in the area of instrument channel component use after an event for applicable components (**with the exception of battery chargers and replaceable batteries**), the following measures are acceptable to verify that the design and installation is adequate. This qualification does not apply to the mounting of components, which is discussed in section 3.3.

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### Seismic

For seismic effects on instrument channel components used after a potential seismic event for only installed components (**with the exception of battery chargers and replaceable batteries**), the following measures are acceptable to verify that the design and installation is adequate. This qualification does not apply to mounting of components, which is discussed in section 3.3.

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# April 22 Fukushima Subcommittee

## NEI 12-02, Section 3.6

### Power Supplies

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All channels of SFP level instrumentation shall provide the capability of connecting the channel to a source of power (e.g., portable generators or replaceable batteries) independent of the normal plant AC and DC power systems. For fixed channels this alternate capability shall include the ability to isolate the installed channel from its normal power supply or supplies. The portable power sources for the portable and installed channels shall be stored at separate locations, consistent with the reasonable protection requirements associated with NEI 12-06 (Order EA-12-049). The portable generator or replaceable batteries should be accessible and have sufficient capacity to support reliable instrument channel operation until off-site resources can be deployed by the mitigating strategies resulting from Order EA-12-049.

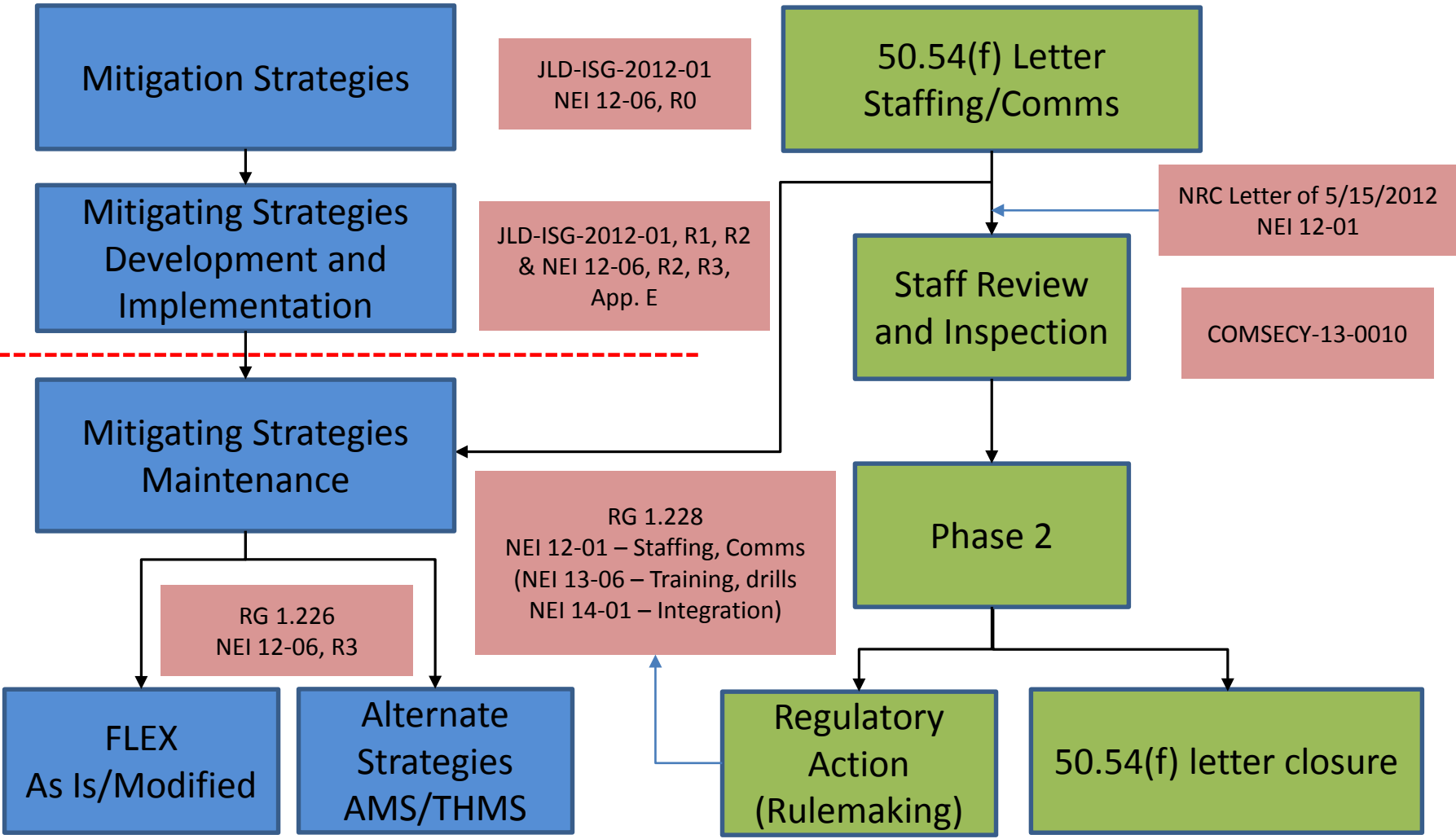
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# Interaction of Mitigating Strategies Order, Rule and Onsite Emergency Response

Order EA-12-049

MBDBE Rule § 50.155



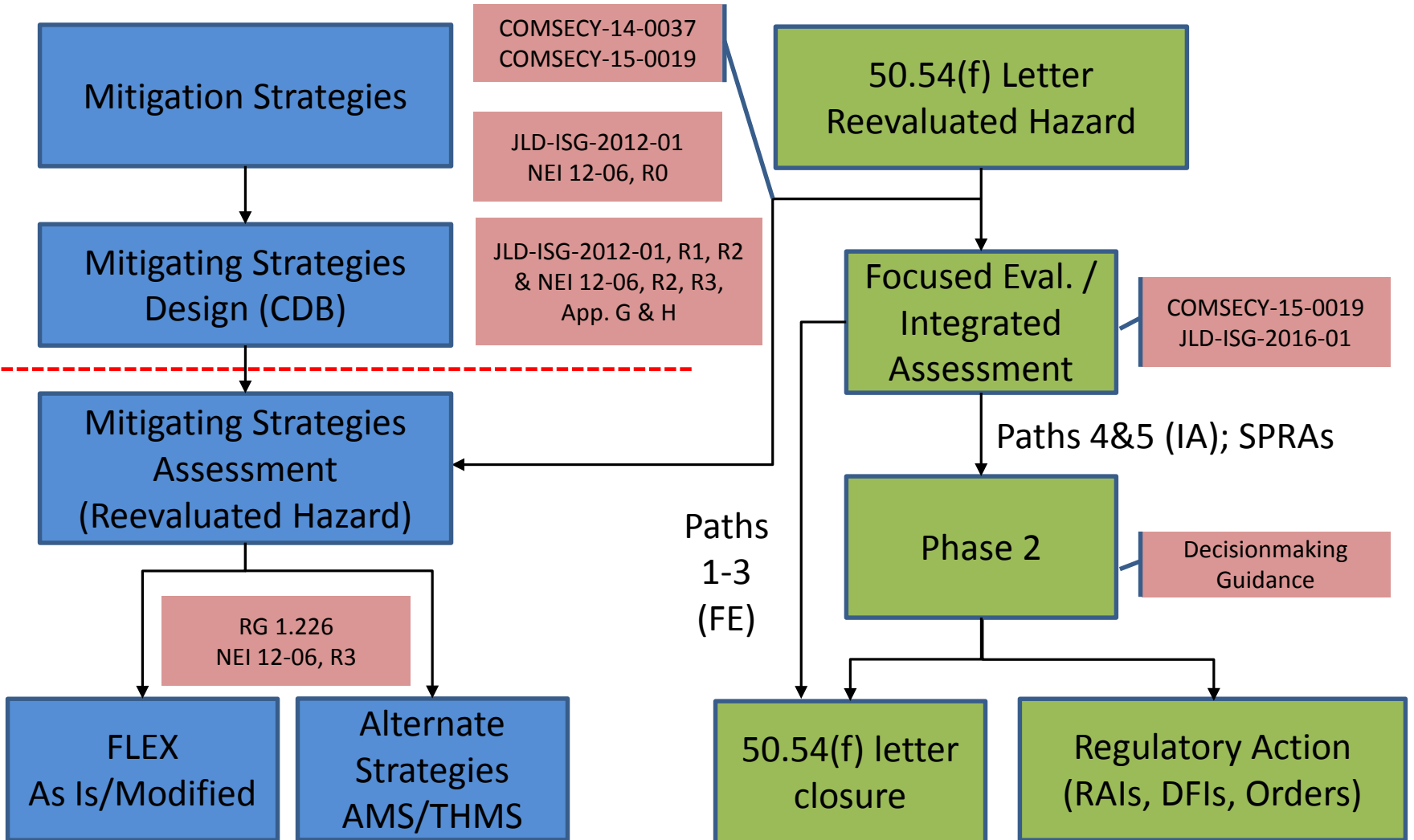
# RG 1.228: Integrated Response Capabilities for Beyond-Design-Basis Events

- Carries forward endorsement of NEI 12-01 to support staffing and communications
- Endorses Revised NEI 13-06, “Enhancements to Emergency Response Capabilities for Beyond Design Basis Events and Severe Accidents,” and NEI 14-01, “Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents”
- Addresses SRM-SECY-15-0065 direction that:
  - staff should ensure that any NRC-endorsed guidance for the proposed rule will provide for appropriate coordination of the FLEX support guidelines, extreme damage mitigating guidelines, and voluntarily maintained SAMGs with the existing Emergency Operating Procedures (EOPs) at each plant (e.g., appropriate transition criteria between EOPs and guidelines and clarity of command and control).

# Interaction of Mitigating Strategies Order, Rule and Reevaluated Hazards

Order EA-12-049

MBDBE Rule § 50.155



# **RG 1.226: FLEXIBLE MITIGATION STRATEGIES FOR BEYOND-DESIGN-BASIS EVENTS**

- Carries forward Draft JLD-ISG-2012-01, Revision 2 endorsement of NEI 12-06, Revision 3
- FRN announcing availability for comment this month with two specific requests for comment
- Reorganization to follow the proposed rule structure
- Treatment of reevaluated hazards
- Editorial changes resulting from comments

# Request for Stakeholder Input 1:

In § 11.5.4.f, NEI proposes to modify the time limits for initiation and completion of actions to restore a site's capability to mitigate a beyond-design-basis external event from the 24-hour initiation and 72-hour completion time limits of NEI 12-06, Revision 0 and Revision 2, § 11.5.4.f, to 72-hour initiation and 7-day completion time limits. The former time limits were previously endorsed as an element of an acceptable method of meeting the Order EA-12-049 requirements for maintaining the strategies and guidelines to mitigate a beyond-design-basis external event in JLD-ISG-2012-01, Revision 0 and Revision 1. The NRC staff seeks stakeholder input on potential justifications for this extension of the allowable outage times for a licensee's capability to mitigate a beyond-design-basis external event. Stakeholder input is specifically requested to address potential benefits of extending these time limits, operating experience on time frames actually necessary to implement compensatory measures for the unavailability of similar equipment, and potential unintended consequences of extending these time limits.

# Request for Stakeholder Input 2:

In JLD-ISG-2012-01, Revision 1, the NRC staff endorsed the NEI 12-06, Revision 2, § 11.5.4.b 45-day time limit for having an available but unprotected set of equipment as part of the site's capability to mitigate a beyond-design-basis external event. The 45-day time limit aligned with the standard 6-week short work cycle period and allowed sufficient time for the pre-staging of one set of equipment in a location that is not entirely protected from all external hazards for the purpose of shutdown risk management during outages, which typically have durations less than 45 days. In NEI 12-06, Revision 3, § 11.5.4.g, this time period is reduced to 14 days, which could conflict with the pre-staging of equipment for risk management during outages. The NRC staff seeks stakeholder input on appropriate methods of control of pre-staging of equipment for shutdown risk management.

## Next Steps

- RG 1.226 – finalize after comment period for JLD-ISG-2012-01, Revision 2 and concurrently with final MBDBE rule
- RG 1.227 – finalize with final MBDBE rule
- RG 1.228 – finalize with final MBDBE rule