

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
 Fukushima Subcommittee Meeting
 Flooding Hazard Reevaluation

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Friday, April 22, 2016

Work Order No.: NRC-2329

Pages 1-206

NEAL R. GROSS AND CO., INC.
Court Reporters and Transcribers
1323 Rhode Island Avenue, N.W.
Washington, D.C. 20005
(202) 234-4433

DISCLAIMER

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

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Reactor Safeguards, as reported herein, is a record of the discussions recorded at the meeting.

This transcript has not been reviewed, corrected, and edited, and it may contain inaccuracies.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

UNITED STATES OF AMERICA
 NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

FUKUSHIMA SUBCOMMITTEE
 FLOODING HAZARD REEVALUATION

+ + + + +

FRIDAY

APRIL 22, 2016

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The Subcommittee met at the Nuclear
 Regulatory Commission, Two White Flint North, Room
 T2B1, 11545 Rockville Pike, at 1:30 p.m., John W.
 Stetkar, Chairman, presiding.

COMMITTEE MEMBERS:

JOHN W. STETKAR, Chairman

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

DANA A. POWERS, Member

HAROLD B. RAY, Member

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
 1323 RHODE ISLAND AVE., N.W.
 WASHINGTON, D.C. 20005-3701

JOY REMPE, Member

PETER RICCARDELLA, Member

GORDON R. SKILLMAN, Member

DESIGNATED FEDERAL OFFICIAL:

MIKE SNODDERLY

ACRS CONSULTANT:

STEPHEN SCHULTZ

ALSO PRESENT:

JOE BELLINI, Exelon

ERIC BOWMAN, NRR

ANDY CAMPBELL, ONR

DEAN HUBBARD, Duke Energy

JOE KENNY, Office of Research

ED LYMAN, Union of Concerned Scientists

DREW MILLER, Exelon

MIKE POWELL, Arizona Public Service Company

JIM RILEY, NEI

MOHAMED SHAMS, NRR

MIKE TSCHLITZ, NEI

TOM ZACHARIAH, NEI

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

A G E N D A

Opening Remarks and Objectives - J. Stetkar.....	4
Discussion of Draft Guidance and Various.....	7
Paths for Flooding Integrated Assessment -	
NEI	
Status of Staffs Revised Phase 1 Guidance.....	93
NRR	
Comments on Draft Guidance - UCS.....	146
Public Comment.....	147
Discussion - ACRS Members.....	148
Adjourn	

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

P R O C E E D I N G S

1:31 p.m.

CHAIR STETKAR: The meeting will now come to order. I will apologize to everybody. We ran long this morning and we do have some flexibility for subcommittee meetings. So thanks for your indulgence in starting a little late.

This is yet another meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Fukushima. And I am still John Stetkar, Chairman of the Subcommittee. Members in attendance today are Pete Riccardella, Harold Ray, Dick Skillman, Dana Powers, Dennis Bley, Ron Ballinger, Charlie Brown and Joy Rempe. And we're joined by our consultant, Dr. Steve Schultz.

The purpose of today's meeting is to review Draft Revision 0 of JLD-ISG-2016-01, Guidance for Activities Related to Near Term Task Force Recommendation 2.1, Flooding Hazard Reevaluation, Focused Evaluation and Integrated Assessment.

This Interim Staff Guidance is being issued to describe stakeholders' methods acceptable to the staff for satisfying Phase I of the request for external flooding. This Interim Staff Guidance

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

(202) 234-4433

1 endorses with clarifications the approach proposed
2 by Nuclear Energy Institute report, NEI-16-05,
3 External Flooding Assessment Guidelines Revision 0.

4 The meeting is open to the public. The
5 meeting is being conducted in accordance with
6 provisions of the Federal Advisory Committee Act.
7 Rules for the conduct of and preparation in the
8 meeting have been published in the Federal Register
9 as part of a notice of this meeting.

10 The Subcommittee intends to gather
11 information, analyze relevant issues and facts and
12 formulate proposed positions and actions as
13 appropriate for deliberation by the full Committee.
14 Mr. Michael Snodderly is the Designated Federal
15 Official for this meeting.

16 A transcript of the meeting is being
17 kept and will be made available as stated in the
18 Federal Register Notice. Therefore, it's requested
19 that all speakers first identify themselves and
20 speak with sufficient clarity and volume so that
21 they can be readily heard. I'll remind everyone to
22 check and turn off your little communications
23 devices please.

24 We received no written comments or
25 requests for time to make oral statements from

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 members of the public regarding today's meeting.
2 And I understand that there may be individuals on
3 the bridge line who are listening in on today's
4 proceedings.

5 We'll keep the bridge line closed on
6 mute so that those individuals may listen in. And
7 then at an appropriate time later in the meeting,
8 we'll have an opportunity for public comments from
9 the bridge line.

10 We'll now proceed with the meeting.
11 And I'll call upon Mohamed Shams of the Japan
12 Lessons Learned Division in the Office of Nuclear
13 Reactor Regulations to open the presentation. Mo.
14 Long time no see.

15 MR. SHAMS: Yes, sir. Thank you. I
16 don't have any profound words to offer after the
17 introduction. You've laid out what we need to do
18 in this meeting. And I looked to industry to walk
19 us through their guidance and then we'll follow
20 with the ISG endorsing this guidance. Thank you.

21 CHAIR STETKAR: Great. Thanks very
22 much. I don't know who is going to lead up there.
23 Mike or Tom? You got it.

24 MR. ZACHARIAH: This is Tom Zachariah
25 from NEI. So this presentation will like Mo had

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 mentioned walk us through NEI-16-05 which is the
2 guidance document that NEI had submitted on behalf
3 of the industry to NRC for their review and their
4 endorsement.

5 I'll be going through most of this
6 presentation. Some of my panelists will go into
7 more with the technical details as we walk through
8 it.

9 Just for some background, the purpose
10 of this guidance document, our intent was to
11 develop guidance to meet the intent of the external
12 flooding 50.54(f) letters and incorporate concepts
13 from related COMSECYs, specifically COMSECY 14-0037
14 and 15-0019 that had come out since the 50.54(f)
15 letter and their related SRMs.

16 Specifically, we were looking to take
17 the Commission direction on focusing on areas where
18 we can make substantial -- There was opportunity to
19 make substantial enhancements to safety and provide
20 flexibility on how to respond. Some of the items
21 that we cover is improving realism in bounding
22 hazard and the flood mechanisms that were
23 established. There was considered flood protection
24 and available physical margin and lastly
25 consideration of initiating event frequencies.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 These are the major ones.

2 The other elements that we want to
3 include as part of our guidance document are that
4 there is a good amount of overlap with the
5 information that was developed in the MSAs and the
6 guidance that was provided in NEI-12-06. So we
7 wanted to not reinvent the wheel but build on that
8 information.

9 CHAIR STETKAR: Maybe, Tom, you can
10 help. You weren't here this morning. Were you in
11 the back?

12 MR. ZACHARIAH: I was in the back.

13 CHAIR STETKAR: Yes. Okay. So you had
14 the benefit of listening to rants this morning. We
15 have a little more time this afternoon. As I read
16 through the NEI guidance and the draft Interim
17 Staff Guidance, I'm getting confused about the
18 relationship between the mitigating strategy
19 assessments, the MSAs, and the things that are
20 being done under NEI-16-05. Can you help me with
21 that because in many places it sounds like there
22 are two distinct things that are maybe somehow
23 related or maybe not related? Help me out with how
24 they relate to one another.

25 MR. ZACHARIAH: Sure. I'll attempt to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 clarify. I'll first start off with saying that
2 there is a lot of information that is common
3 between the two assessments. That's why we look to
4 build upon the MSAs.

5 But the MSAs were mainly focused from a
6 different perspective, from the perspective of FLEX
7 and mitigating strategies and protecting those from
8 the reevaluated flood hazard where the focused
9 evaluations and the integrated assessments are
10 looking from a perspective of how the site responds
11 overall from a protection standpoint and from a
12 mitigation standpoint and how the conditions of the
13 plant -- how the site responds to those impacts.

14 CHAIR STETKAR: I remain confused.

15 MR. ZACHARIAH: Okay.

16 CHAIR STETKAR: Help me with the basic
17 concepts. I need to do a mitigating strategies
18 assessment to make sure that FLEX works as I had
19 planned it to work. Maybe Mo can help. Anybody
20 honestly. I really want to understand. There's
21 apparently some subtle difference between these
22 things.

23 MR. SHAMS: There is.

24 CHAIR STETKAR: And I don't understand
25 it. I honestly don't understand it.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. SHAMS: There is. So the 2.1
2 activity is certainly one that started consistent
3 with the NTTF recommendation and it has in it a
4 process that fairly well laid out calculate the
5 hazard or assess the hazard using a present day
6 guidance. There is an increaser if you would or as
7 the hazard exceeds the design basis hazard for the
8 facility, then the next step would be to do an
9 integrated assessment of the plant response to that
10 flood. So that was the body of work under 2.1.

11 And as we interacted with the
12 Commission, we were directed, if you would, to use
13 a graded approach and actually focus more because
14 the integrated assessment is an intense evaluation.
15 The Commission directed us to focus it more on the
16 sites that would benefit from such an evaluation.
17 So in response to the Commission, we put together
18 the action plan of developing a graded approach, a
19 graded guidance which is the guidance that we're
20 talking about today.

21 How can plants do the evaluation in a
22 different level on a different scope? One being
23 the full scope which would be the integrated
24 assessment. The other being the more focused scope
25 which would be the focused evaluation. And we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 would define which plants or which types of hazards
2 would qualify for the focused evaluation. So
3 that's one set of activities if you would that has
4 its own swim lane.

5 The other set of activities is the
6 mitigating strategies. So mitigating strategies
7 were developed under the EA-12-049. In the order
8 the response of the industry was to develop the
9 mitigating strategies based on the current design
10 basis of the facility.

11 As we learned about the reevaluated
12 hazard, the Commission essentially clarified that
13 the intent was to reevaluate the strategies with
14 respect to and make sure they're implementable
15 under the reevaluated hazard. That's what the
16 mitigation strategies assessment is actually doing,
17 looking at the three phases of the mitigating
18 strategies, part of which is plant equipment, part
19 of which is portable onsite and certainly part of
20 which is portable offsite. It's looking at how
21 these strategies can be successfully done. And
22 that's done under Appendix G in 12-06.

23 To get specifically to the question
24 that Mr. Stetkar was asking, is there an overlap?
25 We recognize there is and what Tom was alluding to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 is where we see the overlap. The overlap means if
2 I protected a piece of equipment under my
3 evaluation of the MSA do I need to come back and
4 demonstrate that that same piece of equipment is
5 protected to reevaluated hazard as part of the
6 focused evaluation.

7 The answer is no. You can leverage
8 that you've already demonstrated one time in one
9 track that it's protected. So therefore you don't
10 have to demonstrate that one more time.

11 MEMBER RAY: Just one interruption.
12 You've done really, really good. But I think it's
13 important at this point. When you say you
14 protected a plant's piece of equipment, I
15 understand that you wouldn't ask did I protect it a
16 second time.

17 But I think the question and I don't
18 know if you were here yesterday that I indicated
19 and I'm still trying to focus on is not did I
20 protect it, but was I able to respond to its
21 failure in the first evaluation. And therefore I
22 don't need to ask the question would it fail in the
23 second evaluation. That's what I'm wanting to
24 understand.

25 MR. SHAMS: That's a fair question. A

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 mitigating strategies assessment is focused on a
2 set of equipment and strategies, strategies that
3 involve equipment, that maintain the key safety
4 functions. And those defined to be the core
5 cooling, spent fuel pool cooling, and containment.

6 A focused evaluation is also
7 essentially focused on the key safety functions.
8 So, yes, if a piece of equipment or a function has
9 failed and you needed to demonstrate that the
10 mitigation is appropriate for under the mitigation
11 strategies, what happens in the focused evaluation
12 would be is there a potential for an integrated
13 assessment. Is there a potential enhancing the
14 protection for that piece of equipment in the plan
15 or does it not really add any safety benefits, if
16 you would, or minimal safety benefits?

17 So we wouldn't particularly ask if that
18 function has failed one more time. But we're
19 looking for if there's an opportunity to improve
20 the safety function.

21 MEMBER RAY: I won't pursue this any
22 way further now that you've given a good answer. I
23 would just say I think we would benefit from some
24 opportunity to better understand how those things
25 work together. And the simple way to express it

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 that I would express it is are we accepting events
2 because we can mitigate them.

3 In other words, just to be simple, are
4 we accepting a loss of coolant accident because
5 we're confident we can mitigate it and avoid core
6 damage as a result even with the extended loss of
7 AC power? If the answer is yes, that's fine. I
8 would just like to know that that's the answer. I
9 won't wax on any longer about it. But that's still
10 the question I'm trying to get an answer to which
11 is are we now relying on mitigation of events that
12 we feel confident we would avoid under the design
13 basis, but we might not under the extended hazard
14 that we're now evaluating.

15 MR. SHAMS: I would say the way we
16 designed the mitigating strategies is as long as we
17 can maintain the key safety functions I think we're
18 accepting some loss of safety related equipment.

19 MEMBER RAY: And that's great. I
20 appreciate that clarification and it's news to me.
21 But nevertheless that's fine.

22 CHAIR STETKAR: I'm still a little
23 confused, but I'm getting less confused. The thing
24 that NEI-16-05 calls an MSA, that thing, whatever
25 it is, when was it developed and submitted to the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 staff?

2 MR. ZACHARIAH: I'm sorry. Can you
3 repeat the question one more time?

4 CHAIR STETKAR: Okay. I think I can.
5 That thing that 16-05 refers to with the three
6 letters MSA, when was that thing developed and
7 submitted to the staff?

8 MR. TSCHLITZ: That's NEI-12-06,
9 Appendix G. It was submitted to the staff and
10 endorsed I think at the end of last year. Jim was
11 responsible for that.

12 CHAIR STETKAR: Thank you. That's
13 enough. So that's already a done deal. People did
14 things that are called MSAs. They've been
15 submitted to the staff.

16 MR. TSCHLITZ: They're in the process
17 of doing MSAs.

18 CHAIR STETKAR: Well, you told me.
19 No, I'm sorry. You said --

20 (Simultaneous speaking.)

21 MR. TSCHLITZ: Guidance was issued and
22 endorsed.

23 CHAIR STETKAR: Okay.

24 MR. TSCHLITZ: But the MSAs are
25 underway.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: You did not answer my
2 question though. My question very specifically is
3 when was the thing that is called an MSA submitted
4 to the staff. Not guidance. Not NEI-12-this. Not
5 NEI-16-that. Not JLD. When was the thing that was
6 called an MSA submitted to the staff? Has it been
7 submitted to the staff yet for any plant?

8 MR. SHAMS: We only received one.

9 CHAIR STETKAR: One.

10 MR. SHAMS: Yes.

11 CHAIR STETKAR: Okay. Thank you. And
12 that one I suspect was done for the current design
13 basis hazard level. Is that correct?

14 MR. SHAMS: The one compared the
15 reevaluated hazard to the current design basis
16 hazard and it happened to be bounded. It could
17 have been not bounded and they would have gone
18 through the process Jim walked us through this
19 morning.

20 CHAIR STETKAR: Fine. So they got an
21 easy out. Now in the context of NEI-16-05 then,
22 when will the things that are called FIAPs and
23 integrated assessments be submitted to the staff?
24 Not the guidance. When will those things be
25 submitted to the staff?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. SHAMS: The licensee submittal for
2 focused evaluations is expected the middle of next
3 year, June of next year.

4 CHAIR STETKAR: Middle of next year.

5 MR. SHAMS: Yes.

6 CHAIR STETKAR: Is there a requirement
7 to submit something called an MSA before then?

8 MR. SHAMS: For most plants, it is,
9 yes. The agreement with the licensee is for these
10 submittals to be completed by the end of this year.

11 CHAIR STETKAR: By the end of this
12 year. Are the MSAs to be submitted by the end of
13 this year supposed to account for the reevaluated
14 hazard?

15 MR. SHAMS: Yes.

16 CHAIR STETKAR: Thank you. So now I am
17 less confused. I don't know why the guidance in
18 NEI-16-05 speaks to MSAs in the past tense as
19 saying already is evaluated as part of the MSA.
20 The MSA should be evaluated further. I may be able
21 to benefit from something in it.

22 If we're doing all of this stuff right
23 now, why don't we say this is guidance for doing
24 all of this stuff right now?

25 MR. TSCHLITZ: I think the intent is to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 do the MSA first followed by the integrated
2 assessment for those plants that need to. So the
3 MSA is the first evaluation, and then the focused
4 evaluation or the integrated assessment is for
5 those that need to do the following assessment to
6 support Phase II decision making for the staff.

7 CHAIR STETKAR: If you want to be
8 really inefficient and spend a lot of money, you
9 can do it that way. Or you can just use a graded
10 approach that seems to be laid out in the guidance
11 and saying if I can get away by demonstrating this
12 level of confidence with this amount of assessment,
13 that's good. If I need to do a little bit more,
14 then I'll do a little bit more. And if I need to
15 do yet more, then I'll do a little more.

16 But going through -- I don't care. But
17 I don't want to hear the industry coming back and
18 saying this is so complicated and we're being
19 required to submit things under certain criteria
20 that is too onerous. And I don't want to entertain
21 that because I think you're digging yourself into a
22 hole that doesn't need to be dug into.

23 MR. SHAMS: If I may offer. I
24 understand and I do appreciate the complexity of
25 what we're trying to do.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: Wait. Why does it have
2 to be so complex? That's my whole thing. My first
3 thought was NEI-16-05 might be guidance on how to
4 do the stuff that's laid out in Appendix G of NEI-
5 12-06 because NEI-12-06 tells me what ought to be
6 done. It doesn't tell me how to do it.

7 NEI-16-05 goes closer to telling me how
8 I might do that in terms of different paths through
9 different logic diagrams that we'll get to. But
10 apparently that's not the case. So why are we
11 making this so complex?

12 MR. SHAMS: If I may offer.

13 CHAIR STETKAR: Between the industry
14 who is developing all of these numerous reports
15 that I have to spend a lot of time reading and the
16 staff who's apparently developing three or four
17 different sets of parallel guidance for all of
18 these things that seem to be addressing the same
19 thing. And I'm being provocative, but I'm
20 intentionally being provocative because I see this
21 thing growing out into all sets of guidance and
22 rules about here's what you do for this, here's
23 what you do for that, here's what the staff accepts
24 for this, here's what it accepts for that.

25 I thought the whole process was to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 simply gain confidence that the strategies being
2 developed including FLEX equipment will make the
3 plant not melt under what we now understand is a
4 reevaluated, in this particular case, flooding
5 hazard. That's a pretty simple concept.

6 (Simultaneous speaking.)

7 MR. TSCHLITZ: Let me give it a shot.

8 CHAIR STETKAR: Let's let Mike.

9 MR. TSCHLITZ: So the mitigating
10 strategies look at the implementation using the
11 FLEX equipment to perfect the key safety functions.
12 The integrated assessment focused evaluation is
13 looking at the overall plant, the function of the
14 plant, just not the FLEX equipment.

15 CHAIR STETKAR: Okay. Here's a
16 question I've been asking some of our members over
17 the last two hours. For pressure, you're a boiling
18 water reactor or pressurized water reactor guy?

19 MR. TSCHLITZ: Pressurized.

20 CHAIR STETKAR: Okay. Is the turbine
21 driven OX feed water pump a piece of FLEX
22 equipment? Yes or not?

23 MR. TSCHLITZ: It is installed plant
24 equipment that's used in the FLEX strategy.

25 CHAIR STETKAR: Thank you. Good.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. TSCHLITZ: Okay.

2 CHAIR STETKAR: That gives you guys a
3 notion of what the scope.

4 MR. TSCHLITZ: Can be. It's not
5 necessarily.

6 CHAIR STETKAR: But I mean -- Okay.
7 That thing needs to be reevaluated in terms of can
8 it survive for the reevaluated in this case
9 flooding hazard. Is it at appropriate elevation
10 and all that kind of stuff? Right?

11 MR. TSCHLITZ: Yes, and I would say
12 what was done in the mitigating strategies
13 assessment may have already looked at that piece of
14 it. That piece of it, not the entire plant, but
15 that piece of it.

16 MEMBER RICCARDELLA: But would that
17 have been already looked at as part of the
18 reevaluation of hazards separate from FLEX,
19 separate from mitigating factors? I mean there's a
20 whole other task, right?

21 MR. BELLINI: This is Joe Bellini. I
22 represent Exelon. I'll maybe try to boil it down a
23 little bit. First of all, the reevaluated hazard,
24 the flood hazard reevaluations, are defining the
25 hazard parameters. So the purpose of that under

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 2.1 just to find the hazard parameters and making a
2 comparisons with your current design basis flood
3 hazard parameters. That's the starting point for
4 what we're talking about now, the MSAs and the
5 integrated assessments, the focus assessments.

6 Maybe let's boil it down to say that
7 the MSAs like Mike was saying and others is just
8 focused on can FLEX work with these reevaluated
9 flood hazards, not the overall plant response
10 including what's in the current licensing basis or
11 current design basis. That's related to the order,
12 right.

13 So the integrated assessments, the
14 focus assessments, the 16-05 is getting at what is
15 the -- this is tied to closing out 2.1, not the
16 order, but closing out 2.1 says let's look at the
17 current licensing basis strategy for flooding and
18 there might be some overlap as Mike was saying with
19 what equipment is being used and so forth. That's
20 where there is some overlap.

21 And then we'll also talk about how the
22 MSA might be credited as part of that process.
23 We're going to get into that. But it's really to
24 look at the overall plant response, what's in the
25 current licensing basis and to close out the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

(202) 234-4433

1 recommendation 2.1 information request.

2 MR. SHAMS: If I may just offer one
3 last thought. A year and a half ago in COMSECY 14-
4 00-37 the staff put forth the recommendation to the
5 Commission to essentially combine 2.1 and the
6 mitigating strategy. In other words, once you have
7 a mitigating strategy in place, reevaluate it or
8 evaluate it for the reevaluated hazard, that
9 represents the only evaluation you needed.

10 And the Commission directed us that
11 there will be a few plants that would benefit from
12 an overall look for the response of the entire
13 plant. And the Commission directed us to proceed
14 with the 2.1 and the way it's designed with the
15 thought of creating a graded approach, an approach
16 that focuses on that subset of plants. That's the
17 reason you're seeing a bit of an overlap.

18 We've recognized that a while back.
19 And what the guidance is trying to get to is
20 deliver what the Commission asked us for but
21 recognize that there's an overlap and not to be
22 overburdened on some plants to do the same thing
23 over again.

24 CHAIR STETKAR: That's my concern quite
25 honestly, Mo. All of this is that you're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 characterizing this in the context of an SRM from
2 the Commission on a particular SECY paper. And
3 I've read the SRM. I've read the SECY paper.
4 Perhaps of my interpretation of that might be
5 different from yours.

6 I hope that we're not getting into a
7 situation where people are doing multiple
8 assessments and then trying to justify like your
9 fourth sub-bullet here, Build on information
10 developed in MSAs as if they are distinctly
11 different from this continuum of what do I need to
12 do to demonstrate that the plant will be safe for
13 the reevaluated hazard. And we're not getting into
14 from the industry's perspective multiple guidance
15 that might be interpreted or misinterpreted or
16 interpreted differently by any of the utilities or
17 expectations on the part of the staff that certain
18 things need to be submitted. Then if new things
19 are submitted because they're called an FIAP, then
20 you need specific crosswalks between how the FIAP
21 relates to the MSA because my FIAP isn't submitted
22 until June of next year. And I somehow had to
23 submit artificially an MSA by December of this year
24 when I knew I had to rely on.

25 It sounds like we're walking down a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 path that isn't necessarily the most efficient way
2 to answer the fundamental question. And that is
3 will the plant melt or not for the reevaluated
4 hazard and what confidence do we have in that.

5 MR. TSCHLITZ: I would just offer if
6 you let us go through the presentation.

7 CHAIR STETKAR: Yes, I will.

8 MR. TSCHLITZ: It may be clearer.

9 CHAIR STETKAR: But I want to bring
10 this out front because this is another set of
11 guidance to read through. Go on.

12 MEMBER BLEY: You've got the sense a
13 number of us had trouble understanding. And Tom
14 was trying to just help guide you to giving some
15 clarity when all of this is put together. But go
16 ahead.

17 MR. TSCHLITZ: One thing we haven't
18 said so far is part of this process and part of the
19 reason for the process was to inform the staff's
20 Phase II decision making process about whether or
21 not the plant needed to have its licensing basis
22 changed. These reevaluated hazards are still
23 considered beyond-design-basis events.

24 One of the inputs or the outputs of
25 this integrated assessment is input into the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 staff's Phase II decision making process. And it's
2 been built to facilitate or help facilitate that
3 decision making.

4 CHAIR STETKAR: But, Mike -- Well, I'll
5 let you go for a while here. We have now defined
6 an integrated assessment that will then be used to
7 inform that Phase II decision making as precisely
8 Path 5 through and only Path 5 through the flow
9 diagram that you're going to show in a couple of
10 slides. Right?

11 MR. TSCHLITZ: Four and five.

12 CHAIR STETKAR: Four and five?

13 MR. TSCHLITZ: Yes.

14 CHAIR STETKAR: Okay.

15 MEMBER RAY: Can I just say, John, I
16 thought what Michael said was very good and on
17 point. And it is the answer to the question I
18 think you're posing which is why is it being done
19 this way. It's because somewhere, somehow,
20 somebody make see an opportunity to substantially
21 improve things by making a change in the design
22 basis, one that's practical or not unreasonable to
23 do.

24 MR. SHAMS: That's the ultimate goal
25 essentially and that's the group of plans that are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 going through the integrated assessment.

2 MEMBER RAY: I understand.

3 MR. SHAMS: There are many subsets.

4 MEMBER RAY: To me that explains why
5 it's being done the way it's been done just like
6 Michael said. But it does -- John's question still
7 stands which is --

8 MR. SHAMS: The other subset there's
9 certainly an overlap and we're just trying to
10 mitigate that overlap as best as we can.

11 CHAIR STETKAR: Again I hope that
12 trying to as you said account for that overlap as
13 best as you can. I hope that that is not creating
14 undue burden on the licensees who are having to do
15 a lot of work. And I hope it's not creating undue
16 burden on the perspective of the staff who has to
17 actually sit down and review all of these plant-
18 specific assessments regardless of what acronym you
19 give them or submitted under some agreed-upon
20 submittal schedule.

21 MR. SHAMS: We're certainly cognizant
22 of that and the submittal would be minimal. If
23 there's a clear overlap, that it should be a
24 minimal submittal.

25 CHAIR STETKAR: Good. Thanks. Now

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 line two on your first slide. Sorry.

2 MR. ZACHARIAH: I think we can move
3 onto the next slide. So this is the flow diagram
4 that you had mentioned. And we're going to go
5 through this in detail. But I do want to mention
6 some initial items before we get started.

7 One is that this whole flow chart like
8 Joe had mentioned starts with the information in
9 the FHRR, the Flood Hazard Reevaluation Report,
10 that's been submitted to NRC for review and the
11 portions and what they accepted of it. It's
12 limited to the flood mechanisms that are identified
13 as unbounded in the FHRR.

14 The point is that if you're a site that
15 has no flood mechanisms that are unbounded, you
16 would not be in this process to begin with. So
17 that's the idea.

18 So we use the path approach. So we
19 have five paths here in which you've seen multiple
20 times with other processes. It's different than
21 what you would see in seismic. It's not a site
22 that's on a specific path. Each mechanisms is
23 identified and put through this process. And each
24 mechanism may be on a different path.

25 The other things I want to mention that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 are similar to the mitigating strategy assessment
2 and 12-06 is it looks at flood impacts on the key
3 safety functions, again being core cooling, spent
4 fuel cooling and containment integrity. And
5 specifically we use a term called key SSCs and
6 these are the permanently installed equipment in
7 the plant which support the key safety functions.
8 More specifically, they're the ones that the site
9 would identify. If there was a failure of one of
10 these pieces of equipment it may lead to the
11 failure of a key safety function.

12 As I go through this document, just
13 background on how it's set up. The body of the
14 document is the process. It's what outlines the
15 flow diagram in words. And the appendices are
16 where the technical information and technical
17 evaluations are done. And we'll go into that in
18 more detail. And the others up here on the panel
19 will provide more detail on the technical
20 evaluations.

21 Like I mentioned, there are five paths
22 with different elements that are addressed in each
23 path. A few vocabulary items I want to mention is
24 the difference between protection and mitigation.
25 And I heard it mentioned earlier. So we just want

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 to make it clear.

2 Protection, what we mean by that, is
3 that the flood waters don't impact the SSC. It
4 doesn't get to that point.

5 Mitigation is a strategy where it
6 allows coping capability for loss of any of those
7 key SSCs.

8 And the other element as Mo had
9 mentioned the focused evaluation versus the
10 integrated assessment paths. One through three are
11 considered the focused evaluation where we feel
12 there would be sufficient information that further
13 regulatory would not be necessary. And four and
14 five would step through the Phase II decision
15 making.

16 MEMBER BLEY: I might be missing the
17 boat here. When you go through this process if
18 there are multiple flooding mechanisms you could
19 end up on different paths for each mechanism.

20 MR. ZACHARIAH: Right. You could have
21 a combination of paths for each. So path one is an
22 evaluation of the flood hazard. It's not revising
23 the Flood Hazard Reevaluation Report, but it is
24 revisiting it to determine if there could be
25 improvements to the realism of the flood mechanism

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 parameters that are identified.

2 Path two here is what we call effective
3 flood protection. This would say that the key SSCs
4 are protected from the flood waters. This
5 evaluation includes demonstrating that there's the
6 available physical margin that's available and it's
7 adequate. The protection features that are being
8 relied upon are reliable. And the overall site
9 response is adequate as well. And the guidance for
10 each of these processes are in Appendix B and
11 Appendix C of this document.

12 Path three is a path uniquely for local
13 intense precipitation. I believe it was COMSECY
14 13-00-19 where it mentions local intense
15 precipitation not going through the integrated
16 assessment process. So this path would be for
17 sites that can't demonstrate effective protection
18 for this mechanism. It would go down this path and
19 use the guidance in NEI-12-06. So this would be an
20 overlap with the mitigating strategies assessment.

21 CHAIR STETKAR: We're going to have an
22 opportunity to discuss each of these paths in more
23 detail.

24 MR. ZACHARIAH: Yes.

25 CHAIR STETKAR: Thank you.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. ZACHARIAH: And path four is
2 effective flood mitigation. So this is for flood
3 mechanisms that the site cannot show effective
4 flood protection. And it's looking at the
5 reliability of the mitigation equipment that's
6 being reliable upon and the overall site response.
7 It is again in Appendix B and Appendix C.

8 And path five has its own flow chart.
9 So we'll get into more details. But this is
10 breaking up each of those mechanisms into different
11 flood scenarios and determining what the correct
12 response is for each of those scenarios based on
13 its likelihood.

14 The first piece of the flow chart is
15 what we call the initial evaluation process. The
16 purpose of this is two-fold. One is to revisit the
17 flood mechanism characterization in the FHRR to see
18 if there are any opportunities for improvement of
19 realism using Appendix A of this document.

20 The second piece of it is looking at
21 the site response. So given the flood mechanism
22 and the flood parameters identified in the FHRR
23 what the site conditions are. And more
24 specifically for each mechanism you would identify
25 which of the flood mechanisms are unbounded and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 whether or not it is practicable or feasible to
2 improve realism of any of those flood mechanisms,
3 using Appendix A characterizing those flood
4 parameters.

5 And then for the site conditions, it
6 would be identifying what your key SSCs are, again
7 the ones associated with the key safety functions.
8 Then identifying the critical elevations of where
9 each of those SSCs are and what flood protection
10 features are relied upon given the flood and given
11 where the key SSCs are. With that information
12 calculating available physical margin. From here
13 we felt that this gives enough information from the
14 initial evaluation process to determine what the
15 right path for each site is.

16 So the first is the focused evaluation
17 path one. This demonstrates that the flood
18 mechanism is actually bounded once a more realistic
19 evaluation is done for the mechanism. This
20 includes a comparison of the revised flood
21 parameters, the ones that are for this new
22 evaluation with revised assumptions, inputs and
23 methods which are bounded by the design or
24 licensing basis. And demonstrating all parameters
25 are bounded is the end point of this path.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER SKILLMAN: Tom, how do you, not
2 you, how does this process account for uncertainty?
3 Identifying how much margin you have presumes that
4 you know if you will the acre-feet of water, the
5 location of your component, how high the component
6 is relative to other components. So my question is
7 how do you account for uncertainty in this riddle.

8 MR. ZACHARIAH: I'm going to let Joe
9 answer that, but just to clarify. In this aspect,
10 this path, we wouldn't be looking at the actual
11 site conditions. But I'll let Joe explain how.

12 MEMBER SKILLMAN: Now wait a minute.
13 Go back to slide seven please.

14 MR. ZACHARIAH: Yes.

15 MEMBER SKILLMAN: You're calculating
16 APM.

17 MR. ZACHARIAH: Right.

18 MEMBER SKILLMAN: To calculate APM, you
19 need to have some level of confidence that the
20 aerial mass and the elevation of your device are
21 sufficiently well known that you can make that
22 calculation.

23 MR. ZACHARIAH: That's true which is
24 true for four of the five paths. So for path one
25 if we go to this flow chart it's going from box one

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 to box two through 2A and 2B saying yes and exiting
2 the process without doing an initial evaluation of
3 flooding hazard.

4 CHAIR STETKAR: What he's saying, Dick,
5 is that he doesn't want to answer the question
6 until he gets to path two. So we'll ask the
7 question then.

8 MR. ZACHARIAH: We can answer the
9 question now.

10 MEMBER SKILLMAN: On your slide eight,
11 you have a pass because you don't have to do this.

12 MR. ZACHARIAH: Right.

13

14 MEMBER SKILLMAN: I got that. But I
15 guess I'm asking a broader question.

16 MR. ZACHARIAH: A broader question.

17 MEMBER SKILLMAN: This is an issue of a
18 site, a location, with a very, very large lake or a
19 small lake or one of the Great Lakes and whatever
20 else and you're going to determine that this device
21 right here is going to be high and dry. I'm
22 saying how do you account for uncertainty.

23 MR. BELLINI: Maybe I can add to that.
24 So path one would be similar to the entry point in
25 this whole process in the beginning where you're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 making a hazard to hazard. You're comparing hazard
2 parameters. In the path one you're just revising
3 those parameters and then going back and checking
4 those flood parameters against what was in your
5 current design licensing basis.

6 As Tom mentioned, you're not going back
7 and looking plant's response to that because if you
8 end up bounded in path one then we say you're done.
9 The parameters are bounded by your current design
10 basis for license-based parameters. So the
11 uncertainty issue and the margin issue is going to
12 be discussed in path two. And we will talk about
13 how uncertainty would be part of that evaluation
14 and dealing with the question of adequacy in the
15 margin.

16 MEMBER SKILLMAN: Okay.

17 CHAIR STETKAR: Dick, all he's saying
18 is that you have to wait and ask the question until
19 we get to slide 11.

20 MEMBER SKILLMAN: Okay.

21 CHAIR STETKAR: We can ask that
22 question then when he gets to slide 11.

23 MR. ZACHARIAH: Slide 11 if I need to.

24 MEMBER SKILLMAN: Okay. Thanks.

25 MR. ZACHARIAH: So the next path, path

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 two, is also focused evaluation. This is
2 demonstrating effective protection. This is going
3 through the entire process of the initial
4 evaluation process identifying what flood
5 protection features you have, I'm sorry, what flood
6 protection features you're relying upon. After
7 calculating your APM demonstrating, your available
8 physical margin is adequate and the protection
9 features that you've identified are reliable as
10 well as your overall cyber response is adequate
11 using Appendix B and Appendix C.

12 CHAIR STETKAR: Now can we ask the
13 questions? Your first bullet say ADemonstrate
14 available physical margin is adequate.@ You heard
15 him. His question is still on the table. I'll
16 point you to things in Appendix B that says certain
17 flood features may not lend themselves to specific
18 quantitative value but may need to be supported by
19 qualitative analysis. Things that say, ANegligible
20 or zero available physical margin can be justified
21 as acceptable if the use of conservative input
22 assumptions and/or methods in the flood hazard
23 reevaluation can be established.@

24 So how do you account for uncertainty?
25 How do I determine that something is conservative

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 enough? And what sort of qualitative analysis do I
2 do to determine that the barrier is high enough or
3 that the drain is big enough?

4 MR. BELLINI: Yes, this is Joe Bellini
5 again. Ultimately, the licensee has to build their
6 case to do that. And the points being made in the
7 Appendix B are providing some suggestions on how to
8 build their case.

9 So I'll deal with the first one you
10 mentioned on the negligible or zero of APM can be
11 justified as acceptable if the use of conservative
12 input assumption methods and so forth can be
13 established. And maybe the best way to handle that
14 one is an example.

15 The idea there is that we are
16 addressing uncertainties what can be established as
17 overly conservative, unrealistically conservative,
18 inputs or methods or assumptions. So maybe an
19 example might be helpful. If you assume 50 dams in
20 a watershed fail at the same time and are
21 artificially located just upstream from the plant.

22 And it fails as one big dam or
23 something like that. And you assume zero
24 attenuation. And if dam failure is a governing
25 mechanism for that plant, we would say that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 uncertainty is really not a relevant question
2 because you're clearly using a very unrealistically
3 conservative assumption when establishing that
4 mechanism. Somebody could make that case and use
5 that first bullet and deal with the margin that way
6 as adequate.

7 CHAIR STETKAR: Simplify.

8 MR. BELLINI: It's a simplified
9 assumption.

10 CHAIR STETKAR: There are things that I
11 like to call bounds and that are based on physical
12 limits. It can't be any worse than X. And your
13 example is more along the notion of that.

14 If I'm a poor licensee out there who
15 says that I have to go negotiate with the staff on
16 how I've adequately assessed qualitative estimates
17 of conservatism to justify that my barrier doesn't
18 have to be any higher than some level, I'm kind of
19 left at odds about how do I do that. All I have is
20 guidance that says do a conservative analysis and
21 you may need to make qualitative judgments.

22 There's a train of thought that says if
23 the best estimate value is 0.5 a value of 0.6 is
24 conservative. Maybe it can't get any higher than
25 1.0. So certainly you could say 1.0 is an

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 appropriate bound on the scale from zero to one.
2 But 0.6 might be conservative.

3 MR. BELLINI: Yes, there is judgement
4 involved certainly with making the case for what
5 is. If you're going to use that first bullet as
6 making your case for what is acceptable margin, or
7 I'm sorry, yes, what's adequate margin, then
8 there's judgment involved and the case has to be
9 made for sure.

10 MEMBER SKILLMAN: I would just observe
11 that we've seen in the last 20 years a 100 year
12 flood that people once thought was not thinkable.
13 Now it's being said, well, maybe that was a 500
14 year flood.

15 And maybe we haven't seen the worst
16 because we've done a new evaluation and we have
17 more rainfall upstream of what we anticipated. So
18 what we once thought was this type of flood is now
19 that type of flood. And gee whiz, there could be
20 more water still.

21 And so the ability to demonstrate
22 physical margin depends on the assumptions. And
23 unless you're beginning with a very strong basis
24 for that assumption, then your uncertainty should
25 be high, very high.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 And there needs to be recognition of
2 that uncertainty. If one is saying, AI'm going to
3 take protective measures, those protective measures
4 have to be proportional to that uncertainty.

5 MR. BELLINI: Some of this is discussed
6 in Appendix A. But I would separate the flood
7 hazard reevaluations which for the most part are
8 deterministic in nature. So separate them into two
9 different parts. You have the inputs, the
10 rainfall, the snow melts, the hurricane wind and so
11 forth. That's the initiating condition. And the
12 going end point is that even with some reductions
13 in conservatisms we're still representing a
14 bounding event. What's physically the outside
15 extreme possible.

16 And the second part is how does the
17 system respond to that input. And that's where you
18 get into some more questions about uncertainty
19 about what your assumptions are in modeling and
20 simulating that response. I think the inputs is
21 what you're talking about.

22 We're not talking about 100 year, 500
23 year input. We're talking about a probable maximum
24 precipitation that sometimes is a more generic
25 definition of that. Sometimes it's a more site-

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 specific definition. But it's still considered
2 what's the outside bounding of what's physically
3 possible.

4 CHAIR STETKAR: You'll find other who
5 don't agree with that definition of what PMP means.

6 MR. BELLINI: I understand that.

7 CHAIR STETKAR: They just say it is
8 what is calculated is not intended to be bounded by
9 physics and the laws of nature. It is simply that
10 which is calculated according to a set of rules
11 that define what is calculated and is called a PMP.
12 It's a spherical chicken.

13 So you can't rely on the fact that that
14 is necessarily a bounding value. It is what it is.

15 MR. SHAMS: If I may offer going back
16 to your point, Dr. Stetkar, that it is not a best
17 estimate. What we're dealing with is the probable
18 maximum precipitation, probably maximum hurricane,
19 probably maximum whatever mechanism we're dealing
20 with. So it may not be the bounding event, but it
21 certainly is larger.

22 CHAIR STETKAR: You're dealing with
23 what was calculated and that's all you're dealing
24 with. It probably is not a good day. But you're
25 dealing with what was calculated. Things might be

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 worse than that. Things might be different than
2 that, but you're dealing with what's calculated.

3 MEMBER POWERS: I think that's an
4 unduly pessimistic view.

5 CHAIR STETKAR: No, I'm okay accepting
6 that.

7 MEMBER POWERS: Let me just pursue
8 this. If I got 15 plants and I wanted historical
9 data and I know a little bit about precipitation
10 and I come up with a correlation and this guy that
11 doesn't have all that data uses that correlation, I
12 think he does know something at this point.

13 I don't think you can say he doesn't
14 know and it's just a number that got calculated.
15 I think it's a representation of the current state
16 of knowledge.

17 CHAIR STETKAR: And I agree with you
18 except for the fact that then someone asserts that
19 it can never be any worse than that based on what
20 we know because some people will tell you that it
21 could be. We just don't assess that uncertainty
22 because we're given rules on the way to calculate
23 PMP and we're given models to calculate flows and
24 things like that.

25 But I'm willing to accept the hazard as

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 it's been defined. But there is still -- We're
2 making determination that the protection at the
3 plant is good enough to protect against that
4 hazard. It strikes me as we ought to have some
5 uncertainty in that judgment of is it good enough.

6 MEMBER POWERS: I think what you're
7 asking for is you want a quantification of that
8 uncertainty.

9 CHAIR STETKAR: Yeah, I'm a
10 quantitative guy. So, yeah, given my druthers, I'd
11 rather have a quantification of it.

12 But if I'm not going to quantify it,
13 I'd at least like guidance to tell me that if I'm
14 not going to quantify it I should address it
15 explicitly qualitatively. Why do I have confidence
16 that the hazard that I've calculated is in fact
17 very, very pessimistic? Why do I have confidence?

18 MEMBER POWERS: If I drew this from a
19 correlation of what is represented by someone
20 someplace as the best current state of the
21 knowledge, you would accept that.

22 CHAIR STETKAR: I would accept that as
23 long as they also questioned -- When you say best
24 state of knowledge, did I ask the people who
25 developed that correlation of could it be worse

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 than that. And if they say no --

2 MEMBER POWERS: They would definitely
3 say yes. It could be.

4 CHAIR STETKAR: Might they be able to
5 tell me how much worse it might be given all they
6 know.

7 MEMBER POWERS: We're doing this
8 qualitatively. I have very strong qualitative
9 assurance I'm not going to get hit by a meteorite.
10 I can be and it could be a very bad day. But I'm
11 not going to sit down and give you an uncertainty
12 as to my confidence right now.

13 CHAIR STETKAR: What I'm going to --

14 MEMBER POWERS: And you're asking them
15 to do a very similar thing for a very similar set
16 of very extreme situations. I mean how far do you
17 have to push these things.

18 I mean if I go and pull out of the
19 Journal of Meteorological History or whatever and
20 this guy says, AI've looked at 15 sites and here's
21 the thing, kind of bound the worst precipitation
22 these places ever had over whatever database I
23 could collect.@ And there are a lot of datapoints
24 there and he's drawn a curve over the top and says,
25 here's how you extrapolate that curve. And they

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 use that. Why is that not good enough?

2 MR. TSCHLITZ: I would just offer just
3 to put in an overall context is we're always going
4 to have the feasible mitigation piece in place.
5 That's been established.

6 We're trying to look at where do we
7 draw the line between the reliable protection of
8 the key SSCs and where do we rely on feasible
9 mitigation. And we're facilitating the staff's
10 decision on whether that boundary has been
11 established at the right place.

12 CHAIR STETKAR: That's true except to
13 the fact that under path two evaluation you don't
14 need to evaluate whether that feasible mitigation
15 can survive the reevaluated flood. All I need to
16 do is show that I've protected everything.

17 MR. TSCHLITZ: That's not true because
18 the MSAs will already have been done and they
19 already show that the mitigating strategies will
20 survive the reevaluated hazard. When we do the
21 integrated assessment, when we go through the
22 focused evaluations, the MSAs will already have
23 been completed and we'll already have demonstrated
24 feasible mitigation for all the plants.

25 We're going back into this and the 16-

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 05 process to facilitate what the Commission
2 required to support the Phase II decision making
3 process.

4 MR. SHAMS: In other words, indeed that
5 the mitigating strategy for that set of plants that
6 would fall on this path would have been evaluated
7 for the reevaluated hazard.

8 CHAIR STETKAR: I'll have to think
9 about that. Go on.

10 MR. BELLINI: If I add one more thing.
11 We talked about the one negligible margin crediting
12 conservatism, but there are suggestions in here
13 about how to quantify uncertainties, modeling
14 natural uncertainties, and so forth. So that's
15 still part of what we're saying. If you don't have
16 those excess conservatisms, then you will have to
17 possibly quantify your uncertainties to demonstrate
18 adequacy in your margin.

19 MR. ZACHARIAH: So this is Tom
20 Zachariah, NEI, again. I'll just mention that
21 we're going to come back around. I'm just going to
22 outline the process here. Each of these elements
23 are embedded in an appendix. So we will circle
24 back around and actually talk about the technical
25 detail in each of the appendices.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 The last path in the focused evaluation
2 is path three and this is a feasible response to
3 LIP.

4 CHAIR STETKAR: Before you get into the
5 details on this, can you explain to me why local
6 intense precipitation needs a different construct
7 from any other possible flooding hazard? Why do we
8 have a path three?

9 MR. ZACHARIAH: So when developing 16-
10 05 and maybe Mo can give some background on this,
11 it was taking the concepts of the COMSECYs and the
12 COMSECY I believe it was 15-00-19 mentioned that
13 LIP would be treated differently.

14 CHAIR STETKAR: But why -- Honestly, my
15 mind glazes over because I get too many different
16 bits and pieces that have been created at too many
17 different times. So let me just step back and ask
18 everybody in this room the assembled wisdom of why
19 do I need to treat local intense precipitation
20 separately and perhaps differently as a flooding
21 mechanism compared to any other way that I might be
22 able to flood the site? Why do I need to do that
23 from pure technical basis?

24 I don't want to hear any references to
25 COMSECYs. I don't want to hear an SRM. And I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 don't want to hear references to any NEI guidance.
2 I want understand from a physical perspective why I
3 need to treat it separately.

4 MR. SHAMS: We have Joe Kenny from
5 Research.

6 MR. KENNY: Joe Kenny from the Office
7 of Research. When we developed the original
8 interim staff guidance for the --

9 CHAIR STETKAR: No, no. I don't want
10 that approach. I want to understand physically why
11 I want to treat it separately. I don't want it
12 referenced to ISGs. I don't want COMSECYS.

13 I don't want you to use those words in
14 a sentence please. If you use that word, I'm going
15 to be Ah like that. I want to understand from a
16 physical perspective why I need to treat it
17 separately.

18 MR. KENNY: The motivation was not a
19 physical perspective. That's why I would like to
20 finish the response if I may.

21 CHAIR STETKAR: And that's why I wanted
22 to get on the record. So now finish the response.

23 MR. KENNY: Okay. When we originally
24 developed the ISG for the integrated assessment, it
25 was realized that there would be some plants where

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 the local intense precipitation might be the only
2 hazard that was not bounded. So there was a path
3 created. And the reason for that was because there
4 were some plants that when they were originally
5 licensed that particular hazard did not get a lot
6 of scrutiny.

7 CHAIR STETKAR: And might there be a
8 plant where a tsunami is the only hazard that might
9 be the problem?

10 MR. KENNY: That's possible. But the
11 idea was that in the integrated assessment the
12 local intense precipitation, if that was the only
13 thing that needed to be addressed, there was an
14 efficient manner to address it within the
15 integrated assessment.

16 Evaluating the impact of a tsunami or
17 storm surge would be a much more complicated
18 analysis procedure. So it was to make the
19 integrated assessments more efficient.

20 CHAIR STETKAR: Now my question is in
21 this construct now -- it's now 2016 -- and we had
22 different paths and different ways of dealing with
23 these things, why can't I do what smells like a
24 path two assessment for local intense precipitation
25 or a path four assessment for that matter if I need

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 to sharpen my pencil and think about it
2 differently? Why can't I do that?

3 MR. KENNY: You could. There is
4 nothing that --

5 CHAIR STETKAR: What difference then
6 because we still don't have the details of how
7 people do these things? What difference is there
8 in a path three assessment for local intense
9 precipitation compared to a path two assessment for
10 let's say a local intense precipitation that
11 happened 100 miles away that overtopped the dam
12 that then flooded my site?

13 MR. SHAMS: That would be a dam
14 failure.

15 CHAIR STETKAR: That would be.

16 MR. SHAMS: Yes. And it would be
17 treated --

18 CHAIR STETKAR: What difference now, if
19 I'm asking licensees to do things, conceptually is
20 there in a path three evaluation compared to a path
21 two evaluation for those two different flooding
22 mechanisms where I look at goes in and goes out?
23 Goes in is what's coming in. Goes out is either
24 what goes through or is drained away or whatever.

25 MR. ZACHARIAH: So in a path three

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 evaluation, the difference would be that there
2 would be some element of mitigation. So it would
3 not be preventing the waters from impacting the key
4 SSCs. It would instead be realizing that (1) the
5 key SSCs may be impacted and (2) there is a
6 strategy to cope with that.

7 CHAIR STETKAR: Is that like a path
8 four assessment for my dam failure?

9 MR. ZACHARIAH: It could be, yes.

10 CHAIR STETKAR: So why don't I have
11 path two assessments for local intense
12 precipitation and path four assessments for local
13 intense precipitation?

14 MR. SHAMS: You could have a path two
15 assessment for local intense precipitation if you
16 have plant protection that's able to withstand that
17 hazard, yes. That would be equivalent. You still
18 call it a three, but nonetheless you're
19 demonstrating that the plant protection are able to
20 withstand that hazard.

21 CHAIR STETKAR: So let me try something
22 else. If I have a dam failure and I decide that I
23 need to implement mitigation because I can't
24 protect the plant adequately. By definition then,
25 I fall into either a path four or path five

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 assessment. Is that correct?

2 MR. ZACHARIAH: Correct.

3 CHAIR STETKAR: And by definition
4 because you're characterizing those as integrated
5 assessments, those somehow have some nexus to Phase
6 II regulatory decision making. Is that correct?

7 MR. ZACHARIAH: Correct.

8 CHAIR STETKAR: Okay. If I need to
9 invoke mitigation for a local intense precipitation
10 event, by definition that does not fall into a path
11 four or path five. Is that correct?

12 MR. ZACHARIAH: Correct.

13 CHAIR STETKAR: And therefore it will
14 never trigger possible regulatory attention. Is
15 that correct?

16 MR. ZACHARIAH: Correct.

17 CHAIR STETKAR: So this is simply a
18 trick to say I'm not never going to look from a
19 regulatory perspective at mitigation of local
20 intense precipitation. Is that correct?

21 MR. ZACHARIAH: So path three does look
22 at mitigation for local intense precipitation but
23 using the guidance in NEI 12-06 and not the
24 guidance in the appendices.

25 CHAIR STETKAR: I don't care about the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 guidance. I'm trying to get -- It sounds to me
2 like the motivation is some sort of negotiated
3 condition that the staff has said, AYeah, you can
4 put mitigation in for local intense precipitation,
5 but for some reason that will never be looked at
6 under Phase II. To me, I don't get it. I mean I
7 don't get it.

8 MR. RILEY: Now can I take a shot?

9 CHAIR STETKAR: Yes, you may.

10 MR. RILEY: This is Jim Riley. Let me
11 preface this by saying I'm not a hydrologist. So
12 for those of you who are you can shoot at me.

13 We were discussing this when this was
14 getting kicked off and I believe the thinking
15 behind this was that the local intense
16 precipitation event is an extremely conservative
17 set of assumptions in a highly stylized storm. So
18 you start off with kind of a smart storm that
19 centers itself directly over the site over a small
20 area and uses an extreme amount of precipitation.
21 I think it had to do with the probability of this
22 event being very extreme and it wasn't necessary to
23 consider it in the same realm with things that are
24 more likely.

25 Now you guys can shoot at me, those of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 you who are hydrologists. But that's to me what
2 played a part in why local intense and in short
3 duration.

4 MEMBER SKILLMAN: I'd like to weigh
5 into this if I can. I think that there is at least
6 one operating experience event that probably is the
7 basis of this. And it happened in South Texas. As
8 I recall, they ended up with 16 inches of water in
9 their aux building.

10 And it happened because it was a summer
11 day and they had all the doors open. And this
12 horrific weather front came through. And they knew
13 that they were going to get rain. But they never
14 anticipated that amount of rain.

15 My hunch is this isn't an
16 accountability item, John, where there really has
17 been an event of record that just kind of took
18 everybody's breath away. And they said, we'd better
19 be careful here.

20 CHAIR STETKAR: Good. I'm worried
21 about all of the sites in the country. And I'm
22 worried about how people are going to address this
23 and the motivations for why things are assigned to
24 these different paths of doing assessments. To me,
25 probability arguments, fine. If you want to make

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 probability arguments, that's great. You have a
2 mechanism of doing that. It's called pass find.

3 If you want to fine tune your analysis
4 of how deep might the water get, that's fine. You
5 can do that. I don't understand why local intense
6 precipitation can't be handled with the options of
7 doing a path two assessment if you can judge that
8 you have adequate protection, meaning elevation,
9 drains, sluiceways, whatever you want to do, big
10 doors. I don't care what it is. Adequate
11 protection.

12 Or if indeed you can't provide adequate
13 protection, you need some sort of mitigation
14 because you're going to get some damage. It's
15 called local intense precipitation, but
16 reevaluating that path forward. I don't understand
17 why local intense precipitation must of necessity
18 be treated differently other than the fact that
19 you're trying to argue that mitigation of local
20 intense precipitation will never be examined in the
21 Phase II regulatory assessments. And that's the
22 only thing that I can see of why path three exists
23 because it has been somehow negotiated.

24 So explain to me if that's not the
25 motivation for path three. Explain to me what it

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 is because otherwise I don't see the difference
2 between treating it as a path two or four or five
3 in this vernacular.

4 MR. SHAMS: I think that the various
5 parts and pieces that were mentioned by a number of
6 us here really are the foundation. You're
7 absolutely right. LIP is not intended to go
8 through the Phase II decision making because we
9 essentially do not believe that given the low
10 probability that given the number of aspects that
11 different people described would warrant a
12 regulatory action such as a bad fit.

13 But again, that is based on as we
14 discussed the low frequency of the hazard, the
15 short duration of the hazard. This is not like the
16 entire of Mississippi flooding and everything
17 around the site. It's a small event.

18 Also one of the things that we had
19 worked with the industry earlier on that path is to
20 put together a warning time, leveraging if you
21 would warning time, for precipitation. You would
22 see it coming regardless of if you have hours or
23 more.

24 CHAIR STETKAR: Do you get warning time
25 for the upstream dam failure?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. SHAMS: You do.

2 CHAIR STETKAR: Okay.

3 MR. SHAMS: But some of them are much
4 closer than being days away. Some are a couple of
5 hours away. Yes, you do get warning time for them
6 as well.

7 CHAIR STETKAR: So conceptually there's
8 no difference. I can account for warning time.

9 MR. SHAMS: Except just the low
10 frequency of that event and the short duration and
11 --

12 CHAIR STETKAR: Dam failures occur. We
13 know that they occur at much higher frequencies
14 especially in multiple dam failures.

15 MR. SHAMS: Right, but they don't
16 impact that square mile which is what is what the
17 local intense precipitation is intended to impact.
18 So these are the different aspects that we looked
19 at and recognized that it is appropriate to treat
20 this hazard without particularly concerting it as
21 part of the regulatory decision making.

22 And to answer your first question which
23 is is it appropriate for someone to demonstrate
24 that there's protection in the plant to take care
25 of LIP. The answer is actually that's what we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 want it to. In fact, we're putting in an ISG that
2 that should be an aspect of a licensee's
3 investigation for this hazard. It's to assess
4 whether or not protection is available and if it's
5 not, mitigation would be an acceptable way to treat
6 it.

7 CHAIR STETKAR: I agree with you that
8 if the staff can protect against it that's great.
9 Put in big drains or make sure you have appropriate
10 elevations or slopes or whatever. That's fine.

11 What I'm challenging is the fact that
12 for some reason classes of flooding mechanisms can
13 trigger in this context a path four or path five
14 mitigation assessment which then can be examined
15 for potential regulatory response; whereby edict
16 analogous local intense precipitation events that
17 could require mitigation are off the table for that
18 evaluation. And if the only basis is
19 that, I have a real question. I don't understand
20 why we just don't look at all possible flooding
21 mechanisms and treat them in the context of do we
22 have adequate protection. If we don't, do we have
23 adequate mitigation? And if we don't have adequate
24 mitigation and we can't justify it, maybe we need
25 to think about taking regulatory action.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. SHAMS: And I would offer we are in
2 the sense that the different paths either you
3 arrive at one that demonstrates you have
4 appropriate protection. And if you don't, then you
5 move onto the next path that would lead you to
6 demonstrate where the protection essentially ceases
7 to be effective and where mitigation becomes the
8 appropriate method of response.

9 What Phase II does is to determine if
10 that bifurcating point is an appropriate one. In
11 other words, is the frequency of the event that's
12 overwhelming the protection is too high if you
13 would. For local intense precipitation, we just
14 felt that it would not benefit from this exercise.
15 It's limited.

16 MEMBER BLEY: You've prejudged that one
17 because the probability is low enough.

18 MR. SHAMS: That's what we did, yes.

19 MR. KENNY: This is Joe Kenny from
20 Research. Getting back to your original question,
21 fundamentally there is no reason why you couldn't
22 handle local intense precipitation by one of the
23 other paths. But there are a couple key points
24 about local intense precipitation which lend it to
25 having its own path. And fundamentally though one

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 is the ability to forecast a LIP event which is not
2 nearly as well developed as our ability to forecast
3 other large scale flooding events and (2) also the
4 impact, the duration, of that event on the plant is
5 going to be most of the time very, very short
6 compared to the other large scale flooding events
7 that we're concerned about.

8 So it's those two key pieces, the
9 inability to forecast relative to the forecasting
10 abilities for other phenomena and the short
11 duration of the event.

12 DR. SCHULTZ: And not the low
13 likelihood of occurrence.

14 MR. KENNY: Personally for myself from
15 professional standpoint, the likelihood does not
16 come into it because the other hazards that we're
17 concerned with also are large event, large, rare
18 events. So personally I don't incorporate the
19 likelihood argument into my thinking about it.
20 Other people may differ.

21 CHAIR STETKAR: Go ahead. We've had
22 enough on this one.

23 MR. ZACHARIAH: This is Tom Zachariah
24 again. So the first path within what's dubbed the
25 integrated assessment is demonstrating that we have

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 effective flood mitigations. So these are for the
2 mechanisms where effective protection wasn't
3 effective or demonstrated further.

4 For this, there are two main -- This is
5 looking at the problem maximum flood levels and
6 conditions and demonstrating that the mitigation
7 equipment that's being relied upon to mitigate any
8 impacts due to those conditions are reliable. And
9 the overall site response is adequate. And this is
10 again Appendix B and Appendix C which we will get
11 into in more detail.

12 The second major bullet is to show what
13 the difference here is between path four and path
14 five. And path five is intended to focus on the
15 sites where developing of frequency which we'll get
16 into with path five would be challenging. And our
17 example is dam failures. This path is not
18 developing frequencies or likelihood which
19 separates it from path five.

20 CHAIR STETKAR: But there is this --
21 You spoke this morning. In path four, it seems
22 that because they're deemed to be more frequent or
23 whatever the words are in the guidance there is the
24 onus to provide confidence that the mitigating
25 strategies are both feasible and reliable.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Whereas, for the less frequent events
2 that are evaluated on path five, feasibility is --
3 demonstrating adequate feasibility is sufficient.
4 Is that correct?

5 MR. ZACHARIAH: So path four is
6 demonstrating that the plant's response is adequate
7 without making any likelihood or frequency.

8 CHAIR STETKAR: But there are
9 discussions in your first sub-bullet. A Demonstrate
10 that the mitigation equipment is reliable.@

11 MR. ZACHARIAH: Yes.

12 CHAIR STETKAR: A Demonstrate overall
13 response is adequate.@ Now you're careful to use
14 words like effective flood mitigation applies for
15 path four while feasible mitigation applies for
16 path five. And I'm trying to understand what you
17 mean by that.

18 In particular, you heard the discussion
19 this morning of what you mean by effective flood
20 mitigation in the context of personnel response. I
21 know what feasible means.

22 MR. ZACHARIAH: I mean specifically the
23 difference is the process and the guidance that
24 we're using, so what we outline in Appendix B and
25 we've outlined in Appendix C.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: You're telling me to
2 wait for my question until we get to Appendix B and
3 Appendix C.

4 MR. ZACHARIAH: No, no.

5 CHAIR STETKAR: Fine. I can do that.
6 But you're not going to make me go away.

7 MR. ZACHARIAH: That's not what I was
8 doing. I'll let Mike.

9 MR. TSCHLITZ: So I think it boils down
10 to you're getting at Appendix C and what we
11 consider to be adequate response. How is that
12 different from B's mitigation.

13 CHAIR STETKAR: That's right.

14 MR. TSCHLITZ: And the aspects in
15 Appendix build off of what's done in NEI-12-06
16 Appendix E for the validation of response actions.

17 CHAIR STETKAR: And we established for
18 the purpose of this afternoon's meeting this
19 morning that those very carefully now in NEI-12-06
20 Revision 2 state that that's an assessment only of
21 feasibility and not reliability. Despite the fact
22 that the attachments still exist, they're not
23 referred to anywhere.

24 So it's feasible. Appendix E means it's
25 feasible.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. TSCHLITZ: Feasible plus what we do
2 in Appendix C for effective flood mitigation for
3 path four is what we're saying is adequate, an
4 adequate overall site response. I don't know
5 whether we want to get into discussion of that now
6 or whether we want --

7 CHAIR STETKAR: Whenever you feel it's
8 better to do it. But C only refers to Appendix E
9 in NEI-12-06 for anything that deals with human
10 response.

11 MR. TSCHLITZ: Right.

12 CHAIR STETKAR: It says you do timeline
13 analysis. You do all that other. But in terms of
14 evaluating if you want to use the term
15 effectiveness or adequacy or reliability or
16 whatever word you want to use it simply refers you
17 to Appendix E in NEI-12-06 unless I'm
18 misinterpreting something.

19 MR. MILLER: This is Drew Miller
20 representing Exelon. I think what Appendix C is
21 that it uses that as a starting point. And it's
22 really designed to evaluate manual actions to carry
23 out the site response in response to an external
24 flooding mechanism. And any of the paths are going
25 to use this appendix if you have manual actions

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 regardless if it's two or four or five and three as
2 well.

3 And let me just give you a little
4 background on what we did to build this appendix.
5 We stepped back and said, ALet's try and forget all
6 the guidance which I've already heard today. Don't
7 mention ISGs or other guidance.

8 CHAIR STETKAR: Thanks.

9 MR. MILLER: And we said as the group
10 came together what we would if we wanted to come up
11 with a strategy ourselves. It doesn't exist now.
12 Right. So what would we ask ourselves and how
13 would we put together a strategy? What would we
14 look for and what would be appropriate, what
15 questions would be appropriate to ask?

16 And the things we came up with would be
17 the actions would need to be clearly defined. You
18 need to know when to start and where to go and what
19 to do. You would want to know -- You wouldn't want
20 this to be the first time performing the action
21 especially when it counts. You would want
22 enough time to complete the actions with some
23 buffer margin. You would want to anticipate the
24 conditions in which you're going to be performing
25 said actions. And then you would want to have the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 proper tools to complete the job and do something
2 to try to anticipate unanticipated consequences. I
3 know that's a weird way to phrase it, but we really
4 want to account for unanticipated consequences or
5 suboptimal human performance as you'll see a little
6 bit later.

7 It turns out NEI-12-06, the Appendix E,
8 also known as FLEX validation covers a lot of these
9 items. So we felt it was most appropriate to go
10 ahead and use that as the basis. And what happens
11 in Appendix C is you say I'm going to take all my
12 actions and put them through the Appendix E
13 validation process to determine their feasibility.

14 There is a lot of things in there that
15 it does really well. It looks at performance
16 shaping factors. It determines time margin.

17 CHAIR STETKAR: I'm sorry. It doesn't
18 use performance shaping factors anymore. It used
19 to, but it doesn't anymore.

20 MR. MILLER: There is an attachment I
21 believe.

22 CHAIR STETKAR: There is. It's not
23 referred to anymore. Those attachments have become
24 attachments. The former incarnation of Appendix E
25 used to talk about how one might use those

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 considerations to evaluate confidence in the
2 reliability. It doesn't do that anymore, at least,
3 as far as I can tell because it narrowly focuses
4 only and only on feasibility. Despite the fact
5 that those things are in there, it doesn't use
6 them.

7 MR. MILLER: Okay. So that's
8 understood. And now again what we did is we pulled
9 out some of those performance shaping factors
10 specifically in the environmental condition section
11 and said, ANow that we know what this flood hazard
12 looks like we have a scenario or a particular
13 mechanism we want to consider the impacts of those
14 environmental conditions on the human actions.

15 What we determined to put in Appendix C
16 that we thought was building upon 12-06 for the
17 five bullet points you see on the slide in front of
18 you which is the clear procedural triggers, the
19 established organizational response, a detailed
20 flood response timeline and then again everything
21 needs to consider environmental conditions and that
22 the overall site response time margin is adequate.
23 We really built upon what NEI-12-06 Appendix E
24 looked at and then said here are the flood specific
25 recommendations to get you to determine that it's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 adequate.

2 CHAIR STETKAR: Let me try this because
3 I'm not making much headway here. I satisfy all of
4 these things for path five evaluation where all I
5 need to do is justify feasibility because I have
6 determined that the frequency is low enough that I
7 don't have to have a real decent assessment. I
8 have a high confidence that the people will
9 reliably implement this stuff.

10 I have confidence that they'll
11 implement it because I've gone through this
12 process. But I don't need better confidence on the
13 reliability. Fine.

14 But you're saying that that's perfectly
15 adequate for a path four assessment where I do have
16 to have some confidence in the reliability. And I
17 see no difference in the guidance for path three,
18 four versus path five in Appendix C in this
19 document or Appendix E in the other document. I
20 see no difference.

21 Everything you talk about here is
22 precisely the same. I see nothing that says if
23 you're going to do a path four assessment you have
24 to more carefully consider attachments whatever the
25 heck they are -- they've been renumbered -- four

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 and five I think in Appendix E to NEI-12-06. Or
2 that perhaps you might use other types of processes
3 that have been used and endorsed by both the staff
4 and the industry to look at time margins as a
5 surrogate for assessing confidence and reliability.
6 There's no discussion of that.

7 MEMBER BLEY: Now let me give you a way
8 out.

9 CHAIR STETKAR: I tried to give them a
10 way out.

11 MEMBER BLEY: I know, but they have to
12 think the way you do. If in Appendix C when you
13 refer back to NEI-12-06, your intention was
14 referring back to as it was with those attachments
15 clearly linked. It might just be the sequence this
16 was written at the time where that worked for you.

17 If it no longer works for us or for
18 you, maybe you need to beef up the language over
19 there to pull some of that back in here.

20 MR. MILLER: Yes, if the link doesn't
21 exist clearly as I had once thought when I wrote
22 this, we could certainly go back and take a look to
23 include more than environmental conditions.
24 Clearly a lot of things that I've --

25 MEMBER BLEY: And you don't mention

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 performance shaping factors but you have the ideas.

2 MR. MILLER: Yes, the idea was that
3 NEI-12-06 had they been in there --

4 MEMBER BLEY: It used to have that.

5 MR. MILLER: Right, I understand. And
6 again the process that I laid out and all the
7 things that we talked about, they get addressed.
8 The performance shaping factors are addressed.
9 It's just not called out as PSFs and the table is
10 not quite as explicit. So maybe we need to beef
11 some of that up.

12 MEMBER BLEY: And the citations don't
13 mean what you thought they meant.

14 MR. MILLER: That may be possible.
15 We'll have to go back and look at that.

16 MEMBER BLEY: Perhaps.

17 MR. TSCHLITZ: So that covers Appendix
18 C.

19 CHAIR STETKAR: That's fine. It's
20 important as these things come up. I know you
21 organized your presentation. But if we can address
22 issues sort of in the context of the way they're
23 being used, now we don't have to talk about
24 Appendix C in the context of the path five
25 evaluation if you will.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: And in fact you refer
2 back to that document over and over again in
3 Appendix C.

4 MR. MILLER: Yes.

5 CHAIR STETKAR: Oh yes.

6 MR. MILLER: Paths four and five you
7 will see will come back up again.

8 MR. RILEY: Can I say something?

9 CHAIR STETKAR: I'm sorry. Yes.

10 MR. RILEY: Jim Riley again. I got to
11 looking at Appendix E in NEI-12-06 and in section
12 E.6 under the validation process there's a step
13 that refers to completing Table E on performance
14 attributes. It refers to attachment four and
15 attachment five which are the guidance on how you
16 evaluate performance attributes. It used to be
17 called performance shaping factors.

18 There is a link from the body of
19 Appendix C over to those attachments. It's on page
20 100 if you have the PDF version.

21 CHAIR STETKAR: It's on 100 of the --

22 MR. RILEY: It's the PDF version. It's
23 Section E.6.3 and right above E.6.3.1.

24 CHAIR STETKAR: E.6.3.1.

25 MR. RILEY: In 12-06.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Yes. Even if it is there
2 the links are real great.

3 MR. RILEY: And it's in the section
4 that talks about what is this process and how do
5 you do it. Validation that is.

6 CHAIR STETKAR: Okay. We can -- I see
7 that here, but I also reread all of the text and it
8 says we've eliminated the notions of reliability in
9 these assessments and only look at feasibility.

10 MR. RILEY: I know there were
11 discussions about the implication that reliability
12 was addressed specifically in Appendix E. But the
13 fact is that these different performance attributes
14 put in there was kind of a -- I think Scott said it
15 this morning. It isn't anything we would say is a
16 strict evaluation of reliability as much as the
17 kind of factors that take you beyond feasibility to
18 something that's more likely to be able to be
19 accomplished.

20 CHAIR STETKAR: Let's go on. I read
21 that.

22 MR. MILLER: And again Appendix C only
23 points to NEI-12-06, Appendix E directly in the
24 feasibility section. So there are several
25 sections, right. It doesn't imply -- This guidance

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 does not imply that it goes beyond feasibility.
2 12-06 Appendix E goes beyond feasibility. So that
3 evaluation is in the feasibility section in
4 Appendix C.

5 CHAIR STETKAR: And that was my point
6 by saying because a path five assessment makes the
7 same reference as a path four assessment. There is
8 no distinguishing in this document that we're
9 looking at about how I need to consider reliability
10 different for human performance in a path four
11 assessment versus a path five assessment because
12 they both basically refer to C in this document
13 which refers to E in 12-06.

14 MR. TSCHLITZ: They're the same.

15 MR. MILLER: That is correct.

16 CHAIR STETKAR: Yes. And what we're
17 saying is if this distinction does apply that for
18 events that are judged more frequent we need to
19 have confidence in both feasibility and
20 reliability. I'm not seeing that distinction made.

21 MR. TSCHLITZ: So clearly on --

22 CHAIR STETKAR: For the human. I am
23 for the hardware because you're pretty careful to
24 say you need to satisfy as where we were your sub-
25 bullet for the hardware. Appendix B mitigation

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 equipment is reliable. And there's a lot of
2 guidance in there that it's maintained, that it's
3 available. They even have databases for how
4 frequently the valves fail and all that kind of
5 stuff. Not so much for the people.

6 MR. TSCHLITZ: Since we've got Drew
7 talking, we'll just keep going with path five.

8 MR. MILLER: I think maybe this will
9 help this discussion along as well. So path five
10 was really developed to allow sites to better
11 characterize their flooding mechanisms when
12 deterministic methodology yielded a single PMF type
13 of a value. And that wasn't enough to provide the
14 most meaningful insights to a plant about their
15 flood mechanisms and/or their response.

16 Tom, if you could go to the next page,
17 we can talk about the process that we outlined to
18 assist in creating flood scenarios. These flood
19 scenarios are mainly built upon plant impacts.
20 Once the flood scenarios are developed, then we
21 want to identify all the scenarios that have
22 effective protection.

23 And the effective protection are
24 determined in the same manner as we talked about
25 the path two in Section 7.2 or APM's adequate

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 protection features aren't reliable and the
2 flooding response is adequate.

3 After those scenarios are identified,
4 the next step is to determine the appropriate level
5 of evaluation for the remaining scenarios. So you
6 have your adequate protection scenarios or the ones
7 that have effective protection. And then the
8 scenarios that are above that you have to determine
9 what the appropriate level of demonstration would
10 be.

11 And the way we talk about doing this is
12 developing a probabilistic characterization of the
13 flooding mechanism. And then from that the main
14 goal is to determine whether the scenarios are more
15 likely or less likely to occur.

16 I guess I should stop here for a second
17 and just mention that we're not advocating in this
18 process to put together a full PFHA probabilistic
19 flood hazard assessment and characterizing the full
20 hazard curve. We recognize that that process for
21 the extreme end of the curve is immature and that
22 we want to really focus in on the decision making
23 regime of likelihoods. That really contributed to
24 the development of Appendix D which we'll talk
25 about in a little bit, determining that frequency,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 and it focuses in on rare floods which are 10^{-4} per
2 year with an annual accedence frequency or a 10^{-3}
3 with margin. And this is consistent with what was
4 suggested in COMSECY 15-00-19.

5 CHAIR STETKAR: Let me ask about that
6 since you brought it up. I was going to ask later
7 but. Again, I want to stay away from COMSECYs and
8 anything that a lawyer might have touched. And I
9 understand the difficulty and current state of
10 practice in developing complete probabilistic
11 flooding hazard curves with associated
12 uncertainties. Depending on who you talk to you
13 get more or less confidence in whether or not that
14 can be done.

15 Let me see if I can -- As I read
16 through this, I get the notion that you want to
17 develop assurance that we can protect or mitigate a
18 10^{-4} or more frequent flood, right?

19 MR. MILLER: 10^{-4} or 10^{-3} with margin.

20 CHAIR STETKAR: 10^{-4} or more frequent.

21 MR. MILLER: Or more frequent, yes.

22 CHAIR STETKAR: Suppose we can't do
23 that. Suppose we cannot mitigate a 10^{-4} flood.

24 MR. TSCHLITZ: Mitigate or protect.
25 Mitigate has already been proven through mitigating

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 strategies.

2 CHAIR STETKAR: How did we prove that
3 we could mitigate a 10^{-12} flood through mitigating
4 strategies?

5 MR. TSCHLITZ: We proved that we could
6 mitigate against what the reevaluated hazard was
7 and the likelihood of that hazard is open to
8 debate.

9 CHAIR STETKAR: And that's what I'm
10 asking about, the debate. Now we're starting to do
11 quantitative analysis to say as long as the
12 frequency of that reevaluated flood severity is low
13 enough and I have feasible mitigating capability,
14 I'm okay. Conceptually, I'm okay with that. I get
15 it.

16 What I'm asking though is that a
17 distinct line is drawn at 10^{-4} . And I'm asking you
18 if I cannot prevent core damage for example for a
19 10^{-4} flood what does that mean. I can ask you and I
20 can ask the regulator. What does that mean?

21 If I'm developing mitigating strategies
22 I'm sitting at a plant and I can't mitigate a 10^{-4}
23 flood to prevent core damage. I'd damn well better
24 try to keep the containment intact. And that might
25 be a different mitigating strategy. I might have

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 more time available to do that, but I don't see any
2 of that notion here. It's just pass/fail at 10^{-4} .

3 MR. TSCHLITZ: It isn't. I mean the
4 Commission directed the staff to have licensees
5 evaluate their flood hazards using the existing
6 guidance for siting of new reactors. People went
7 off and did that. Those reevaluated hazards were
8 used to develop the mitigating strategies.

9 The likelihood of those flood hazards
10 is debatable, but I say most people would say for
11 most of the mechanisms they are less than 10^{-6} . For
12 new reactors, that's not such a big deal because
13 you can change the siting of your reactor very
14 easily. For existing reactors that's a more
15 difficult question to answer.

16 CHAIR STETKAR: Let me try it this way
17 because I'm probably not communicating my concern
18 well enough. People will say we'll accept a 10^{-4}
19 core damage frequency maybe. All right. Well,
20 we'll look at a 10^{-4} hazard and say we've got some
21 mitigating strategy that has some reliability such
22 that my core damage frequency might be lower than
23 10^{-4} by one or two orders of magnitude.

24 If that core damage occurs and I'm
25 guaranteed to have containment failure it's not a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 good day offsite. Do you follow me? So if I'm
2 only focusing the concept of my mitigating
3 strategies against protection of core damage with
4 some frequency and not recognizing the fact that if
5 they are not effective to prevent core damage, it
6 is very likely that I will also have a conditional
7 containment failure probability of one. Are we
8 thinking that way?

9 In other words, what's the basis for
10 this 10^{-4} and our judgment that our mitigating
11 strategy is adequate for overall plant safety? If
12 it's only on core damage, then I'll say maybe
13 you're not thinking far enough. Maybe you ought to
14 be thinking about all the way out to releases.

15 MR. SHAMS: John, if I may offer some
16 thoughts on that. What we're trying to do in this
17 part of the evaluation is to have these sites --
18 Essentially we have the reevaluated hazard and
19 there was a fair degree of debate on the frequency
20 of that reevaluated hazard. We tend to see more
21 agreement that it is a lower frequency than 10^{-4} .

22 But be that as it may, the idea is to
23 have the site go through the integrated assessment,
24 provide the plant response. And part of that plant
25 response would be where does a 10^{-4} or 10^{-3} plus

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 margin fall relative to that reevaluated hazard and
2 also relative to the ability of the plant to
3 protect the key safety function. We have the
4 mitigating strategies that are able to mitigate and
5 maintain the key safety functions at the
6 reevaluated hazard regardless of what frequency
7 that hazard is.

8 Now I want to understand the rest of
9 the response for the plant itself. And then in
10 Phase II is where we actually do exactly what
11 you're thinking about. Do we have a large release
12 frequency that's essentially not acceptable by
13 Commission goals or CDF or a combination of that.

14 At this point, we would start thinking
15 there are actions that we can order a licensee to
16 do. Would this be a back fit process? So there is
17 a tail end of this process that represents this
18 thought that you're thinking about.

19 CHAIR STETKAR: That helps a lot, Mo,
20 actually. Thank you. Go on.

21 MR. MILLER: Do you want to go onto --
22 We can go on. I have an example. I think we
23 talked a lot about the scenarios and how things are
24 developed. But this seemed to help with the group
25 when they were discussing it initially.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 We put together a fictional plant that
2 always has a sight elevation of 100 and then the
3 flood barrier height of 105 with a transformer for
4 offsite, maybe a diesel generator at 107 and then a
5 maximum still water elevation of 110 from the PMF.
6 What we will be able to do from this information is
7 create three scenarios for evaluation. This is
8 just to give you an idea on what this process looks
9 like and how we consider creating scenarios.

10 If we move to the next one, Tom,
11 please. We can now further evaluate each scenario
12 and its frequency, the annual accedence frequency.
13 So for scenario one we created -- again this is all
14 fictitious of course -- a scenario that it has a
15 frequency of accedence of $7E-3$. And we determined
16 that the likelihood of that scenario is higher.
17 But we also said that that scenario has effective
18 protection. So maybe there are flood barriers that
19 are up or there's a berm protecting the site or
20 something like that.

21 The second scenario, number two there,
22 where the offsite power diesel generator, whatever
23 safety, key SSCs would be effected has a frequency
24 of $1E-4$, right on that threshold we've been talking
25 about. And we've determined that that scenario is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

(202) 234-4433

1 a higher likelihood. In this case, then we're
2 advocating that effective mitigation be
3 demonstrated using Appendix C.

4 The last scenario from above that last
5 key SSC up to the PMF we know is much less than
6 $1E-4$. We don't know what that exact frequency is.
7 But we know that it's less than $1E-4$. We
8 determined that that scenario is a lower likelihood
9 and the feasible response is an appropriate
10 response given the likelihood of the scenario.

11 And again that was intended to be
12 Appendix C, the feasibility section. I forget
13 exactly what section it is after the reformatting.
14 But it was to look at NEI-12-06 Appendix E and
15 determine feasibility. That ends what I had to
16 talk about for path five. Any questions?

17 MR. ZACHARIAH: This is Tom Zachariah
18 again. The next few slides we'd be going through
19 the appendices. We went through Appendix C.
20 Appendix A we talked about a little bit. But I
21 think we should talk a little bit more about it in
22 detail. I was going to pass it onto Joe here.

23 MR. BELLINI: Appendix A really can be
24 used in any of the paths as an option for
25 addressing reductions in conservatisms or improving

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 realisms, different ways of saying the same thing.
2 If you see Appendix A, it's intended to really just
3 be tools for licensees to use to provide a little
4 bit of guidance on what inputs, methods or
5 assumptions could be overly conservative. They
6 have to just build their case on a site specific
7 basis.

8 It provides a catalog of potential
9 conservatisms, mostly deterministic. And the
10 objective would be that they have to develop a
11 basis for why reducing conservatisms is
12 appropriate. But it's still bounding and any
13 uncertainties that you're erring on the side of
14 conservative and if there's any actions that need
15 to validate those assumptions. One example that
16 commonly is used if you have to add a procedure to
17 credit storm drain conveyance, for example, as a
18 reduced realist conservatism.

19 And there's an EPRI report that I'm
20 part of that effort. An EPRI report to develop
21 goes further and goes beyond what's in Appendix A.
22 Looking at alternatives, some examples and
23 additional technical basis for justification on the
24 conservatisms.

25 The Appendix A provides insights in

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 determining where safety enhancements are really
2 most beneficial and based on more realistic
3 scenarios. And the goal again is not to -- We
4 caution not to introduce nonconservatisms. So
5 we're providing some -- we're emphasizing that
6 there still should be a bounding scenario that
7 what's physically possible.

8 And it's consistent with the
9 hierarchical hazard assessment approach in the
10 guidance. And it's still consistent with what's
11 already in the guidance and just revisiting it from
12 what was done in the original flood hazard
13 submittal. Obviously, like I said before, the
14 justification has to be site specific and each
15 licensee has to build their case.

16 MR. HUBBARD: This is Dean Hubbard,
17 Duke Energy. And I'm going to talk about Appendix
18 B. The purpose of Appendix B is to address two
19 aspects. One is to look at the available physical
20 margin and is that adequate and (2) then to look at
21 the reliability of the flood protection.

22 It's structured under the available
23 physical margin. You're going to be looking at two
24 types of flood features. We looked at existing
25 flood features that were designed for the purpose

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 of flood features that are now being challenged
2 with perhaps higher levels or different aspects.

3 The hazard might be dynamic loading
4 that wasn't considered in the original analysis.
5 And you would be evaluating that. And the other
6 feature would be what I'll call repurposing where I
7 may want to take credit for berms or existing
8 structures that are going to be subjected to
9 flooding that previously were not and how you would
10 evaluate those.

11 And the level of rigor that would be
12 required to address those would be different. It
13 would involve a more rigorous analysis using
14 standards and criteria that would be consistent
15 with flood barriers such that you would demonstrate
16 that those barriers would be able to perform their
17 function, the new function, as part of the
18 repurpose.

19 The guidance is on reliability for
20 passive and active protection features. You're
21 going to be really looking to determine whether
22 that feature in terms of reliability will fail or
23 not and whether it can perform its function as
24 projected for the new flooding scenario.

25 The way Appendix B is structured it

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 goes through feature by feature. It's not
2 comprehensive in absolutely every type of feature
3 that you would be able to want to credit, but it
4 gives examples that can be applied more broadly.

5 CHAIR STETKAR: One of the things -- I
6 don't have many comments that you'd use the term
7 repurposing. One of the things that came across is
8 there is a discussion of flood doors and hatches,
9 the barriers that aren't in the current plant flood
10 design basis, but now you're going to take credit
11 for them.

12 And there is guidance in there that
13 says you have to make sure that you do a realistic
14 assessment given the reevaluated flood of
15 hydrostatic loads, hydrodynamic loads. Don't
16 forget to think about debris, all of that kind of
17 stuff that can challenge that barrier.

18 For everything else I see guidance that
19 points me to the fact that something is reliable
20 and reasonably available. In here I don't see
21 anything that says that the plant has to now have
22 some sort of assurance that indeed the door is
23 closed or the hatch is in place.

24 Now I can have the best door in the
25 world that can resist a force. But if the door is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 open it ain't going to do a lot of good.

2 Now for other things, for portable
3 things, there is when I talk about moving things
4 around this notion if I have to move it around I
5 know how to move it around, but not so much for
6 these doors and hatches that you're going to take
7 credit for. So I'd ask you to think about that
8 because certainly for the existing design basis
9 stuff there are requirements to confirm the doors
10 intact or the flood barriers are watertight, the
11 maintenance is done on them, the holes get filled
12 and all that kind of stuff. I don't see how that
13 follow-up is done on this repurposing.

14 MR. HUBBARD: That's a great comment.

15 CHAIR STETKAR: Because you do mention
16 for hardware if I'm going to take credit for
17 hardware, I'm still have to have some notion that
18 it's going to work. Pull a cord on a lawnmower and
19 it's going to work.

20 MR. HUBBARD: We had that discussion
21 and in practical terms doors and hatches, let's
22 say, they can either become active or passive
23 features. If administratively, they're going to be
24 maintained in a closed position and that's part of
25 your passive civil features program, then you would

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 expect to see that documented and your plant
2 processes and administrative procedures would
3 reflect that.

4 If they are active features, then you
5 have to evaluate them as active features and take
6 into account warning time to go take action and
7 make sure they're in the correct position. It's a
8 good question.

9 CHAIR STETKAR: Okay.

10 MR. BELLINI: If I can add, where
11 Appendix B is referenced say in path two for
12 instance, it also references Appendix C for where
13 there's temporary passive features where there are
14 actions involved.

15 CHAIR STETKAR: And I didn't want to --
16 I'm thinking about a door that wasn't designated as
17 a flood door in the current design basis. But now
18 you want to take credit for it because it's going
19 to protect against the reevaluated flood. So I'm
20 not talking about moving a barrier or anything like
21 that that might get into the other stuff I was
22 ranting about.

23 I'm talking literally about a door or a
24 hatch in the floor or ceiling or whatever. And the
25 guidance says that I have to make sure that it will

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 withstand the physical force of the water that I'm
2 taking credit for it blocking.

3 As I said, that's part of the equation.
4 The other part of the equation is making sure that
5 it's actually in place. That's the only one I had
6 on Appendix B. There's qualitative judgments. We
7 talked about all that stuff earlier.

8 MR. ZACHARIAH: So we'll skip over
9 Appendix C since we talked about it and we'll go to
10 Appendix D.

11 MR. BELLINI: Okay. This is Joe
12 Bellini again. Appendix D was incorporated into
13 this guidance as Drew was talking about with path
14 five to try to -- Again, the goal here is to
15 characterize frequency up to 10^{-3} to 10^{-4} , 10^{-3} with
16 margin for the purpose of just really binning the
17 scenarios ultimately and not necessarily trying to
18 actively characterize the full frequency spectrum
19 all the way up to the PMF.

20 We do provide I think a comprehensive
21 set of references for both those that fall into the
22 lower likelihood and the higher likelihood of the
23 frequency spectrum just for completeness sake.
24 There are other, more complex methods that can be
25 used. We wanted to at least get out there what

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 methods are available and have been used and are
2 more well established even if there is some
3 extrapolation involved and how you characterize
4 uncertainty. Those methods do exist for the 10^{-3} or
5 10^{-4} range.

6 The Appendix D basically provides a
7 catalog again of those methods and provides the
8 references and where they fit in that range in this
9 higher low likelihood. It also talks about
10 combined effects and dealing with combinations.

11 There's a very simple example based on a
12 combined effect, combinations of mechanisms that
13 are part of the NRC guidance. And depending on the
14 method, it addressed and evaluated uncertainty
15 that's consistent with those methods. And the
16 documentation that we haven't really talked about
17 yet, but adding some documentation to make sure
18 it's well documented as guidance provides in
19 section nine.

20 Again, it's not only for the purpose of
21 path five and binning the scenarios, but also for
22 again those Phase II decision making to inform the
23 flood mechanism and provide a probabilistic
24 characterization of the flood that the NRC can then
25 use as a way to do the Phase II decision making.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

(202) 234-4433

1 And just like some of the other aspects
2 we talked about already, the licensee has to --
3 It's very much site specific. And they have to
4 build a case and make it technically valid.

5 CHAIR STETKAR: Joe, I actually liked a
6 lot of the stuff in Appendix D. The only question
7 I had is there's a table. You mentioned combined
8 effects. And I know it's intended to be an
9 example. And I interpreted it as look at all of
10 the different permutations and combinations of
11 numbers that I can put together to get me a value
12 of 1E-4. There are five line items in it, five
13 alternative combinations and you show how I can
14 multiple different numbers together to get me to 10⁻
15 4.

16 Okay. I don't think that way. I think
17 of there's an uncertainty distribution about each
18 of these five perimeters that you had in there,
19 some of which you just set at fixed values and
20 others of which you examine the effects of
21 variability. This kind of matrix approach
22 immediately wins the question of how many of these
23 things do I need to do because I can set a large
24 number of different perimeters with a large number
25 of different values to come up with the same

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 result.

2 Or because you do address -- this is in
3 particular for risk-informed approach -- the
4 concept of uncertainty. Why don't you tell people
5 just to develop an uncertainty distribution for
6 these things and I need the combination of these
7 five perimeters to get my joint probability? I
8 don't care whether it's 10^{-4} or 10^{-7} or 3.6×10^{-12}
9 with uncertainty. Tell people to just do that and
10 it comes out to the way it is.

11 It might be lower than 10^{-4} . It might
12 be higher. There might be some probability, a
13 small probability, that it's higher. But it would
14 avoid this notion of pick some set of discrete
15 numbers to try to justify that you picked an
16 appropriate set to meet that nominal line in the
17 sand of 10^{-4} if that's the intention.

18 MR. BELLINI: Yes, I'll say a couple of
19 things to that. I think it's a valid comment and
20 this idea of accommodations this goes very little
21 in developing that.

22 CHAIR STETKAR: Yes.

23 MR. BELLINI: This example was really -
24 - this table was really just to make very crude
25 assumptions about independence and correlation and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 so forth to say that you don't -- Let me just
2 address this particular example.

3 So this is an example where you have an
4 antecedent storm and a main storm, two events
5 occurring back to back. And the point of this was
6 to say you can't have a 500 year flood and if the
7 500 year flood occurs first you don't get a 10^{-4}
8 ultimate combination when you combine that with
9 another 100 year flood or 500 year flood. It's
10 only a two year flood.

11 That's the only intent of this to show
12 that this standard combination that's part of the
13 guidance is just showing that you don't get very
14 far with the main event if you have an antecedent
15 storm. And you work the combination from there.
16 Now this is something we're going to work on
17 further.

18 CHAIR STETKAR: Yes. I was going to
19 say it might be -- When I read through it, I said
20 this is kind of a neat example to illustrate what
21 you're talking about there. And as long as people
22 recognize it as that and only that, that's okay.

23 On the other hand, people who pick up
24 this guidance or staff who look at what people who
25 pick up the guidance and submit start playing games

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 of large numbers of different combinations of if
2 the number is this and that number is this I get
3 this number. It's not going to help anybody.

4 MR. BELLINI: Yes, it's intended to be
5 very clear that.

6 CHAIR STETKAR: In this case you'll get
7 five questions about is this really the appropriate
8 number. If you take this as 1.0 and 1.5, you might
9 get slightly higher than 10^{-4} . So how could you
10 justify that one and two is the appropriate number?
11 And you'll get that.

12 MR. BELLINI: Yes, part of the ISG that
13 the NRC had put out is enclosure two I think. The
14 ISG and it addresses the whole probabilistic
15 aspects much more broadly. And this is something I
16 think we're going to have more discussion about is
17 how we deal with these combinations.

18 CHAIR STETKAR: The reason -- I didn't
19 actually even think about it until I read. I read
20 NEI's guidance first. So I knew what the basis
21 was. Then I went back and read the draft ISG and
22 saw what was in that enclosure two. I thought
23 maybe there's a different way to address that issue
24 that might satisfy both parties.

25 MR. BELLINI: Yes, I think we're going

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 to develop some examples and try to work on some of
2 the details a bit more on how to deal with the
3 combinations.

4 CHAIR STETKAR: I think that would
5 help.

6 MR. BELLINI: Yes. So we understand
7 that at least -- I understand that it wasn't very
8 well developed or extensively developed here in
9 terms of combinations. But I think enclosure two
10 of the ISG and Appendix D complement each other is
11 this provides a bit more specifics on getting to
12 the 10^{-3} or 10^{-4} for individual mechanisms.

13 CHAIR STETKAR: Yes.

14 DR. SCHULTZ: I had looked at a little
15 bit differently. It seemed like you were trying to
16 here develop not in a fully quantitative fashion
17 but rather stepping back and say perhaps we can
18 provide some examples that would demonstrate in a
19 number of different ways combinations that lead us
20 to the quantitative conclusion. And leave it at
21 that for now because we're not prepared to address
22 it in the quantitative evaluation of the
23 probabilistic approach. Was that it? Am I right?

24 MR. BELLINI: I think that's accurate.

25 DR. SCHULTZ: Okay.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: This is the end, right?
2 Do any of the members have any more questions for
3 NEI? If not, we're going to take a break. Let's
4 come back at 3:50 p.m. please. Off the record.

5 (Whereupon, the above-entitled matter
6 went off the record at 3:34 p.m. and resumed at
7 3:50 p.m.)

8 CHAIR STETKAR: We're back in session.
9 And it looks like any --

10 (Simultaneous speaking.)

11 CHAIR STETKAR: -- all of your friends
12 and compatriots have -- I can, I can feel the
13 suction, as they ran out the door. Eric, it's,
14 it's your show.

15 MR. BOWMAN: That happens. That
16 happens. Well, frankly --

17 CHAIR STETKAR: Even first thing in the
18 morning it happens.

19 MR. BOWMAN: I neglected to tell any of
20 my management I was coming here today, so I'll just
21 start. I'm Eric Bowman. I'm a Special Advisor,
22 still, in the Japan Lessons Learned Division. It
23 may be permanent, I don't know, it's been a while.

24 I'm here to discuss with you the
25 interim staff guidance that we've issued for public

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 comment, the draft, it was announced in the Federal
2 Register this morning. It proposes to endorse the
3 NEI document that you just had the briefing on from
4 Industry.

5 The purpose for this document is to
6 provide guidance for the closure of the flood
7 hazard reevaluation request for information using a
8 graded approach and also to provide some revised
9 procedures for the accomplishment for the
10 integrated assessment.

11 Guidance for the regulatory
12 decision-making will be forthcoming later. It'll
13 be a separate interim staff guidance document that
14 Bill Reckley will be leading the charge on, so
15 you'll get to interact with him, in the future, on
16 that one.

17 Okay, background for the interim staff
18 guidance document, it's to resolve the 10 C.F.R.
19 5054(f) letter that was issued March 12th, 2012,
20 under NTTF Recommendation 2.1, specifically, for
21 the flooding hazard reevaluations, as modified by
22 the COMSECYs 14-0037 and 15-0019 and their SRMs.

23 In addition to that and parallel with
24 that, we've got the actions that have been going on
25 for the mitigating strategies order and the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 mitigating strategy assessments under NEI 12-06,
2 Rev 2, Appendix Gulf that you heard about this
3 morning, and the ongoing effort for the MBDBE that
4 is the mitigation-beyond-design-basis events
5 rulemaking.

6 CHAIR STETKAR: Eric. Eric, help me
7 out again, because I get --

8 MR. BOWMAN: Certainly.

9 CHAIR STETKAR: -- I get lost, there's
10 just too many, there are too many things floating
11 around. This is interim staff guidance,
12 specifically, for flooding assessments, right?

13 MR. BOWMAN: Right. This --

14 CHAIR STETKAR: Okay.

15 MR. BOWMAN: -- is essentially to take
16 the place, or supplement the integrated assessment
17 guidance that was in 2012-05.

18 CHAIR STETKAR: Okay. That was going
19 to be the second question, but let's ask, answer
20 the second question first. Does this replace
21 2012-05?

22 MR. BOWMAN: It does not. 2012-05
23 remains an option that is available for licensees
24 to use for the integrated assessment. I believe,
25 we had a couple that submitted integrated

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 assessments using that, along with their flood
2 hazard reevaluation reports.

3 CHAIR STETKAR: Because --

4 MR. BOWMAN: They were situated in a
5 way that made it a simple thing for them to
6 accomplish.

7 CHAIR STETKAR: Let me, I don't think,
8 I don't know, because maybe Steve remembers, I
9 don't think that either our subcommittee, or the
10 full committee, ever had the opportunity to look at
11 2012-05. I know I didn't have any notes on it, but
12 that doesn't mean --

13 MR. BOWMAN: I --

14 CHAIR STETKAR: -- that we didn't.

15 MR. BOWMAN: I believe, the
16 Subcommittee and the Full Committee saw it and, I'm
17 not sure if they wrote a letter on it, but --

18 PARTICIPANT: We did not.

19 CHAIR STETKAR: We did not.

20 PARTICIPANT: I don't remember writing
21 a letter.

22 CHAIR STETKAR: We did not. No. I, in
23 fact, I looked that up. I --

24 MR. BOWMAN: Okay.

25 CHAIR STETKAR: My notes, here, did not

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 write -- we didn't write a letter that,
2 specifically, addressed that interim staff
3 guidance. We did write a letter on December 10th,
4 2014, listed it as a reference, but we didn't --

5 MR. BOWMAN: Yes.

6 CHAIR STETKAR: -- but we didn't
7 explicitly identify it. And in that letter we
8 recommended that the staff should better-define the
9 scope, this is a quote, the staff should
10 better-define the scope and intent of the
11 integrated assessments that are performed after
12 development and implementation of litigating
13 strategies, in accordance with Order EA-12-049.

14 So at that point we, apparently, had
15 acknowledged that it existed, but we recommended
16 that the staff develop better guidance, basically.
17 And that's what lead me to ask about, whether this
18 is that better guidance that then replaces 2012-05
19 --

20 PARTICIPANT: And you're saying --

21 CHAIR STETKAR: -- no it doesn't.

22 MR. SHAMS: What we're saying is, in
23 many respects it does, but we don't want to take
24 1205 off the street, because some --

25 CHAIR STETKAR: Okay.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. SHAMS: -- have used it.

2 CHAIR STETKAR: Because I didn't have
3 any notes, and if you can do this in a couple of
4 minutes, or less, because I don't have any notes on
5 2012-05 and I didn't have time to read it and study
6 it, for this meeting, are there any functional
7 differences between that guidance and this
8 guidance?

9 MR. SHAMS: The first glaring one would
10 be the, the recognition of focused evaluation.
11 That was not a concept that was introduced in the
12 original guidance, the 12-05 guidance.

13 CHAIR STETKAR: Okay.

14 MR. SHAMS: There was no discussion
15 there, I would assume, about probabilistic
16 calculation, or estimate of hazard that's a new
17 item also that we've introduced in this guidance.

18 CHAIR STETKAR: Okay.

19 DR. SCHULTZ: Mo, you said some have
20 used the previous document, is that, can you
21 quantify that, at all, or give a sense of how many
22 have used it?

23 MR. SHAMS: I would say a couple, it's
24 small --

25 MR. BOWMAN: There's 12 --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: Well, but I thought,
2 Mo, you said earlier, and I, I didn't write it
3 down, but I thought you said on, earlier today,
4 only one licensee has submitted a mitigating
5 strategy assessment --

6 MR. SHAMS: Right.

7 CHAIR STETKAR: -- and that licensee
8 concluded that they didn't need to do anything.

9 MR. SHAMS: It's true. That's true.
10 Now --

11 CHAIR STETKAR: Okay, so now going
12 forward --

13 MR. SHAMS: Yes.

14 CHAIR STETKAR: -- which guidance will
15 people use?

16 MR. BOWMAN: The mitigating strategy
17 assessments are different than the integrated
18 assessments. We've got a lot of different things
19 going on. So, what licensees hear.

20 CHAIR STETKAR: I know, this gets back
21 to, this gets back to my earlier rant, and I don't
22 want to revisit the earlier rant, because everybody
23 heard it.

24 (Simultaneous speaking.)

25 MR. SHAMS: I'll --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: You can read it.

2 MR. SHAMS: I'll try to be, try to be

3 --

4 CHAIR STETKAR: I'm asking that, if I'm
5 a licensee right now, today, in the first, the
6 beginning of the second quarter of the Calendar
7 Year 2016, and I am developing things that I'm
8 going to submit to the Nuclear Regulatory
9 Commission to convince the staff that, indeed, what
10 I have in place --

11 MR. SHAMS: Yes.

12 CHAIR STETKAR: -- at the plant will
13 make the core not melt --

14 MR. SHAMS: Yes.

15 CHAIR STETKAR: -- for my reevaluated
16 flooding hazard, which of the guidance am I going
17 to follow?

18 MR. SHAMS: So --

19 MR. BOWMAN: It's what I'm attempting
20 to layout in this slide. There are --

21 CHAIR STETKAR: Okay.

22 MR. BOWMAN: -- two regulatory outcomes
23 that will be from these parallel efforts. Under
24 the 5054(f) letter, there's a need to, to close out
25 of the letter and the licensee has a choice.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 That choice, if the licensee has a
2 flooding hazard that is not bounded by the
3 design-basis flood hazard, is to, either, do an
4 integrated assessment under the old
5 JLD-ISG-2012-005, or use this new ISG when it's
6 issued, to do a focused evaluation to screen-out of
7 doing the integrated assessment, or doing the
8 revised integrated assessment.

9 CHAIR STETKAR: Okay.

10 MR. BOWMAN: Under the mitigation of
11 beyond-design-basis events rulemaking, coupled with
12 the Order EA-12-049, there's the mitigating
13 strategies assessment a licensee will need to do,
14 to verify that the mitigating strategies they
15 developed are capable of combating the flood hazard
16 reevaluation resulting from the 5054(f) letter.

17 So you're going to have two things in
18 the end. You're going to have input to the Phase
19 II regulatory decision-making from this process, or
20 the integrated assessment process that will include
21 whatever a licensee proposes to justify that no
22 further action is necessary and you are also going
23 to have the mitigating strategies that will have
24 been demonstrated to be feasible at the flood
25 parameters resulting from the 5054(f) letter.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 In general, the latter case, the
2 mitigating strategies will be at the level that's
3 documented in the flood hazard reevaluation
4 reports, as they were approved by the NRC, after
5 review.

6 We do have a couple of licensees that
7 are going through and revisiting what those
8 reevaluated levels should be, not just levels, but
9 all the parameters, using guidance that follows the
10 same guidance. So it will have the same standing,
11 if you will, as a, as a flood hazard, resulting
12 from the 5054(f) letter that is considered to be a
13 bounding flood hazard.

14 CHAIR STETKAR: I'll have to read it.

15 MR. BOWMAN: I'm just trying to
16 understand --

17 CHAIR STETKAR: I'll have to read the
18 transcript to work through all of those words, but
19 let me, let me, because we want to get into this
20 stuff. So I, I have some perspective of how this
21 relates to 2012-05.

22 Now, since this is interim staff
23 guidance, as is 2012-05, this morning we had a
24 discussion about draft regulatory guide DG-13-01,
25 how does this all relate to that, because that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 endorses Appendix, in this particular case, G, in
2 NEI 12-06. It doesn't, it doesn't talk anything
3 about NEI 16-05, or, or, kind of, how to do an
4 assessment.

5 MR. BOWMAN: Okay.

6 CHAIR STETKAR: How does, how does all
7 of this roll together, eventually, into guidance
8 that will be linked to the rule?

9 MR. BOWMAN: The guidance that will be
10 linked to the rule will be, as it becomes a final
11 set of regulatory guidance, Reg Guide 1.226,
12 currently, draft Guide 13-01, taking into account
13 the permutations that went on with the Order and
14 any changes that happened to the Rule.

15 This guidance document, really, will
16 not serve a purpose, once we have closed out the
17 5054(f) letter. This guidance document is just to
18 provide an input to the regulatory decision-making.

19 CHAIR STETKAR: Okay.

20 MR. BOWMAN: It's not to meet a
21 requirement, but it may result in requirements, or
22 regulatory commitments, in the end.

23 CHAIR STETKAR: Got it. Thank you.

24 MEMBER REMPE: John, a long time ago we
25 used to always press the staff, could we see a flow

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 diagram that shows all of these things and all the
2 different pieces? And sometimes you'd bring one
3 and, I haven't seen that in this whole discussion
4 and, in a while, and does such a flow diagram still
5 exist, with all the activities and happenings of
6 late?

7 MR. BOWMAN: Do you mean, specific to
8 the flooding, or --

9 MEMBER REMPE: That and the mitigating
10 strategies.

11 MR. BOWMAN: -- or all the Fukushima
12 stuff.

13 MEMBER REMPE: All of the Fukushima
14 stuff. Does that diagram still exist that shows
15 all the connections and --

16 MR. BOWMAN: We do have versions of it.
17 I guess, I would ask the question, what would be
18 most helpful to the Committee, for the Full
19 Committee Meeting, at the beginning of May, just --

20 MEMBER SKILLMAN: I'd sure like to --

21 MR. BOWMAN: -- something that --

22 MEMBER SKILLMAN: Yes.

23 MR. BOWMAN: -- restricted --

24 MEMBER SKILLMAN: Yes.

25 MR. BOWMAN: -- to the flooding and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 seismic, or --

2 MEMBER SKILLMAN: I --

3 MR. BOWMAN: -- do you want something
4 beyond that?

5 MEMBER SKILLMAN: I believe a Venn
6 diagram that showed how, it shows how these pieces,
7 in some places, are separate, but overlapped.

8 MR. BOWMAN: Okay.

9 MEMBER SKILLMAN: That would help me.
10 It's, kind of, building on Dr. Rempe's question.

11 MR. BOWMAN: Yes --

12 MEMBER SKILLMAN: Just something, just
13 a pictorial that shows how --

14 MR. BOWMAN: We'll --

15 MEMBER SKILLMAN: -- we've got this one
16 set --

17 MR. BOWMAN: -- we'll see what we can
18 do --

19 MEMBER SKILLMAN: -- 5054(f), we've got
20 this initiative, here's the overlap, and that, kind
21 of, gets to John's question --

22 CHAIR STETKAR: I think that would help
23 an awful lot for the Full Committee Meeting. And
24 you might need, you might need a couple of them,
25 where you have some sort of top level. And if, if

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 indeed this has tentacles down into flooding show
2 how --

3 MR. BOWMAN: Okay.

4 CHAIR STETKAR: -- in particular the
5 flooding. Because the, the Full Committee Meeting,
6 on this particular topic, we'll be addressing this
7 interim staff guidance. But we're, also, at the
8 same Full Committee Meeting, addressing then, other
9 natural hazards, which, in some sense, is a little
10 bit separate, but, but it also has some links back
11 to NEI 12-06 and those types of things. So I think
12 --

13 MEMBER RAY: Well as, as --

14 CHAIR STETKAR: -- I think it would be
15 very helpful.

16 MEMBER RAY: As Michael explained and
17 you agreed, Mo, the, one of the things that helps
18 understand this is the outcome. I mean, one of the
19 outcomes is the possibility that there would be
20 some change noted.

21 We seem to dwell so much on how we're
22 going to avoid that outcome, but one of the reasons
23 why things are done the way they are is because
24 that might be the right answer, in some cases.

25 And so just keep that in mind when

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 you're doing what they ask you to do. But, it's
2 explicit that -- well that's one of the
3 possibilities, you know, --

4 MR. BOWMAN: Well --

5 MEMBER RAY: -- not always going to
6 decide that there's, anything needs to be done.

7 MR. BOWMAN: Exactly. The purpose of
8 this is to set up the information that's going to
9 be necessary for the Phase II regulatory
10 decision-making. The outcome of that
11 decision-making can be what the licensees have
12 proposed to do to protect or mitigate the flooding
13 hazard is acceptable, taking into account, whether
14 or not they needed to make regulatory commitments,
15 or they make plant modifications, or whatever, and
16 that can be okay, fine, what you're doing is good
17 and the plant is safe, we are closing out this
18 action.

19 If we don't get sufficient information
20 to satisfy our needs for the Phase II regulatory
21 decision-making, there's always the possibility to
22 go through request for additional information, or
23 demands for information, and if we need to impose
24 further requirements there's always the potential
25 for an order forthcoming from it.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Typically, we set up the guidance,
2 taking into account all stakeholder input, so that
3 we get an appropriate response in the, in this
4 stage, so that we can say, indeed, the facilities
5 are safe.

6 MR. SHAMS: So a diagram, in my mind,
7 just if I take five seconds to describe, because
8 it's already prepared, it's one that starts with a
9 high level that every plant prepares a reevaluated
10 hazard, both seismic and flooding, and then goes
11 down two different paths.

12 One of, assessing the mitigating
13 strategies to the reevaluated hazard, and then,
14 making changes, as appropriate, and that will be
15 the end of that, and updating the documentation for
16 the plant, you know, in that branch.

17 The other branch, again, using the same
18 reevaluated hazard to start doing assessments
19 associated with the 5054(f) letter and seismic side
20 it's SPRAs, its spent fuel pool, its high
21 frequencies.

22 In a flooding site, it's either a, an
23 integrated assessment, or a focused evaluation.
24 The outcome of that would be that many plants were
25 screened and closed out that 5054(f) letter, some

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 --

2 CHAIR STETKAR: But --

3 MR. SHAMS: -- would be --

4 CHAIR STETKAR: But, but part of the
5 alphabet soup is --

6 MR. SHAMS: Yes.

7 CHAIR STETKAR: -- is you, because you
8 guys work --

9 PARTICIPANT: We're getting secured
10 disorder.

11 CHAIR STETKAR: -- with this all the
12 time, you say it's either an integrated assessment,
13 or a focused evaluation, it's either an integrated
14 assessment, under 2012-05, whatever it means in
15 that context, or, at least, as we've heard here, an
16 integrated assessment, under 2016-01, which means
17 Path 4 and Path 5, as elaborated, I think, in NEI
18 16-05.

19 (Simultaneous speaking.)

20 MR. BOWMAN: That's correct.

21 CHAIR STETKAR: And I don't know how,
22 and it would help us, also, in this chart that you
23 don't restrict it to simply the alphabet soup of
24 the staff's regulations, but point us to which of
25 the NEI documents, the ISGs, or draft guidance,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 refer to, so that we know how those things --

2 MR. SHAMS: Correct.

3 CHAIR STETKAR: -- fit into the
4 picture.

5 MR. BOWMAN: And just to circle back to
6 your question about 2012-05, one other difference
7 is that Appendix Charlie of 2012-05 implemented an
8 evaluation of human actions that was modeled after
9 the NUREG 1852 for determination of reliability.

10 In this process we have the NEI 12-06,
11 Appendix E, and as implemented through NEI 16-05,
12 Appendix C, that --

13 CHAIR STETKAR: That has abandoned that
14 concept, but go on.

15 MR. BOWMAN: It, it doesn't use all of
16 that concept. It touches on aspects of it.

17 CHAIR STETKAR: We had enough
18 discussion about that. You, you heard the concern.

19 MR. BOWMAN: What?

20 CHAIR STETKAR: You heard the concern
21 earlier.

22 MR. BOWMAN: You were concerned about
23 it?

24 (No response.)

25 MR. BOWMAN: Okay.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: Not at the moment.

2 MR. BOWMAN: I didn't get that sense.
3 Okay, the Industry proposed guidance is NEI 16-05,
4 which you just heard about. Our guidance is the
5 JLD-ISG-2016-01.

6 It was made publically available and
7 announced in the Federal Register, the page number
8 in the Federal Register is 81FR23758. It was, this
9 morning, it was published and I'll be sure that
10 Mike Snodderly has a copy of the announcement.

11 The comment period, it's a 30-day
12 comment period. They get an extra day, so it's
13 really 31 days, because the 30 days ends on, not a
14 Sunday, but the 22nd of May.

15 So comments will be due May 23rd and we
16 do anticipate further interactions with public
17 stakeholders in the, during the comment period, to
18 discuss any potential changes to it.

19 MR. BOWMAN: Okay, getting into the
20 meat of what we've got in the interim staff
21 guidance document. We talked to the reductions and
22 conservatism and the basis for this is, the ongoing
23 direction that we've gotten from the Commission and
24 COMSECY 14-0037 and 15-0019 that we should look for
25 additional opportunities to address

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 over-conservatism, so in 14-0037 it also included
2 looking for areas where there was not sufficient
3 conservatism.

4 The idea behind that is the direction
5 that we have, and it make sense, is follow the back
6 fit rule when you make a determine on whether or
7 not further regulatory action is warranted, and
8 that points to the hazard we consider needs to be
9 more representative of a real hazard, rather than a
10 deterministic bounding hazard.

11 The method for the reductions and
12 conservatisms, we are proposing that the use of
13 individual items that are listed in the catalog
14 that's in Appendix A and NEI 16-05, we are not
15 endorsing those generically, because they're, the
16 such specific considerations that go into, whether
17 or not the changes in the methodologies that are
18 suggested there would, indeed, be more realistic.

19 Reductions and conservatism need to
20 follow the accepted process that's currently NUREG
21 Sierra 7046, the paragraph with the old hazard
22 assessment process.

23 MEMBER RAY: Eric, since I can't resist
24 asking this question, since it's coming out of the
25 JLD, do we test this, these methodologies against

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 what the answers it would have given, had it been
2 applied at the origin of this whole episode?

3 In other words, it seems to me like one
4 question that has to get asked, before it's all
5 over is, well all right we finally settled on all
6 of this methodology that we're describing and
7 agonizing over here, trying to understand, but if
8 we used it, would it, in that case, have prevented
9 what occurred? And I, you don't have an answer to
10 that, but --

11 MR. BOWMAN: I --

12 MEMBER RAY: -- I'm just asking, does
13 anybody --

14 MR. BOWMAN: I don't have --

15 MEMBER RAY: -- look at that?

16 MR. BOWMAN: I don't have a great
17 answer for it. But my understanding is that there
18 was evidence in the historical record of the
19 tsunami heights at Fukushima Daiichi, and if, if
20 that had been taking into account in setting the
21 design-basis of the facility --

22 MEMBER RAY: Yes, I know. But, see, I
23 don't want to get into this any further, I'm just
24 asking the question.

25 MR. BOWMAN: You can't.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER RAY: I'm not talking about
2 design-basis, we're talking about, you're talking
3 about things that are likely, or unlikely, and so
4 on and so forth, and I'm just saying, given all of
5 the refinements we've made under Commission
6 direction and so on, somebody, sooner or later,
7 needs to say, but this still remains adequate to
8 avoid that kind of scenario.

9 And, you know, it would just be really
10 nice to have somebody address that, at some point
11 in time, and say we haven't so refined our process
12 that we can't recognize something that, as you say,
13 well looking back on it, surely, you could've
14 recognized. Well, I don't know, if you grind it
15 through this process what would have been the
16 outcome?

17 MR. BOWMAN: I, I don't know. I'm not
18 a hydrologist, but I suspect that, using the HHA
19 process would not allow a removal of a hazard
20 that's in the historical record, as having actually
21 occurred, take place in setting the design-basis
22 for the location where that hazard had occurred.

23 MEMBER REMPE: Eric, I would be careful
24 sliding that. Recent presentations from TEPCO are
25 pretty explicit about that that was at a different

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 location that -- is my recollection. This has come
2 out in --

3 MR. BOWMAN: Oh.

4 MEMBER REMPE: -- a lot more recent
5 things that -- so I'd check that back, before you
6 cite it again.

7 MR. BOWMAN: I don't know.

8 MEMBER REMPE: Yes, I'll try and find a
9 presentation and send it --

10 MR. BOWMAN: You know --

11 MEMBER REMPE: -- to Mike, to verify
12 that. But I just wanted to bring that point up.
13 So be careful --

14 MR. BOWMAN: Thank you.

15 MEMBER REMPE: -- on citing that.

16 MR. BOWMAN: Thanks for that.

17 MEMBER REMPE: Yes.

18 MR. BOWMAN: And, as I said, I'm not a
19 hydrologist, I'll leave the interpretation of the
20 record to the hydrologists. So --

21 MEMBER RAY: It wasn't just hydrology,
22 it --

23 MR. BOWMAN: Yes.

24 MEMBER RAY: -- also involved the plant
25 and seismology and so on. But, in any event, it's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 just something that occurs to me, as we get so
2 sophisticated in what we're doing, and I'm not
3 objecting to that, at all, I'm just saying --

4 MR. BOWMAN: Right.

5 MEMBER RAY: -- at some point, we ought
6 to have a measure that says oh well, but this is
7 still capable of recognizing and dealing with
8 something of that.

9 MR. SHAMS: And I would offer that that
10 is actually the case. What we haven't, being that,
11 we're real careful not to cross a threshold that
12 just makes what we're doing unrecognizable.

13 In fact, I should point to you, in our
14 ongoing reviews that we've already just completed,
15 there are, there were situations where we took some
16 liberty and went back and forth with the licensee
17 to look at how they applied the guidance and
18 refined the data, just to be able to get to a more
19 realistic hazard, but nonetheless stay within the
20 bounds of acceptable methods and, you know, there
21 are a number of sites that we've done that way.

22 So we're real careful. The catalog
23 that's presented in Appendix A is untested. It's
24 just, you know, that's actually what it is, it is
25 untested. So that's the reason we're saying, we'll

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 test it, as you apply to ever site, because it may
2 or may not be applicable to a given site, given
3 exactly your concern that we're going too far and
4 wouldn't be able to recognize where we're at.

5 DR. CAMPBELL: So --

6 MR. SHAMS: Andy, do you want to --

7 DR. CAMPBELL: So this is Andy
8 Campbell. I'm Deputy Division Director in New
9 Reactors in DSCA. We're doing all the flooding and
10 seismic reevaluation work, reviewing what the
11 Industry has done.

12 And GDC-2 applies to design-basis. And
13 in GDC-2 you are directed to be able to handle the
14 worst store that is ever heard on that staff, in
15 that site, at that location for that kind of
16 scenario, with margin, and that has been our guide.

17 So as we reviewed some of these
18 flooding analyses, we are, our staff has also
19 looked historical, as well as the licensee, and
20 come to conclusions about, okay, what's the worst
21 case historical storm that has occurred?

22 And you don't want an answer that's
23 less than an historical event that has occurred,
24 but you want something with margin beyond that.
25 And that guided us in a number of, kind of,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 difficult discussions where we had to get deep into
2 the realism, looking statistical analysis at rivers
3 and watersheds, to be able to come to a mutual
4 conclusion about what is an appropriate flooding
5 number, or the flood type elevation for a combined
6 event. And we have done that.

7 In other cases, it's much easier. So
8 that's, that's, kind of, been our guide all along
9 is, is not to get into a point where you're flood
10 reevaluation's actually lower than some event that
11 has occurred on that watershed.

12 MR. BOWMAN: Okay, the next two
13 sections that we talk about on the ISG, is Section
14 6.3.1 provides guidance on an initial assessment of
15 the impact of the flood reevaluation. We found,
16 we're proposing that the NEI 16-05 guidance in that
17 area is acceptable.

18 And in 6.3.2, in Appendix B, are the
19 areas that provide the information for the process
20 for a determination to be available physical
21 margin. We had a couple of clarifications.

22 There was a request for additional
23 information that was issued and is incorporated in
24 Appendix B, now. It had to do with the
25 determination of available physical margin, during

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

(202) 234-4433

1 the recommendation 2.3 flooding lockdowns,
2 particularly, in the area of flood penetration
3 seals.

4 They have appropriately included that
5 RAI, what the RAI, itself, is keyed directly to the
6 licensing-basis flood levels, as opposed to the
7 reevaluated flood parameters and we've just made
8 the clarification that it should take into account
9 the reevaluated flood parameters that they're
10 considering for the focused evaluations, or
11 integrated assessments.

12 And the other piece is that reliability
13 of temporary features that are used for flood
14 protection, we need to take into account operating
15 experience on the use of those temporary features.

16 DR. SCHULTZ: Eric, I'm not seeing that
17 point in the, in the document, where the
18 determination of available physical margin appears.
19 And it just --

20 MR. BOWMAN: In which document?

21 DR. SCHULTZ: -- I'm searching it
22 quickly, so I'm just not seeing it.

23 MR. BOWMAN: Which document?

24 DR. SCHULTZ: The Reliability of
25 Temporary Features should be, should consider

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 operating experience, but --

2 MR. BOWMAN: Appendix B speaks to the
3 reliability equipment --

4 DR. SCHULTZ: It's in Appendix B?

5 MR. BOWMAN: It doesn't --

6 DR. SCHULTZ: That discussion related
7 to that?

8 MR. BOWMAN: It doesn't, specifically,
9 call out operating experience.

10 DR. SCHULTZ: Okay.

11 MR. BOWMAN: And we're just adding, as
12 a clarification that they should look to operating
13 experience --

14 DR. SCHULTZ: Makes sense --

15 MR. BOWMAN: -- because --

16 DR. SCHULTZ: -- based upon the
17 discussion we've already had this afternoon. I
18 just didn't see it called out that --

19 MR. BOWMAN: Right.

20 DR. SCHULTZ: -- explicitly.

21 MR. BOWMAN: And in, in this section,
22 it's merely the mathematical determination of the
23 available physical margin there, looking to the
24 evaluation of human actions involved with temporary
25 flood protection features.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Okay, one clarification we've made to
2 the Path 1 in NEI 16-05, the instructions that are
3 included in NEI 16-05 make a statement that they
4 can use a bounding set of flood parameters, so long
5 as the parameters bound all of the flood parameters
6 for the flood mechanisms.

7 We're just clarifying that it's
8 acceptable to use it to group certain of the flood
9 mechanisms for the consideration of the focused
10 evaluation, it doesn't have to be all the flood
11 mechanisms that are applicable to the site.

12 Next path, Path 2, which is the
13 Effective Flood Protection Path. We got a couple
14 of clarifications. They're, as we've discussed,
15 Appendix C, which incorporates by reference NEI
16 12-06 Appendix E, for the evaluation of site
17 response that is human actions, we will review the
18 qualitative evaluation of the capabilities of this
19 site to respond to the flood using engineering
20 judgment, as was proposed to the Commission in the
21 COMSECY 15-0019 and approved by them in the SRM on
22 that.

23 CHAIR STETKAR: So it's -- I -- no, I'm
24 not, I won't say, it's too provocative. It's just
25 interesting where we can use qualitative judgment

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 and where we can't use qualitative judgment, I'll
2 just say that.

3 MR. BOWMAN: Okay. And we've reiterate
4 the clarification on the RAI for the determination
5 of available physical margin. For Path 3, the
6 slide's wordy and this is, as it's discussed, in
7 the COMSECY 15-0019, this is the direction we got
8 on how to resolve the local intense precipitation
9 in the Interim Staff Guidance, itself, we have also
10 added that licensees should look to the capability
11 to protect against the local intense precipitation
12 and the potential for resulting flooding, prior to
13 going to rely on mitigation of the local intense
14 precipitation.

15 Oh, I had that here, too. And, again,
16 we will look to applying engineering and
17 operational judgment on the qualitative evaluation
18 and site response.

19 CHAIR STETKAR: You heard the
20 discussion before, we don't need to have it again.
21 I'm still baffled why we need to treat this
22 differently from any other flooding mechanism?

23 MR. BOWMAN: I would respond to that.
24 We look, generically, at the issue of local intense
25 precipitation and took into account what we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 evaluated as the frequencies occurrence and the
2 amount of margin areas to it, as well as the
3 availability of warning time, and concluded that we
4 would not, after an evaluation of the response,
5 have sufficient information to pose a fact to not.

6 CHAIR STETKAR: That's, that's fine.
7 You're prejudging a conclusion, whereas you're
8 requiring licensees to go through a fairly
9 protracted evaluation that others might have said
10 you could equally prejudge.

11 MR. BOWMAN: Thank you. Okay, Path 4,
12 the demonstration of the effected mitigation for
13 the flood hazards. We are making the clarification
14 that, in order to come to a regulatory conclusion
15 on this area, we do need flood hazard information,
16 in particular, the frequency of exceedances of the
17 critical flood elevations that are identified in
18 the initial evaluation of the flood. This is an
19 area where we are not, yet, in alignment with
20 Industry on.

21 Critical flood of elevations, you may
22 have heard of referred to, as the consequential of
23 flood, that point, at which the flood protection
24 for the plant would be ineffective of preventing
25 water from effecting the key structure systems and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 components.

2 MEMBER SKILLMAN: Eric. Eric, do the,
3 do the data available to the licensees provide an
4 accepted body of information for predicting those
5 exceedances? In other words, is good information
6 really available, or are the licensees going to
7 have to struggle to get this?

8 MR. SHAMS: That's Appendix D, that
9 the, that the Industry presented this morning.
10 There are a number of methodologies out there.
11 There will be some extrapolations.

12 The intent is not to, as was said this
13 morning, this area is fairly an immature in the
14 development of PFHA, so we recognize that there
15 will be some limitations, but as I described
16 earlier, the piece of information is necessary, as
17 part of the overall assessment in a qualitative way
18 not just, I'm sorry, in a quantitative way, not
19 just qualitative, to assert whether or not we need
20 to do more with the licensees. So recognizing the
21 limitation, we still believe that there is some
22 value of calculating such number.

23 MR. BOWMAN: And it may be that all
24 they can provide is that the frequency of
25 recurrence of a flood of a certain height is less

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 than ten to the minus fourth, rather than
2 pinpointing an exact number extrapolating it to a
3 number. The intent is to recognize the limitations
4 of the current state of the art.

5 MEMBER SKILLMAN: Okay, thank you.

6 MR. BELLINI: If I can, if I can have
7 -- this is Joe Bellini. And just to answer the
8 point about the readily available information,
9 depending on the mechanism, but for the higher
10 frequency events for rivers and streams and local
11 intense precipitation, but we're not talking about
12 local intense precipitation, as part of Appendix
13 Delta, but rivers and streams, there is publically
14 readily available data, stream flow data, rainfall
15 data, up to that frequency level, ten to the minus
16 three, ten to the minus four.

17 MR. BOWMAN: Okay.

18 MR. TSCHLITZ: This -- can I comment on
19 that, as well?

20 MR. BOWMAN: Yes.

21 MR. TSCHLITZ: This is Mike Tschlitz.
22 One of the reasons we're not in alignment with the
23 staff on Path 4 about likelihood and, I think the
24 example we gave in the slides was the dam failure
25 likelihood.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 And, you know, part of the issue with
2 that is, some of the dams are Army Corp of Engineer
3 dams, there's not information available for, about
4 the construction of the dams, the way the dams are
5 maintained.

6 So we feel that, for certain
7 mechanisms, it will be challenging to come up with
8 likelihood, and we don't want to engage in a long
9 research project to try to come up with likelihoods
10 for some of those mechanisms. That's, in large
11 part, why Path 4 exists. So that's what our
12 misalignment is with, on the staff on that.

13 MR. BOWMAN: On the subject of the
14 frequency determinations, we made a few
15 clarifications, particularly, on the methods that
16 are cited there, publically available methods, but
17 we recognize that these uses of the determinations
18 for flooding frequencies are predominantly not in
19 the area of nuclear power plant regulation.

20 We haven't gone through and endorsed
21 the referenced guidance documents that exist for
22 this purpose. There is an ongoing effort on the
23 part of our Office of Nuclear Regulatory Research,
24 to develop methodologies, perhaps, relying on the
25 existing methodologies for the determination of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 flooding frequencies.

2 We recognize that and we will look to
3 the quality of the frequency determinations on a
4 case-by-case basis, depending on the justification
5 provided by the licensees for the determination of
6 frequencies within the frequency range that we
7 believe represents the current state of the art.
8 That being the ten to the minus fourth, or ten to
9 the minus three, plus some margin.

10 DR. SCHULTZ: So this is a little
11 different, Eric. What, what -- the way I read this
12 is that, you want to be sure that the licensee
13 knows, or I hear you say verifies that what they
14 have determined, or what they have chosen to use is
15 the most recent, the most current information that
16 would be appropriate to draw up conclusions.
17 You're not endorsing what's in the document.

18 MR. BOWMAN: Right.

19 DR. SCHULTZ: There's more ongoing
20 information that's available, so you just want to
21 be sure that, given that there might be a moving
22 target on methodology that it's appropriately
23 evaluated. But the time frame we have here is
24 fairly limited, is it not?

25 MR. BOWMAN: We have a very limited

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 time frame and I'm aware of one of the documents
2 that cited that's supposed to get superseded in the
3 very near term.

4 DR. SCHULTZ: Okay.

5 MR. BOWMAN: A licensee could make an
6 acceptable argument, perhaps, that use of the
7 current guidance is acceptable, because it's a
8 technically acceptable document right now. But,
9 again, we're going to have to look at it on a
10 case-by-case basis, because we have not
11 specifically endorsed any of these methods.

12 DR. SCHULTZ: Okay. So, so here are
13 the caveats then?

14 MR. BOWMAN: Yes.

15 DR. SCHULTZ: Okay. Thanks.

16 CHAIR STETKAR: Eric, on -- are you
17 done, kind of, presenting this slide? Can I ask a
18 question, or are you going to talk more about it?

19 MR. BOWMAN: Ask away.

20 CHAIR STETKAR: No, I didn't want to
21 ask, until you're done.

22 MR. BOWMAN: I'm done.

23 CHAIR STETKAR: Okay. I got a little
24 confused by the second one. Item B, on this slide,
25 its 3-B Staff Position. I think I know what you're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 saying, but I'm not sure. It says, we want to
2 aggregate the contributions from a range of
3 potential flooding mechanisms and relevant
4 contributing events.

5 I understand a concern about someone
6 subdividing things so that each individual piece
7 part is magically less than ten to the minus five,
8 which for some reason, is a magic number. And I,
9 certainly, endorse the notion that people should
10 not try to do that.

11 On the other hand, if I only use what
12 I'm interpreting here as, when you say measure of
13 flood severity, what do you mean by that? Do you
14 mean, level?

15 MR. SHAMS: Water elevations, perhaps,
16 have water velocity.

17 CHAIR STETKAR: Do you think at all
18 about, and when I think of contact scenarios I
19 think of all parameters of the scenario, which is
20 all of those hydraulic things that you talked
21 about, and I also think about stuff like warning
22 times.

23 So for example, if a specific set of
24 flood mechanisms can result in similar elevations
25 with similar warning times that, to me, is

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 important, because my strategies may account for
2 those warning times.

3 Another set might result in the same
4 exact elevation. Give me the fact that I can
5 calculate that stuff, precisely, but a much
6 different set of warning times, that might entail a
7 very different set of strategies.

8 So if you're advocating only
9 aggregating, based on the elevation, it's difficult
10 for me, now, to address different strategies that
11 might take advantage of those different warning
12 times. To me, the severity includes all of those
13 and the warning times.

14 MR. BOWMAN: It can. And if you look
15 to what is done in Path 5, there's an
16 identification of different scenarios. We have
17 made the clarification that the identification of
18 different scenarios should include the
19 consequential flood.

20 A consequential flood would not,
21 typically, be resulting on reliance on warning
22 time, unless you're looking at temporary flood
23 protection measures.

24 So it could be that, in that case, you
25 wouldn't be looking to the warning times, but there

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 may be other scenarios in that area where the
2 warning time does make a difference, because it's a
3 mitigation rather than a protection --

4 MR. SHAMS: But --

5 MR. BOWMAN: -- situation.

6 MR. SHAMS: -- it is to your point.
7 I'm sorry. It is to your point that we're not
8 particularly looking at just the flood elevation,
9 it would be whatever appropriate parameter that,
10 that would be most critical to the strategy that --

11 CHAIR STETKAR: Okay.

12 MR. SHAMS: -- that was decided upon.

13 CHAIR STETKAR: I just wanted --

14 MR. BOWMAN: And --

15 CHAIR STETKAR: -- I just wanted to
16 make sure that that's the intent, because --

17 MR. BOWMAN: And for those
18 consequential flood it's not, necessarily, always
19 the same elevation, it's also the dynamic loadings
20 and --

21 CHAIR STETKAR: That's why I asked you
22 first, by what do you mean by flooding severity and
23 all I got back was hydraulic parameters and not,
24 necessarily, warning times.

25 MR. SHAMS: Other, other quantities,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 yes.

2 CHAIR STETKAR: Other, other
3 quantities.

4 MR. SHAMS: Yes.

5 CHAIR STETKAR: Yes.

6 MR. BOWMAN: Yes, this is the language
7 that I was, sort of, had in my mind when we were
8 talking about the need to, sort of, develop further
9 together with the staff and developing examples of
10 --

11 CHAIR STETKAR: Okay.

12 MR. BOWMAN: -- for precise enough
13 language that --

14 CHAIR STETKAR: Good, I'm glad to hear
15 that. Thank you.

16 DR. CAMPBELL: You -- so this is Andy
17 Campbell, I just wanted to address the concern
18 about what constitutes severity. And it's, the
19 5054(f) also request information about flood event
20 duration, associated effects, and there were some
21 parameters associated with LIP, which was primarily
22 warning time, not much else.

23 And we have a laundry list of all the
24 licensees, what they gave us and what they didn't
25 give us, a number to move of that information into

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 the integrated assessment and their letters back to
2 us, or their response to RAIs, in fact, the
3 majority did, at least, some part of that
4 information.

5 In order to evaluate that, we're going
6 to be looking that and think in the context of the
7 mitigating strategies assessment, because warning
8 time can be different, depending upon what your
9 strategy is to protect against a certain flood
10 elevation.

11 Associated with that flood elevation
12 will be certain velocities and certain parameters
13 sets associated with, you know, impacts and loads
14 and that kind of thing.

15 All of that, really, and the licensees,
16 many of them said, we need to look at that in our
17 integrated assessment, at that time, we didn't have
18 this guidance from the Commission about developing,
19 you know, different pathways that are a graded
20 approach they called it.

21 So you're right, there's more to it
22 than just an elevation number. And some of that
23 has to be done in the context of, well, what is
24 your strategy for protecting against that type of
25 event?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: Thanks.

2 MR. BOWMAN: Okay, and the --

3 CHAIR STETKAR: Before you leave that,
4 though, well, you could leave it, but you didn't,
5 there's one other staff position, and maybe you
6 addressed it, orally, but I, maybe I missed it.

7 There's a Staff Position 4 that says,
8 information submitted to the NRC should include the
9 frequency of exceedance for the critical flood
10 elevations or, if appropriate, should identify that
11 the frequency of exceedance for the critical flood
12 elevations is estimated to be less than one E to
13 the minus four, per year. So for some reason,
14 they, they have to assert that the frequency is
15 less than one E to the minus four, per year.

16 MR. BOWMAN: That was to give the
17 option, to make it perfectly clear that we
18 recognize that the current state of the art does
19 not go beyond about a ten to the minus fourth of
20 flood exceedance --

21 CHAIR STETKAR: And now I'll come back
22 to what I was discussing before, now that you're
23 up-front and maybe you've had a little more time to
24 think about it, what's the magic number, one E to
25 the minus four, what's, why, why is that the magic

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 number and not one E to the minus five, or five E
2 to the minus six, or one E to the minus seven, or
3 some other magic number?

4 MR. BOWMAN: I would have to rely on
5 the technical input from the hydrologists. That's
6 what I've been told the current state of the art
7 is. If you could, answer that.

8 MR. KENNY: Yes. Based -- this is Joe
9 Kenny, from Office of Research. You know, based
10 upon, you know, our knowledge of, of the field
11 analyses, which have been done for nuclear power
12 plants and in other applications.

13 You know, if you look through the
14 different range, the different flooding mechanisms,
15 you'll find that, you know, with current methods,
16 you know, we have some confidence that you, you can
17 credibly estimate the, the flood parameters for
18 events of that, in that range of likelihood.

19 CHAIR STETKAR: Okay.

20 MR. KENNY: Yes, because there is,
21 there is collective experience in the field of
22 doing it.

23 CHAIR STETKAR: And all that, to me,
24 says is that I had much larger uncertainties for
25 less frequent and more severe events, which is --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. KENNY: I would, I would offer --

2 CHAIR STETKAR: -- considerably true,
3 which is always going to be true. That's a
4 totality, I, which is about all I'm capable of,
5 right now. I come back to this notion of, if, if I
6 can demonstrate that the frequency of all of my
7 critical flood elevations is 9.95 E to the minus
8 five event, per year, because, for some reason,
9 I've done something better than anybody's capable
10 of doing, and so I'm less than one E to the minus
11 four, per year, do I now pass, because, because I
12 could have core damage and direct containment
13 failure at that frequency?

14 MR. BOWMAN: That's outside the scope
15 of this ISG, that's going to be determined under
16 the Phase 2 ISG, for the making of regulatory
17 decisions.

18 CHAIR STETKAR: Good. And I, and I
19 wanted to make sure, because I thought that's what
20 I heard Mo say, earlier. But the reason I was
21 scribbling notes here and I wanted to make sure
22 that that's, that that's what I was supposed to
23 hear, so thanks.

24 MR. SHAMS: And I want to offer a
25 little bit, you know, just more insights into that.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 Again, this is not a fine laser point, the ten to
2 the minus, four ten to the minus. Joe described
3 that some degree it's driven by the state of the
4 art, in terms of what you can calculate. But,
5 also, it is, for us, it's a number that gives us a
6 level risk, then one would start being, assuming a
7 one containment conditional failure probability,
8 then you're getting into a level of risk that one
9 would have to be questioning, whether or not we're
10 pushing at Commission safety goals. So that's the
11 reason we look for that number not ten to minus
12 five, not ten to the minus six.

13 CHAIR STETKAR: Yes. Again, it's, it's
14 , when I read this and I start thinking about it,
15 and I start thinking about how plants might address
16 this is, if for some reason, a core damage
17 frequency of a roundish ten to the minus four event
18 per year is sort of 'ish okay'ish, fine. Okay,
19 that's, that's between the regulator and the
20 Industry and I'm not going to say anything about
21 particular numbers.

22 On the other hand, if there's something
23 that I can do in my strategy that to say, well, if
24 something around 'ish ten to the minus five'ish, per
25 year'ish, could give me greater assurance that I'm,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 at least, maintaining containment, that might be
2 good. I mean, that's this notion of
3 defense-in-depth, it's notion of that largely
4 release frequency ought to be a lower frequency
5 than core damage frequency, depending on, you know,
6 whatever you want.

7 And, and I, I hope that those notions
8 will, somehow, creep into the Phase 2 evaluations.
9 Because, I don't see them right now, I see a focus
10 on this ten to the minus four number, for, for a
11 variety of different rationales.

12 And it might, actually, that type of
13 thought process might, actually, effect what
14 licensees build into their strategies. If I can't
15 protect the core, at least protect the containment,
16 and you might have more to do it.

17 MR. SHAMS: Sure. And --

18 CHAIR STETKAR: And so --

19 MR. SHAMS: So as Eric mentioned, we're
20 putting that together in our guidance on how we
21 would look for the need for additional regulatory
22 actions for certain licensees. And, you know, and
23 again, that number would go with a group of other
24 considerations, as qualitative as they might be
25 warning time, evacuation time, actions, protective

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 actions, so, so absolutely, it's not a laser sharp
2 point, it's a collection of a number of other
3 things added together and we're putting the
4 guidance, hopefully, by October of this year, to be
5 able to be fair to licensees to see what's coming
6 down, so that way --

7 CHAIR STETKAR: Well --

8 MR. SHAMS: -- they can adjust.

9 CHAIR STETKAR: We have a Subcommittee
10 meeting scheduled --

11 MR. SHAMS: For that, yes.

12 CHAIR STETKAR: -- to look at the first
13 snapshot of that guidance --

14 MR. SHAMS: That's true.

15 CHAIR STETKAR: -- in early June.

16 MR. SHAMS: June/July time frame, yes.

17 CHAIR STETKAR: Same time frame. June
18 8th. Thank you.

19 MR. SHAMS: We'll come back again in
20 June 8th, on June 8th.

21 MR. BOWMAN: Okay, the final Path, and
22 the final slide for today, Path 5, the
23 scenario-based approach that we briefed on. As I
24 mentioned, we've clarified that the scenarios
25 developed should include one that represents the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 critical flood elevations, or the consequential
2 flood.

3 We're pointing out that the
4 considerations of the scenarios for effective flood
5 protection should include all the guidance that's
6 involved in the Path 2 considerations for NEI 16-05
7 and, and this ISG, those being the considerations
8 of the flood penetration seals and the REA that
9 went into that and the, and the evaluation of human
10 actions for a temporary flood protection measures.

11 And, finally, we're saying that use of
12 the methodologies for the frequency of exceedance,
13 following Appendix D and the enclosure to the ISG,
14 should be appropriate.

15 CHAIR STETKAR: Okay. One, one thing
16 that I'll just point you to that I stumbled across,
17 only because it's something I was thinking about,
18 in, in Enclosure 2 where you, Section 1 addresses
19 riverine flooding without upstream dams, and
20 Section 5.2 addresses riverine flooding with
21 upstream dams.

22 And it's, in there, you have laundry
23 lists of things that people ought to think about.
24 And I noticed that, if I have an upstream dam, I
25 need to think about treatment of downstream dam

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

(202) 234-4433

(202) 234-4433

1 failures.

2 On the other hand, for some reason, if
3 I don't have an upstream dam, I don't have to think
4 about downstream dams. So you might want to, might
5 want to ask me to think about downstream dams, even
6 if I don't have an upstream dam because I might
7 have snow melts with large precipitation events
8 that can spill over top of downstream dam.

9 MR. BOWMAN: We do have downstream
10 apodments, so it may be appropriate to have it in
11 that section.

12 CHAIR STETKAR: It, it, it, it,
13 whatever, I was just looking at comparisons of what
14 I ought to think about, if I'm, if I'm going to do
15 those two things.

16 One thing that I did want to ask you
17 about, now that, now that we're through this part,
18 is, you, the ISG has a section in it about peer
19 review. And without regurgitating all of the, the
20 text, it says, to make the staff's life easier,
21 you'd really like people to have a peer review
22 performed of their assessments.

23 I read that and that, that sounds, that
24 sounds good, until I start thinking about the
25 practicalities of having a peer review done in the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 time frames that we're talking about for, I don't
2 know what the, the population of these types of
3 analyses would be, in other words, I don't know how
4 many are going to be done.

5 But, if I, if I look back, now, at our,
6 at our wonderful experience from NFPA 805, in terms
7 of peer reviews, and I think about the resources
8 that are required, required, first of all, for peer
9 review and the availability of qualified
10 independent peer reviewers to perform those peer
11 reviews, I start to get real concerned, because
12 there aren't too many people who do this kind of
13 stuff.

14 I mean, maybe, we're talking about, you
15 know, a very small set of bodies world-wide, if I
16 can, if I can rely on international places, that do
17 this type of flooding evaluation that, that would
18 be acceptable experts to perform an independent
19 peer review, presuming that they're not already
20 biased, because they've, they've been hired by the
21 Industry to do the analysis.

22 DR. SCHULTZ: They've already been
23 involved.

24 CHAIR STETKAR: Yes, they've already
25 been involved, which is --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 DR. SCHULTZ: One way or another.

2 CHAIR STETKAR: So in practice, what
3 are your plans in the eventuality that you don't
4 get a peer review, how are you going to accomplish
5 the staff's review of the submittals? Because I
6 think it would be very -- it's very, very
7 difficult, in a practical sense, to expect that the
8 Industry could mobilize pure, what, what I would
9 like to see a technically qualified independent
10 peer review in the time frame, such that the review
11 is done, the licensee receives the findings of that
12 review and resolves the findings of that review, in
13 such time that they can submit their evaluation to
14 you and you can say, yep, we're happy with it.

15 MR. SHAMS: So I'll start with
16 answering a couple of, a couple of questions you
17 asked early on. The population of how many plants
18 were expecting to be doing integrated assessment,
19 and we're looking at about ten, or less, around
20 that number. That, that's, those are the ones that
21 has an increase in their hazards, such that they
22 would, they would need to do an integrated
23 assessment.

24 And, in terms of the time frame, when
25 would they submitted to the NRC? So the schedule

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 would have these licensees submit at the end of
2 2018. So they're, essentially, a year-and-a-half
3 away, or so from now, so that's as far as the
4 population and the time frame.

5 So in writing Enclosure 2, we were
6 trying to strike a balance. But, what the Industry
7 offered in Appendix D, is a catalog approaches
8 that, that one could use to calculate, or estimate,
9 a hazard frequency at a given, you know, at a given
10 return period.

11 And what we're trying to offer here is
12 a little bit of what the staff would be looking
13 for, but it's precisely that consideration for how
14 you would do it.

15 In other words, it is not essential and
16 necessary and mandatory for every licensee to have
17 to follow every, each and, you know, each and every
18 piece of this, because again, it's not a consensus
19 approach, it's not particularly vetted, but, but it
20 does, however, provide a bit of a, a roadmap, if
21 you would, for the licensee to follow.

22 So to what degree the peer reviews, you
23 know, have to be of an acceptable standard, as an
24 anti-standard, that's not what we're looking for,
25 it is intended to just provide rigor into, into the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 analysis.

2 So either than can do it, it's, it adds
3 rigor into their analysis, if they can't, they
4 can't that's acceptable still.

5 CHAIR STETKAR: The, the -- I know how
6 this stuff, kind of, evolves, and we're talking
7 about now a, a laundry list of possible methods
8 that people might kind of use for their
9 site-specific evaluation.

10 In, in NFPA 805, we had the grand and
11 glorious NUREG/CR-68.50, which wasn't a list of
12 methods that people could, kind of, sort of, use
13 for their site-specific, it was, it was reasonably
14 well-defined, or at least, some people would say it
15 was reasonably well-defined.

16 And, yet, you still had problems
17 getting a set of technically qualified independent
18 peer reviews to even look within the constraint of
19 that of, of, is it applied consistently, is it, is
20 it technically competent. I don't know how one
21 does a peer review of this. I honestly don't.

22 DR. SCHULTZ: And then always --

23 CHAIR STETKAR: And if, and if you do,
24 it would be really good to get clarity on that,
25 now. Because, if you're expecting a peer review

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 in, you said, well, it's a year-and-a-half from
2 now, you know, a year from now we'll have the same
3 discussion, except people screaming at one another.
4 That's --

5 DR. SCHULTZ: Well that's --

6 CHAIR STETKAR: -- that's just a
7 suggestion.

8 DR. SCHULTZ: -- that's not a very long
9 time to move forward --

10 CHAIR STETKAR: It's --

11 DR. SCHULTZ: -- even with it --

12 CHAIR STETKAR: It is --

13 DR. SCHULTZ: -- even with the --

14 CHAIR STETKAR: -- it is not to do an
15 analysis --

16 DR. SCHULTZ: -- even with, for the
17 work.

18 CHAIR STETKAR: Right.

19 DR. SCHULTZ: And if you're saying, I'm
20 not sure what you said, in terms -- there's
21 guidance here, in Enclosure 2, but if you're
22 saying, well, it's really guidance, then it's not
23 clear to me what the expectations are.

24 Are you expecting that the guidance
25 could be applied in some sort of graded approach,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 depending on what the original findings are
2 associated with the hazard versus the plant design?
3 There's a --

4 CHAIR STETKAR: And, and if --

5 DR. SCHULTZ: There's a lot of
6 variability here and how one could approach this in
7 a variable manner is not at all clear.

8 CHAIR STETKAR: And if the expectation
9 -- I just, you know, I'll -- it's good, I'm glad
10 you used expectation, because I think there needs
11 to be clarity here about what is expected from a
12 peer review, because the Industry has, has
13 established for a variety of other things, what is
14 needed for a peer review.

15 We don't have standards here, so you
16 can't review it against a standard. Okay, well
17 what is meant by peer review, here, and if, if you
18 come to me and said I want a peer review, and I
19 said I can't get it done, but here's my submittal,
20 you know, December 31st, one minute before
21 Midnight, 2018, here it is, how are you going to do
22 the review to develop adequate assurance that what
23 they've done, technically, is acceptable, that
24 there's, that there's reasonable assurance that
25 they've done an adequate assessment?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 DR. SCHULTZ: And especially if you get
2 ten different versions.

3 CHAIR STETKAR: Ten different versions
4 with --

5 DR. SCHULTZ: Thought of different --

6 CHAIR STETKAR: -- with --

7 DR. SCHULTZ: -- by each licensee --

8 CHAIR STETKAR: Yes, with --

9 DR. SCHULTZ: -- with bits.

10 CHAIR STETKAR: With bits and pieces of
11 about seven different methodologies for each one
12 that have been applied for their site, which might
13 be reasonable. Just, you know, NFPA 805 has taught
14 us some really, really painful lessons about the
15 glib use of terms like, independent peer review.

16 MR. SHAMS: Well, I mean, and I,
17 really, thank you for the feedback on this. I
18 think we're putting this out for public comment for
19 that kind of feedback.

20 If it's problematic, we want to know
21 about it. We're trying to strike the right
22 balance. I mean, we're, as I, as I said, we're,
23 we're not saying it's a mandatory, but that could
24 be a problematic in and on itself, I'm not saying
25 it's mandatory.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 So we put it out to see what is the
2 right balance, how far, you know, how far we need
3 to go versus are we asking too much, or setting up,
4 you know, people to fail, so we're not looking for
5 that --

6 MEMBER BLEY: I'm --

7 MR. SHAMS: -- and I --

8 MEMBER BLEY: If --

9 MR. SHAMS: I B-

10 MEMBER BLEY: If, if you guys directly
11 weren't involved in the NFPA 805 stuff, I suggest
12 you look at it. But there's a thing called the,
13 the facts, which are a big catalog of places where
14 expectations were wildly different and it became
15 really contentious, at the end. So having clarity
16 helps a lot.

17 CHAIR STETKAR: Anything for -- oops.
18 Anything for a wrap-up?

19 MR. BOWMAN: That concludes the
20 discussion of the ISG. All I, I would, I would
21 ask, in addition to the Venn diagram that we
22 discussed, is there anything that you see, as would
23 be helpful to have in that presentation for the
24 Full Committee?

25 CHAIR STETKAR: Let's -- that's a good

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 question. Let me give the members a few minutes to
2 think about that, because I've got to do some other
3 things, so it gives --

4 MR. BOWMAN: Okay.

5 CHAIR STETKAR: -- us a, a thought time
6 here. Let's -- Mike, Mike is way ahead of me, as
7 usual. We're going to get the bridge line open, so
8 if there's members of the public that want to make
9 a comment, they have the opportunity to do that.

10 While we're accomplishing that, I'll
11 ask, if there's anyone in the room, who would like
12 to make a comment, please, come up to the
13 microphone and do so, while we wait to get the
14 bridge line open.

15 (No response.)

16 CHAIR STETKAR: It's way too quiet to
17 be open, but I'll, I'll try. Well, I'll make an
18 attempt. If there's someone out on the bridge
19 line, just please say hello, or something, so that
20 we know that you're out there that confirms that
21 it's open.

22 PARTICIPANT: Hello.

23 CHAIR STETKAR: Thank you. Good, it
24 is. It's amazingly quiet today. Now, if there is
25 anyone on the bridge line, who'd like to make a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 comment, please, identify yourself and, and do so.

2 (No response.)

3 CHAIR STETKAR: Okay. We'll re-close
4 the bridge line. And as we usually do at the end
5 of a Subcommittee meeting, I'll go around the table
6 and ask, now that we've had, you know, 35 seconds
7 to think about it, ask Members for any final
8 comments that you might have and, as requested by
9 the staff, anything that we might think would help
10 the Full Committee presentation. Mike, I, how
11 much, how much time do we have allocated for this
12 one?

13 MR. SNODDERLY: The 8:30 a.m. to 10:00
14 a.m.

15 CHAIR STETKAR: So we got an hour --

16 MR. SNODDERLY: An hour-and-a-half.

17 CHAIR STETKAR: Okay. Okay. I've been
18 starting with you for the last day-and-a-half, so I
19 still will, Steve, do you have any --

20 DR. SCHULTZ: That's fine. I, I really
21 just want to thank the Industry and the Staff for
22 the presentations. And it took me a while to wrap
23 my arms around why the presentations were so
24 helpful, and then I remembered that this was
25 flooding and not seismic.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 (Laughter.)

2 DR. SCHULTZ: After what PRA gives it,
3 you, you forget that flooding is differently
4 different than the above, so in that, in that
5 sense, it was, it was very helpful to then
6 understand why the approaches had been taken the
7 way the way that it had.

8 And it was very helpful to have the
9 breath of discussion from the Industry, especially,
10 and then to have that put in a different framework,
11 the content of the ISG, that you've done a good job
12 explaining and describing this afternoon.

13 So I, I appreciate all of them. But
14 I'm, I'm very interested to see what comments come
15 back, especially, on, well, both enclosures
16 associated with the ISG, because, as we've
17 discussed, the time frame for a response is fairly
18 limited, given what one could interpret as being
19 asked of the licensee. So --

20 MR. BOWMAN: Well, they did get an
21 extra day.

22 DR. SCHULTZ: -- work. No, I don't
23 mean, in terms of comments, in terms of what they
24 will need --

25 MR. BOWMAN: Oh, okay.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 DR. SCHULTZ: -- to do, once the
2 comments are completed and the, and the guidance is
3 issued. Thank you.

4 CHAIR STETKAR: Harold.

5 MEMBER RAY: I don't have anything to
6 add and I don't think I should try and repeat what
7 I've said before, so I, this is challenging. I
8 look forward to learning more, as we go forward.
9 And I think I've made comments along the way that
10 I, I won't add anything to.

11 CHAIR STETKAR: Thanks. Dick.

12 MEMBER SKILLMAN: Just, I would thank,
13 Mo, and his team --

14 MR. SHAMS: Okay.

15 MEMBER SKILLMAN: -- for all of the
16 work. And I would thank, Industry, for their
17 presentations. Thank you.

18 CHAIR STETKAR: Dana.

19 MEMBER POWERS: I think I'll cogitate
20 more, but I do call people's attention to Ms.
21 Phillips' comment about the magnitude of under two
22 percent what's being required of the licensees,
23 once the comments are received, and remind,
24 everyone, that this is an area of rare occurrences
25 that are poorly understood, at this juncture.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: Let me, and I'm going
2 to, because otherwise I won't remember it. What,
3 what's, you said that, you guys are flooding, so
4 for flooding, if I'm going to submit an integrated
5 assessment, apparently, I need to do that, by the
6 end of 2018, correct?

7 MR. SHAMS: Yes.

8 CHAIR STETKAR: So I'm, I'm also a
9 licensee, I got a plant out there and I have to
10 address seismic stuff, what's my, what's my time
11 schedule for doing a, and I get mixed up with paths
12 and things, kind of, the most detailed seismic, a,
13 a, Path 5, or whatever the heck it was, you know,
14 seismic PRA?

15 MR. SHAMS: So for, for our -- I'm
16 sorry. Thank you. For the SPRA, so there are 20
17 plants that are in the hazard increase range,
18 range, if you would, that would warrant an SPRA,
19 and those plants start next year, March time frame,
20 March '17 --

21 CHAIR STETKAR: For submittals?

22 MR. SHAMS: For submittals. All the
23 way through 2019.

24 CHAIR STETKAR: So, so I now, as
25 licensee, have got what might be, if it's a real

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 bad day in the neighborhood, I've got seismic PRA
2 and, and integrated assessments for flooding going
3 on, at the same time. And they're probably some
4 subset of the ten, or so that you said for flooding
5 and 20 for seismic that are probably having to deal
6 with both of those things.

7 MR. SHAMS: It is fair to assume that
8 the end --

9 CHAIR STETKAR: What's, what's the end,
10 what's the last date for the seismic PRA, as it a
11 top, is it a --

12 MR. SHAMS: December 2019.

13 CHAIR STETKAR: 2019, so that's a,
14 that's a year after the flooding.

15 MEMBER POWERS: But one has to recall,
16 remind themselves that there has been a substantial
17 institutional body to set up to handle seismic --

18 CHAIR STETKAR: That --

19 MEMBER POWERS: -- events.

20 CHAIR STETKAR: It's, it's, in some
21 sense you're right, it might be easier to do the
22 seismic stuff, once they figure out the guidance
23 for how to do it, the accepted, remember, we're
24 still out, people are still negotiating over what
25 that means.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MEMBER POWERS: Yes.

2 DR. SCHULTZ: It's not clear that it's
3 good or bad.

4 (Laughter.)

5 MEMBER POWERS: No, but --

6 CHAIR STETKAR: No, but don't, you're
7 right, Steve, in the sense that there could be
8 7,000 RAIs on a seismic, because we know how to do
9 that, as opposed to 15 on a flooding, because we
10 don't how to do that.

11 MEMBER POWERS: I know. Yes, but
12 you're still asking people to become instant
13 experts --

14 CHAIR STETKAR: Yes.

15 MEMBER POWERS: -- at a level of detail
16 that, probably, is difficult to justify, in light
17 of the state of the art. And, and so I, I really
18 am quite concerned.

19 MR. SHAMS: Okay.

20 CHAIR STETKAR: Dennis.

21 MR. SHAMS: That's excellent.

22 MEMBER BLEY: Yes, I, you know, when
23 we, when we went through the Path business on, on
24 the seismic, it made sense to me, to think of the
25 Paths, they were distinct things. When we get to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 NEI 16-05, and I didn't talk about this, at the
2 time, I hadn't really formulated what I wanted to
3 say, the Paths are kind of odd to me.

4 What I was thinking is, if I was a poor
5 guy, whose boss handed me this thing and said go do
6 this, I'd be mightily confused at places. And
7 just, to me, for, and Path 1 an easy that's a
8 separate thing.

9 But, for the other four, if this were
10 more laid out as a, which it could be, it really
11 is, in, in a sense, laid out as a sequential flow
12 diagram, ask this question, you come out that way,
13 you come to the end, if it's the rain issued, right
14 there you say the resolution we've already decided
15 is this.

16 And then, for each of the other steps,
17 it's, you're actually doing this, as you go down,
18 is it this, no, is it this, and it more is a flow
19 path, which then links to the analysis. I think it
20 would be easier for me to understand, if I were
21 trying to do it.

22 MR. SHAMS: Yes.

23 CHAIR STETKAR: Is that a comment on
24 the guidance, or is it something that --

25 MEMBER BLEY: It's a comment on the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 guidance.

2 CHAIR STETKAR: Okay. Because I was
3 going to say, that's something that the staff could
4 probably present at the Full Committee, but if it's
5 intended to be the guidance then --

6 MEMBER BLEY: I, I wouldn't --

7 CHAIR STETKAR: -- it's --

8 MEMBER BLEY: -- raise this to the Full
9 Committee, I don't think. It's, I'm really saying
10 it for the, for the folks at NEI to think about.
11 If somebody has to pick this up and use it, I think
12 some reworking of that, get out of the Path stuff
13 and just work through the questions and get to the
14 end, would, would be a lot easier for people to
15 use.

16 I don't know how many people have begun
17 to try anything here, but I suspect when we get
18 some trials, it's going to be, kind of, difficult.
19 I think, there's been a lot of progress and I, I
20 like much of what I've seen, so I'll just quit
21 there. Thanks.

22 MR. BOWMAN: Thank you.

23 CHAIR STETKAR: Ron.

24 MEMBER BALLINGER: Well I appreciate
25 the --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 CHAIR STETKAR: Turn your mic on.

2 MEMBER BALLINGER: I appreciate the
3 presentations. I've gone after this in
4 considerable detail, and a couple of us have
5 actually been out to Omaha and places like that, so
6 we, pretty much have a good idea of the flooding,
7 parts of the flooding part, so this didn't
8 intimidate me, like it would have, if we hadn't
9 done a little bit of, little bit of homework. But,
10 thank you, very much.

11 CHAIR STETKAR: Charlie.

12 MEMBER BROWN: No additional comment.

13 CHAIR STETKAR: Joy.

14 MEMBER REMPE: With respect to the Venn
15 diagram, I'd like to re-emphasize the point that
16 several diagrams were mentioned, ones that would
17 show outcomes that were desired and the
18 gobbledygook of the various guidance and bets and
19 things like that, to communicate to people.

20 MR. SHAMS: Sure.

21 MEMBER REMPE: Also, I just wanted to
22 follow-up on the comment I made about where the
23 larger tsunami occurred, it was the Iwate
24 prefectures and, actually, I did forward Mike the
25 file, which, hopefully, he'll forward to you and --

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1 MR. SHAMS: Okay.

2 MEMBER REMPE: -- it shows, actually,
3 the different heights of tsunamis along the coast
4 and they're much lower, historically, at Fukushima,
5 and it was because of land features.

6 And they've been pretty active in
7 trying to promote that this is not true and to
8 press what you said earlier, so I would try and
9 make sure that that's quoted correctly. Thank you.

10 CHAIR STETKAR: And, again, I'd like,
11 it's been a really long day. I know that many of
12 the participants have shared the joys of both
13 morning and afternoon. And, again, I'd like to
14 thank, everybody.

15 I've, certainly, learned a lot. I
16 learned a lot by trying to wade through all of the
17 stuff. I learned a lot more today, and I, and I
18 really appreciate that.

19 And I think we've given you some
20 guidance for the Full Committee Meeting. If you
21 have questions, just get back to Mike and we'll
22 work out, you know, what is reasonable to present.
23 And with that, we are adjourned.

24 (Whereupon, the meeting in the above-
25 entitled matter was concluded at 5:10 p.m.)

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS
1323 RHODE ISLAND AVE., N.W.
WASHINGTON, D.C. 20005-3701

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

NEI 16-05: External Flooding Assessment Guidelines

NEI Fukushima Flooding Task Force

ACRS Meeting

April 22, 2016 • NRC Headquarters White Flint



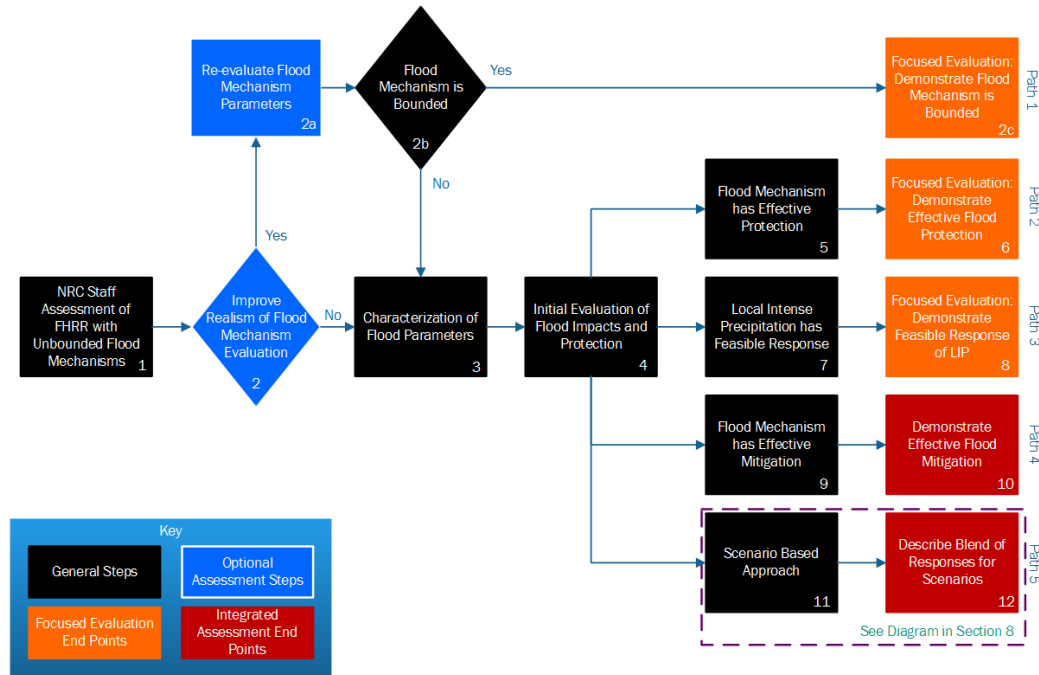
NUCLEAR ENERGY INSTITUTE

nuclear. clean air energy.

Purpose of NEI 16-05

- Develop a graded approach in meeting the 50.54(f) request and incorporating concepts of the related COMSECYs & SRMs
- Goals of development of NEI 16-05
 - Focus on sites with the most potential for safety enhancements
 - Improve realism in establishing the bounding hazard
 - Consider flood protection and available physical margin
 - Build on information developed in MSAs
 - Allow for consideration of initiating event frequency

Flooding Impact Assessment Process



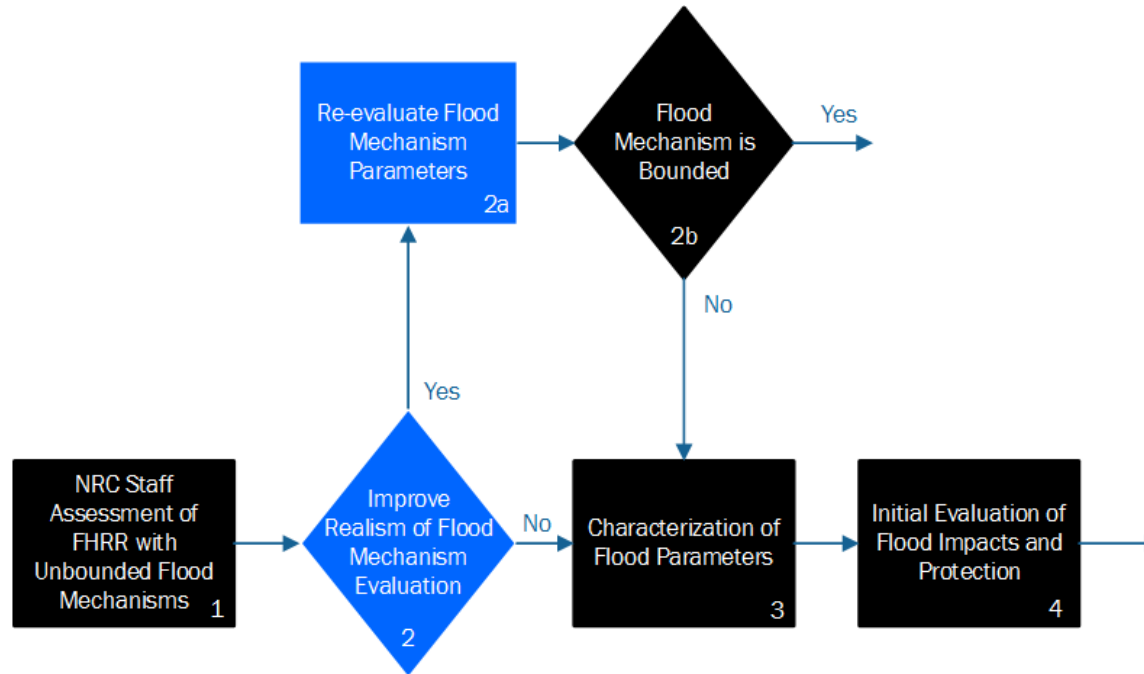
NEI 16-05 Appendices

- **Appendix A:** Reduction of Conservatisms
- **Appendix B:** Evaluation of Passive & Active Features
- **Appendix C:** Evaluation of Overall Site Response
- **Appendix D:** Methods for Estimating Likelihood of Flooding

Flooding Impact Assessment Process

Path	Required level of Evaluation	Elements to be Evaluated	Relevant Guidance
Path 1 (Section 7.1)	Flood Hazard Evaluation	Flood Mechanism Parameters	NEI 16-05 Appendix A
Path 2 (Section 7.2)	Effective Flood Protection	Available Physical Margin	NEI 16-05 Appendix B
		Reliability of Protection Features	NEI 16-05 Appendix B
		Overall Site Response	NEI 16-05 Appendix C
Path 3 (Section 7.3)	Feasible Flood Response for LIP (Protection and/or Mitigation)	Reliability of Protection Features and Mitigation Equipment	NEI 12-06
		Feasibility of Manual Actions	
Path 4 (Section 8.1)	Effective Flood Mitigation	Reliability of Mitigation Equipment	NEI 16-05 Appendix B
		Overall Site Response	NEI 16-05 Appendix C
Path 5 (Section 8.2)	Scenario Based Approach (Blend of Responses)	Various	Various

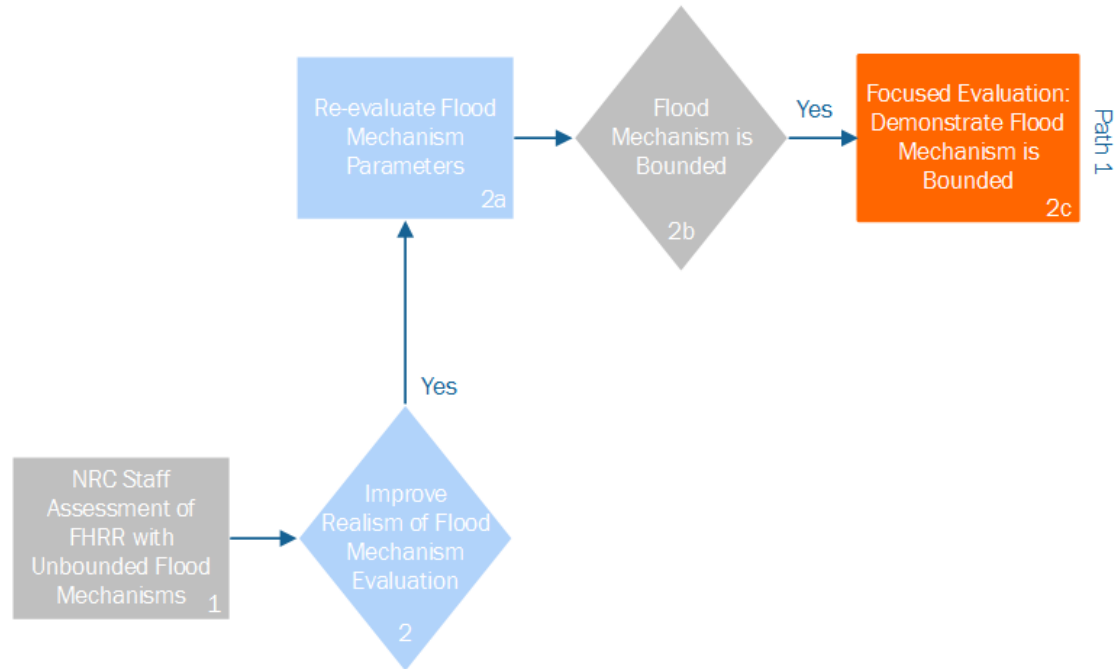
Initial Evaluation Process



Initial Evaluation Process

- Process Steps
 - Identification of unbounded flood mechanisms
 - Improve realism of flood mechanisms using Appendix A (Optional)
 - Characterize flood parameters for each mechanism
 - Identification Key SSCs (associated that support Key Safety Functions)
 - Identification of flood impacts on Key SSCs for each mechanism
 - Identify critical elevations
 - Identify flood protection features
 - Calculate APM
 - Decision of evaluation path for each mechanism

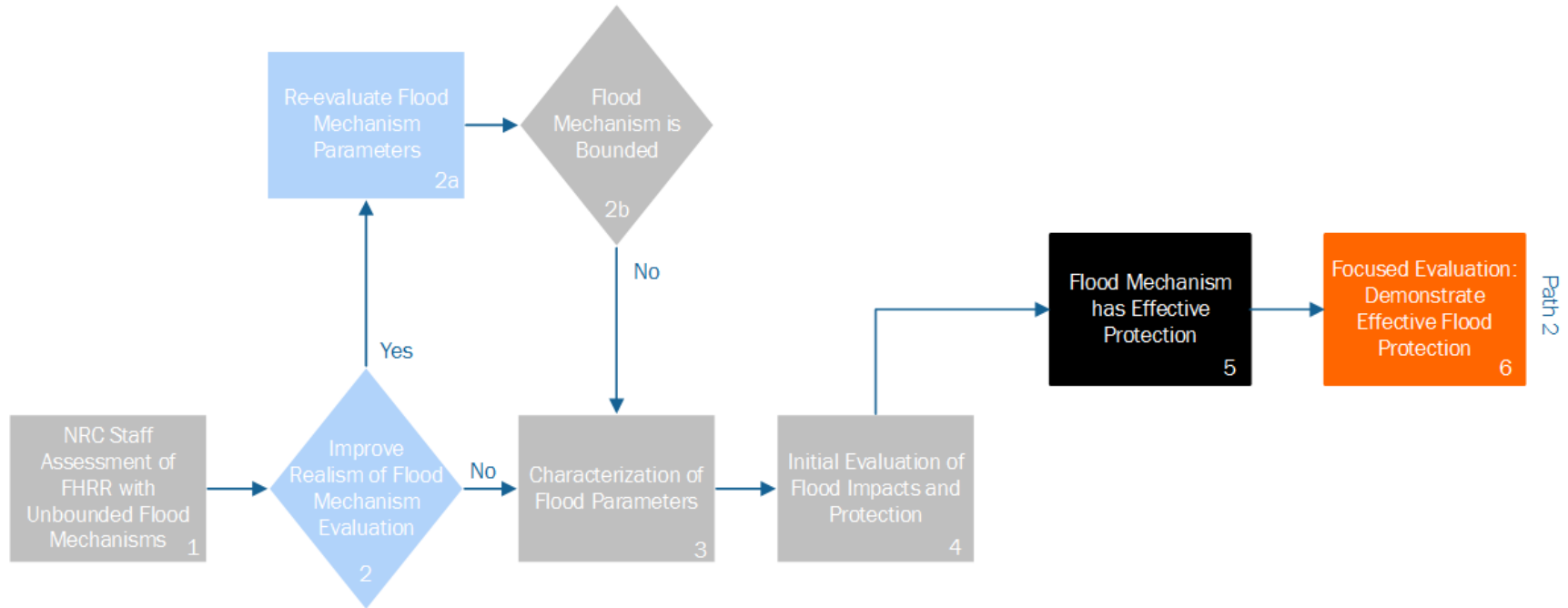
FE Path 1: Bounded Flood Mechanism



FE Path 1: Bounded Flood Mechanism

- Process steps for each mechanism:
 - Comparison of revised flood parameters to design or licensing basis flood parameters
 - Demonstrate that all parameters are bounded

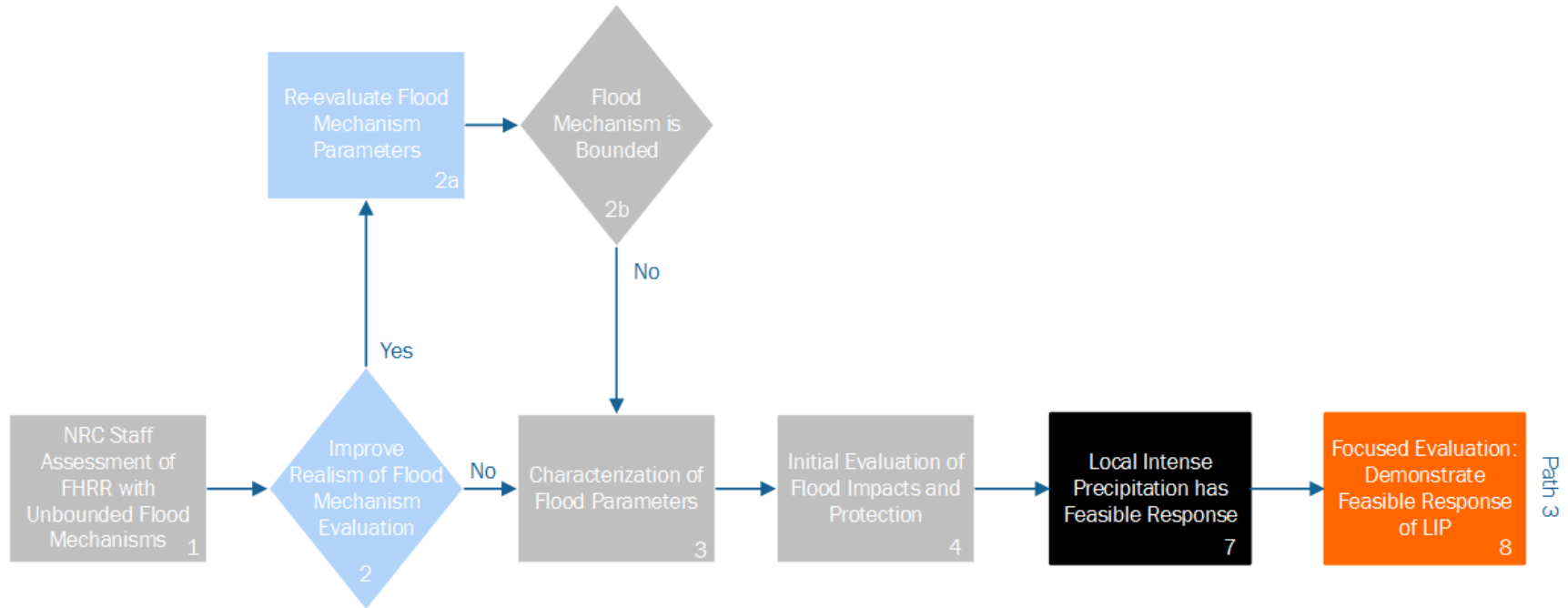
FE Path 2: Effective Protection



FE Path 2: Effective Protection

- Process steps for each mechanism
 - Demonstrate available physical margin is adequate (Appendix B)
 - Passive and/or active flood protection features are reliable (Appendix B)
 - Overall site response is adequate (Appendix C)

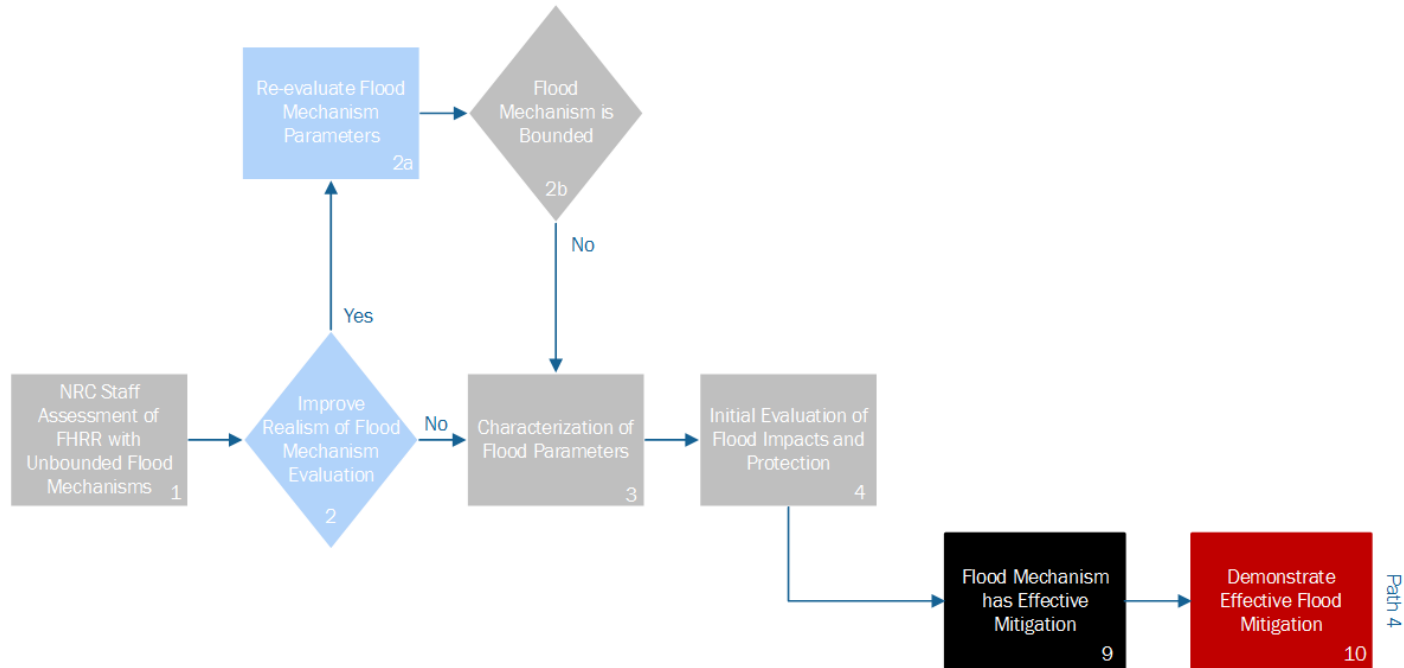
FE Path 3: Feasible Response to LIP



FE Path 3: Feasible Response to LIP

- Process steps for LIP mechanism
 - Evaluate MSA information and determine if LIP is appropriately mitigated
 - Describe feasible response using NEI 12-06 and utilize information from MSA

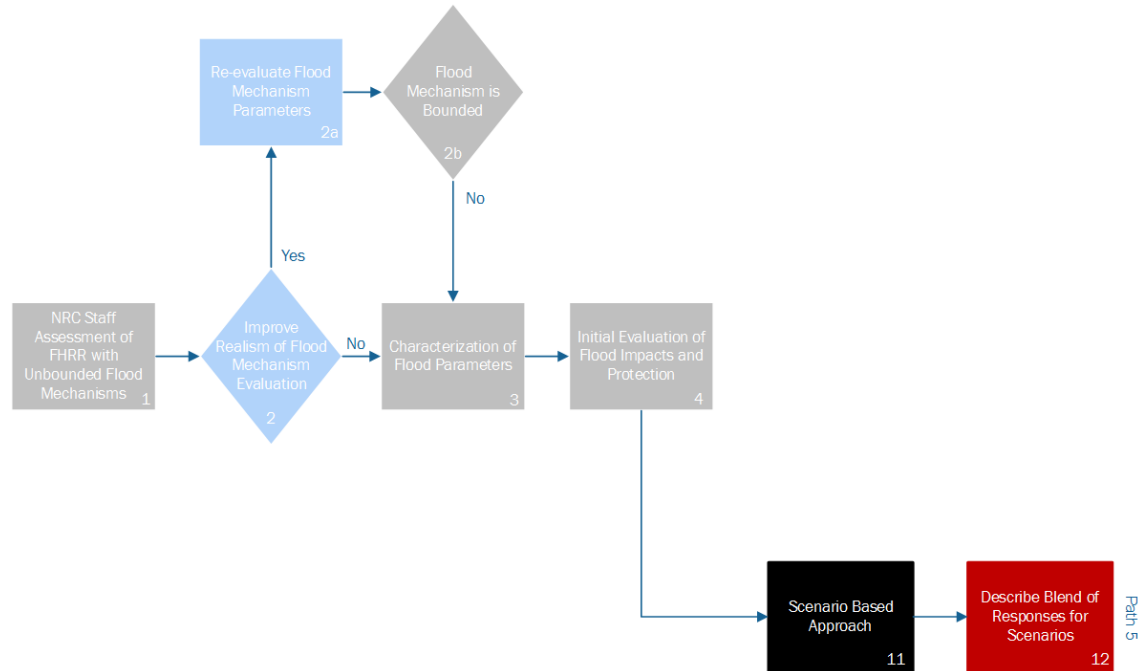
IA Path 4: Effective Flood Mitigation



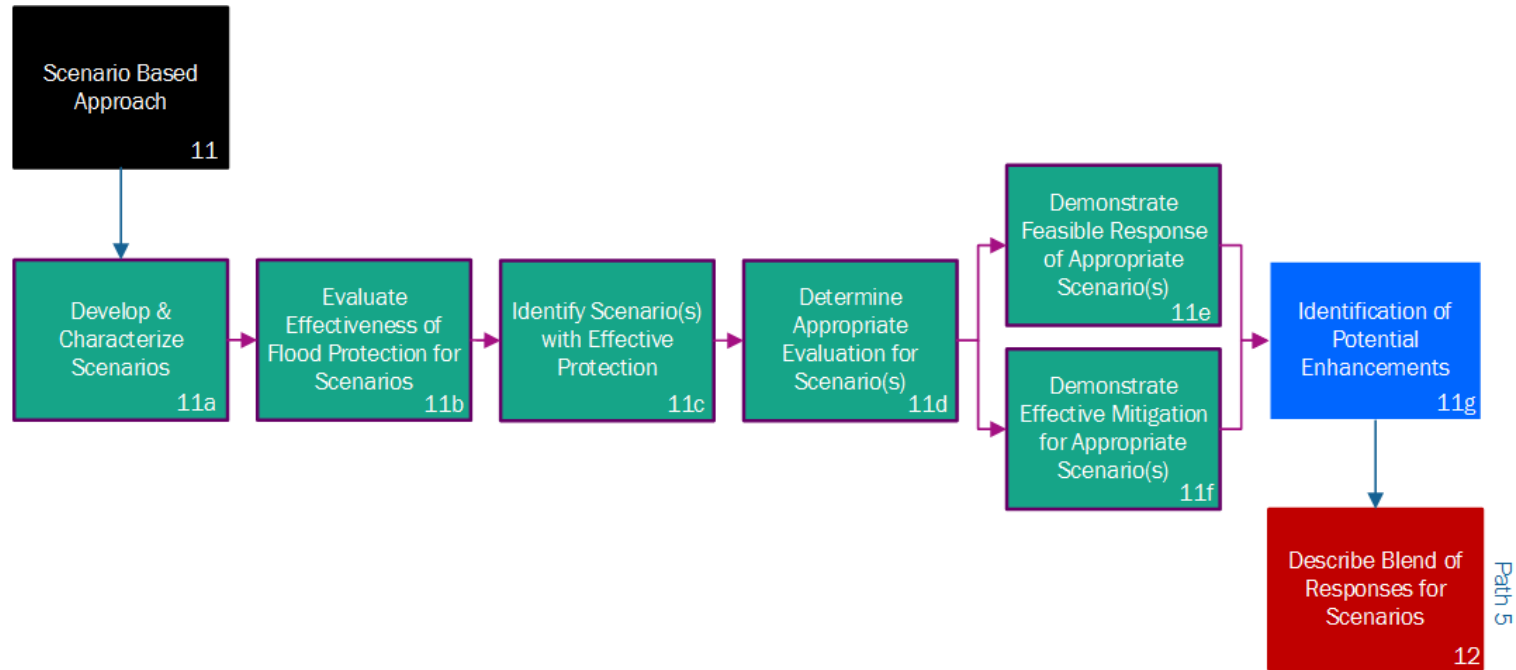
IA Path 4: Effective Flood Mitigation

- Process steps for each mechanism:
 - Demonstrate that the mitigation equipment is reliable (Appendix B)
 - Demonstrate overall site response is adequate (Appendix C)
- Intended to focus on sites with mechanisms where site-specific frequency development would be challenging (e.g. dam failure)

IA Path 5: Scenario Based Approach



IA Path 5: Scenario Based Approach (Detailed)



Example of Scenario Development

Scenario	WSE (ft)
Scenario 1	105
Scenario 2	107
Scenario 3	110

- Site with ground elevation at 100 ft
- Flood barrier height of 105 ft
- A transformer for offsite power or emergency diesel generators at 107 ft
- Maximum still water elevation of 110 ft from the PMF

Determining Appropriate level of Evaluation (Example)

Scenario	WSE (ft)	Scenario Frequency (1/yr)	Likelihood Determination	Response Strategy to be Demonstrated
Scenario 1	105	7.3E-3	Higher	Effective Protection
Scenario 2	107	1.0E-4	Higher	Effective Mitigation
Scenario 3	110	$\ll 1.0\text{E-}4$	Lower	Feasible Response

Appendix A

- Reduction of Conservatisms
 - Provides a catalog of potential conservatisms to consider
 - Discuss basis of why reducing conservatism is appropriate and evaluation is still bounding
 - Address any actions to validate new assumptions
- EPRI developing a report on improving realism in flood hazard development

Appendix A

- Provides insights to determine where safety enhancements may be beneficial based on more realistic scenarios
- Ensure that reduction of conservatisms should still produce bounding flood parameters
- Process is consistent with HHA approach in NUREG/CR-7046
- Justification of the specific application of the method will be part of the site-specific assessment

Appendix B

- Evaluation of Passive and Active Components
 - Determination of available physical margin and adequacy
 - Features engineered in the design/licensing basis as having a flood protection function
 - Features engineered for a purpose other than flood protection in the design/licensing basis but are now being credited.
 - Guidance on reliability of passive and/or active flood protection features

Appendix C

- Evaluation of Overall Site Response
 - Define critical path and identify TSAs
 - Determine if individual TSAs are feasible using NEI 12-06
 - Determine if overall site response is adequate:
 - Clear procedural triggers
 - Established organizational response
 - Detailed flood response timeline
 - Considers environmental conditions
 - Determine overall site response time margin is adequate

Appendix D

- Objective
 - Provide a catalog of models and methods consistent with existing state of practice for frequency development
 - Establish which flood scenarios in Path 5 are high likelihood vs low likelihood (above or below E-4 or E-3 with margin)
 - For example, allow use of 17B for the high and low likelihood determination

Appendix D

- Addresses the following elements:
 - Identification of flood causing mechanisms and combined effects
 - Identification of existing technically defensible methods focused on the E-3 and E-4 range
 - Uncertainty evaluations consistent with the identified methods
 - Quantification associated with each of the methods
 - Documentation is addressed in Section 9
- Provides insights to determine where safety enhancements may be beneficial based on risk.
- Justification of the specific application of the method will be part of the site-specific assessment



JLD-ISG-2016-01

**Guidance for Flooding Hazard
Focused Evaluation and
Integrated Assessment**

ACRS Fukushima Subcommittee

Eric E. Bowman

April 22, 2016

Purpose

- To provide guidance for closure of flooding hazard reevaluations by:
 - Endorsing NEI 16-05 with clarifications in order to provide a graded approach to identify the need for, prioritization, and scope of, integrated assessments.
- Guidance for making regulatory decisions for integrated assessments will be issued separately.

Background

- 10 CFR 50.54(f) Letter of March 12, 2012
- COMSECY-14-0037 and SRM
- COMSECY-15-0019 and SRM
- Order EA-12-049
- NEI 12-06, Rev. 2, Appendix G
- MBDBE Rulemaking

Anticipated Regulatory Outcomes

- Under 50.54(f) Letter:
 - Interim actions addressing hazard
 - Commitments to justify improved realism:
 - Plant modifications
 - Programs and Procedures
 - Phase 2 Regulatory decisions
- Under MBDBE Rule:
 - Mitigating strategies for hazard without change to improve realism

Industry Proposed Guidance: NEI 16-05

- JLD-ISG-2016-01 issued in draft form by Federal Register Notice dated April 22, 2016
- Comment period runs through May 23, 2016
- Document Number:2016-09421
<https://federalregister.gov/a/2016-09421>

Reductions of Conservatism

- SRM-COMSECY-15-0019: “[S]taff should continue to look for additional opportunities to address any over conservatism.”
- Method: NUREG/CR-7046 HHA Process
- Catalog of potential sources of conservatism in NEI 16-05, App. A to consider in HHA
 - Site-specific consideration of changes

Initial Evaluation of Impact and Protection

- NEI 16-05, Section 6.3.1 is acceptable

Determination of Available Physical Margin

- NEI 16-05, Section 6.3.2 and Appendix B are acceptable with clarifications
 - The considerations of the December 23, 2013 RAI (ML13325A891) should account for the reevaluated flood parameters rather than the current licensing basis flood height
 - Reliability of temporary features should consider operating experience

Path 1 – Bounded by Design Basis

- Licensees may use bounding sets of flood parameters to disposition groups of flood mechanisms, leaving others to be dispositioned by other paths

Path 2 – Effective Flood Protection

- NEI 16-05, Section 7.2 and App. B & C are acceptable with clarifications:
 - Resulting qualitative evaluation of site response will be reviewed using engineering judgment (See COMSECY-15-0019)
 - The considerations of the December 23, 2013 RAI (ML13325A891) should account for the reevaluated flood parameters rather than the current licensing basis flood height

Path 3 – Local Intense Precipitation

- NEI 16-05, Section 7.3

As discussed in COMSECY-15-0019, “licensees [with LIP hazards exceeding their current design-basis flood should] assess the impact of the LIP hazard on their sites and then evaluate and implement any necessary programmatic, procedural or plant modifications to address this hazard exceedance. This assessment includes evaluation and justification for: crediting systems that were assumed clogged during the hazard reevaluations; and considering available warning time and flood protection measures, both permanent and temporary, as well as associated manual actions.” Licensees may use the process described in the NEI White Paper, “Warning Time for Maximum Precipitation Events,” dated April 8, 2015 (ADAMS Accession No. ML15104A157), and the related NRC letter dated April 23, 2015 (ADAMS Accession No. ML15110A080) in order to take advantage of warning time for LIP.

Path 3 – Local Intense Precipitation

- Licensees should assess protection of key SSCs as defined in NEI 16-05 with the considerations described above. Protection should include considerations described in Appendix B. If the key SSCs cannot be protected from the LIP hazards, licensees should attempt to mitigate the impact of the LIP on key SSCs. Demonstration of mitigation capability could include reliance on the mitigating strategies assessment LIP evaluation.
- NRC staff reviewing the plant response evaluation for LIP should apply engineering and operational judgment.

Path 4 – Demonstrate Effective Mitigation

- NEI 16-05, Section 8.1
- Licensees should provide corresponding information to address critical flood elevations from NEI 16-05, Section 6.3.1, including frequencies of exceedance

Path 4 and Path 5 Frequency Determinations

- a. Appendix D, Section D.2, compiles selected methods and references related to developing a probabilistic characterization of flooding hazards that have been used primarily in applications not related to nuclear power plants. When applying methods and references provided in Section D.2, licensees should assess the methods and references to:
 - Verify that that references have not been superseded or rescinded due to identified technical inadequacies or shortcomings. Limitations on rescinded references do not apply to documents that have been administratively withdrawn for reasons not related to technical adequacy (e.g., due to administrative schedules associated with Standards).
 - Ensure context and caveats related to the numerical values in Table D-1 (as described in USBR, 2004) and Figure D-1 as well as the methods and references described in Table D-2 are addressed.
- b. To establish the frequency of exceeding a given measure of flood severity, the licensee should aggregate the contributions from a range of potential flooding mechanisms and relevant contributing events and should not limit the assessment to development of frequencies associated with deterministic event combinations (e.g., combinations identified in NUREG/CR-7046) shown in Section D.3.

Path 5 – Scenario-Based Approach

- NEI 16-05, Section 8.2 and App. D
- Scenarios developed should include critical flood elevations
- Identification of scenarios with effective flood protection should include path 2 considerations of NEI 16-05 and ISG
- Frequencies of exceedance should be developed with a methodology that conforms to App D, taking into account PFHA attributes and clarifications of ISG