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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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620TH MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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THURSDAY

DECEMBER 4, 2014

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ROCKVILLE, MARYLAND

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

COMMITTEE MEMBERS:

- JOHN W. STETKAR, Chairman
- HAROLD B. RAY, Vice Chairman
- RON BALLINGER, Member
- DENNIS C. BLEY, Member-at-Large
- MICHAEL L. CORRADINI, Member
- DANA A. POWERS, Member
- JOY REMPE, Member
- PETER RICCARDELLA, Member

1 MICHAEL T. RYAN, Member
2 STEPHEN P. SCHULTZ, Member
3 GORDON R. SKILLMAN, Member
4

5 DESIGNATED FEDERAL OFFICIAL:

6 MICHAEL SNODDERLY
7

8 ALSO PRESENT:

9 CHRISTINA ANTONESCU, NRC
10 ROBERT ARRITT, EPRI
11 SCOTT BAUER, NEI
12 MICHELLE BENSI, NRC
13 ALYSIA BONE, NRC
14 JEREMY BOWEN, NRC
15 ERIC BOWMAN, NRC
16 GORDON CLEFTON, NEI
17 PAUL COLAIANNI, Duke Energy
18 SCOTT FLANDERS, NRC
19 BRYAN FORD, Entergy
20 MICHAEL FRANOVICH, NRC
21 SCOT GREENLEE, NEI
22 DAVID HEACOCK, Dominion
23 GARY HOLAHAN, NRC
24 WAYNE JOHNSON, EPRI
25 MARVIN LEWIS *

1 JOHN McKIRGAN, NRC
2 JEFFREY MITMAN, NRC
3 ABY MOHSENI, NRC
4 ANTHONY PIETRANGELO, NEI
5 JOSEPH POLLOCK, NEI
6 WILLIAM RECKLEY, NRC
7 TIM REED, NRC
8 JAMES SCAROLA, NEI
9 FRED SCHOFER, NRC
10 SUZANNE SCHROER, NRC
11 G. MATHARU SINGH, NRC
12 GEORGE TARTAL, NRC
13 RUTH THOMAS, Environmentalists, Inc. *
14 BILL WEBSTER, Dominion
15 JACOB ZIMMERMAN, NRC

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17 *Present via telephone

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P R O C E E D I N G S

8:30 a.m.

CHAIR STETKAR: The meeting will now come to order. This is the first day of the 620th meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the Committee will consider the following; proposed rule for mitigation of beyond-design-basis events, integration of mitigation strategies for beyond-design-basis external events and the reevaluation of flooding hazards, regulatory gap analysis of the Nuclear Regulatory Commission's cost benefit guidance and practices, Branch Technical Position 8-9, Open Phase Conditions in Electric Power System, and preparation of ACRS reports.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mr. Mike Snodderly is the Designated Federal Official for the initial portion of the meeting.

Portions of the session on proposed rule for mitigation of beyond-design-basis events may be closed in order to protect unclassified safeguards information. We have received no written comments or request to make oral statements from members of the

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1 public regarding today's sessions.

2 There will be a phone bridge line. To
3 preclude interruption of the meeting the phone will be
4 placed in listen-in mode during the presentations and
5 Committee discussions.

6 A transcript of the meeting is being kept
7 and it is requested that speakers use one of the
8 microphones, identify themselves, and speak with
9 sufficient clarity and volume so they can be readily
10 heard. And I ask everyone in the room to please check
11 all of your communications devices, turn them off,
12 silence them or throw them under water, or do
13 something to them, please.

14 And with that, because we have a very,
15 very tight agenda for today, we will proceed with the
16 first topic, and I'll turn the meeting over to Dr.
17 Steve Schultz. Steve.

18 MEMBER SCHULTZ: Fine. For the record, I
19 want to welcome the Staff to the presentations today.
20 John has introduced the topic for this morning's
21 presentation. We are going to be holding this
22 discussion for the full morning. Our first topic is
23 this one on mitigation of beyond-design-basis events
24 and proposed rulemaking.

25 The members that are in attendance today

1 are Michael Corradini, Joy Rempe, Ron Ballinger, Mike
2 Ryan, John Stetkar, Harold Ray, Dana Powers, Dick
3 Skillman, and Pete Riccardella.

4 This is a topic that the Committee has
5 been considering for some time as it came to be as a
6 part of the Fukushima activities. We met with this
7 group as a full Committee in July and got a preview of
8 what was coming with regard to the rulemaking
9 activity.

10 Since then, we had a two-day Subcommittee
11 meeting, which the Fukushima Subcommittee is a
12 Committee of the whole of the ACRS, so we had a two-
13 day Subcommittee meeting which included this topic on
14 November 21st.

15 I want to say that since that meeting
16 we've received additional information associated with
17 Plan 4 of the proposed rulemaking language and so we
18 expect in this presentation to hear more about what's
19 been done, and what is now planned going forward.

20 Our first presentation is by the NRC
21 Staff, and then we'll hear from industry with regard
22 to their views and their activities associated with
23 the rulemaking. So, with that, I would like to
24 introduce Aby Mohseni to make the introductions of the
25 Staff and the topic. Thank you.

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1 MR. MOHSENI: Thank you very much, Dr.
2 Schultz, distinguished Members. My name is Aby
3 Mohseni, and I'm the Deputy Director of the Division
4 of Policy and Rulemaking in the Office of Nuclear
5 Reactor Regulation.

6 Today we will provide a shortened version
7 of our presentation similar to what we provided to the
8 Fukushima Subcommittee, as you indicated, Dr. Schultz,
9 on November 21st, 2014 on the proposed mitigation of
10 beyond-design-basis events rulemaking. Please note
11 that this activity is formerly also known as the
12 consolidated rule.

13 Recognizing the limited time available to
14 us today we will focus on the most important elements
15 of the proposed rule, Paragraphs B, C, and D. We are
16 providing slides on the remaining aspects of the
17 proposed rule for the full Committee's information,
18 but do not plan to discuss those slides in any detail.
19 Of course, we can answer any questions on any aspects
20 of the presentation.

21 Since the Subcommittee we met with our
22 internal Steering Committee and have revised the
23 proposed rule language to both reflect the ACRS
24 feedback regarding protection for equipment required
25 for beyond-design-basis external events mitigation,

1 i.e., proposed 50(sss)(C)(2), and to provide language
2 that aligns with COMSECY-14-0037 which is currently
3 with the Commission.

4 To support this presentation, I have with
5 me several members of NRR and a member from NRO. Tim
6 Reed from our staff will be leading the discussion of
7 the proposed rulemaking. Supporting Tim as the Lead
8 Technical Expert in the mitigation strategies is Eric
9 Bowman from the Japanese Lessons Learned Division.
10 Hiding behind one of the columns if you can find him,
11 we have Bill Reckley, also from the Japanese Lessons
12 Learned Division to support any discussion regarding
13 feedback from NTF 2.1 flooding reevaluated hazards
14 and its relationship to this proposed rulemaking.

15 And, finally, we have from NRO's
16 Rulemaking George Tartal to support discussion of the
17 proposed provisions for new reactors. There are other
18 members from the Mitigation of Beyond-Design-Basis
19 Event Rulemaking Working Group in attendance to
20 support questions from the Committee.

21 The preliminary proposed rule language was
22 made publicly available prior to the Subcommittee
23 meeting and a revised new version is now publicly
24 available. The preliminary proposed rule language
25 shows the integration of requirements that reflect and

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1 align with industry implementation. Since the
2 Commission has not considered the draft proposed rule
3 language, these clearly do not constitute an official
4 NRC position.

5 As directed by SRM 14-0046 issued July
6 19th, 2014, this consolidated rulemaking addresses
7 either in requirements or through supporting
8 implementation guidance regulatory actions that stem
9 from all of the recommendations in NTF 4789.2, 9.3,
10 9.1 with one exception, maintenance of ERDS capability
11 throughout the accident, 10.2 and 11. 1.

12 Note that the presentation provides a
13 brief summary of the backfit analysis and basis for
14 the potential inclusion of SAMGs as requirement in
15 this rulemaking activity. This was discussed with the
16 Subcommittee on November 21st, but will not be the
17 focus today.

18 The NRC is very appreciative of the ACRS
19 time and interest in this proposed rulemaking
20 activity. We look forward to today's discussion. Thank
21 you. Tim.

22 MR. REED: Okay. Thanks, Aby. Given the
23 time we have, again as Aby said, I'll focus on
24 Paragraphs B, C, and George Tartal from NRO will talk
25 about the PORV-fitted new reactor assessment

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1 requirements of Paragraph D, so I'm going to skip
2 through the first couple of slides, just briefly
3 mention that, of course, this applies to power
4 reactors both currently operating licensed power
5 reactors, as well as new applicants either under Part
6 50 or Part 52. We have decommissioning provisions
7 built into this, and we're currently working on those
8 to align those with our recent actions on the plants
9 that are decommissioned, make sure we don't have any
10 unintended consequences in that regard, so I won't say
11 anything more about the applicability in that.

12 So going on now to what I think the focus
13 should be, is Paragraph B, and then I'll talk about C.
14 And also have Eric here to talk about any questions on
15 C, if we need.

16 B, to me, is the heart of this regulation.
17 It is, in fact, requiring an integrated accident
18 response capability, develop and maintain that
19 capability. It reflects basically taking three
20 different guideline sets and integrating them with the
21 already existing symptom-based EOPs. These all exist,
22 two of which are already required, one of which is a
23 voluntary initiative.

24 FLEX, which is the first line item there,
25 beyond-design-basis external event mitigation known as

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1 FLEX in the industry. That, of course, is being
2 implemented right now as a result of EA-12-049. This
3 would, of course, make that generically applicable in
4 this rulemaking, so that's a part of this integrated
5 response capability.

6 The EDMGs usually -- typically called the
7 EDMGs, those are the guideline set that implements the
8 requirements of 10 CFR 50.54(hh)(2). You'll probably
9 recall that comes from the Section B5B of the ICM
10 Order of 2002. Those, of course, are also already in
11 existence. This was simply move those into this set of
12 requirements because it makes a whole lot of sense. A
13 large measure are very, very similar to the strategies
14 that also are being developed under FLEX, so it made
15 sense to pull those in.

16 And then, of course, the last set of
17 requirements, perhaps the most interesting ones from
18 this rulemaking standpoint are the severe accident
19 management guidelines. These were implemented at the
20 end of 1998 at all facilities in the U.S., but they
21 were done as a voluntary initiative, and we're
22 suggesting to the Commission there may be good reasons
23 to make these a requirement. Of course, as we've
24 mentioned there's pros and cons in that. That's
25 addressed in the slide package. I won't go into a lot

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1 of detail on that, but that's essentially what we're
2 doing.

3 Now, as a practical reality this is
4 largely already done, as you might expect at
5 facilities, because SAMGs are in existence. These
6 transitions do already exist between EOPs and SAMGs.
7 The EDMGs are existence, and FLEX is being built into
8 the EOPs. But nonetheless, this is going to make this
9 a requirement so that does change the nature of this.

10 MEMBER REMPE: So, Tim?

11 MR. REED: Yes, ma'am.

12 MEMBER REMPE: When I was looking at the
13 draft rule language they had the same text, integrated
14 accident response capability. I didn't see anything
15 about assessment. Could you kind of comment about that
16 a little bit?

17 MR. REED: In terms of the forward-fitting
18 assessment requirements?

19 MEMBER REMPE: In terms of an integrated
20 assessment, and what you -- how do we feel that that
21 would fit into this response capability?

22 MR. REED: Did I say assessment? Okay. I
23 should say integrated response capability.

24 MEMBER REMPE: Okay.

25 MR. REED: So, strike that --

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1 MEMBER REMPE: But how does -- does an
2 assessment fit into the capability --

3 MR. REED: No, the assessment is really --

4 MR. BOWMAN: That would be -- well, there
5 are two different assessment things that will be
6 discussed today. There's the assessment forward-
7 fitting for the new reactors that's in Paragraph D
8 that George will be talking about. And then there's
9 the integrated assessment that was a part of the
10 50.54(f) letters pursuant to Recommendation 2.1 that
11 Bill Reckley will be discussing as it pertains to
12 COMSECY-14-0037. And that would be, essentially,
13 showing the capability of the mitigating strategies to
14 address the change in the flooding hazard reevaluation
15 levels.

16 MEMBER REMPE: So nothing in the rule
17 really, that's --

18 MR. BOWMAN: Well, there is a relation to
19 the rule, but it's not directly required by the rule.
20 Bill will go into that in a lot more detail.

21 MEMBER REMPE: Okay.

22 MR. REED: I should be saying capability
23 here, not assessment.

24 MEMBER REMPE: I think you did.

25 MR. REED: So, I apologize for that.

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1 MEMBER REMPE: Yes, I just was wanting to
2 clarify that.

3 MR. REED: All right, thanks.

4 Slide 6, I mentioned that these different
5 guideline sets would be integrated with the EOPs, and
6 that's intentionally done in that way because we
7 certainly don't want to go back and revisit all the
8 work, an extensive amount of work that was done on the
9 EOPs, develop the symptom-based EOPs. We want to leave
10 that in tact and not inadvertently backfit or do
11 anything else in that regard. So, that's -- we've
12 structured that way in hopes of not doing -- having
13 any unintended consequences, leaving that work in
14 place.

15 And then we have two additional
16 requirements there. You'll see in Paragraph B it goes
17 to staffing and command and control. This is
18 recognizing the fact that if you want to have a
19 seamless integrated accident response capability you
20 need to have sufficient command and control,
21 obviously. You need to also have enough staffing to do
22 that.

23 We feel the fact that this is probably in
24 place as a result of implementation of EA-12-049. I
25 think we will, in fact, ask questions in this regard

1 to make sure that's, in fact, the case. If there's
2 not, I want to understand that for the final rule. So,
3 that's the nature of the requirements right now as
4 they exist in Paragraph B.

5 All right. Going then to the equipment
6 requirements, Paragraph C. These are essentially doing
7 -- making generically applicable two orders, EA-12-
8 049, of course, mitigation strategies order, and EA-
9 12-051, spent fuel pool level instrumentation order.
10 That's basically what it's trying to do.

11 So, the first is a basic requirement to
12 have functional capacity and capability for the
13 equipment, and strategy for the equipment. This is
14 making sure you have enough of that equipment that can
15 do the job. Of course, you'll recognize this from the
16 mitigation strategies order.

17 And then the second thing that's much more
18 interesting, I think, for this Committee and the
19 discussion today, and this is the difference that was
20 already mentioned versus the previous language we
21 provided to the Committee on November 21st, is
22 reasonable protection for that equipment from external
23 events.

24 You will note that the new language,
25 current version of draft language talks about

1 protection against external events including any
2 reevaluated hazard, so that's a difference versus the
3 previous language. And that's assuming that the
4 Commission is going to affirm the COMSECY that's with
5 the Commission right now. That's the COMSECY that Eric
6 just talked about, 14-0037. So, that's -- it's written
7 now with that presumption in mind; whereas, before we
8 weren't writing it that way.

9 CHAIR STETKAR: Tim?

10 MR. REED: Yes, sir?

11 CHAIR STETKAR: I'm assuming that the term
12 "reasonably protected" is not very precise, but rules
13 -- I personally think it's appropriate that rules do
14 not get into precision. I'm assuming that regulatory
15 guidance that would be issued in support of this rule
16 would elaborate more details on what reasonable
17 protection might involve. Is that an appropriate
18 assumption?

19 MR. BOWMAN: That's a good assumption. NEI-
20 12-06, Revision 0 in Sections 5-9 provide definition
21 for what reasonable protection means under-12-049.
22 We're currently working with industry and external
23 stakeholders on a revision to that particular industry
24 guidance, and will be putting together draft guide, I
25 believe the number is 1301, to go forward and endorse

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1 that with any clarifications and exceptions that are
2 appropriate.

3 CHAIR STETKAR: Thank you.

4 MEMBER SCHULTZ: Eric, how extensive do you
5 expect that revision to be from Rev 0?

6 MR. BOWMAN: At this point, I believe it's
7 going to be essentially just incorporating the
8 alternative approaches that we found acceptable in the
9 industry's implementation of the order. And there will
10 be a few other things that are added in there. One in
11 particular, the validation process has -- there was
12 merely a single mention of licensees would be
13 validating the procedures to show that they can be
14 accomplished in a time frame that it's necessary to
15 accomplish them. There's a lot more detail that's
16 being added into one of the appendices for the new
17 version of the industry guidance as to how that
18 validation will take place. And there will also be a
19 more generalized appendix on approaches for new
20 reactors.

21 MEMBER SCHULTZ: Thank you.

22 MR. REED: Okay. Then we also have a basic
23 maintenance requirement. That also again stems from
24 EA-12-049 and the way that order is being implemented,
25 again, it's meant to make generically applicable those

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1 activities to insure that this equipment remains
2 functional and available.

3 And then, finally, we have a high-level
4 performance-based requirement for the spent fuel pool
5 level instrumentation order that's in this in C-4, I
6 believe, in front of me. So, essentially, then what
7 this -- these requirements as they are built right now
8 are making two orders generically applicable, and
9 they're also reflecting language from the 2.1
10 reevaluated hazard. So, that's the way Paragraph C is
11 currently drafted.

12 So, as has been mentioned, this is
13 changing. This language is still not fixed, like even
14 yesterday, we've been working on it every day, so
15 this is the way it looks today.

16 So, with that I guess we can go to the
17 forward-fitted assessments requirements for new
18 reactors, and George Tartal will talk about that.

19 MR. TARTAL: Thanks, Tim. So, Paragraph D
20 for new reactor requirements, the first thing I'll say
21 on this is this is an additional requirement outside
22 of the orders that were mentioned earlier. The intent
23 of this new requirement is based on the Commission's
24 Advanced Reactor Policy Statement and the clips from
25 that policy statement are here on the slide.

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1 As Tim mentioned, this is a forward-fit
2 rule. That's our intent, so that's why it applies to
3 applicants and not to current licensees or current
4 design certification holders, et cetera. We want this
5 requirement to be done as early as possible in the
6 design phase, and that's another reason why we're
7 applying it to applicants. And the requirement here
8 would be to perform a design-specific assessment of
9 the effects of an extended loss of all AC power
10 concurrent with loss of normal access to the ultimate
11 heat sink. And then based on the results of that
12 assessment we would expect the applicant to
13 incorporate in the design some features that would
14 minimize reliance on human actions, enhance coping
15 durations, demonstrate the ability to maintain and
16 restore core cooling, containment, and spent fuel
17 cooling capabilities.

18 And the other thing I wanted to say about
19 this is this doesn't obviate the need for FLEX, just
20 to be very clear about this. We're really looking to
21 give operators more time to respond to the ELAP
22 condition, but they still are very likely going to
23 need to have FLEX.

24 MEMBER CORRADINI: So, can I ask about
25 that?

1 MR. TARTAL: Sure.

2 MEMBER CORRADINI: So, at least in some
3 examples we've seen there's kind of an inconsistency
4 that develops by this in the sense that the new plants
5 have installed features that are quite robust, and in
6 some sense the rule will have features that are
7 different. And they are not allowed to take credit for
8 what they already have on site, if I understand the
9 rule properly.

10 MR. TARTAL: I wouldn't assume that they
11 couldn't take credit for what they already have. The
12 assessment may look at what they already have in the
13 current design, and it may result in -- the result of
14 the assessment may be that the current design is good
15 enough --

16 (Simultaneous speech)

17 MR. TARTAL: When you look at the guidance,
18 the guidance is saying that -- well, I don't -- we
19 haven't released the guidance yet, but the guidance is
20 going to give some timelines for expectations for when
21 you would need to transition into FLEX equipment. So,
22 based on that assessment, they may find that the
23 design is acceptable as is.

24 MEMBER CORRADINI: Okay. All right. Well,
25 yesterday we had a meeting and I didn't get that

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1 impression.

2 MR. TARTAL: Well, yesterday was on a
3 specific design so I don't want to --

4 (Simultaneous speech)

5 MEMBER CORRADINI: That's fine. I don't
6 want to go to -- all right. But the spirit of this in
7 my mind is that we've got the advanced plants which
8 have at least generically pretty substantial coping
9 capability built in almost independent of site. And
10 now this, at least as I understand it, has the
11 possibility of not allowing them to take credit for
12 things that are there. And so, okay, that's a
13 deterministic way of doing this. Is there a better way
14 being considered by the Staff going forward such that
15 from a risk standpoint certain things that are on this
16 -- that are in the bag of things that they've got,
17 they can take credit for from a risk approach versus
18 this deterministic, you can take credit for that but
19 you can't take credit for this, you can count that but
20 you can't count this?

21 MR. BOWMAN: I can probably address that a
22 little bit for you. The current version of the
23 proposed rule language does not include the
24 specification that licensees have to rely on portable
25 equipment that was included in the EA-12-049, so you

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1 will see probably a different treatment of pre-staged
2 or installed generators, for example, than was
3 necessary under the order.

4 MEMBER CORRADINI: All right. So, what I'm
5 hearing is wait and see, the jury is still out. That's
6 what I'm hearing. Am I hearing that correctly?

7 MR. BOWMAN: Right.

8 MEMBER CORRADINI: Okay. Because
9 yesterday's jury, or least the interpretation was
10 different than today. Just so I'm --

11 MEMBER REMPE: Relying on industry
12 guidance.

13 MR. BOWMAN: This is the proposed rule at
14 this stage and the Commission hasn't made a decision
15 on it, of course.

16 MEMBER CORRADINI: Okay. But --

17 MEMBER SCHULTZ: Just to be clear, George,
18 and I'm not trying to quibble, not trying to be too
19 specific here, but what you're talking about is new
20 requirements for new reactors.

21 MR. TARTAL: Yes, this is an additional
22 requirement. Yes.

23 MEMBER CORRADINI: So, can I say it
24 differently, and then I'll stop?

25 MR. TARTAL: Yes.

1 MEMBER CORRADINI: Which is I understand
2 the need for -- I understand the Staff incorporating
3 the recommendations in NEI 12-06 for current plants.
4 What I'm questioning, wondering is for advanced plants
5 a direct and rigid application of NEI 12-06 seems
6 surprisingly inflexible when you want flexibility.
7 That's all. That's my comment, so I want -- so, I will
8 just leave it there and keep on going.

9 MR. BOWMAN: I think the only thing I'd say
10 is we are not making 12-06 a requirement. 12-06 is an
11 acceptable approach that we've endorsed --

12 MEMBER CORRADINI: I understand that. I
13 understand that.

14 MR. BOWMAN: -- so if the -- and there's
15 an effort in progress to update 12-06 to provide
16 different guidance for new reactors that we may be
17 able to allow more flexibility there.

18 MEMBER CORRADINI: Okay, thank you.

19 MR. REED: So, that's the central
20 Paragraphs B, C, and D. You have the rest of that
21 presentation there. Of course, you have the draft rule
22 language there, also. There, of course, are training,
23 there's drills and exercise requirements, there's a
24 change-control requirement there. There's been some
25 feedback on that, we heard that, we're aware of that.

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1 And then there's some I'll call them EP-related
2 requirements that will be located in Appendix E, so
3 take a look at all that. So, the rule is fairly broad;
4 there's a lot in here. As was mentioned in the
5 beginning, we're addressing quite a few of the
6 different recommendations stemming from the NTTF
7 report.

8 We can answer any questions on the
9 remaining portions, but for the sake of time we just
10 focused on the three central paragraphs. Also, I would
11 like to mention the fact that we're -- we have an
12 extension until April 30th, so we'll be able to -- I
13 hope to get the full Committee the full package, you
14 know, probably the April time frame, maybe the
15 Subcommittee in that time frame, March-April so you
16 can do -- you know, basically do your job, give you
17 the full package and allow you to write your letter on
18 that, so I wanted to make sure that that's our plan,
19 to bring back the full package.

20 MEMBER SCHULTZ: Tim, that raises an
21 important point. What is the implementation schedule
22 -- what do you envision the implementation schedule to
23 be associated with the overall program?

24 MR. REED: Yes, that's -- those
25 requirements you don't see written there. We're

1 working on them right now. I -- first of all, a lot of
2 this is being implemented right now, so that's the
3 good thing about in terms of it's already been
4 implementing under currently implementing orders.

5 In terms of the additional requirements
6 we're going to, obviously, look for stakeholder
7 feedback in that regard followed by cumulative effects
8 regulation process. Okay? We're even considering
9 potentially maybe offering a flexible risk-informed
10 scheduling process. I'm trying to work that. Folks
11 here are familiar with the RPI, Risk Prioritization
12 Initiative. The initiative will recognize that idea.
13 I've worked on that in the past, so I'm trying to get
14 that in there, also. So, to make a long answer short,
15 I recognize there's an awful lot on the plates of the
16 licensees out there, and we want to make sure that the
17 implementation period is adjusted accordingly based on
18 what's already on their plate, and we're not
19 distracting, further distracting those resources. So,
20 those aren't written at this time, but that's our mind
21 set on that.

22 MEMBER SCHULTZ: Can you give me a general
23 framework when you think it would be complete based on
24 the work that you've done, and what you see going
25 forward? Are we talking 2016, end of 2016, end of

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1 2017, or further in time?

2 MR. REED: Okay. First of all, you still
3 have to work the calendar a little bit and you figure
4 if we make the final rule and give the final rule
5 package to the Commission in December of 2016. Okay?
6 And the Commission takes several months to deliberate,
7 writes an SRM, we make the changes, the rule goes into
8 the Federal Register in 2017, becomes effective
9 sometime the latter part of 2017, then you start,
10 okay, how much time do I give somebody? Nominally, you
11 know, we have to see what the additional requirements
12 are, whether, in fact, those have to be tied to, for
13 example, refueling outages or not, or they can be
14 outside of that. And then I need to factor in the
15 feedback I hear from external stakeholders to see what
16 makes sense. So, I just -- I'd be purely guessing at
17 this point.

18 MEMBER SCHULTZ: We'll discuss the same
19 with Entergy, because you talked about the
20 implementing strategies that are already moving
21 forward.

22 MR. REED: Yes. I think the big part in my
23 personal understanding right now would be basically
24 bringing the 1998 SAMGs work forward and updating it
25 to the most -- very good work that's been done by EPRI

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1 and the Owners Groups here recently on the SAMGs,
2 making that basically plant-specific, building it into
3 configuration management program, and reflecting this
4 new equipment from FLEX.

5 Again, presuming the Commission agrees
6 with that as a requirement, but if that goes in there
7 I think that's the big piece I see right now in terms
8 of what I'd be concerned -- because I believe that's
9 the same set of resources that would be implementing
10 management strategies, at least in my mind. And I
11 think those people are obviously very consumed right
12 now, so right now that's all I know on that. I'd like
13 to hear what the industry has to say about that.

14 MEMBER SCHULTZ: We will ask. Thank you.
15 Other questions from the Committee?

16 MEMBER REMPE: On this one with the new
17 reactors, if I look at the text here it seems to
18 indicate a preference for capabilities on site,
19 enhanced associated with the reactor over the FLEX. It
20 doesn't eliminate or preclude FLEX, but it would
21 clearly indicate the way you're doing this assessment
22 and the evaluation that there is a preference for the
23 plant to take care of itself without relying on FLEX
24 that's offsite. Right?

25 MR. TARTAL: That's the point, is trying to

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1 use more installed equipment.

2 MEMBER REMPE: Right.

3 MR. TARTAL: Trying to get the operator
4 away from having to take too many actions, being able
5 to evaluate the plant conditions, take more time to
6 evaluate what's going on and plan for what might be
7 the actions needed to take care of the plant now, and
8 then also to transition to FLEX. It's really to give
9 them more time to think and act.

10 MEMBER REMPE: Okay.

11 MR. TARTAL: That's the intent.

12 MEMBER REMPE: Yes.

13 MEMBER SCHULTZ: I thought in something
14 that was said regarding the guidance that there are
15 already public meetings ongoing associated with the
16 development of the guidance that would be required. Is
17 that correct, and can you describe where the process
18 is in that regard?

19 MR. BOWMAN: That's correct. We've had one
20 meeting so far. It was just prior to the meeting with
21 the Subcommittees, the two-day meeting, and I
22 anticipate in January or February we'll be having
23 another meeting. Has not yet been scheduled.

24 CHAIR STETKAR: Eric, do you have a target
25 date for a draft of the guidance to go out?

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1 MR. BOWMAN: Our target is in conjunction
2 with the --

3 CHAIR STETKAR: So, you're talking March or
4 April, roughly.

5 MR. BOWMAN: Right. And I would anticipate
6 that we'd interact with the Committee in conjunction
7 with the proposed rule package.

8 MEMBER SKILLMAN: Let me ask a question,
9 and it ties to Dr. Corradini's and Dr. Rempe's
10 question. If I'm a clever applicant for a new design
11 and instead of having four diesels I have six, and
12 instead of having three emergency cooling towers I
13 have nine, and I have demonstrated by assessment that
14 I really won't need FLEX for eight years, two months,
15 and fifty-six minutes. Are you still intending that
16 FLEX be part of this scenario? Haven't I proven that
17 with my installed equipment I've done everything that
18 is reasonable and sufficient to protect the
19 containment, to protect the core, and to protect the
20 spent fuel? Isn't there a way for a new design to
21 accommodate self-sufficiency?

22 MR. TARTAL: I'll let John McKirgan start
23 with that.

24 MR. McKIRGAN: Thank you. This is John
25 McKirgan for the NRO Staff. The designs that we have

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1 before us now have not achieved that level. I wouldn't
2 preclude it, and certainly we would probably -- again,
3 we're going very far out, we might be in an exemption
4 mode then. But the designs we're looking at now have
5 not reached that level where FLEX is obviated.

6 I do believe there are some very smart
7 designers out there. If they were to bring something
8 forward to the Staff, we would certainly consider
9 that, but that's not what's before us now. So, I think
10 the current thinking is that the designs that we've
11 seen would -- we would expect them to have that FLEX
12 capability.

13 MEMBER SCHULTZ: Isn't there an inherent
14 advantage to the FLEX concept that one could apply to
15 any design standard that one would propose? In other
16 words, an advantage to having the FLEX capability that
17 would be useful to have regardless of how robust the
18 design might be?

19 MR. McKIRGAN: Yes, I think that's the
20 Staff's position.

21 MEMBER SCHULTZ: Okay.

22 CHAIR STETKAR: And I also think, and we
23 have to be cognizant of the time here so I'll keep
24 this short. I think it's also important when you're
25 looking at any proposed process for dealing with

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1 accidents that you clearly distinguish between the
2 concepts of redundancy and diversity. And redundancy,
3 putting in 15 identical diesels that are susceptible
4 to the same failure modes doesn't achieve the
5 diversity that you may need from other -- either other
6 design features that are installed in the plant
7 footprint, or the diversity that's brought in from the
8 concepts of FLEX in the sense of portability and
9 different opportunities to use that equipment. So, I
10 think that's an important concept, and that may have
11 different implications on different specific even new
12 reactor designs.

13 VICE CHAIR RAY: Tim?

14 MR. REED: Yes, sir.

15 VICE CHAIR RAY: Could you help me with
16 something I'm still struggling with, which is at what
17 point, if ever, during this process is the status of
18 adequate protection either necessitating FLEX, or
19 resolved by FLEX, or is it just irrelevant to FLEX?

20 MR. REED: Yes. I mean, this goes back to
21 EA-12-049, the mitigation strategies order. I think
22 the Committee will recall, obviously, that was an
23 order implemented under adequate protection by the
24 Commission as an additional defense-in-depth
25 capability, recognizing uncertainties associated with

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1 beyond-design-basis external events. So, that itself
2 is an adequate protection action, and all of the
3 requirements in my rule that stem from that are
4 already imposed backfits, so they're not -- as long as
5 they stay in that footprint I'm actually stepping out
6 of it. I'm not imposing more backfits, new
7 impositions. So, that's the portion that's adequate
8 protection today. Okay? That was a COMSECY that's
9 going up to --

10 VICE CHAIR RAY: Excuse me. I'm
11 interrupting you, I know.

12 MR. REED: Yes, sir?

13 VICE CHAIR RAY: I just want to make sure
14 I understand. So, we need to do those things to
15 maintain adequate protection.

16 MR. REED: That's been -- that's the
17 Commission's position, yes.

18 VICE CHAIR RAY: Okay. I hope my colleagues
19 don't hear that. We need to do what you described just
20 now in order to maintain adequate protection. Okay, go
21 ahead.

22 MR. REED: And, of course, as I mentioned,
23 there's a COMSECY that's an agenda item here later
24 today that's up there with the Commission to address
25 whether, in fact, protection at the reevaluated

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1 hazard, whether they affirm that that's the meaning of
2 what we're doing in EA-12-049. So, that extends that
3 adequate protection argument to that.

4 VICE CHAIR RAY: Yes. So, that's a key part
5 of what we should be thinking about and discussing
6 here.

7 MR. REED: Absolutely. Absolutely.

8 MR. BOWMAN: The decision by the Commission
9 that it was insuring continued adequate protection was
10 necessary for the -- by means of EA-12-049 was in SRM
11 -SECY-12-0025.

12 VICE CHAIR RAY: We have, and the language
13 often references to backfitting, and the Backfitting
14 Rule. The Backfitting Rule includes adequate
15 protection as a --

16 MR. REED: Yes.

17 VICE CHAIR RAY: -- determinate step, and
18 sometimes it's perceived as an alternative, or we have
19 adequate protection already. Now we'll look at whether
20 we should do this under the backfitting, cost-
21 effectiveness rule and so on, so it can get confusing.

22 MR. REED: It can. I mean, it's a very
23 simple idea. If you have a license and as a regulator
24 I make you do more than what you did -- required when
25 you had the license, I'm backfitting you. And that

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1 regulation then -- you know, back -- 51.09 says here's
2 some ways you don't have to consider cost, here's one
3 way you have to consider cost, so that's a simple way
4 of viewing it.

5 VICE CHAIR RAY: Right. And I'm just trying
6 to figure out how those two steps in 51.09 are working
7 as we're talking through this.

8 MR. REED: Yes.

9 VICE CHAIR RAY: Okay. So, I may ask it
10 again.

11 MR. REED: Sure.

12 MR. MOHSENI: Dr. Ray, if I may add. The
13 NRO piece is forward-fitting, so it doesn't fall into
14 that logic.

15 VICE CHAIR RAY: I do understand that.

16 MR. REED: Okay.

17 VICE CHAIR RAY: I'm more concerned about
18 the effect on the existing plants.

19 MR. REED: Okay.

20 MEMBER SCHULTZ: With that, Aby, I want to
21 thank you, and I want to thank the Staff for their
22 presentation this morning. And we're going to rapidly
23 move to the industry's first presentation.

24 MR. PIETRANGELO: Mr. Chairman, good
25 morning. We're really here to talk about the SECY that

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1 went to the Commission on November 21st, not
2 specifically about the rulemaking that you were just
3 discussing; but, obviously, they're not mutually
4 exclusive.

5 I spoke with this Committee a couple of
6 weeks ago about some of the issues associated with
7 that SECY. We appreciate the opportunity to be back
8 today with members of our Fukushima Response Steering
9 Committee to kind of talk more about how we got to
10 where we are, why we got to where we are. Let me
11 introduce them.

12 Dave Heacock is the President and Chief
13 Nuclear Officer at Dominion Generation. Joe Pollock is
14 the VP of Nuclear Operations for NEI, and previously
15 was the Site Manager at Indian Point. And Jim Scarola
16 is the Executive Director of our Fukushima Response
17 Steering Committee, so we've been with this issue
18 since March 11th of 2011. And I'm going to turn it
19 over to Jim to kind of start the discussion and
20 conceptually how we got to where we are. Jim.

21 MR. SCAROLA: Thanks, Tony, and just thank
22 the Committee this morning for allotting us some time
23 to have this discussion. I appreciate some of the key
24 points in the previous interactions here about
25 diversity, about redundancy, and many of the

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1 discussions that you're having now we have debated as
2 an industry quite thoroughly over the last three
3 years.

4 Following the accident at Fukushima, we
5 formed the Industry Steering Committee, and our
6 objective was really to help prioritize and focus the
7 many lessons that we knew would be coming out of the
8 event itself. And as we look at the history of event
9 analysis, the early years are always focused in on the
10 hardware. And as you get past the hardware, you begin
11 to deal with the more difficult questions, or the
12 behavioral questions that may have led to those
13 weaknesses in defense.

14 And we've been through that evolution and
15 continue that evolution today as we work. On the
16 Committee we have EPRI represented, we have Chief
17 Nuclear Officers on the Committee from the industry
18 operating plants, and then we also have INPO
19 participate, and all very senior levels.

20 And what I want to really talk to you
21 today is the background that led us to the mitigating
22 strategies. so, early out in the discussion when we
23 had the news of the event at Fukushima, our -- I think
24 it was about our third meeting we had very healthy
25 discussion about what was the significance of this

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1 event? Was it really about a tsunami, was it about
2 flooding, was it about seismic, the predictability or
3 the errors that may have been made, or assumptions
4 that were made, and what might be the threats, the
5 external threats to that station. And as we went down
6 that path, we stepped back from it and we recognized
7 that, you know, if you start heading down that path it
8 would be easy for operating plants throughout the
9 world to start justifying why lessons out of this
10 event didn't apply to them, whether they were more
11 thorough with their analysis, well, we're not
12 vulnerable to tsunamis, all sorts of reasons to
13 distinguish this event from why it really didn't
14 impact me at my plant.

15 And we had those same debates here in the
16 U.S. and the U.S. operators located in the middle of
17 the desert. You know, I'm not going to be susceptible
18 to this. Do I go forward with this? I'm high on a
19 mountain, I've got six diesels. And quickly we turned
20 this to, you know, this is an event where the lessons
21 are embedded in an event that overcomes what we had
22 predicted as engineers.

23 Now, why it had overcome, why it did that
24 is a different question, but we have to make the
25 assumption here that as good as we are as engineers,

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1 there are assumptions that we make in our engineering
2 values, there's assumptions that went into the
3 designs. And we're going to state that the beginning
4 of this lesson is about those assumptions for some
5 reason were flawed in their predictive capability.

6 Now, that broadened ourselves to the
7 discussion beyond the specific hazards of flooding and
8 seismic. We had discussions about mudslides, we had
9 discussions about manmade threats, we had discussions
10 about meteors, and we quickly came to the focus as an
11 organization that this really should be a look at how
12 do we provide water and power? Because regardless of
13 how the event initiated, it starts to affect reactor
14 safety, public safety when it impacts water and power
15 at the plant. There may be all different initiating
16 events that could get to that threat, but what can we
17 do to think about water and power in a nontraditional
18 manner? And that pushed us into the thought on
19 diversity.

20 We said okay, you know, I could build the
21 wall higher around the plant. How much higher do you
22 do it? What assumptions will we accumulate now to come
23 up with the new level? And we said, you know, this is
24 traditional thinking, this is further protection of
25 the installed safety trains that we have. Is there a

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1 way that we can come at this question of water and
2 power that is different than what we've done in the
3 past? And this is how we evolved to what is today
4 known as the Mitigating Strategies.

5 The key aspect of it, it was diverse. So,
6 in order to have the appropriate commitment and buy-in
7 we disabled all the equipment on site. We said the
8 starting point is, I don't care if you have six
9 diesels, I don't care if you have cross-ties among
10 those six diesels, I don't care if it's located on a
11 mountain, you're not going to credit that. We want you
12 to come up with a strategy that is diverse from what
13 you currently have. That will be adding a layer of
14 protection to the public that currently is not in
15 place. So, this is the path and evolution that we have
16 moved down, and we have today being implemented at all
17 the sites throughout the U.S.

18 Now, it does not ignore protection of
19 installed features. As we continue to become more
20 informed about hazards, we continue to look at that
21 core group of installed equipment and protecting that
22 equipment that is necessary in order to insure that we
23 continue to cool the core and protect the containment,
24 and the fuel pools. So, this is the combination, and
25 I've heard the discussion around the debate, is it

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1 mitigate or protect? And I believe, and the Committee
2 believes that this is not the correct question. It is
3 not that debate. It is both, but it is how you focus
4 the attention and the resources to insure that you're
5 delivering results that matter in a timely fashion for
6 public safety. And this is the path that we are on.

7 So, for us that prioritization involves a
8 focus on that plant equipment that is necessary in
9 that Phase 1 of the event. It's giving the operators
10 that time to be in the assessment mode, to shore up
11 that equipment to those connection points to make sure
12 that that is, in fact, as protected as reasonable to
13 allow Phase 2 to come into play. So, it's not the
14 either/or, it is both, but it is both with a specific
15 focus.

16 So, as we have moved through this, we have
17 continued to reevaluate, continued to study the
18 lessons. Last fall we took all the Chief Nuclear
19 Officers in the U.S. over to Japan. We spent time at
20 both Dai-ini and Dai-ichi, and the importance of that
21 was understanding what were the success paths and the
22 success stories that occurred at Dai-ini, as well as
23 what fell short at Dai-ichi.

24 This caused us again to adjust, but it's
25 the adjustments that we have seen of late are really

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1 better preparing ourselves on the behavioral aspects
2 involved with the lessons. The hardware lessons we
3 have continued to get reaffirming data, and even in
4 the international forum now that this approach to
5 mobile backup that goes beyond the site capabilities.
6 And, again, it's you are strengthening site
7 capabilities during this whole process, but you are
8 adding this additional layer that if the site is
9 overcome for an undefined hazard, you have the
10 capability to still provide that protection when it
11 engages water and power. And that's where we think we
12 are today.

13 VICE CHAIR RAY: Well, accepting the merits
14 of everything you said as true, if you had the ability
15 by some simple change to increase the flooding level
16 that would -- where the emergency power was protected
17 by a door seal or raising air intake or whatnot,
18 wouldn't you prefer to -- not prefer, I don't mean
19 that. Wouldn't you do that, notwithstanding the
20 benefits of the mitigating capabilities you're
21 referring to?

22 MR. SCAROLA: I would very easily say yes,
23 and I'll ask Dave to jump in because he's --

24 MR. HEACOCK: Yes, that's a great question,
25 and we wrestle that question every day. So, the

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1 reality is we look at our PRA and figure out where the
2 best benefit is to spend that money. Now, if it's
3 taking the diesel in a beyond-design ten to the minus
4 tenth event, or is it replace reactor coolant pump
5 seals. That gives me a Chapter 15 benefit, I'd take
6 the coolant pump seals first to do that.

7 (Simultaneous speech)

8 MR. HEACOCK: I guess the question is --

9 VICE CHAIR RAY: I appreciate that. I'm
10 interrupting just because of time. The question is,
11 are we making it clear enough that that's the intent,
12 what I just asked and what you just affirmed, which is
13 if --

14 MR. HEACOCK: And I can also --

15 VICE CHAIR RAY: -- there is a simple fix
16 that would avoid our relying on this diverse excellent
17 suite of equipment that we now have available, and
18 that we all presumably agree with, wouldn't we do it?
19 And how do we make that clear?

20 MR. HEACOCK: I can address my plants, for
21 example, North Anna we've done the -- the LIP is the
22 big flood issue for us, and we have chosen to do that.
23 We've put barriers on the fuel pump house for the
24 diesels.

25 VICE CHAIR RAY: Sure.

1 MR. HEACOCK: Not required because you
2 assume the diesels are gone, but it's a good asset
3 protection logic, to me. So, we have chosen to do that
4 in many cases in our plant because it just -- it's
5 simple to do. It makes good sense, it's not a multi-
6 million dollar project.

7 Now, raising the flood level of the
8 turbine building, I may choose not to do that.

9 VICE CHAIR RAY: Allow that to flood.

10 MR. HEACOCK: That's exactly right. We
11 would make those decisions on a case-by-case basis,
12 and some cases decision --

13 VICE CHAIR RAY: Okay. So, at least for me
14 when you hear questions and comments, you know, I'm
15 coming from the standpoint of well, wouldn't you want
16 to do what you just said if you could?

17 MR. HEACOCK: And we do that. It's not a
18 black and white issue, but the point is we're
19 protecting our Phase 1 equipment, the important safety
20 equipment will be protected, not mitigated.

21 VICE CHAIR RAY: Thank you.

22 MR. HEACOCK: Thank you.

23 MEMBER POWERS: I very much enjoyed your
24 comments and resonate with them, but I wonder if you
25 could address Mr. Skillman's question earlier. Since

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1 we're dealing with new plants here, what if I put in
2 my super plant?

3 MR. SCAROLA: So, this has been debated in
4 the international forums because there are people in
5 the international forum that said hey, we're putting
6 it all on the hardware side, and bunkered systems.
7 What I would propose is that the -- from my
8 perspective, the answer still comes back to diversity.

9 I believe that the key to this mission is
10 to have diverse approaches available to your operating
11 staff. I have not lost any confidence in my installed
12 design. It's very robust. I continue to, as new
13 information comes and is available, I continue to make
14 changes to installed equipment along the way. But this
15 has really been the challenge of changing the thinking
16 that we have traditionally done. As our engineers are
17 very quick to move into seal the door around the
18 diesel. That's a no-brainer for them, they're often
19 doing that. But to have them think about a set of
20 mobile equipment being another solution path, and how
21 do you make it that way? That has been the challenge
22 for us as an industry, is to move our thinking style
23 to where we start to say, you know, there are merits
24 in diversity.

25 So, again, in the new plant design I may

1 not be looking for, you know, four additional diesels,
2 or eight additional diesels, but I may be looking at
3 a diverse approach to providing --

4 MEMBER POWERS: Well, that raises the other
5 question. If I'm designing a new plant rather than
6 following Dick's super plant, why don't I make the
7 wimpy plant?

8 MR. SCAROLA: And I think that that --

9 MEMBER CORRADINI: Dana, could you repeat
10 that, please?

11 MEMBER POWERS: Well, Dick posed the
12 question of suppose I've got the super plant that does
13 all things, can survive for eight years as an isolated
14 being, has its own natural gas, well, and everything
15 like that. Enter makes the point even if you do all
16 that thing, humans are fallible and you probably
17 didn't think of everything that could occur, so having
18 diversity is a value. So, I ask the opposite question;
19 suppose I make the wimpy plant because I know I have
20 this diversity here. I come right up to the very edge
21 of the minimum requirement and whatnot to get my
22 capital fabrication cost down, and I rely on this
23 diversity to save me in the event of something that
24 goes beyond the current regulatory design-basis
25 envelope.

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1 MR. SCAROLA: I would like to think that
2 the safety cultures that we have established here in
3 the U.S., and I don't say it's an industry safety
4 culture.

5 MEMBER POWERS: Let's stay in the U.S.

6 MR. SCAROLA: That this is what drives us
7 not to do that. Right? Is that the thinking that we
8 have, and it's promulgated, and I give credit to the
9 people long before we came into leadership position in
10 my generation, but it wasn't a minimalistic approach.
11 And we never have in this industry, and I would
12 suggest that that is never going to be a path that
13 would be followed here.

14 We do drive for excellence in what we do,
15 so I think the wimpy design, I don't see it here. And
16 I don't see that that's what FLEX is about, is an
17 allowance to do less. It was put in place to provide
18 more, not to say we're doing less.

19 MEMBER BALLINGER: But what Dana is saying
20 is that they'll just abide by the rules. And if the
21 rules are what they are, they'll build a plant in
22 accordance with the rules specifically, and if FLEX is
23 allowed as part of those rules, I'll just follow the
24 rules. And that's, in effect, I don't want to call it
25 the wimpy plant. It's the sort of de minimis plant or

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1 something like that, still plenty safe, but following
2 the rules.

3 MR. SCAROLA: Certainly, I think that the
4 track record in the industry today shows well beyond
5 the rules, almost on every topic out there. And even
6 these events that we talk about today in the
7 rulemaking initiation of the mitigating strategies was
8 an industry initiative.

9 MEMBER BALLINGER: This is spite of the
10 financial pressures.

11 MR. SCAROLA: In spite of the financial
12 pressures. And there's been many a Chief Operating
13 Officer and, you know, CEO that has made it very clear
14 that to the day that they're in this business, this is
15 a business of continuous improvement. It is not a
16 business of minimalistic approach. If you're in --

17 MEMBER POWERS: I certainly agree with you
18 on your assessment of the nuclear safety culture. My
19 problem is so many things are run by people from the
20 accounting culture, and the Wall Street culture, and
21 I'm wondering if they may not have a vote here.

22 MR. SCAROLA: I will tell you that we work
23 very hard as an industry to educate all those --

24 MEMBER POWERS: Sometimes painfully, by the
25 way.

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1 MEMBER SKILLMAN: I'd like to get back into
2 this conversation. I respect your comments. The
3 hardware fix is normally run parallel with the rate at
4 which decay heat decreases. That's what we found at
5 TMI. Eight months, twelve months, all of a sudden
6 you're out of hardware and you're back into people. My
7 comments are aimed at new plants. And it seems to me
8 that in a country of the resources that we have with
9 the importance of the 21 percent of generation that's
10 driven by nuclear, and hope that there will still be
11 more, that we ought to be able to build plants that
12 are strong and robust.

13 And to the FLEX, I agree with the concept
14 but I come from the school of having been through a
15 LOCA. And rule number one is, you don't know what you
16 don't know. And Fed Ex might not be able to deliver.
17 And the event that took out the transportation system
18 may have taken out all the bridges, and the only thing
19 that you may have left for the next 60 days is your
20 plant, and what's in close, and what you have been
21 able to maintain effectively.

22 So, I don't know whether it's 100-hour, or
23 200, or 500-hours that a batteries, and fuel, and air
24 cooled diesel, and water cooled diesel, and water
25 cooled gas turbine, and the air cooled gas turbine,

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1 but we're smart enough to know how to build a plant
2 that can provide for itself for 30 days, or something
3 like that. And that's all I am saying. I respect the
4 effort of the FLEX for the plants that are currently
5 built, but going forward, getting to Dr. Rempe and Dr.
6 Corradini's question, shouldn't there be a way that a
7 new plant can really be self-sustaining? It seems to
8 me that that was kind of what we were talking about,
9 and there's no reason why we couldn't do that. Just
10 one man's opinion.

11 MR. SCAROLA: I certainly don't disagree
12 with that, and I think that the attention here on
13 passive systems has, in fact, been moving in that
14 direction. But I also continue to believe that for
15 reasons even beyond the hardware, this system that we
16 have set up of the layered additional support from
17 offsite, and it's a coordinated support, so this isn't
18 a single, you know, person at the other end of the
19 phone waiting to respond. This is an industry response
20 capability that is networked throughout the United
21 States. It's a tight mesh system we put together, and
22 it has been very thoroughly thought out with standard
23 connections, color coding.

24 MEMBER SKILLMAN: I understand.

25 MR. SCAROLA: Play books to deliver by,

1 people to come with it to connect it, and then
2 palletted such that it could be airlifted to the site.
3 So, I don't want that and say well, because you have
4 that you don't focus on passive systems, you don't
5 focus on continuing to increase operator response time
6 allowed, but I believe that what we are setting up
7 here in the mitigating strategies is beneficial going
8 forward with new plants as it is today for the
9 operating fleet.

10 MEMBER SKILLMAN: Fair enough.

11 MR. SCAROLA: Thank you.

12 MEMBER SCHULTZ: James, just an add-on
13 comment, and you can respond. The mitigating
14 strategies rulemaking as we've described, it's now
15 consolidated, and it includes a lot more than just the
16 equipment side of it, which we come to focus on in the
17 discussion here. So, would you speak to the other
18 elements of it in terms of the response capability?

19 MR. SCAROLA: So, when you start to look at
20 the other elements talking today, some of the
21 procedural aspects, the SAMGs, the integration of the
22 emergency procedures. We are well along on that
23 effort, and I do believe it's appropriate the industry
24 has taken strong actions in that area. As we have
25 written our strategies here for the mitigating

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1 systems, it was an opportunity to reassess the lessons
2 that we see coming out of Fukushima, the strategies
3 that we have had under the SAMGs, and to re-validate
4 or adjust as we thought appropriate. And there have
5 been adjustments being made in those strategies, so
6 this integrated look, not looking at them in separate
7 boxes, but now as you start to bring all these
8 initiatives back together, we feel it's appropriate to
9 bring them back together and make sure that we mesh
10 them correctly.

11 MR. HEACOCK: If I could add one thing.
12 North Anna 2 was the first operating plant in the
13 United States where my plan is to be in full
14 compliance with the mitigating strategies order, so
15 we've had the opportunity to do all that. It's done at
16 North Anna. The equipment is on site, the connections
17 are done, the training has been done, the procedures
18 are in place.

19 What we found is additional enhancements.
20 When you run people through this process to expose
21 them to beyond-design-basis events and add additional
22 capability at the plant, which we have done cross-ties
23 and ability to shed load, and ability to provide
24 backup diesels or backup generators along various
25 stages of the system, it provides operating benefit,

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1 as well. So we've added tremendous capability. I walk
2 in the control room in my plants and the Shift Manager
3 pulls out a sheet to say let me show you what we've
4 got here. We have this capability here to do this,
5 right from this room. I can go back here and shed
6 load, I can hook a portable generator up, I can power
7 my vital safety equipment for days and days and days
8 on a small amount of gasoline.

9 So, all those benefits are here today and
10 we can use those at many plants. We have about eight
11 or ten plants that are in full compliance this fall.
12 I saw it at North Anna, I saw the benefits of not just
13 beyond-design-basis scenarios, but many, many
14 potential scenarios.

15 MEMBER SCHULTZ: Thank you, Dave. We're on
16 Slide 1 of the presentation. Thank you for your
17 discussion, that was very helpful.

18 MR. POLLOCK: Thanks. The slide you see
19 before you is the proposed revision. Eric talked about
20 earlier a revision to 12-06 we're proposing. In that
21 revision is to conclude the discussion on integrated
22 assessment and how you would take that new hazard
23 information, in this case flood hazard information,
24 and how you would walk through a systematic approach
25 to make the decision on how you would respond to that

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1 new information. So, I'm going to walk through these
2 pretty quickly.

3 It all starts with updated hazard
4 information. And the updated information is based on
5 a source of this credit, the NRC letter requesting
6 information, a rulemaking, information comes out
7 that's been vetted through the process and requires a
8 response.

9 This doesn't take away from the Corrective
10 Action System that all the sites have today when new
11 information comes into the system that respond but
12 this is the higher level where you're doing a complete
13 hazard type of re-evaluation.

14 So, the first thing you would look at in
15 the new hazard information, the information is
16 specific to the plant. As Jim talked earlier, when we
17 designed mitigating strategies we picked a
18 hypothetical event with a hypothetical result. The
19 hypothetical results were you lost all AC power and
20 the capabilities of having cooling. So, that was what
21 we decided to do.

22 In this case you would have a known
23 hazard, flooding, and you'll have a known result from
24 your hazard assessment of what the new impact is to
25 the site. And there's been a lot of discussions on

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1 integrated assessments or not, but in order to
2 implement mitigating strategies you have to understand
3 what happens to your installed equipment on the site,
4 as well as how you would deploy mitigating strategies.
5 They are not separate activities.

6 If you go to the next slide, which I'll
7 refer to as Box 1, the first thing you're going to do
8 is compare the results of your new analysis, hazard
9 analysis to your existing design and see if you're
10 bounded. If you are bounded by your existing design,
11 you have answered the question that by your design you
12 are protected. You can implement mitigating strategies
13 still because all your installed design equipment is
14 protected; therefore, your mitigating strategies will
15 be able to go forward. You're done. You would document
16 that, conduct that review, submit it to the NRC for
17 review and approval, and that would complete that
18 action.

19 If you go to Box 2, Box 2 is it's not
20 bounded and it can be not bounded in many different
21 ways. There's -- as you are well aware in the flooding
22 hazard analysis there's many separate aspects that end
23 up combining into a complete picture of what the
24 maximum level would be, but any individual one could
25 be outside the bounding of your current design basis

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1 that you would have to address. Either you were silent
2 in your design about a hazard, or it wasn't bounded.

3 In order for you to make the conclusion
4 that mitigating strategies would still work, the first
5 thing you have to do is be able to say the protected
6 equipment, the installed permanent plant equipment
7 that I was counting on in the mitigating strategies is
8 unaffected. So, that means all my systems that I was
9 connecting through, your electrical distribution,
10 batteries, et cetera that I was counting on, you have
11 to be able to validate that they are not impacted by
12 the new hazard information.

13 And then you look at the mitigating
14 strategy component where you are going to be storing
15 equipment and moving equipment to connect. You have to
16 look at that to say that my road is not flooded out,
17 so where I was going to pull this motor or pump down,
18 I can still do it. My connection point is not under
19 water somehow that would preclude me to do that. If
20 your conclusion at the end is my Phase 1 equipment,
21 which is my installed permanent plant equipment, is
22 still protected and I can implement my mitigating
23 strategies in accordance with the submittal I had
24 provided the NRC and they have reviewed and approved,
25 then I would document that, submit it to the NRC for

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1 review and approval, and I would complete that.

2 VICE CHAIR RAY: Why doesn't that make the
3 mitigating strategies part of the design? In other
4 words, if you're going to take that Yes branch, what's
5 the difference between relying on the mitigating
6 strategies to put you in the Yes branch, and saying
7 that the mitigating strategies are now part of the
8 design?

9 MR. HEACOCK: I could address that a bit.
10 We've been looking at this very issue and the reality
11 is the assumptions made to get this new hazard are
12 beyond-design-basis, so you have assumptions created
13 that create a new design beyond your current design
14 basis, but not part of the design-basis.

15 VICE CHAIR RAY: Well, I'm talking about
16 the mitigating strategies themselves, which enable you
17 to say that we can arrive at the Safe Box there at the
18 bottom. I'm trying to distinguish between those
19 mitigating strategies and the design, not talking
20 about the design-basis hazard, I'm talking about the
21 plant design.

22 MR. PIETRANGELO: You may enhance your
23 plant design for that permanent plant equipment that
24 you take credit for in Phase 1 of mitigating
25 strategies, turbine-driven auxiliary feedwater pump,

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1 condensate storage tank, or RCIC system, et cetera,
2 the batteries. So, you could change the design in
3 terms of the protection features associated with this
4 to buy you enough time to get to Phase 2 with the
5 portable equipment.

6 MR. SCAROLA: And, in fact, all those
7 connection points are done with design changes to the
8 power plant.

9 VICE CHAIR RAY: Absolutely.

10 MR. SCAROLA: Right.

11 VICE CHAIR RAY: Correct. I'm just trying
12 to understand why we don't then say well, I modified
13 the plant design so that now it'll -- I think the
14 answer turns out, Tony, to be because at least under
15 certain scenarios we're mitigating an event that we
16 don't want to include as part of the design basis.

17 MR. PIETRANGELO: Basis, because it's a
18 beyond-design-basis event.

19 VICE CHAIR RAY: I know, but I'm trying to
20 understand why we don't enlarge the design-basis by
21 virtue of having the mitigating strategies.

22 MR. PIETRANGELO: You're enlarging the
23 licensing basis of the plant.

24 MEMBER RICCARDELLA: You know, I don't
25 fully understand the flooding aspect, but I know for

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1 seismic the redefined hazards that are coming out of
2 2.1 are based on essentially the same probability or
3 frequency of occurrence as the SSE, the original SSE.
4 And given that --

5 MR. HEACOCK: That's not true for flooding.

6 MR. PIETRANGELO: Pardon me?

7 MR. HEACOCK: That's not true for flooding,
8 it's different.

9 MR. PIETRANGELO: Okay. But, you know, how
10 would we say that's beyond-design-basis if it's the
11 same frequency of occurrence as the original SSE?

12 MR. HEACOCK: Yes, the flooding assumptions
13 are much more severe than the original design-basis
14 were and very conservative. For example, you've got 29
15 inches of rain in six hours and you have to assume all
16 your drains were plugged up. So, you have other
17 assumptions that didn't exist during original design-
18 basis and don't in reality exist concurrently.

19 CHAIR STETKAR: David, but it's always easy
20 to flop back over. Back with Pete, this process, this
21 philosophy should apply regardless of the hazard. Jim
22 made a really good approach that we as engineers tend
23 not to -- we tend to think compartmentalized. So, I'm
24 trying to pull you back and say if this -- you address
25 it from floods. The same thought process ought to

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1 apply to seismic, so if I have re-evaluated my -- pick
2 a frequency, ten to the minus four exceedance
3 frequency hazard for my site and it's now twice the
4 peak ground acceleration that it used to be, how does
5 this thought process apply to that situation, because
6 the same philosophy should apply for floods, which we
7 can't assign a frequency to --

8 MR. HEACOCK: They've done some work at the
9 risk probability of floods which is not very well
10 developed theory, but if you did you'd find that these
11 are way beyond design-basis --

12 CHAIR STETKAR: Please don't talk about
13 floods. I want to talk about the seismic example
14 because the same philosophy applies for the seismic.
15 Don't talk about floods, please.

16 MR. SCAROLA: I think we can clearly state
17 on the seismic, this is the expedited approach to
18 seismic, is focused on the same core set of equipment
19 installed --

20 (Simultaneous speech)

21 MR. SCAROLA: -- that is robust to the new
22 information on seismic to insure that we can maintain
23 the core cooling.

24 CHAIR STETKAR: Do you protect it against
25 the redefined seismic hazard, or do you protect it

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1 against 10 years ago seismic hazard? Which one do you
2 protect it against? And I won't use yesterday or
3 tomorrow. Which one do you protect it against to
4 transfer in that Yes direction.

5 MR. POLLOCK: Currently we protect it to
6 two times the SSE. That was what we did --

7 CHAIR STETKAR: Two times the 10 years ago
8 SSE.

9 MR. POLLOCK: Two times the 10 years ago
10 SSE because we were moving forward before we had
11 results from the --

12 CHAIR STETKAR: And my example is though we
13 understand that the ten to the minus four SSE is at
14 that two times value, or maybe two and a half times.

15 MEMBER RICCARDELLA: There are a few plants
16 where it's three times.

17 (Simultaneous speech)

18 MR. HEACOCK: North Anna, for example, is
19 one of those plants and we have evaluated using the
20 SEP process the Phase 1 FLEX equipment installed, aux
21 feedwater pump, the flow path to the steam generators,
22 the steam vent path. We've evaluated that path for the
23 ESEP enhanced hazard, the new hazard.

24 CHAIR STETKAR: You have.

25 MR. HEACOCK: We have.

1 CHAIR STETKAR: Okay.

2 MR. HEACOCK: It went beyond the two times
3 SSE for our plant evaluated to the new hazards.

4 CHAIR STETKAR: But we're aware of some
5 plants that haven't taken that approach.

6 MR. HEACOCK: That's right.

7 CHAIR STETKAR: They've taken the approach
8 to only look at two times the ten years ago let's call
9 it SSE.

10 MR. POLLOCK: And remember the reason we
11 did two times is we were doing it before we had
12 results. Right? So, we're going to go back and we're
13 looking as we go back, this would apply. What doesn't
14 show up on this chart is the methodologies that you
15 would have to employ to determine the margins
16 required.

17 MEMBER RICCARDELLA: But my question is I
18 think more fundamental than that. The new ground
19 motion response spectra, do you consider those design-
20 basis or beyond-design-basis?

21 MR. POLLOCK: Beyond.

22 MR. PIETRANGELO: But they're the same
23 probability --

24 MR. POLLOCK: You're designed to a
25 different earthquake than those plants were licensed

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1 to in the design-basis --

2 VICE CHAIR RAY: The probability wasn't the
3 basis on which we licensed the plant.

4 MR. PIETRANGELO: That's correct.

5 VICE CHAIR RAY: It was the response
6 spectrum, which is Tony talking about. And that's why
7 you would still say it's beyond the design. It wasn't
8 licensed to a probability, it was maximum credible was
9 the language that was used.

10 PARTICIPANT: Deterministic.

11 VICE CHAIR RAY: And so later it was
12 equated to a probability, and now that probability
13 produces a larger response spectrum, but the design-
14 basis is still what it always was; that is, a ground
15 acceleration spectrum, so I think that's what they're
16 trying to say.

17 MR. HEACOCK: At one point here we found in
18 practice at North Anna because we had the two and a
19 half times design-basis earthquake, and the
20 calculations both validate that there's tremendous
21 margin in the plant, so that's --

22 PARTICIPANT: I appreciate that.

23 MR. HEACOCK: -- potentially a difference
24 between seismic and other characteristics. For flood,
25 you know, once you exceed the limit that's a --

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1 PARTICIPANT: Cliff edge.

2 MR. HEACOCK: -- cliff edge. Exactly.

3 MEMBER BALLINGER: When I look at Boxes 1
4 and 2, and then read the green cloud, I see Box 1A and
5 2 because perform an integrated assessment. Bingo,
6 that's always been -- that's the requirement. But
7 where the deviation occurs is now we take and we're
8 going to apply the mitigating strategies as part of
9 the response to the integrated assessment. Right?

10 MR. PIETRANGELO: That's correct.

11 MEMBER BALLINGER: But that's not what that
12 --I mean, that's fuzzy to me there. That's what I
13 think, there should be a 1A there, do the integrated
14 assessment. And then Box 2 is apply the --

15 MR. PIETRANGELO: No, but you can't do it
16 mutually exclusive like that.

17 MEMBER BALLINGER: I know, but with the
18 gedankenexperiment I can --

19 (Laughter)

20 MR. POLLOCK: The other thing is that
21 although I drew these in a line so they look like a
22 flow chart, the realities are you can move to any box
23 because one of the discussions we've had on this is if
24 I decide to put protection up on these two doors, then
25 do I go back to Box 1, or do -- you know, if it's a

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1 design change in accordance with design, now I need
2 the design. So, it's -- they're very fluid.

3 MEMBER BALLINGER: Now, you are --

4 MR. POLLOCK: Yes, they're very fluid. You
5 know, you're going to move back and forth.

6 VICE CHAIR RAY: Yes. Well, that was the
7 nature of my question. If you add some capability, why
8 don't we consider that a change in the design rather
9 than something that's part of the --

10 MR. POLLOCK: If you're modifying the plant
11 you are changing your plant, at least the licensing is
12 the middle, and the design characteristics of your
13 plant. Right? So, if I put up on a flood gate, or I
14 put up -- build a wall in that plant, I have to do it
15 to all of my requirements to install anything in the
16 plant. It doesn't -- you know, it's not separate from
17 that.

18 MEMBER SCHULTZ: I'm glad you said it that
19 way, Joe. I think Jim would come back and say I'm
20 still interested in diversity and flexibility.

21 PARTICIPANT: We still need FLEX.

22 MEMBER SCHULTZ: Focused on the design-
23 basis, I'm focused on what I need to do, and how I'm
24 going to do it given the circumstances I'm confronted
25 with.

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1 MEMBER RICCARDELLA: You talk about this --
2 I'm going to talk a little about the integrated
3 assessment. There' existing Staff Guidance on how to
4 perform an integrated assessment. Are you proposing
5 that you -- that these integrated assessments would
6 comply with that guidance?

7 MR. POLLOCK: No. What we're proposing is,
8 is it would be focused on the mitigating strategy
9 aspects on how to do it. The Staff's integrated
10 guidance on the flooding is whole plant, the whole
11 site is to do the integrated assessment. What we're
12 suggesting is the focus would be success pass fail to
13 get through your protect the core, protect the
14 containment, and make up the spent fuel pool.

15 MEMBER RICCARDELLA: But the Staff Guidance
16 doesn't rule out the use of mitigating strategies, as
17 I read it.

18 PARTICIPANT: It allows it.

19 MEMBER RICCARDELLA: It allows the -- you
20 to address the mitigating strategies, but it says it
21 wants you to assess your existing equipment kind of
22 with and without the mitigating strategies, the way I
23 view it.

24 MR. POLLOCK: Staff Guidance doesn't do it
25 in accordance with 12-06, so the implementation of the

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1 FLEX that's being done now and all that is not in
2 accordance with the flooding Staff Guidance. It's in
3 accordance with 12-06.

4 MEMBER CORRADINI: Could you repeat that
5 again? I don't appreciate that. I'm sorry.

6 MR. POLLOCK: The guidance in 12-06,
7 although we didn't call it an integrated assessment
8 had many aspects of the same thing. You had to
9 evaluate the hazards, you had to make your
10 connections, you had to take into consideration the
11 current design flood, so you had a path to go and your
12 connection is above. So, you had to go through all
13 that, and then you had to validate that I could do it
14 in the time frame required. So, when I laid the plan,
15 and I know we had industry in presenting to you how
16 their plan works in the site, so they went from time
17 zero in an ELAP event and how they would sequence
18 implementation. You had to validate all that, you had
19 to go through a verification that you could implement
20 that in the time with the resources you had allowed.

21 In the flooding event with all but one or
22 two sites this is a very slow moving event. It doesn't
23 happen immediately at time zero, and a couple of sites
24 were dam breaks, and it's very short time, but the
25 remainder of the sites are usually multi-day events.

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1 The exception is the LIP event which is the local
2 intense precipitation where we're having a very high
3 volume, as Dave said, of 30 inches in six hours with
4 all your drains clogged so you can't take -- that's a
5 shorter one, and that's the more challenging one. But
6 the integrated assessment in the flooding does not
7 accept the mitigating strategies in FLEX as the
8 response.

9 MEMBER CORRADINI: And I heard it, and
10 again I'm -- it doesn't take into account flood.

11 MR. POLLOCK: It allows for mitigating
12 strategies in flooding. However, the methodologies
13 that were employed in 12-06 that we're currently using
14 and we're codifying are not acceptable to be used as
15 a basis for the integrated assessments in flooding.
16 And that's where we're looking to be more focused and
17 not change requirements on something that's installed,
18 move forward. And which, in fact, would stop us from
19 moving forward if you went back and you had to go back
20 and change was the requirements were for the same
21 components and strategies you have today.

22 MEMBER CORRADINI: So, if I might ask, I
23 look at my colleagues. So, if I'm the only one that
24 doesn't understand what you just said, I'll be quiet
25 and they'll explain it to me later, but I'm still a

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1 little fuzzy.

2 MR. POLLOCK: Okay, so --

3 CHAIR STETKAR: Let me try something, and
4 we have to be, by the way, cognizant of the time
5 because this is a full Committee meeting, and at 10:30
6 we have to stop. We have to hold to our schedules at
7 full Committee. We don't have the flexibility.

8 I hear what you're saying, but I also
9 heard what David said, and I heard what Harold said
10 earlier, and that is shouldn't we be looking at, for
11 these reevaluated hazards, I won't get into frequency
12 arguments here, the opportunity to install -- I think
13 Harold used relatively inexpensive, I'll not put money
14 on it, efficient ways to protect existing plant
15 equipment against those hazards. Shouldn't we be
16 thinking about that first?

17 VICE CHAIR RAY: And calling it a change in
18 design.

19 CHAIR STETKAR: I'm not -- Harold, I don't
20 want to get into that discussion. Shouldn't we first
21 be looking at those opportunities and see if, indeed,
22 we can protect a larger footprint of that equipment
23 before we then take into credit -- into consideration
24 mitigating strategies, the FLEX?

25 David said well, at their plant even

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1 though they didn't have to do it, of course, they
2 sealed those doors because that seemed to be the good
3 thing to do. What I hear you saying is no, we're just
4 going to give up on that, and as long as the
5 mitigating strategies can protect me, that's good
6 enough.

7 (Simultaneous speech)

8 CHAIR STETKAR: So, I want to see how the
9 approach under 12-06 forces me as an owner to think
10 consistently about can -- do I have the opportunity to
11 protect my plant equipment against that re-evaluated
12 hazard?

13 MR. POLLOCK: So, this is a step back out
14 of 12-06 from a fundamental operational approach that
15 we have in the U.S. You would protect your plant if it
16 was an uncomplicated -- I'll drop the cost, but an
17 uncomplicated modification of putting things off to
18 protect your plant. The first thing that's always
19 required for us is to protect the health and safety of
20 the public. That never goes away from us. The second
21 thing is if you can protect your asset on top of that
22 by doing these protection features, minor change,
23 you're absolutely going to do that.

24 CHAIR STETKAR: But how does your approach
25 tell me that I ought to look at that?

1 MEMBER BLEY: Remind you.

2 CHAIR STETKAR: Remind me. I'm sorry.
3 That's a better way to put it. Remind me that I ought
4 to do that first, rather than saying I ticked off all
5 the boxes, and according to this methodology I have
6 the bare minimum that I need to satisfy these
7 particular requirements.

8 MR. POLLOCK: We are only here if we have
9 the highest level worst case scenario of our
10 evaluation. I won't tell you what is the probability
11 of that event, but when we're there. That is not how
12 we make the decisions on how to respond to the
13 analysis, and a document here walks you through how
14 you would approach it. And when you get to Box 4 where
15 you couldn't do mitigating strategies in design,
16 you're going to have to come back with a combination
17 of either modifications to the facilities'
18 protections, change items so that you could still have
19 that safety path to go forward.

20 MR. SCAROLA: I think to a large extent,
21 and I hear the discussion here, we're looking for a
22 way in which we can draw a line and force a safety
23 culture in an organization. And I think that that's a
24 very difficult thing to define clear enough. We want
25 to carve out this particular area and say well, you

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1 can evaluate the whole plant and let's talk about a
2 door seal, and all of us can come to the same
3 conclusion, put the door seal in. All right? You
4 regulate that.

5 Well, I'm not worried, if you didn't make
6 the decision on the door seal, I'm not worried about
7 the door seal. I'm worried about the thousand other
8 things that you're making a decision on every darned
9 day at that power plant. That's safety culture.

10 What we're talking about here is the way
11 to focus the attention and the resources on those
12 areas that we know will add that diverse layer of
13 defense and public safety at the earliest opportunity.
14 It isn't that we say hey, wouldn't it be nice to
15 evaluate and know how it affects the whole plant?
16 Certainly, it would be nice, but the reality is that
17 both this agency and the industry have a lot of
18 technical resources that are going through these
19 evaluations, and we try to focus that attention on
20 that area that provides the earliest benefit to the
21 public.

22 VICE CHAIR RAY: Okay. Look, time is a
23 problem. I'm going to be real short, but I have to
24 respond to what you just said. It's not just about us,
25 it's also about what people understand that we're

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1 doing.

2 MR. SCAROLA: I understand.

3 VICE CHAIR RAY: And if you do something,
4 my original question, slight variant of what John
5 asked but I endorse his comment, as well. Why don't we
6 take credit for having changed the design? Why don't
7 we deliberately do, as David has done, and say we've
8 improved the design, and take credit even for
9 mitigating strategies in that regard, instead of
10 saying oh, if we exceed our design basis, and the
11 consequence is we lose AC power, we'll mitigate that
12 with this other stuff that we've described. So, it's
13 a matter not just of culture as we understand it, it's
14 how everybody else understands what we're doing, as
15 well. Put yourself in our position.

16 MR. SCAROLA: And, Harold, I think we are
17 changing the design, but we're not changing the
18 design-basis. We've never invalidated the original
19 design-basis through this.

20 VICE CHAIR RAY: I don't want to get into
21 semantics, but in any event I'm just saying, we're
22 talking about the design-basis, we're not going to
23 touch it. We're just going to mitigate when we exceed
24 it, and I'm not sure that's the best way to think
25 about this, but you should go on.

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1 MR. SCAROLA: Okay.

2 MEMBER REMPE: Before you do, could I just
3 ask a real blunt question. If you exceed the safe
4 shutdown earthquake by a factor of three would a plant
5 automatically beef up the equipment to accommodate
6 that, or would they say no, I can rely on some offsite
7 stuff?

8 MR. PIETRANGELO: You would have to do a
9 seismic PRA. Those are all the Group 1 plants that you
10 just mentioned. They'll get the results in 2017. In
11 the interim, we're doing the expedited evaluation, an
12 SSE two times the original --

13 MEMBER REMPE: But if it's three instead of
14 two, maybe --

15 MR. PIETRANGELO: Dave's case they went
16 higher because it was 2.5.

17 MEMBER REMPE: Okay, 2.5. Are you beefing
18 up the -- would every plant have to beef up more than
19 a factor of two?

20 MR. HEACOCK: Great question. I'll just
21 tell you our case, an example at North Anna. No mods
22 required.

23 MEMBER REMPE: And every plant will go
24 through that evaluation and if there is a mod required
25 they will do it. They wouldn't say no, I'm going to

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1 rely on the offsite stuff.

2 MR. HEACOCK: That's correct. If they
3 identify a mod is required, they're going to fix that
4 to withstand two times the --

5 MR. PIETRANGELO: To the Phase 1 equipment.
6 It's the same equipment we're talking about for
7 flooding, is what you need for power and water to cool
8 the core, the spent fuel pool, and protect
9 containment. That's the core equipment we're talking
10 about in Phase 1 whether it's flooding, whether it's
11 seismic, whether it's hurricanes, whether it's
12 tornados, terrorist attack, manufacturing defect,
13 operator error. That's what you need.

14 MEMBER RICCARDELLA: There are a lot of
15 margins in the original -- there are -- the original
16 seismic evaluations were all linear.

17 MR. PIETRANGELO: Right.

18 MEMBER RICCARDELLA: And as the loads go up
19 you go non-linear, you change your damping, so there's
20 a lot -- chances are you won't have to modify a lot of
21 equipment because --

22 MEMBER REMPE: But they would do it if they
23 saw it.

24 MR. POLLOCK: Almost all. I can't say all,
25 but it's pretty close to all of them are in the first

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1 group, the ones that are exceeding the two times, so
2 they're required to do that SPRA. And as a result of
3 that SPRA they would require to do any modifications
4 that would be identified that came out of that.

5 MEMBER REMPE: Okay. Go on, thanks.

6 MEMBER SKILLMAN: I would just like to make
7 one comment. It seems like so much of the passion over
8 this issue becomes centered around the debate of what
9 is the design-basis, and what can be changed for
10 design-basis. But the kind of things you're talking
11 there are changing your engineering design-basis which
12 is a much larger envelope. Why can't we find a way to
13 take credit for changes to engineering design-basis
14 and advertise those, and at least for the time being
15 leave the licensing design-basis alone? If you're
16 putting in layers of protection, if you're putting in
17 diversity and redundancy, if you're really changing
18 your core damage frequency to a measurable extent that
19 is beneficial, then why isn't the industry saying here
20 is how we're changing our engineering design-basis
21 even though we're leaving our licensing basis alone.

22 MR. HEACOCK: Great question. I think an
23 interesting point you brought is that we're not really
24 changing our core damage frequency. The reality is if
25 it was a beyond-design-basis event which has extremely

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1 low probability of occurrence, so the initiating event
2 has such a low probability that any modifications you
3 do are in the dust and don't show up on your core
4 damage frequency. So, back to my original point is,
5 we're spending money, and energy and time on things
6 that have virtually no safety impact.

7 MR. MITMAN: My name is Jeff Mitman. I'm a
8 Risk Analysis with the Office of NRR. That's probably
9 true for most plants, probably true for most plants.
10 It is not true for all plants in flooding, and we
11 shouldn't lose track of that. There are plants out
12 there that have high frequency flood events, and by
13 painting the whole industry as a very rare event is
14 disingenuous. Okay? Unfortunately, we don't even know
15 the frequency of flood events because of the
16 characteristics involved, and it's a very
17 controversial area. But it's not true that all flood
18 events are rare.

19 And a second point to be made is that for
20 some plants the design-basis at one-half the design-
21 basis flood elevation, the ECCS and the electrical
22 distribution under water, so we're not talking about
23 protecting the ECCS so it can address and protect the
24 plant from a design-basis flood. There are floods out
25 there that will make the ECCS under water, it will

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1 disable the containment, and you're left with nothing
2 but FLEX. FLEX is a great strategy for a layer on top
3 of the existing design, but it's not appropriate, in
4 my opinion, to be the only line of defense for an
5 event that's not rare.

6 MR. SCAROLA: I appreciate that comment,
7 and I think that if we present in a manner to take
8 FLEX as the only answer to all plants, certainly
9 that's not the case.

10 We know that there are plants as a small
11 subset that have, in fact, taken action because they
12 found errors or assumptions that were invalid in their
13 original design, and they are going and correcting
14 that. And they are doing that in the appropriate
15 licensing basis changes, and the appropriate oversight
16 from the regulatory body. So those, though, are not
17 Fukushima lessons, and what we talk about here is we
18 are promulgating all this action on an expedited
19 approach as lessons from Fukushima. To bring those
20 plants in and say hey, these are Fukushima lessons
21 would be inappropriate, and we're not suggesting that
22 that's what the action is on all plants. There are
23 plants that certainly their flooding probability
24 because of various reasons is different than those
25 that we talk about for these extreme conditions on the

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1 majority of the plants.

2 And I hear the message on the way in which
3 we are communicating engineering basis change, design
4 basis change, licensing, and this has been a challenge
5 for us, so I respect and value the feedback that
6 you're giving us. We still don't have it right in
7 terms of how we characterize this, but we are
8 protecting installed equipment. We're focusing that
9 protection on that that provides the greatest benefit,
10 and it's the strategy to keep that core cooled. All
11 right? So, that's what the difference is in the
12 proposals. It's cast a wide net or focus the efforts,
13 and right now we're trying to keep ourselves focused.
14 Thank you very much.

15 MEMBER SCHULTZ: Joe, you're staying?

16 MR. POLLOCK: I'm staying.

17 MEMBER SCHULTZ: And we have two members
18 that are coming up for the second presentation.

19 MR. POLLOCK: Yes, they had a specific
20 example to walk through.

21 MEMBER SCHULTZ: I'd like them to come up
22 while you're returning to the slides.

23 MR. POLLOCK: Sure.

24 MEMBER SCHULTZ: I know that the --

25 CHAIR STETKAR: Anyone listening in, the

1 presenters had to truncate their presentation because
2 they have another really important meeting that they
3 have to attend that is beginning now.

4 MEMBER SCHULTZ: Joe is the main presenter
5 here, and he's going to move forward with his
6 presentation. And this melds into the example
7 presentation, as well, so if you go through your
8 slides it will set us up for the example. You should
9 go through those quickly because --

10 MR. POLLOCK: Yes, thank you. I'll try to
11 move forward.

12 MEMBER SCHULTZ: -- there's related and
13 important points in the example we want to get to
14 before 10:30.

15 MR. POLLOCK: Yes, Box 3 is the -- again,
16 since many of the flooding concerns at the plants are
17 very slow moving, in essence. You know, when you take
18 out -- I'm not talking about plants that have a dam
19 upstream, and there's only a couple of those, but most
20 of them require hurricane, Noreasters, rain for
21 several days, then additional rain on top of it, so
22 it's something that the plant can react to fairly
23 quickly, you know. And they have time to get there, so
24 it's not starting at time zero where all the water
25 comes to that site level.

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1 So, the next question you would ask if I
2 had the time warning, could I implement that? And the
3 example I would use is though some of the site becomes
4 flooded but the principal buildings are still
5 protected, so where I was going to pull my equipment
6 down, I have to move that ahead of time and pre-stage
7 it at a location. I don't know how many plants this
8 would apply, but that would be also a condition you
9 would go through. And once you validated your
10 permanently installed equipment is protected and you
11 had the means to hook up your mitigating strategies,
12 you would document that and submit it.

13 The next one is where it starts to change
14 somewhat, because now some aspect of your installed
15 Phase 1 equipment that you are going to utilize for
16 FLEX installation is not available. It's been impacted
17 by the new hazard assessment. So, in this case you
18 would have to go back and develop a new mitigating
19 strategy similar to that where you would add either
20 modifications, additional protection so that -- I'll
21 give you a for instance. If you were to lose batteries
22 in the flooding event, you would go back and figure
23 out how I protect them because I couldn't implement
24 mitigating strategies without the capabilities of
25 batteries, so this is sort of -- when I said these are

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1 -- although I have them sequenced, this is where you
2 would do modifications and additional protections to
3 be able to demonstrate I would have a train to go
4 through available to protect the equipment and still
5 protect the core, the containment, and the spent fuel
6 pool. So, this would be a combination of modification,
7 and it would also be the opportunity to use installed
8 equipment that wasn't affected.

9 When we did mitigating strategies we said
10 you lost all AC power. When you do the specific flood
11 hazard you may find that all of your emergency diesel
12 generators are high and dry, and they're not impacted
13 by this, so it would give you a more reliable source
14 to utilize.

15 The operators in our emergency operating
16 procedures always go progressively from installed
17 equipment, and then you get to the FLEX equipment, so
18 any time you would have available installed equipment
19 to utilize, you would utilize that. So, if I had
20 emergency diesel generators, I would be utilizing
21 emergency diesel generators to power up equipment.

22 MEMBER CORRADINI: But the way your diagram
23 shows, I interpret that as the Option or Box 5, what
24 you just said.

25 MR. POLLOCK: Well, Box 5 is what I would

1 describe is for the wet sites, there are sites here
2 that was discussed, where the FLEX, there's not
3 permanent equipment left to install. There are sites
4 out there where they're at the high flood levels that
5 we experienced in Nebraska. Their flood level, if you
6 have the ultimate flood for them, the Missouri River
7 becomes 18 feet high and 50 feet deep, so they have a
8 scenario where they still have to protect the core and
9 the spent fuel pool. So, they have a methodology to be
10 able to make up, remove heat, and protect the core if
11 they were to do that. You no longer have site Phase 1
12 equipment that you're going to be utilizing FLEX for.

13 MEMBER CORRADINI: Okay.

14 MR. POLLOCK: Which would be Box 5. And
15 that's where we called a target hazard mitigation
16 strategies where you would have to go and demonstrate
17 that you have the capabilities throughout the event.
18 Because an event of that severe in nature is not a
19 short-term event, it would be multiple days so you
20 would have to be able to demonstrate you could
21 maintain cooling and make up the spent fuel pool as
22 the event moved up. And then you would have to
23 demonstrate you could maintain that cooling as the
24 levels drop back down until you got into a recovery.
25 And that would be in the target hazard mitigation.

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1 So that was trying to walk through that,
2 and I recognize there's a lot on the slide, and
3 there's a lot that's not on the slide. And your
4 example, 1A, well, our team has come up with four,
5 Alpha, Bravo, Charlie, Delta in order to be able to
6 try to describe that. So, there is a lot in between
7 that, but the fundamental for all mitigating strategy
8 is our installed permanent equipment has to be able to
9 be protected so that you can implement mitigating
10 strategies. You cannot do that, and if there was
11 uncomplicated modifications we would do that as the
12 very nature, whether you were doing it for FLEX or
13 anything else and going through. It becomes more
14 complicated when, as Jim talked about, do I have a 10-
15 foot wall, do I add two more feet to a 10-foot wall?
16 Is that good enough? And I rely now on that two more
17 feet on the wall until the next hazard evaluation.

18 MEMBER CORRADINI: So, just as a prelude,
19 so instead of asking a question that we could expect
20 the example will help illuminate what you think of an
21 integrated assessment versus what Staff originally
22 anticipated. I'm still struggling as to the
23 difference. I'm back at Pete's original question, and
24 I'm -- so, is the example going to help us there?

25 MR. POLLOCK: Yes.

1 MEMBER CORRADINI: Okay.

2 MEMBER RICCARDELLA: The question is how
3 integrated is integrated?

4 MEMBER BALLINGER: I'm looking at the ISG
5 now. Right? And there's a paragraph in there, and I
6 won't read the whole thing, but it says, "In light of
7 the re-evaluated hazard, the integrated assessment
8 will," and it goes one, two, three. But three is,
9 "Assess the effectiveness of existing or planned
10 systems and procedures for protecting against and
11 mitigating consequences of the entire -- for the
12 entire duration of the flood event," period.

13 MR. POLLOCK: Correct, and then you would
14 go to the appendices that would tell you how to do
15 that.

16 MEMBER BALLINGER: Yes, but it's in there.

17 MR. POLLOCK: Yes.

18 MEMBER RICCARDELLA: It certainly doesn't
19 rule out the use of mitigating strategies.

20 MEMBER BALLINGER: Yes, it doesn't rule out
21 the use of mitigating strategies.

22 MR. POLLOCK: Yes. But, again, I would tell
23 you, you go to the appendix, and the requirements for
24 mitigating strategies in the appendix are not the same
25 requirements for 12-06.

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1 MEMBER BALLINGER: Okay, but 12-06 is not
2 the ruling -- not the controlling document. Right?

3 MR. POLLOCK: It is a controlling document.
4 It is right now, that's what we're --

5 PARTICIPANT: It's been endorsed.

6 MEMBER BALLINGER: All right.

7 MEMBER SCHULTZ: Joe, if you'll stay at the
8 table that will be helpful for us. We may come back to
9 you after we hear from the example, but the example is
10 going to use the same approach framework to move
11 forward. Scott, let's get to that presentation.

12 MR. BAUER: Okay. Well, last -- two weeks
13 ago we were in here and we talked -- we had the same
14 cast here, and we mentioned -- I'm Scott Bauer from
15 NEI. I'm the Project Manager for FLEX implementation,
16 and we've been following along with this. When the new
17 flood evaluation, we knew from the beginning that when
18 new flood results and seismic results came in, we were
19 going to have to reconcile with the FLEX
20 implementation.

21 So, what Joe went through was basically
22 the process that we believe is correct that basically
23 implements what the COMSECY is suggesting. So, we
24 talked about the method, and now we're going to
25 basically walk through an example for one of the

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1 plants as to what that method would look like, so what
2 would -- so, two weeks ago, Bill sat here and
3 basically showed you how North Anna implemented this
4 for them, and now he's going to talk about their
5 example of here's our re-evaluated flood hazard.
6 Here's how we would go back and using that chart that
7 Joe just walked through, how we would analyze which
8 column we were in, and what actions we are taking to
9 basically do the integrated assessment to say how I
10 will deal with the re-evaluated flood hazard. So with
11 that, I will turn it over to Bill.

12 MEMBER SCHULTZ: Thank you, Scott.

13 MR. WEBSTER: All right. I appreciate the
14 opportunity to represent this. For Dominion, we have
15 gone through part of the reevaluation. We got results.
16 We are in the integrated assessment process. I think
17 the philosophy of the integrated assessment is
18 similar. I think some of the details and the
19 requirements might be what's different about the
20 approach we're taking here. And I think as mentioned
21 earlier, it's more focused on those pieces of
22 equipment that would prevent the -- that maintain core
23 cooling rather than just any piece of equipment in the
24 plant.

25 So, in the 12-06 assessment, I guess we

1 want to call it that, for FLEX we had an undefined
2 hazard. We assumed, as stated earlier, that we
3 initially had a loss of all AC power, we're unable to
4 use that in any case because the hazard was undefined.
5 And then we develop mitigating strategies based on
6 those conditions.

7 In the re-evaluated flood hazard, you
8 know, the hazards are more defined. We re-evaluated
9 them, we have better information. So, therefore, when
10 we are looking at developing our strategies we may not
11 necessarily assume that we've lost all AC power if we
12 can show in the sequence of events and the hazard
13 details that, indeed, some of the power may still be
14 there.

15 Now, that may not be always the case.
16 Certainly, there's margin to play in that, but if it's
17 clear that there's a piece of equipment that we can
18 protect and it's available, we're going to use that as
19 part of the basis of our overall strategy. And then
20 we'll develop those strategies with those known
21 conditions.

22 For Dominion site, I think Dave Heacock
23 has stated earlier that our hazard that wasn't
24 evaluated or was higher than original design-basis was
25 the local intense precipitation, 29 inches in six

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1 hours, no storm drains cause quite a bit of problems
2 in the site as far as the accumulation of water.
3 Albeit, the water accumulation was only for a limited
4 period of time; in other words, the peak was about an
5 hour duration, so we had to consider that peak, two to
6 three foot of water, and how it migrated into various
7 areas in the plant.

8 MEMBER RICCARDELLA: Excuse me.

9 MR. BAUER: Yes?

10 MEMBER RICCARDELLA: Why do you have to
11 make the assumption of the no storm drain?

12 MR. BAUER: Well, that's just -- and we did
13 the evaluation, that's -- you know, if you -- it's
14 just one of the requirements for doing the evaluation.
15 We could have, in fact, assumed some storm drains, but
16 the storm drains are really a small -- would be a
17 small portion. I know that the --

18 (Simultaneous speech)

19 MR. BAUER: -- it wouldn't help a lot. It
20 helps some, but it wouldn't help a lot.

21 MEMBER BALLINGER: Can I ask a really dumb
22 question?

23 MR. WEBSTER: Sure.

24 MEMBER BALLINGER: Where the heck did the
25 29 inches of rain in six hours come from? I have --

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1 the world's most intense rainfall is 600 inches per
2 year. I've been where that occurs. That's in a year.

3 MR. WEBSTER: We used the information from
4 the NUREG on how to evaluate this, and HMR 51.52
5 report, that's where the information comes from.

6 MEMBER BALLINGER: All right.

7 PARTICIPANT: So, you're going to go look

8 --

9 MEMBER BALLINGER: I've got to go look at
10 HMR 51.52.

11 MR. WEBSTER: And I think as was stated
12 earlier, in some cases -- again, in some cases the
13 events we're evaluating are clearly very improbable
14 events. So, we did a preliminary flood hazard
15 evaluation based on the amount of water accumulated,
16 saw where the water would go in various buildings, and
17 we determined that this flood would, in fact, impact
18 multiple areas in the site.

19 So, looking at this chart for our example
20 we, of course, determined that we had an event that
21 was beyond the original design-basis, so this would be
22 no. We moved in here and said can our current
23 mitigation strategy deal with it, and the answer was
24 no, because the areas of the plant that were affected,
25 affected some of my Phase 1 equipment, so that was no.

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1 I looked at do I have adequate warning
2 time to take actions that would prevent or give me
3 additional actions I could take, the answer was no.
4 So, I ended up here in Column 4, and that's where I
5 currently am doing an assessment to determine what a
6 mitigating strategy would look like for our Dominion
7 site.

8 Again, this is preliminary information. We
9 haven't actually finalized it, but we have our
10 direction that we're headed into.

11 MEMBER SKILLMAN: Bill, for this type of
12 event, can you give us an appreciation for the time it
13 would take to go from Block 1 to Block 4? Is this a
14 Shift Supervisor in 16 minutes, or is this an eight-
15 hour deliberation with the home office?

16 MR. WEBSTER: Well, actually, so we have
17 the information available somewhere in 2013. It took
18 a set of engineers and a team. You know, actually we
19 had -- we subcontracted out to an engineering firm to
20 really calculate what you're looking at in this case
21 --

22 CHAIR STETKAR: Bill, you're not answering
23 his question. His question is not relative to this
24 slide. We do have to be careful about the time,
25 because I'm going to stop this discussion at 10:30. We

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1 have an important meeting that starts at 10:45.

2 MR. BAUER: The goal will be to put in
3 place procedures just like the FLEX support guidelines
4 we talked about last time that would basically direct
5 the operator in an integrated manner to go to his
6 abnormal weather procedure, and then proceed into the
7 mitigating procedure he's going to talk about here in
8 a moment.

9 MR. WEBSTER: Yes, I apologize.

10 MR. BAUER: Yes. Do you remember when he
11 sat here and talked, how he'd go through it, he would
12 go right to that procedure. It would direct him what
13 steps to take, and when to --

14 MEMBER SKILLMAN: Okay.

15 MEMBER SCHULTZ: The action is fast. This
16 event is not necessarily fast --

17 MEMBER RICCARDELLA: But six hours --

18 MEMBER SCHULTZ: Okay, six hours for the
19 rainfall, the flood doesn't happen immediately.

20 MEMBER SKILLMAN: Until later.

21 MR. WEBSTER: Okay. So, we again found
22 ourselves in Block 4. We do find ourselves in Block 4
23 so we're doing a reevaluation to make sure or
24 determine what capabilities that we would still -- to
25 make sure that we can implement mitigation strategies

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1 to prevent core damage. So, the flooding mitigation
2 strategy would enable us after modifications to move
3 back and say yes, our FLEX strategy works, and that's
4 -- so we'd be back in Blocks 2 or 3 in the previous
5 chart. And all that means is I'm going to take actions
6 to make sure that I have a mitigating strategy that
7 would prevent core damage.

8 The objective, again, is to maintain and
9 restore key safety functions. I'm going to do
10 protection of the plant. We talked about that earlier.
11 I'll be protecting Phase 1. In our example, we had
12 water migrating in the turbine building, and our
13 emergency switchgear room is located in the basement
14 of that building. I have flood protection walls up to
15 36 inches before that, so I had to make sure my water
16 didn't exceed that 36-inch dyke that would affect my
17 emergency switchgear room, which is part of my Phase
18 1 work.

19 And as Dave Heacock had mentioned earlier,
20 I also elected to, or we elected to protect other
21 aspects of the plant like the fuel or transfer pump
22 house, as well. So, I'm going to maintain and restore
23 protection of the plant and/or protection of my
24 diverse flexible mitigation strategies, including the
25 FLEX equipment.

1 So, I had to determine what the sequence
2 of event was. I already had that from my analysis. I
3 knew how long the event would last. I knew the peak
4 water levels, and that accumulation on site, so I've
5 been through that process. And I had to determine what
6 equipment was needed to maintain my key safety
7 functions.

8 Again, clearly that would be my emergency
9 switchgear room which is where my AC power
10 distribution system is, my DC batteries are, so that
11 was clearly one of the areas that I focused on as far
12 as protection. The other area would be aux feedwater,
13 the turbine-driven aux feed pump is clearly a piece of
14 equipment and a system that I would have to protect
15 from the flood.

16 So, I determined modifications that were
17 necessary to do that. Those include some -- I'll give
18 you some examples of that here in the next slide.
19 Enclosed portable dykes around doorways, I did have a
20 sump pump outside the -- in the yard area that was
21 designed to keep water out of that area. That turned
22 out to be a challenge, so I'm going to maintain that
23 sump pump capability as far as my mitigating
24 strategies. I have multiple power sources. Actually,
25 one of the power sources can be my SBO diesel, so if

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1 my evaluation concludes my SBO diesel is not affected,
2 then I would assume as far as strategy-wise that that
3 could power these sump pumps and maintain that water
4 outside of the building in that area.

5 MEMBER SCHULTZ: So, Bill, just to make it
6 clear, you have assumed that the characteristics of
7 the hypothetical plant equipment available that is
8 outlined in NEI 12-06, all of those pieces and
9 functionality that NEI 12-06 has assumed is not
10 available to you, independent of flood or anything
11 else. You're assuming that's not available to you, so
12 you've got a short set of equipment that's available
13 to you in the first place because of the guidance.

14 MR. WEBSTER: No, I wouldn't -- I'd take a
15 look at what the -- I'd do the evaluation of where the
16 water goes in the plant, and I'd do an assessment of,
17 you know, what key pieces of equipment I need for --

18 MEMBER SCHULTZ: I'm talking about AC
19 power, offsite AC power, for example.

20 MR. WEBSTER: AC power. Well, you know, and
21 we're doing this reevaluation, clearly my SBO is in a
22 location outside of the power block. I would do an
23 evaluation to see -- I mean, I would look at my normal
24 diesels, I'll look at the SBO, and I'm going to assess
25 whether or not those would still be available or not.

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1 MR. POLLOCK: You are allowed to utilize
2 because you -- it's a known hazard now instead of a
3 hypothetical hazard. What survives from that known
4 hazard --

5 MEMBER SCHULTZ: All right. So, that's the
6 path you're going down in this box.

7 MR. POLLOCK: Yes.

8 MEMBER SCHULTZ: Thank you.

9 MEMBER RICCARDELLA: I kind of characterize
10 it as mechanistic versus non-mechanistic. In the
11 original stuff you need a non-mechanistic assumption
12 that you lose all AC power, and you lose access to --
13 now in this part of the evaluation we're considering
14 mechanistic and evaluating specific events.

15 MEMBER CORRADINI: Your mechanistic
16 evaluations for a highly deterministic and bounding
17 initiator. But I guess what Steve's point was, all the
18 potential equipment is being evaluated. You're not
19 going to a short list. That's what I think --

20 MEMBER RICCARDELLA: No, I think it is a
21 short list. I think it's just the equipment necessary
22 for containment and core cooling.

23 (Simultaneous speech)

24 MR. BAUER: That's the answer to your
25 previous question about the difference between the --

1 MEMBER CORRADINI: I'm trying to get to
2 that eventually.

3 MR. BAUER: IAISIG, and this. Instead of
4 looking at everything at the plant, we're going to
5 focus on the set of equipment I need to maintain those
6 key safety functions.

7 MEMBER RICCARDELLA: So, if I want to say
8 one other way, you're going to build out from what you
9 need to maintain functionality in those three areas,
10 and everything else, if it floods, it floods. You're
11 not going to worry about it.

12 (Simultaneous speech)

13 MR. BAUER: A couple of slides back he said
14 --a couple of slides back he said, you know, last
15 bullet, determine what equipment is needed for key
16 safety functions. So, he's going to understand from
17 the first bullet there, determine sequence of events,
18 what all is impacted. And he's going to say what is
19 it, the equipment I need to -- so he's going to focus
20 the set of equipment down to a narrower set.

21 MEMBER CORRADINI: Thank you.

22 MEMBER RICCARDELLA: One other potential
23 difference, I know in the ISG, they recommended a Peer
24 Review Team be involved in this integrated assessment.
25 Are you considering that action as sort of an

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1 independent Peer Review, or is it done under Appendix
2 B?

3 MR. BAUER: Well, we would do it the same
4 way we did 12-06. We would not have a Peer Review
5 Team, it would not be an Appendix B evaluation.

6 MR. FORD: But 12-06 does provide quality
7 requirements that you have to apply to the design of
8 the strategies.

9 MR. WEBSTER: The engineering part of it
10 would be, you know, like I said, peer review, you
11 know, standard engineering practices and those types
12 of things. We have a multifaceted or diverse team of
13 engineering and operations, and those type of things,
14 but it wouldn't be an independent peer coming in and
15 doing it.

16 MR. BAUER: Plus, as Joe had pointed out in
17 his slides and some of those bubbles on the thing, it
18 said we're going to submit this for review, so we
19 would see it as being a change to the strategies that
20 we would submit the JLD for them to look at and review
21 it. So, we do essentially the same thing we've done
22 with the implementation of FLEX capabilities for this.
23 Use the same process to do the analysis, the
24 procedures, the training, everything, implement the
25 strategy and get NRC review of that to say they agree

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1 with it.

2 MR. WEBSTER: Okay. So, some of the other
3 modifications that we're considering doing is -- or
4 things that we need to do, is we need to modify
5 operating procedures to implement the mitigating
6 strategies. In some cases, we'll have doors that if
7 the dyke is -- the dykes need to be put in, there are
8 some doors that may be opened or closed to prevent
9 migration of water into those areas.

10 We're going to develop a procedure for the
11 new mitigation strategy that's going to -- it may be
12 a new FLEX strategy guideline, it may be something
13 else, but it will be some new procedures that would
14 implement the strategy for this particular flood
15 hazard. And we're going to conduct training on those
16 procedures similar to -- just like we did for our
17 mitigating strategies, the training on the new
18 procedures. And then we're going to use the validation
19 process from the FLEX validation guidance that NEI put
20 out, the same that we talked about a few weeks ago for
21 our FLEX strategies. That validation guidance, that's
22 -- considers some of the performance-shaping factors
23 and other things that we did. We talked about here a
24 few weeks ago.

25 So, additionally, there's some roof

1 modifications that we are going to make to prevent
2 water from entering buildings, some operator actions
3 again to close doors, minimize water intrusion. We're
4 going to review the maintenance requirements of any
5 mitigating strategy equipment.

6 For instance, the sump pumps I mentioned
7 earlier, we just make sure that the PM process for
8 maintaining those are adequate. And then we're going
9 to reevaluate the deployment routes to make sure that
10 we can still bring our FLEX equipment in in cases
11 where we need to primarily -- in our case, it would be
12 more where in the 16-hour time frame we'd be wanting
13 to make sure we can bring down the portable RCS pump
14 that would be able to put borated water into the RCS
15 using the FLEX connections.

16 Okay, I think that's the end of the
17 example. Any questions?

18 MEMBER SCHULTZ: Any other questions with
19 the Committee of Joe, as well as the rest of the
20 panel? Go ahead, Mike.

21 MEMBER CORRADINI: Yes, I want to repeat it
22 so I've got it correct. So, from the standpoint of the
23 integrated assessment, it's looking at what you think
24 are the key safety features that you need to maintain,
25 not necessarily the FLEX equipment, but beyond the

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1 FLEX equipment, but not the whole plant. So, you're
2 going to work out from that versus working in from
3 everything down to the --

4 MR. WEBSTER: That's --

5 MEMBER CORRADINI: I'm trying to get to the
6 essence of the difference of what you view as an
7 integrated assessment and what Staff views as an
8 integrated assessment. So, have I characterized it
9 approximately right?

10 MR. WEBSTER: That's correct.

11 MEMBER SCHULTZ: Yes, as that staff
12 guidance is outlined in the appendix.

13 MEMBER CORRADINI: Thank you. Yes.

14 MR. WEBSTER: The philosophy is basically
15 the same. The scope is more focused, I guess.

16 MEMBER CORRADINI: So, do I have one more
17 minute to ask a --

18 MEMBER SCHULTZ: Yes, we do.

19 MEMBER CORRADINI: So, I'm back with one,
20 29 inches in six hours is insane, so I think it was
21 Mr. Heacock made a comment briefly that you're looking
22 at probabilistic approaches to kind of unwind this. It
23 seems to me, and I think we asked Staff this a couple
24 of weeks ago, that the comment was that hydrology
25 particularly in flooding events that there's a great

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1 reticence to try to put a probability number on this,
2 or some sort of recurrence number, or something. But
3 he indicated there is some effort to being done that
4 by industry. Can -- are you the wrong group to ask
5 about, because to me we're starting with what seems to
6 me an extreme event that now once you give that,
7 you're chasing your tail. So, can you give me some
8 information?

9 MR. BAUER: Yes, we are. I mean, right now
10 are on the steady, and I'll call it a steady, not a
11 full evaluation where the probability of that -- and
12 I think the Staff has told you there is not existing
13 tools or mechanisms that's acceptable to the general
14 community, I guess, with flooding on the huge
15 probability, so it is something -- we're looking at
16 the valves, we're pulling it in but it's not a near-
17 term -- it wouldn't be done in time to resolve this.
18 And if we did it that way, then we'd be slow in
19 responding. And I think Jim Scarola talked -- we're
20 trying to improve the safety margins for the defense-
21 in-depth as quickly as possible, and then we're going
22 to go back and look at where can I get this amount of
23 rainfall.

24 MEMBER BALLINGER: I have just done a speed
25 search on 51 and 52. This is building a wall around

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1 the plant and allowing 29 inches of rainfall.

2 MR. BAUER: Right.

3 MEMBER BALLINGER: And nowhere else, like
4 the hamburger joint outside the wall, no problem.

5 MR. BAUER: That is not the highest value
6 either.

7 MEMBER BALLINGER: Okay.

8 MEMBER CORRADINI: So, that was my first
9 question, I have 30 more seconds. The other part of
10 this that I thought in terms of speedy flooding is,
11 essentially, dam breaks upstream but bring it down.
12 So, there it's a little more mechanistic in terms of
13 I have a manmade structure. So, my question there is,
14 is there conservatism piled upon conservatism there
15 that can be unraveled to look at the range of more
16 realistic flooding events, or does that require
17 federal assistance because of the Corps of Engineers,
18 and they don't have enough time, or they don't --
19 they're not motivated to assist?

20 MR. BAUER: The latter, federal
21 assistance. The Corps of Army Engineers we're doing
22 that evaluation, and they're limited to what we've --
23 excuse me, what the ISG directed them to use as the
24 tools to do the evaluation.

25 MEMBER CORRADINI: So, can I translate what

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1 you just said? You're saying that they're helping, but
2 they're using the conservative assumptions built into
3 the ISG.

4 MR. BAUER: Right.

5 MEMBER CORRADINI: Okay, thank you.

6 MEMBER SCHULTZ: Very fine. Thank you for
7 your presentations. At this time, I'd like to ask for
8 public comments on the presentations that we have had
9 this morning so far. We'd like to open up the line for
10 individuals that might be on the phone to provide
11 public comments. While we're doing that, is there
12 anyone in the room who would like to make a public
13 comment for the Committee? We'll wait for the phone
14 line to be opened.

15 We hear you on the phone line. If you'd
16 like to make a comment, could you please state your
17 name, and make your comment?

18 MS. THOMAS: Oh, yes. My name is Ruth
19 Thomas with Environmentalists, Incorporated.

20 MEMBER SCHULTZ: Thank you, Ruth. Make your
21 comment, please.

22 MS. THOMAS: A good many of our members are
23 in South Carolina. Now, I take it that this is a
24 generic meeting on flooding? And we are very concerned
25 about the situation at Oconee plant where there are

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1 three reactors. And they're located on a series of
2 dams, and the possibility of there being flooding.
3 Maybe more than one of them, and so it seems like what
4 is being proposed by the NRC is to be prepared in
5 every way to prevent any flooding of a building.

6 Now, in a situation like that, are you
7 considering other -- a number of different nuclear
8 plants that are located in areas that get flooded?

9 MEMBER SCHULTZ: The application we're
10 discussing here is for all of the nuclear power plants
11 in the United States. We appreciate your comment
12 specifically with respect to dam failure, and that is
13 being considered.

14 MS. THOMAS: And what about the situation
15 -- I was trying to think of some -- well, Cooper and
16 Calhoun are also -- so, in other words, the NRC is --
17 now what are they -- what is the NRC basing their
18 questions and comments on? What has been sent to them
19 by NEI?

20 MEMBER SCHULTZ: Well, Ruth, we have your
21 questions on the record and we'll have the answers
22 prepared for you. If you'd like to discuss those
23 further, we can provide a Staff member to discuss
24 those with you. We have heard your comments, and we do
25 appreciate them.

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1 I do want to ask if there are others who
2 might be wanting to make a comment to introduce
3 themselves.

4 MS. THOMAS: Oh, yes. Okay, and what is
5 your name and telephone number?

6 MEMBER SCHULTZ: The contact would be Mike
7 Snodderly. I think you have this, at (301)415-2241.

8 MS. THOMAS: Okay, thank you.

9 MEMBER SCHULTZ: Thank you. Others on the
10 line who would like to make a comment, please
11 introduce yourself. Hearing none at this point, I
12 would like to indicate that we will have an
13 opportunity for public comments at the end of this
14 morning's discussion, and we'll close the phone line.
15 John, I'll turn it back to you.

16 CHAIR STETKAR: Thanks a lot, Steve. We'll
17 take a slightly truncated break and reconvene at
18 10:45. We are recessed until then.

19 (Whereupon, the above-entitled matter went
20 off the record at 10:34 a.m., and resumed at 10:46
21 a.m.)

22 CHAIRMAN STETKAR: We can come back into
23 session. We do have a very, very full schedule here.
24 So I'm going to hold us as tightly as I can to our
25 agenda.

1 We're going to address continuation of
2 this morning's discussions on the COMSECY on
3 Integration of Mitigating Strategies for Beyond Design
4 Basis External Events and Flooding Evaluations. And
5 Steve Schultz will also lead us through this session.
6 So Steve, it's back to you.

7 MEMBER SCHULTZ: Thank you. In this
8 discussion we have three presentations by the NRC
9 staff. The first is a discussion by the panelists
10 here on the COMSECY that has been developed in this
11 area.

12 And then we have two presentations from
13 staff with differing views. So we will follow a
14 schedule to make sure that each of these parties have
15 an opportunity to present to the Committee.

16 Again, the -- this subject was discussed
17 -- has been discussed with the Committee on several
18 occasions. We had some discussions early and got some
19 information from the staff regarding a plan for the
20 COMSECY earlier this fall. And the full Committee had
21 a briefing on this concept and approach in October.

22 Then in November 20th and 21st we had the
23 opportunity to revisit it again. And we spent most of
24 that meeting talking about this subject.

25 Again, as we discussed this morning, since

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1 that meeting, we've received -- we first received a
2 white paper on this subject about two months ago. In
3 November we had the opportunity to have a draft
4 COMSECY available for that review at our meeting.

5 It's changed since then. It's been
6 improved since then. That I'm sure was the intent.
7 And so we want to hear today the changes that have
8 been implemented and any further ideas or concepts you
9 want to provide to the Committee following our
10 detailed discussions in the Subcommittee meeting.

11 So with that introduction, I'll introduce
12 Mike Franovich, who's going to lead the panel.

13 MR. FRANOVICH: Thank you. Good morning
14 Chairman. Good morning members of the Committee. I
15 do have a few remarks.

16 Thank you again for inviting us back to
17 the Committee to talk about the COMSECY. We did have
18 these several evolutions in the past to talk about the
19 white paper.

20 Given that the COMSECY is different than
21 the white paper, we do encourage the members to focus
22 on those differences, not only in the paper proper,
23 but as well as the responses that we had to the two
24 sets of nonconcurrences. It's a pretty rigorous and
25 thorough response for the nonconcurrences.

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1 In addition to that, we did make a few
2 changes to the paper that we'll discuss here in short
3 order. To provide a little more clarity on the
4 context for why we think a course correction is needed
5 at this point regarding the scope and intent of the
6 2.1 work, under Recommendation 2.1.

7 Through this process and the
8 nonconcurrences that we received, we've actually
9 benefitted greatly from those comments. It actually
10 helped crystalize what the policy issues are for the
11 Commission. Which they're going to deliberate on here
12 shortly since they have a paper now.

13 I would like to impart a view that we have
14 a sense of urgency to make this course correction at
15 this time. If you look at recent recommendations from
16 the National Academy of Sciences, one of their
17 overarching recommendations was actually that
18 regulators and utilities should move, in terms of
19 making decisions, they should react in a timely manner
20 when there is information present to -- regarding
21 hazards for power plants.

22 This is a lesson learned that they discuss
23 in their report quite a bit about the actual TEPCO
24 experience. And looking at the level of protection
25 for the seawalls and the iterations that went back and

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1 forth in the analysis between regulator and licensee.
2 And of course that analysis wound up iterating back
3 and forth to a point where a timely action was not
4 taken that could have probably protected the plant.

5 We'd also like to emphasize that the
6 approach that we're proposing in the COMSECY is
7 actually intended in part to stymie a little bit of
8 this cause and effect we see going on between
9 regulator and the licensed community. And that is
10 that we see a desire for more analysis being done.

11 Mostly driven by some uncertainty
12 regarding the decision making that would come out of
13 the integrated assessment. Whatever analysis would be
14 done. Whatever backfit reviews would be done.

15 We see a greater drive to do what are
16 called the site specific probably maximum
17 precipitation models rather than using generic
18 information. As such, that is going to pose some
19 challenges for us in order to make a timely review of
20 such material.

21 And currently we are not on the current
22 trajectory to finish the work in 2.1 as we have
23 portrayed to the Commission back in SECY 12.25.

24 CHAIRMAN STETKAR: Mike, before you?

25 MR. FRANOVICH: Yes sir?

1 CHAIRMAN STETKAR: The statement you made
2 is -- I'm not sure I understand it. You said that
3 you'd rather do generic analysis than site specific
4 evaluations because it takes more resources to review
5 site specific evaluations?

6 MR. FRANOVICH: What I'm referring to is
7 the use of the generic HMRs. Such as HMR 51 and 52.

8 CHAIRMAN STETKAR: Right. Which most of
9 the industry has said is probably not relevant for
10 site specific analysis. So I'm curious, because
11 hazards tend to be extremely site specific.

12 MR. FRANOVICH: But there will be a site
13 specific PMF model. But you use the input from the
14 PMP model to feed the site spec -- the effects on the
15 site.

16 So it isn't a -- there is a site specific
17 analysis. But what I'm talking about is the PMP
18 aspect.

19 CHAIRMAN STETKAR: Yes. I want to make
20 sure that that's really clear in our minds of how
21 you're proposing. Because to me it came across don't
22 use site specific analysis because they're difficult
23 to review.

24 MEMBER CORRADINI: Right. And that's the
25 same impression I got. So if you --

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1 CHAIRMAN STETKAR: Okay. I'm glad there
2 are at least two of us.

3 MR. FRANOVICH: I don't want to leave you
4 with that impression. It's more the input
5 information.

6 MEMBER RICCARDELLA: And to make it
7 clearer in my mind, you'd have to go through some of
8 those acronyms and --

9 MR. FRANOVICH: Acronyms?

10 MEMBER RICCARDELLA: PMP and -- would you
11 help me with some of those.

12 MEMBER BALLINGER: Probable maximum
13 precipitations.

14 CHAIRMAN STETKAR: Probably maximum
15 precipitation which is neither probable nor maximum.

16 MR. RICCARDELLA: What was the other one,
17 HM?

18 MR. FRANOVICH: Hydrometeorological
19 reports.

20 MR. RICCARDELLA: Okay.

21 MR. FRANOVICH: HMR reports. And again,
22 it's more to the inputs for the analysis that are done
23 at the plants. That's the generic impression.

24 CHAIRMAN STETKAR: And by the way Mike,
25 just what might seem as a flip comment regarding

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1 probably maximum precipitation is actually not flip.
2 Because there have been events where what was judged
3 to be the probably maximum precipitation was in fact
4 exceeded. So therefore it wasn't maximum.

5 And in fact there's very little
6 probabilistic analysis that goes into that evaluation.
7 So it's a contrived amount of water.

8 MEMBER SCHULTZ: Mike, you just mentioned
9 --

10 MEMBER POWERS: So, how else do you feel
11 about it?

12 (Laughter)

13 MEMBER SCHULTZ: You just mentioned where
14 the program is in terms of schedule. And a concern
15 that it might not be on schedule. Can you speak
16 further to that?

17 I -- the walk downs were done against the
18 current design basis.

19 MR. FRANOVICH: Recommendation 2.3 has
20 been completed.

21 MEMBER SCHULTZ: Has been completed?

22 MR. FRANOVICH: Those are the walk downs.
23 And a number of corrective actions have already been
24 taken by our licensees. A lot of good lessons learned
25 there.

1 This is a confirmatory step to confirm
2 that licensees are in compliance with their current
3 licensing requirements.

4 MEMBER SCHULTZ: The next step then is to
5 do the evaluation about hazards then.

6 MR. FRANOVICH: 2.1 work is the
7 reevaluation of the flood hazard in particular. And
8 then the output of that feeds into the integrated
9 assessment, the 1-ISG-12-05. Not the one that was
10 termed this morning by NEI in the 12-06 context.

11 MEMBER SCHULTZ: So, you indicated that
12 you anticipate there could be a long duration of
13 iteration to move on the current path. And the path
14 that's being proposed in the COMSECY could get to
15 where the end point would like to -- we would like the
16 end point to be. That is providing the adequate
17 protection --

18 MR. FRANOVICH: Correct.

19 MEMBER SCHULTZ: In a more prompt manner.

20 MR. FRANOVICH: The proposal is to try to
21 get us to focus on -- and this is actually the one
22 universal opinion held by both the staff that have not
23 concurred on the paper as well as the staff that have
24 concurred on the paper. And that is that the
25 mitigating strategies should be protected against the

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1 reevaluated hazards.

2 That is a common denominator. And all the
3 passionate views that are going back and forth, in
4 order to get to that point and to capitalize on the
5 momentum and focus of industry now as you've heard
6 this morning, we would prefer to put primary focus on
7 the mitigating strategies and reevaluation hazard
8 rather than looking at a total effects on the plant
9 and trying to distill out of that process what other
10 improvements beyond mitigating strategies would occur.

11 We think that will be a very lengthy
12 proposition. Licensees aren't quite sure how that
13 will unfold. Therefore, they have commented to us
14 about the uncertainty involved. And the desire hence
15 to do more precise modeling and analysis.

16 And so you quickly wind up in a mode, and
17 we've seen this before, with certain generic issues.
18 I'm sure members around the table have seen this that
19 we wind up in protracted analysis space. And we get
20 somewhat paralyzed and don't make regulatory decisions
21 in a timely manner.

22 And we've had generic issues that have
23 gone on for decades. We do not want to fall in that
24 mode. We'd rather capitalize on the momentum that's
25 here now today. And not rely on what momentum might

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1 look like for an effort in ten years from now.

2 MEMBER SCHULTZ: So there's a potential
3 protracted discussion associated with establishing the
4 reevaluated hazard that could happen. That process is
5 ongoing.

6 MR. FRANOVICH: That's correct.

7 MEMBER SCHULTZ: Has not been completed.
8 And that --

9 MR. FRANOVICH: We are just -- we have
10 only two of the year one facilities that they made the
11 year one submittals. Only two are completed to date
12 for the staff assessment.

13 So given that trajectory, you can imagine
14 when we as a staff told the Commission that we
15 anticipate within five years that we would have the
16 majority of the information and be in a place to make
17 decisions, we're not on that path currently.

18 You heard some of the concerns --

19 MEMBER SCHULTZ: So it's five years from
20 the origination of the program. And that five years
21 would have put us where?

22 MR. FRANOVICH: Into 2017 approximately.

23 MEMBER SCHULTZ: 2017, and we're not on
24 that path? In order to stay with the current path not
25 the COMSECY path, but the current path.

1 VICE CHAIRMAN RAY: How do you deal with
2 the potential that the work -- that this long work
3 that we don't want to get into, that you're trying to
4 avoid, would disclose an adequate protection issue
5 that would not be identified in the work that's being
6 proposed? As you're now proposing.

7 MR. FRANOVICH: Well if you're -- well
8 okay. Turn your question somewhat to say, I think
9 what I understood you say, is if we were to do the
10 integrated assessment as originally envisioned, that
11 we might reveal issues that could be in the adequate
12 protection realm.

13 VICE CHAIRMAN RAY: Correct.

14 MR. FRANOVICH: And that's feasible.
15 That's certainly conceivable that may happen. We
16 would argue that if you focus on mitigating
17 strategies, which involves protection of some of the
18 installed equipment that's relied on for Phase One in
19 particular or the electrical switch gear for Phase One
20 and Phase Two, that -- because that's already under
21 the realm or umbrella of adequate protection, that you
22 have already established a minimum layer.

23 Not as a substitute of the current
24 licensing basis. We're not trying to substitute one
25 for the other. But rather you have added a diverse

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1 defense in depth layer on top of the existing current
2 licensing basis.

3 Therefore, you've already established that
4 minimum bar for adequate protection. It's conceivable
5 that through the integrated assessment as envisioned
6 in 12-05, there may be issues that are revealed that
7 could be added protection.

8 I wouldn't say that's a foregone
9 conclusion that that wouldn't occur. But that is some
10 residual information that we may not capture if we
11 don't complete the integrated assessment as originally
12 envisioned. That is a possibility.

13 VICE CHAIRMAN RAY: Okay. And I
14 understand we have to make decisions here and there
15 are trade offs and so on. But we've been struggling
16 with this concept of have we deemed everything as
17 already without mitigating strategies, meeting
18 adequate protection?

19 Or have we decided that the additional of
20 mitigating strategies will result in adequate
21 protection? Or are we deciding well, we're not going
22 to look at that issue somehow?

23 MR. FRANOVICH: Because we're dealing with
24 the operating fleet and not licensing new reactors,
25 the presumption is by compliance with the current

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1 requirements, that adequate protection is afforded.
2 That is an agency policy.

3 In other words, if we want to demonstrate
4 something is in the converse, the burden is on the
5 staff to actually demonstrate that as being the case
6 that adequate protection isn't currently afforded.

7 VICE CHAIRMAN RAY: Okay, so as a result
8 then of the near term tests, which recommendations and
9 so on, you don't see that as a question that needs to
10 be answered rigorously?

11 MR. FRANOVICH: I -- well it depends on
12 what you mean by rigorously?

13 VICE CHAIRMAN RAY: Well rigorously,
14 comprehensively. Whatever words you want to use.

15 MR. FRANOVICH: Well, I would say that
16 because we have an added layer of assurance and
17 diverse defense in depth approach with mitigating
18 strategies, that that really reduces the likelihood
19 that you may have an issue that's a residual risk that
20 could be sitting there as --

21 VICE CHAIRMAN RAY: Well, without question
22 it reduces it. But I'm still persisting here because
23 this is not -- the reference to the backfitting, it
24 doesn't say backfitting rule, it says backfitting.
25 Three times I think.

1 Well, the backfitting rule starts with
2 establishing that adequate protection exists. And
3 then asks the question whether there's a substantial
4 enhancement in safety and so on.

5 So we're still insisting upon backfitting
6 it seems to me. Maybe not now as an element of this
7 process. But I don't see how you separate --

8 MR. BOWEN: Well, I think it's important
9 to look at the collective --

10 VICE CHAIRMAN RAY: You have to do it --
11 well, let me -- I'm sorry. Let me just say one more
12 thing so I can get it clear.

13 It seems to me you have to affirm adequate
14 protection before you enter into backfitting. Either
15 by some declaration or plant by plant determination.
16 Or somehow.

17 MR. FRANOVICH: That is part of the
18 original licensing process for the facility. Once
19 they are licensed, we don't have any direction to go
20 back and reaffirm that adequate protection is
21 currently afforded by compliance with the
22 requirements. That's not the direction the staff's
23 been given.

24 VICE CHAIRMAN RAY: Okay. Well, that's a
25 very clear statement and I appreciate it. I don't

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1 know how you apply the backfitting process without
2 affirming adequate protection exists. But -- because
3 it's in 51-09.

4 MR. RECKLEY: Well, it's somewhat the
5 negative. We're looking -- when you're doing
6 backfitting, you're looking at a delta. And basically
7 you would be saying, or make -- being asked to make a
8 call as to whether a particular plant change is needed
9 for restoration of adequate protection.

10 Until -- and so as Mike was saying, until
11 we identify an issue and a particular plant
12 modification that might remedy it, we're assuming a
13 plant is adequately protected by compliance with the
14 rules. But upon being faced with a new issue and a
15 possible resolution, then you can reassess whether a
16 change is needed for adequate protection or compliance
17 or as a cost beneficial substantial safety
18 improvement.

19 VICE CHAIRMAN RAY: Don't get me wrong, --

20 MR. RECKLEY: Yes.

21 VICE CHAIRMAN RAY: But what you just said
22 is -- what you all have said is informative but not --
23 it's something we haven't resolved clearly enough.
24 The assumption, you used the word assumption for
25 example.

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1 We're doing a reassessment of flooding
2 hazards. Is that assumption consistent with the
3 reassessment? Or does it have to be reaffirmed?

4 MR. RECKLEY: I'll get to that in a slide
5 if I can read off one.

6 CHAIRMAN STETKAR: Okay, in fact let's
7 finish this.

8 VICE CHAIRMAN RAY: Make sure I'm paying
9 attention when you do, okay?

10 MEMBER SCHULTZ: Exactly. If it's not
11 covered, we'll come back to it. But we would like to
12 go through the presentation. Mike, are you ready?

13 MR. FRANOVICH: I'm just going to wrap up
14 my remarks really --

15 MEMBER SCHULTZ: That's fine. Please do.

16 MR. FRANOVICH: And then we can move on
17 and have Bill go through the formal slides.

18 I do want to characterize, talk about for
19 a moment defense in depth concept. I know that's been
20 raised before. And whether or not we have an adequate
21 balance between protection and mitigation.

22 I think this Committee has heard over and
23 over that in terms of mitigating strategies, it's
24 somewhat of a misnomer. These are really preventative
25 strategies to prevent core damage.

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1 The notion of mitigating strategies as a
2 concept was floated by the Near Term Task Force Report
3 as a model off of the 50-54 HH2 or B.5.b measures.
4 That title carried through over into post Fukushima
5 actions.

6 And actually, it's again centered on
7 preventing core damage inherent in the mitigating
8 strategies. It is a -- installed equipment is relied
9 upon under Phase One. And there would be a level of
10 protection necessary that licensees would have to
11 demonstrate that that equipment is protected against
12 a reevaluated hazard as we're proposing in the MBDBE
13 rule making package.

14 So I just wanted to emphasize that piece.
15 Because I hear a lot of dialog back and forth whether
16 or not mitigating strategies is actually being used
17 for mitigating a core damage event. And it's not.
18 That's not what it's designed for under the FLEX
19 Program.

20 At this point I'm going to turn it over to
21 Bill. So Bill?

22 MR. RECKLEY: Okay. What I'd like to do
23 is go through the COMSECY. We'll talk, as Dr. Schultz
24 asked, talk a little bit about the difference between
25 the white paper and the COMSECY.

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1 They're not fundamentally different. It
2 was rearranged a little bit. Hopefully it's a little
3 clearer. We answered some questions that had come up
4 during the process.

5 So the layout of the paper is on this
6 slide. The discussion section within the paper is
7 basically broken into two parts. And there's some
8 background information provided.

9 But the discussion section talks about a
10 proposed path for what we would require in the
11 mitigation of beyond design basis events rule making.
12 And then there's also a discussion of -- and this goes
13 to Mr. Ray's comments, what we might do to consider
14 requirements beyond that particular rule making, for
15 a particular event, looking at the hazards, plant
16 designs, the histories and so forth.

17 Then we make our recommendations for the
18 Commission to affirm the positions and provide some
19 enclosures for background and further discussions.
20 And then the two nonconcurrency packages.

21 The first item in the discussion section
22 of the paper is the focus, and it really was the
23 initial purpose of the paper. It's grown over the
24 last few months. Was that there was a policy matter
25 we thought we needed the Commission to affirm, which

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1 was mitigating strategy should address the reevaluated
2 hazards. And we could assume that that was what the
3 Commission intended when they told us to issue the
4 order and pursue the rule making, as a matter of
5 ensuring adequate protection of public health and
6 safety.

7 The backfit process been talked about a
8 lot during the Subcommittee, and this meeting even
9 this morning. Our view was that the Commission could
10 weigh in. If it was adequate protection, we can
11 basically go straight to including that language in
12 the rule as Commission direction.

13 If not, we would have to do additional
14 regulatory analysis, backfit analysis of that proposal
15 if the Commission were to say no, that's not what we
16 intended. As Mark said, our mitigating strategies
17 would then lead to address reevaluated hazards,
18 meaning that needs to provide the functions and the
19 capabilities that are installed have to be protected
20 against, or designed to withstand those hazards, so
21 the flooding in this case.

22 CHAIRMAN STETKAR: And Bill, just to make
23 sure, the basic concept is only mitigating strategies
24 need to be designed against the reevaluated flood
25 hazard. Is that correct?

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1 MR. RECKLEY: Yes, and this of course gets
2 to the second point that we're going to look at.

3 CHAIRMAN STETKAR: Okay.

4 MR. RECKLEY: As a rule, as a generic
5 requirement, the baseline that every plant needs to
6 address, they need to address the reevaluated hazard.
7 Now for some plants the reevaluated hazard might be
8 below the design, so nothing changes. But every plant
9 would need to address within mitigating strategies,
10 the evaluated hazard -- reevaluated hazard.

11 Then we'll get to the next slide. Which
12 is we will assess whether we should pursue additional
13 information from licensees and possibly imposing plant
14 specific backfits on licensees based on information
15 about the reevaluated hazard, event frequencies,
16 response times.

17 If a licensee has a long time to prepare
18 for a flood that would be taken into account.
19 Licensing histories, all other available information.
20 This is what we do routinely as issues are identified.
21 And we try to make decisions as to whether a plant
22 should be subject to a new requirement.

23 This can also take into account the
24 discussion from this morning, what have licensees
25 already done of their own accord? And then it gets

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1 into some of the other discussions we've had over a
2 long period of time, on the treatment of regulatory
3 commitments or voluntary initiatives and how that
4 feeds into regulatory analysis and all of that.

5 But this is the kind of thing we need to
6 assess routinely. But based on the reevaluated
7 hazards and all these other parameters that feed into
8 the backfit discussions, we would do that for each
9 plant. We'd document the assessment or the evaluation
10 and close out those activities.

11 So the 2.1 activity, sooner or later, just
12 like all other generic items that have been opened up,
13 need to be closed out. Likewise the order and the
14 rule making will need to get closed out.

15 As part of those processes to close out
16 those open activities, we would basically be
17 documenting a decision that we've decided either to
18 pursue additional information requests and possible
19 backfits on plants. Or we've decided not to do that.
20 So there would be a documentation that the staff made
21 a conscious decision one way or the other.

22 As is also mentioned this morning, we
23 understand, this is complicated by the state of the
24 art and probabilistic flood hazard analysis and the
25 fact that the backfit process really does largely, at

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1 least at the staff level guidance, kind of point to
2 core damage frequency and other measures for us to use
3 in making those judgement calls. That's complicated
4 when probabilistic information is not available.

5 But again, it's not unique. And we will
6 make our way through this. So that's the other part
7 of the discussion. And it's kind of key that
8 basically we consider both of those aspects of the
9 COMSECY.

10 That leads to the recommendations in the
11 paper, which are that the Commission affirm, again,
12 mitigating strategies of best reevaluated flooding
13 hazards as a matter of adequate protection. I
14 shorthanded this, but that's important as it's been
15 brought up.

16 The other thing we wanted the Commission
17 to affirm was that there are as the industry talked
18 about this morning, targeted or scenario-specific
19 strategies, some of which could involve events that
20 would heavily damage a site. These are the
21 overwhelming events that were mentioned this morning.

22 We just thought it was prudent to get the
23 Commission to weigh in that they are cognizant that as
24 we move forward, there will be these scenarios. And
25 again, one can argue how conservative or whatever,

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1 from our standpoint making a recommendation to the
2 Commission, we're going to use those reevaluated
3 hazards. We're going to tell a licensee as part of
4 the rule, they need to have strategies to address
5 them.

6 Some of them will be fairly dramatic
7 events if one should ever occur. So we wanted the
8 Commission to affirm that they are aware of that as we
9 move forward.

10 Those were initially the first two. So as
11 you read the nonconcurrences, it might get a little
12 confusing, because I talk about the original version.
13 Those were the first -- those were the policy issues
14 that we at first wanted the Commission to confirm.

15 As we went through the concurrence and
16 nonconcurrence processes and it was brought out that
17 these -- the flooding assessments and the integrated
18 assessment as it's called out in the current flooding
19 guidance in ISG-12-05, was a significant change. And
20 we should make the Commission aware of it and actually
21 get the Commission to weigh in.

22 We considered that and agreed that when we
23 did other changes to Fukushima and lessons learned
24 activities, when we consolidated some of the emergency
25 planning activities. When we consolidated the

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1 incorporation of the SAMGs into the MBDBE rule making
2 that we ask the Commission to acknowledge that. It
3 was a good point, so we added this as an additional
4 point asking the Commission to affirm the integration
5 of these activities, mitigating strategies and the
6 flooding reevaluations.

7 So I'll get to integrated assessments, the
8 nonconcurs in the paper, we'll be talking later,
9 they're obviously the subject matter experts, but I'll
10 give you my feel. And for what the difference between
11 the current track, and I -- I'm probably going to
12 regret it, I got some flow charts later I'm going to
13 try to use.

14 But the integrated assessments are
15 basically a tool to assess vulnerabilities to a plant.
16 So they are looking at a reevaluated hazard and saying
17 if a plant is going to experience that hazard, that
18 level of an event, what is the vulnerability? What
19 challenges will there be to the structure systems and
20 components important to safety? Which ones would be
21 lost?

22 Once I have that plant level information,
23 I can then assess what might I do to protect some of
24 that equipment? If it's not feasible to protect it,
25 what might I do to mitigate the loss of that

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1 equipment? I -- the terminology, and I apologize for
2 the staff, we are mixed messages.

3 The industry integrated assessment is
4 different then this integrated assessment. The
5 mitigation in this context is a broader context then
6 the mitigating strategies that we talk about. I
7 understand the confusion. I wish I could do something
8 about it, but I'll just add -- I'll probably just add
9 to it.

10 CHAIRMAN STETKAR: And why can't you?

11 MR. RECKLEY: Why -- well, as we go
12 forward, I think we will as these programs get
13 integrated, that it will help in that regard. For
14 now, given they were being pursued somewhat
15 independently, not totally, but as separate functions,
16 they evolved their own terminology. And it wasn't
17 consistent. Well, again, as we integrated, one side
18 benefit of that will be the terminology will at least
19 get worked out.

20 So, as was talked about this morning, the
21 -- earlier this morning, it could, but not necessarily
22 rely on the mitigating strategies equipment, the Order
23 EA-12-049 equipment. And the equipment in the rule
24 making.

25 VICE CHAIRMAN RAY: Excuse me Bill, what

1 do you mean by it? It could rely, you said. What is
2 it?

3 MR. RECKLEY: I'm sorry, the -- when
4 you're looking at a solution to the vulnerabilities
5 identified as part of the integrated assessment.
6 Those fixes, those actions taken in response to
7 address the vulnerabilities, could but would not
8 necessarily rely on the mitigating strategies that
9 were developed under order EA-12-049.

10 VICE CHAIRMAN RAY: That's a good
11 clarification, thank you.

12 MR. RECKLEY: Okay. And again, the people
13 coming up later can correct me if I mischaracterize.
14 But this is my understanding how these pieces fit
15 together.

16 Then the other -- the last part and it does
17 factor into the decision making that we made that I'll
18 try to get to in a moment, is that after we do the
19 vulnerabilities assessments, after we do the possible
20 resolutions to those vulnerabilities, the integrated
21 assessment is basically done. And it feeds into what
22 under Recommendation 2.1 was called Phase Two
23 regulatory decision making, right.

24 So basically the first phase of the
25 flooding reevaluations was this information gathering

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1 assessments, understand plant response, understand
2 plant possible responses to those. And then that
3 would be turned over to Phase Two, which would make
4 regulatory decisions in regards to which of those
5 might be imposed through generic or plant specific
6 regulatory requirements.

7 In my mind it differs and I think this
8 might have begun to crystalize a little bit in the
9 discussion this morning, it differs from the approach
10 in the COMSECY in that the COMSECY proposes to the
11 Commission, and asks the Commission to affirm that the
12 rule making, the mitigation of beyond design basis
13 events rule making, should require licensees to have
14 at least one success path for that reevaluated hazard.
15 All right?

16 And that is as Mike said --

17 VICE CHAIRMAN RAY: What affected that
18 difference in terms of the Phase Two potential for
19 saying more needs to be done?

20 MR. RECKLEY: Well, that is a potential.
21 And I'll get to it in another bullet. An equal, and
22 I'll be honest from the staff level, bigger concern,
23 was that the Phase Two assessment may not result in
24 any regulatory requirements. You cannot have been
25 around this agency --

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1 VICE CHAIRMAN RAY: That was what I was
2 just going to say.

3 MR. RECKLEY: For a long time without
4 realizing that many issues get evaluated and the net
5 result is by the time the evaluations are done, the
6 research programs are undertaken, and sometime down
7 the road when decisions are made, it results in no
8 regulatory action.

9 So yes, there may be a chance that
10 something is missed. There's also a concern, and one
11 that actually drove the generation of the COMSECY to
12 be honest, was the fear that nothing would be done in
13 the absence of asking the Commission to affirm that
14 mitigating strategies should be at least one thing
15 that is done to address the reevaluated hazards.

16 MEMBER SCHULTZ: Or that it could take a
17 long period of time for something to be done
18 comparatively.

19 MR. RECKLEY: Right. And both of those
20 are concerns that either nothing gets done in the long
21 term, or just the fact that it takes a long time,
22 nothings being done in the interim. And while you're
23 waiting, that's not done.

24 I mean people criticize the Japanese
25 event, keeping in mind that the analysis that TEPCO

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1 did, that took a long time leading up to it, but the
2 analysis that TEPCO did that is often cited as being
3 why didn't you act, was completed in 2008. And the
4 event happened in 2011.

5 Well, from a regulatory perspective,
6 that's not a long time. And that's the fear that
7 we're having, is that as Mike mentioned, we don't want
8 to get into that mode when we have an opportunity to
9 take timely action.

10 And again, that's not really that
11 controversial. So I don't want to imply that you
12 know, we're saying to do this. And there's a group
13 saying not to do it. But the --

14 VICE CHAIRMAN RAY: One more time, I'm
15 sorry, but this is so important. You don't see what
16 is now being proposed as a -- at least one success
17 path, as mooted the Phase Two assessment potential
18 for something else or something more to be done?

19 MR. RECKLEY: I don't -- we don't
20 foreclose that we still may want to look and we still
21 may find things on a plant specific basis that we want
22 to pursue. But I'm going to propose a slight
23 difference in how we approach that.

24 And it's a different decision model. I
25 mean, it's very subtle this stuff and --

1 VICE CHAIRMAN RAY: And be very clear when
2 you're doing that.

3 MR. RECKLEY: Okay.

4 VICE CHAIRMAN RAY: Because that's so
5 crucial.

6 MR. RECKLEY: Right. Okay. So that's the
7 last bullet. That we will pursue evaluating the
8 potential need for additional plant specific backfits.

9 MEMBER CORRADINI: I'm sorry, but when you
10 do that Bill, will you still take the same initiators
11 which are potentially quite conservative and unknown
12 in terms of -- why was it? I mean, what you're saying
13 to me is that I'm going to have a chance to take
14 another look at it.

15 But if you're going to take it -- have
16 another chance to take a look at it, would you not be
17 more realistic as to -- on what's the challenge? What
18 the specific challenge is?

19 MEMBER BALLINGER: And I think that that's
20 the difference between what's being proposed in the
21 COMSECY versus the current path if you will. Is the
22 difference with the COMSECY is it says okay, at a bare
23 minimum, let's do something immediately to ensure you
24 have one defined safe shut down train. Then let's go
25 to the next level of detailed review and then make

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1 adjustments as needed.

2 MEMBER CORRADINI: Because my
3 anticipation, or maybe it's just only me and the other
4 members are in disagreement, but my anticipation is
5 there's an awful lot of margin there because I've
6 driven this whole thing with a hypothetical starting
7 point that's at least for flooding, doesn't have -- I
8 mean Ron asked the question about where did you get
9 it. And the answer is go look at the guide.

10 But the guide just says just assume it.

11 MR. BOWEN: That's right. This is the --

12 VICE CHAIRMAN RAY: Jeremy, finish what
13 you were going to say before.

14 MR. BOWEN: I'm sorry. Well like I said
15 that's the -- so that's the version of the COMSECY --
16 proposed approach in the COMSECY. Whereas the current
17 version is start to look at everything. And then from
18 there, kind of narrow down okay, this is the broad
19 impact on the plant, which one's multiple potential
20 should we adjust -- should we address.

21 And it may take a long time to go through
22 each one of those.

23 VICE CHAIRMAN RAY: Okay, but the hard
24 thing to understand is, why would anybody object to
25 doing something soon that provides one path, unless it

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1 was undermining the larger --

2 MR. RECKLEY: And that's the point -- and
3 I'm going to get to it in a second.

4 VICE CHAIRMAN RAY: Please do underscore
5 it. All right, I'm at the point now.

6 MEMBER CORRADINI: And I'm happy.

7 MEMBER SCHULTZ: And excuse me Bill.
8 You've got two sub-bullets --

9 MR. RECKLEY: Right.

10 MEMBER SCHULTZ: One says longer term.
11 The first bullet, where warranted, that is not
12 anticipated to be a long term process?

13 MR. RECKLEY: No.

14 MEMBER SCHULTZ: Where warranted, pursue
15 with appropriate assessment?

16 MR. RECKLEY: Well, again, it's the sort
17 of thing we encounter routinely. That the pace -- the
18 items we identify and the pace at which we address
19 them will be dependent on the information that's
20 driving the concern.

21 And if I had -- and I hate to use the
22 example, but all reasonable example, if we had a high
23 frequency event, and it had flip edge implications,
24 we're not going to want to sit around for a long time
25 while we say we're going to evaluate that as a plant

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1 specific backfit. It's been identified as a high
2 frequency event. It's going to drive us to take more
3 pressing matters.

4 If it is on the borderline of our backfit
5 guidance, which means you know, that backfit guidance
6 is on the order of a core damage frequency between ten
7 to minus four and ten to minus five for a substantial
8 safety enhancement. So somewhat higher for adequate
9 protection if you wanted to make the hard rule.

10 If the initiating event frequency is ten
11 to the minus four or five, well you know that you're
12 on the margins of making it through the backfit.
13 That's going to be treated with less urgency than if
14 I have some high frequency event that's going to make
15 it through.

16 So that's -- it's not only where
17 warranted, but then just like we would do any
18 discovery of a new issue, the urgency will be driven
19 by the level of concern.

20 MR. FRANOVICH: And so in Bill's latter
21 case, you can see the dilemma of how much debate will
22 occur back and forth between licensee and NRC about is
23 it ten to the minus four, ten to the minus five if you
24 don't have the methods fully vetted in advance. We
25 went through this case example actually with one of

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1 our facilities. The one that stimulated GI-204.

2 It took a couple of years to come to a
3 point where this is our best estimate regarding dam
4 break frequency. And that's not a universally held
5 opinion across the federal agencies whether or not
6 that's even an appropriate value.

7 Now we were using other factors in the
8 backfit analysis to drive for at least some
9 compensatory measures such as looking at defense in
10 depth and so forth. And timing and action sequence
11 progression. But that debate back and forth, whose
12 method is appropriate? Which one has got consensus
13 standard behind it if any?

14 Some of them don't have a consensus
15 standard. But that's the kind of dilemma we don't
16 want to try to entertain now up front at risk of
17 losing the benefit of codifying at least this
18 requirement on the mitigating strategies and the
19 reevaluated hazard requirement under the MBDBE rule
20 making.

21 MEMBER BALLINGER: But excuse my naivete,
22 but don't we have two time frames here? If the event
23 that you're describing occurs, there's a -- if
24 somebody discovers something serious, the licensee's
25 going to take action right away.

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1 MR. RECKLEY: Should.

2 MEMBER BALLINGER: Independent of how long
3 it takes you to do it.

4 MR. RECKLEY: Hopefully yes.

5 MEMBER BALLINGER: So there's two time
6 lines here isn't there?

7 MR. RECKLEY: Right, yes.

8 MR. FRANOVICH: We would expect in that
9 matter, if we thought there was a genuine safety
10 issue, there would be interim compensatory measures in
11 place. And we have done that in the past. I mean,
12 there is clear evidence of that and there's no debate
13 about that piece.

14 MEMBER REMPE: So when you go to this
15 second evaluation, you'll consider the mitigating
16 strategies, equipment, whether it's onsite or offsite?

17 MR. RECKLEY: Depending on the scenario,
18 most of this is either the installed equipment Phase
19 One under mitigating strategies, or the portable
20 equipment onsite. The Phase Three offsite is -- it
21 has to play into these longer term events. But I
22 don't see that as a large driver to be honest.

23 MEMBER CORRADINI: So the answer to her
24 question is yes for Phase One and Phase Two?

25 MR. RECKLEY: Yes.

1 MR. CORRADINI: Okay.

2 MR. RECKLEY: And then the last sub-bullet
3 there, as was talked about a couple of times already,
4 this does also factor into the development of improved
5 probabilistic plant hazard analysis methodologies.

6 So trying to go quickly through these
7 slides. Because largely this is a matter of
8 regulatory decision making. I mean there's technical
9 elements to this obviously.

10 But really what we're asking the
11 Commission to do is to make sure that we're on the
12 right regulatory path. So this is -- these are
13 decision making models that we're talking about.

14 So and this is the current path for
15 flooding assessments. And this is out of ISG-12-05,
16 basically describing the integrated assessment
17 process. Starting with the hazard, you're doing the
18 vulnerability assessments. You're looking at flood
19 protection. What SSCs important to safety might be
20 lost or challenged.

21 How might I mitigate the loss of that
22 equipment? Provisions for these dramatic events where
23 I might do what's now called a targeted approach,
24 where I might open up buildings or whatever in order
25 to help maintain their integrity.

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1 And that all feeds into the results of the
2 integrated assessment. Which then goes to Phase Two.
3 Which since for operating plants, and that's what
4 we're talking about in this paper, is what are we
5 doing for operating plants, has to include backfit as
6 a discussion.

7 So as has been brought up a couple of
8 times, backfit shouldn't be just thought of as a cost
9 benefit assessment. Backfit is a whole process. It
10 -- for some, for the default if you will, it includes
11 a judgement as to whether it is a substantial safety
12 improvement and whether it's cost effective. But the
13 exceptions that are defined in the rule include
14 whether it's compliance or whether it's a matter
15 necessary for adequate protection.

16 Separate from the results from the
17 integrated assessment are other things that are going
18 to need to be considered to make backfit
19 determinations. Event frequencies, we're going to
20 need some kind of assessment of that because that
21 backfit rule evolves around that.

22 Core damage, backfit -- core damage here
23 is just an extension of the event frequency sort of.
24 If there's a cliff-edge effect. The plant
25 information, the plant history, the remaining life on

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1 the facility, all kinds of things that would have to
2 get factored in to basically say whether we think a
3 backfit should be pursued for any particular remedy to
4 a vulnerability that was identified in the assessment.

5 MEMBER RICCARDELLA: What do you mean by
6 regulatory history in that box?

7 MR. RECKLEY: When we're doing a backfit
8 determination, we're going to look at what we
9 previously reviewed and approved. And for many cases,
10 there may be something that we're looking at now that
11 directs -- that involves directly what we looked at
12 before, reviewed and approved. So that would be
13 regulatory history.

14 MEMBER RICCARDELLA: Thank you.

15 MR. RECKLEY: Just one example.

16 While not totally independent, because
17 they were both started in 2012 and not fully
18 integrated, somewhat separate, we have EA-12-049, the
19 mitigating strategies order, and much discussion that
20 that order because the reevaluated hazards weren't yet
21 available, proceeded with the most recent site flood
22 analysis. Which could range from early site permit if
23 it happened to be at a plant site that had been
24 addressed later on. Or could be all the way back to
25 the original design basis flood, depending on the

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1 history.

2 But there was a need to make progress on
3 the order. In the absence of having the reevaluated
4 hazards, compromises were made. And decisions were
5 made that we would just use the most recent site flood
6 analysis.

7 The guidance for the flooding assessment
8 and to some degree some of the initial discussions,
9 and you've heard this changes as we talk about the
10 rule making, were assumingly stayed separate and that
11 the burden for justifying any requirement for
12 addressing the reevaluated flooding hazard, fell on
13 Phase Two of the Recommendation 2.1 activity.

14 So starting from that, the decisions were
15 --

16 MEMBER SKILLMAN: Bill, there's a subtly
17 that you are communicating in the sternness of your
18 statement. Would you clarify that or explain that
19 please? That you seem to reinforce that with the
20 unique amount of energy. And I'm trying to understand
21 why.

22 MR. RECKLEY: Well, it's because it goes
23 to the discussion that we were having earlier. If you
24 are going to put the burden on Recommendation on 2.1
25 Phase Two, you can say that that process one, is going

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1 to take longer as we've talked. That's probably a
2 safe assessment.

3 It may identify plant changes that are
4 justified and made. But you also have to recognize
5 the possibility that the reevaluated hazard would not
6 result in a regulatory requirement.

7 So the picture that comes immediately to
8 mind, and we brought this up at the Subcommittee, is
9 that because of the way we proceeded with this, right
10 now to comply with the order -- and licensees aren't
11 doing it, but in terms of a regulatory requirement,
12 they could put the mitigating strategies at the same
13 level as their safety related equipment, even though
14 they have evaluated hazards that show that that level
15 would be flooded.

16 That made a certain amount of concern that
17 we didn't want that to be the end state. That we
18 wanted at least again, one level of protection for
19 that reevaluated hazard. And that's basically then
20 why we go to the proposal in the COMSECY that you have
21 at least one success path for the reevaluated hazard.

22 And --

23 MR. BOWEN: Put plainly, the example that
24 Mr. Webster went through earlier this morning, on the
25 current path, the requirement would be that they

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1 develop their mitigating strategies for the last
2 information they had, which was before their
3 reevaluated hazard. Now they have additional
4 information.

5 On the path that we were on, it would be
6 incumbent upon going to the backfit process to have
7 them change their strategies to address that new
8 information. There is severity in which --

9 VICE CHAIRMAN RAY: But the requirements
10 required is a matter of adequate protection. But time
11 is of the essence here, so yes.

12 MR. RECKLEY: So the fact that that
13 becomes a regulatory requirement does feed back into
14 our assessment of other changes that might come out.
15 But under this proposal, everything else would
16 basically stay intact.

17 So you would still do a total plant
18 assessment. You would -- to look for what other items
19 might warrant a regulatory requirement.

20 The concern, and this again, this is what
21 we go to, the concern with that is that if you are a
22 licensee looking and saying I don't know what the
23 NRC's going to do in terms of adequate protection. I
24 don't know what they're going to require. They don't
25 have well defined decision criteria. The net result

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1 of that is I'm going to pencil-whip the reevaluated
2 hazard and try to make sure that it is low enough that
3 I won't be prompted to do anything under the backfit
4 process.

5 And that's the concern that has been
6 expressed. And as Mike mentioned earlier, whether you
7 want to call it paralysis by analysis. Or you just
8 want to say we've been down this road before with
9 other generic issues. That we get into this mode
10 where licensees understandably say, if you're not
11 going to tell me what you're going to do with the
12 output, I'm going to make sure that the input
13 minimizes my chance of having to do something I think
14 is unnecessary.

15 MEMBER BALLINGER: But that implies a
16 mistrust.

17 MR. RECKLEY: I've had -- I actually think
18 it's human nature.

19 MEMBER BALLINGER: I mean the element of
20 mistrust eventually.

21 MR. RECKLEY: Well, but to say --

22 MEMBER BALLINGER: That they won't -- wait
23 a minute.

24 MR. RECKLEY: Yes.

25 MEMBER BALLINGER: That they won't do

1 something to solve a problem which they clearly know
2 exists.

3 MR. RECKLEY: Well, but this is the
4 dilemma is that there's not a mutual agreement on the
5 level of the problem. I would agree with you if they
6 agree there's a problem, I have not encountered
7 licensees wouldn't fix it. But the degree to which
8 you characterize this as a problem is not the same.

9 VICE CHAIRMAN RAY: And no, I agree with
10 Bill entirely on this one. Having pencil-whipped
11 things myself, I --

12 MR. BOWEN: It's more, to be a little bit
13 more fair, it's also the aspects that were discussed
14 earlier about the, you know, the example from North
15 Anna, the 29 inches in six hours. It's for the sake
16 of expediency of the process, it's a conservative
17 assumption yes.

18 For the purposes of going through the
19 backfit process, it's not an appropriate number is
20 what licensees would say. And I think we would agree
21 with.

22 MR. FRANOVICH: We would iterate back and
23 forth until we refined to a point say we have a mutual
24 understanding. Which is inherently a lengthy process.
25 If you don't agree from the get-go whether or not the

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1 hazard really is legitimate.

2 MR. BOWEN: The process would drive us to
3 do more correct analysis I guess.

4 MEMBER SCHULTZ: For the Committee,
5 because we have six minutes. And Bill's walking
6 through --

7 MR. RECKLEY: Right. And I've only got
8 one more.

9 MEMBER SCHULTZ: I know, but you're
10 walking through a process here.

11 MR. RECKLEY: I know. Right.

12 MEMBER SCHULTZ: And I don't want to get
13 to the end and then have run out of time.

14 MR. RECKLEY: Okay. So then -- so what is
15 the concern? The concern is why we're pencil-whipping
16 the evaluated hazard. You're not making progress
17 because that reevaluated hazard was to be an input to
18 mitigating strategies.

19 And as we're talking about how to
20 calculate the reevaluated hazard, results in a delay.
21 So that is really the management concern that drove in
22 large part the initiation and the development of the
23 concept.

24 So, now this is the one I'm really going
25 to regret. But this is trying to say how the COMSECY

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1 envisions this. And you can compare it to one slide
2 ago, where basically you would say, you can have the
3 reevaluated hazard be mitigating strategies.

4 Again, there's a general agreement on how
5 this happens. Except with the concern that the mode
6 that we're currently in is going to result in problems
7 in agreeing on what the reevaluated hazards is.

8 So what the COMSECY envisions and I think
9 what you heard from industry a little bit this morning
10 was, that if it is understood that the test that is
11 being applied to the reevaluated hazards is the
12 success path for a mitigating strategy, that is
13 something we can agree on, industry and regulatory.
14 And we can move forward.

15 Because they know -- they can understand
16 what they're comparing the reevaluated hazard to.
17 Right, it's a classic, I have a design, I have a
18 hazard, I know how to do the comparison to see if I
19 have -- where I need to develop some enhancement to
20 try to fix it.

21 Now where the COMSECY differs from some
22 other proposals where we would just do this and let
23 everything else the same, is it brings in the
24 judgement of the staff as to when, based on the
25 reevaluated hazard -- this is what I tried to describe

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1 earlier. All of these things, we deal with routinely.

2 Reevaluated hazards, frequencies, plant
3 histories, plant locations, regulatory histories. To
4 make a determination as to whether we think the
5 outcome is likely. Taking the example, we may not say
6 29 inches in six hours is something that would prompt
7 us.

8 Now within those broader discussions, a
9 licensee and the staff might have said, well, gee 29
10 inches in six hours is maybe on rou -- is
11 conservative. But that plant might enter into some
12 kind of problem at ten inches in six hours.

13 Well, if we have that kind of insight that
14 the -- that a lesser hazard might be a problem, we
15 could say do we think the lesser problem might come
16 out the backfit process such that it warrants --

17 VICE CHAIRMAN RAY: Do you have any
18 confidence you're going to do that? I mean just like
19 licensees behave in their self interest, staff does
20 too. And this is a job that needs some stimulus to be
21 undertaken it seems like.

22 MR. RECKLEY: Well, I would say that the
23 primary way you'll know is because we're telling the
24 Commission we're going to disposition this and
25 document our decision. When I tell you that you know,

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1 that I have not been here long enough that maybe we
2 didn't do such good jobs on some of these things,
3 there's probably histories.

4 But I can tell you that what we're telling
5 the Commission in the COMSECY is we're going to
6 evaluate this. We're going to come to a conscious
7 decision. We're going to document that decision. And
8 I'll be honest, that's about all. That's about as
9 good as I can do.

10 VICE CHAIRMAN RAY: All right. All right.
11 That's fair enough.

12 MR. RECKLEY: So that basically is then
13 what I think is the primary difference. And I didn't
14 want to make this about the nonconcurrences, but the
15 primary difference between what the COMSECY is
16 proposing and what the nonconcurrency is proposing is
17 that the COMSECY is saying the staff will make a
18 judgement call -- well one thing, mitigating
19 strategies is a requirement under the rule.

20 Then following that, the staff will make
21 a judgement call as to how much further to pursue
22 matters on a plant specific basis. Whereas the -- if
23 you left it kind of as it is, all of those would be
24 done under the integrated recycling process. I'm
25 sorry.

1 MEMBER BLEY: Well, you just said
2 something at the end that upset my --

3 MR. RECKLEY: I should have stopped.

4 MEMBER BLEY: In the COMSECY you say we
5 don't need to do the integrated assessment anymore.

6 MR. RECKLEY: Yes.

7 MEMBER BLEY: To the extent it was laid
8 out in --

9 MR. RECKLEY: Yes, I'm sorry.

10 MEMBER BLEY: ISG-105 or whatever the heck
11 it is.

12 MR. RECKLEY: Yes, yes.

13 MEMBER BLEY: And I thought I was hearing
14 you say instead of that, to see if there's anything
15 beyond protecting the mitigating strategies, will be
16 a judgement call seeing if something looks like it
17 might be funny. But then you added on at the tail
18 end, the integrated assessment process.

19 And I'm not sure what that means to you
20 now, I mean.

21 MR. RECKLEY: And I should say -- and I
22 should -- and this is the same problem I had this
23 morning that --

24 CHAIRMAN STETKAR: Bill, before you answer
25 that, answer it in the context under the presumption

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1 that the mitigating strategies in regulatory space are
2 guaranteed to always work. They're guaranteed to
3 always work. By definition they're guaranteed to
4 always work.

5 If they're protected against the hazard,
6 they will always work. Even if I have the flimsiest
7 piece of single piece of equipment there, they are
8 guaranteed to work.

9 MR. RECKLEY: I'll address what I have --

10 CHAIRMAN STETKAR: So both of those --
11 under that assumption, then how do you justify
12 completing that process?

13 MR. RECKLEY: First of all, my tongue
14 slipped. I shouldn't have said integrated assessment,
15 I should have just said what the slide says, which is
16 assessment, right. Because there would be a
17 difference between what we pursue if we decided to go
18 forward on an evaluation of a backfit.

19 MEMBER BLEY: And that's kind of
20 undefined?

21 MR. RECKLEY: It would be plant and
22 scenario specific, because that's what we're going to
23 be facing. We're going to be facing a decision on a
24 scenario and a plant. And so we would have to do it
25 on that basis.

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1 So -- but I shouldn't have said integrated
2 assessment. It will be an assessment that may have a
3 lot in common with integrated assessments. But
4 depending on the scenario and the plant, maybe not.

5 Going to Dr. Stetkar's, I wouldn't
6 characterize our assumption ever being that we'll
7 guarantee stuff will work. We're only benefitting
8 capabilities to address a reevaluated hazard and make
9 sure those capabilities would be available faced -- if
10 the plant were faced with that reevaluated hazard.

11 Beyond that, it's got the same kind of
12 reliability that -- you wouldn't say that the ECCS is
13 guaranteed to work. Otherwise we you know, we would
14 have stopped a long time ago. Obviously, we can't say
15 things are guaranteed to work.

16 We'll make sure the capabilities are in
17 place. We'll make sure the licensees have the
18 programs, the staffing, all of the programmatic
19 controls that will be part of the rule, will be part
20 of the guidance to make sure that that is going to be
21 as successful as we can make it.

22 But I don't -- we're not entering into --
23 if we were to enter into it with just the absolute
24 assumption it always works, we would never have to go
25 outside that decision box. We'd just stay in Phase

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1 Two. Because we'd basically almost say, we always
2 have a guarantee of success.

3 That's not going to be true. And so we're
4 going to look at that and see if it's a high frequency
5 event. If there's somewhere to buy --

6 CHAIRMAN STETKAR: How are you going to do
7 that Bill? It's important because I hear, and you
8 have to be careful about time. But I hear the same
9 sort of process that we walked into 25 years ago in
10 fire analysis.

11 Just -- and I'll just say that. I hear
12 that same thought -- sort of thought process. And I
13 thought we've learned more than that.

14 VICE CHAIRMAN RAY: And I had one thing
15 also, which is if we're only focused on core damage
16 frequency and not on preventing the loss of the ECCS,
17 I think the outcomes are going to be as John's
18 hypothetical would say and you affirmed, would be
19 well, there's never anything to do because we can
20 prevent core damage.

21 And the fact that we lose the ECCS and AC
22 power is not a concern. Where does that ever come
23 into the equation?

24 MR. RECKLEY: Well, it's going to come in
25 because as we look at that scenario, and again, you're

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1 going to consider frequencies and other things.
2 You're going to say if that's a high frequency event,
3 do you want to be in the position where you're losing
4 that traditional equipment?

5 VICE CHAIRMAN RAY: Right.

6 MR. RECKLEY: And if the answer --

7 VICE CHAIRMAN RAY: And you're going to
8 ask that question?

9 MR. RECKLEY: Yes.

10 VICE CHAIRMAN RAY: And not just leave it
11 to the licensee, but yours.

12 MEMBER SCHULTZ: Let's go back to your
13 last slide and point the path.

14 MR. RECKLEY: Basically, as we go through
15 the process, again the COMSECY lays out the importance
16 of this. That's the minimum. Mitigating strategies
17 will address the reevaluated hazard.

18 And then it has the second step. That for
19 each plant, we'll go through and make a determination
20 in this decision box, whether to pursue additional
21 assessments, additional regulatory actions. If the
22 event frequency is very high or we have some other
23 reason to say hey, in addition to mitigating
24 strategies, an action should be pursued, we would
25 pursue it.

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1 And we would enter into this and go
2 around. It's so --

3 VICE CHAIRMAN RAY: We're out of time, but
4 I mean we have to make comments here and decide if
5 there's any input that we have. And I'm trying to
6 understand, is there a point at which you'd say well,
7 wait a minute, we shouldn't allow this to happen? Not
8 just be sure we can mitigate it when it does.

9 MR. RECKLEY: And I think the answer is
10 there may be. And this is the difference -- the
11 difficulty you have in the hypothetical versus what we
12 really think the world is right.

13 VICE CHAIRMAN RAY: Right.

14 MR. RECKLEY: In the hypothetical, the
15 answer is definitely yes. In the real world, I'm not
16 so sure that we're going to encounter those.

17 But, we will consider the parameters of
18 frequency and severity and all of these other things
19 that we have to consider as part of a decision to
20 pursue a backfit. And we'll make a conscious decision
21 that we think it might, or it's unlikely to make that
22 result. And therefore we're going to pursue it or not
23 pursue it.

24 MR. FRANOVICH: We wouldn't assume the
25 reliability of a component in this case would be 100

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1 percent either. In any kind of cost benefit test, we
2 wouldn't assume that.

3 So if we had a high frequency event and
4 there was a single success path and we turned out, we
5 looked at that particular component of interest and
6 determined it had lower liability, let's say it was
7 only 50 percent reliable. We would try to balance
8 that in some type of analysis to show how does that
9 really weigh in? Maybe the reliability component
10 needs to be improved. Maybe there needs to be another
11 success path.

12 CHAIRMAN STETKAR: But only if you pass
13 the arbitrary core damage frequency screen --

14 MR. FRANOVICH: Right.

15 CHAIRMAN STETKAR: For that backfit. Only
16 if you pass that would you.

17 MR. FRANOVICH: It would have to be
18 reflected and vetted in the baseline CBO.

19 MEMBER SCHULTZ: Other questions by the
20 Committee? I'd like to move onto the next
21 presentation.

22 (No response)

23 MR. SCHULTZ: Thank you very much. I
24 appreciate the information and the update.

25 Our next presentation is differing view.

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1 And we have the presenters that are here. Hi Suzanne.

2 Suzanne, are you going to lead the
3 discussion?

4 MS. SCHROER: No.

5 MEMBER SCHULTZ: All right.

6 MS. SCHROER: Shelby will be.

7 MEMBER SCHULTZ: Fine, thank you.

8 MS. BENSI: Thanks. All right, so thanks
9 again for giving us an opportunity to speak with you
10 about our differing view on the subject COMSECY.
11 We're going to present an abbreviated version of what
12 we had -- or Suzanne had lead in terms of the
13 presentation at the November 21 Subcommittee meeting.

14 While you see just Suzanne and myself
15 setting before you, as you know, we're representing a
16 very large contingent of fellow nonconcurring
17 employees from a variety of technical disciplines and
18 multiple NRC offices. So we're going to do our best
19 to represent the team's views on this.

20 So our primary concern really centers on
21 the dismantling of the systematic and deliberative
22 process that we current -- we have in place to
23 identify whether additional regulatory actions are
24 required. This includes changes to the design or
25 licensing basis of a plant, which of course the

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1 tasking under Recommendation 2.1. And also the whole
2 reason we issued a 50.54(f) letter.

3 This is being replaced with an undefined
4 ad hoc and less rigorous approach and is eliminating
5 the information we need -- we believe is needed to
6 support regulatory decisions. It's a bit of a chicken
7 or the egg question, right?

8 They're saying well, we'll figure out if
9 we need to do an analysis. But we don't know if we
10 need to do an analysis because we don't have the
11 information to support that decision.

12 So currently Recommendation 2.1 is
13 following a well defined process. And a key
14 component of this process is the integrated
15 assessment. And when we say integrated assessment
16 here, we of course mean JLD-ISG-2012-05 integrated
17 assessment as described in our staff guidance.

18 And this is only required for sites that
19 -- for which the reevaluated hazard is more severe
20 than the design basis of the plants. So all plants
21 aren't required to do this.

22 So the integrated assessment is a
23 systematic, flood specific and graded approach that
24 will allow us to understand several things here.
25 First is the impact of the reevaluated flood on plant

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1 safety. And understand -- and this has all sort of
2 been alluded too in the previous presentations. On
3 understanding the potential vulnerabilities and cliff-
4 edge effects.

5 This is important, Bill had noted in his
6 presentation that you know, while you know, we use
7 these artific -- we use these stylized events for
8 defining of a reevaluated hazard, the event that is
9 consequential to the site may be something
10 significantly less then that due to cliff-edge
11 effects.

12 We don't know this if we don't do the
13 integrated assessment. We don't know this out
14 priority because we're not asking that question. So
15 the integrated assessment will allow us to do that.

16 It's going to allow us to determine
17 whether protection is adequate, identify safety
18 enhancements. This is -- is there any easy solution
19 to sandbag the entrances to the diesel generator
20 building instead of going straight to FLEX? So we're
21 going to look at those options and identify those.

22 And of course it's going to allow us to
23 gather the information we need to support a decision
24 to modify, suspend a licensee.

25 VICE CHAIRMAN RAY: Does doing those

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1 things prevent or discourage or make more difficult
2 doing the Phase One mitigating strategy
3 implementation?

4 MS. BENSI: This does not preclude Phase
5 One mitigating strategies. That can be done
6 independent of this effort.

7 VICE CHAIRMAN RAY: Because that is the
8 issue it would seem. This gets in the way doing what
9 we can do quickly and that would be beneficial to do.

10 MS. BENSI: I think you have a good point
11 there. And that's one of the things I think that is
12 being overstated, is the efficiency gained through the
13 implementation of the COMSECY.

14 So first and foremost, you have to know
15 the reevaluated hazards. So that's going to
16 bottleneck no matter what we do. So we need to
17 understand the -- that. If the Commission approves
18 the rule making to address -- to have the mitigating
19 strategies the R-2.1 hazard, that's going to be put in
20 place regardless of whether or not we perform the
21 integrated assessment.

22 It wasn't brought up that there's interim
23 actions in place. So if a licensee determines that
24 the reevaluated hazard is in excess of the design
25 basis at the time that they submit their hazard

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1 reevaluation report, we also ask them to define
2 interim actions taken across to bridge the gap while
3 we perform the integrated assessment.

4 So those are already in place. I also
5 don't know that there's this guarantee that there's
6 not going to be refinements to the hazard. Backfit
7 has never been taken off the table. So there is
8 always going to be that issue out there. So I don't
9 know why we're guaranteeing that licensees aren't
10 going to perform further refinements to the hazards in
11 response to the approach in the COMSECY.

12 The other thing I think we need to notice
13 is a staggered approach. We keep talking about we're
14 pushing out 2017 deadlines. The first set of
15 licensees were due to have their integrated assessment
16 submitted this March. The next set in March 2016, and
17 the next set in March 2017.

18 So the notion that we are going to be
19 pushing this out for all licensees is just not
20 accurate. We've always intended to have these grouped
21 and staggered in. And so had we not -- had we been
22 proceeding on our path as currently projected, we
23 would have a good portion of the sites submitting
24 their integrated assessments this March or maybe with
25 a slight delay.

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1 But we're not talking 2017. So --

2 MR. MITMAN: If I could add something that
3 Shelby talked about briefly. Under the current
4 regulatory regime, the order EA-12-049, requires that
5 the licensees put in place mitigating capabilities.
6 And for the most part as was discussed previously
7 today, a lot of that work is already done.

8 So that's there today. And that was
9 intended to protect the plants against beyond design
10 basis external events. Now that capability will not
11 be ignored if it's ever needed to respond to a design
12 basis event.

13 So a layer of protection as has been
14 discussed before has already been put in place. Now
15 under the current regime, the second step was the
16 Recommendation 2.1 which required that the licensees
17 go out and revisit the flood hazard and look to see
18 whether something more substantial should be done,
19 okay.

20 That's in my opinion where the big change
21 is being made or proposed under the COMSECY. Is that
22 that -- under 2.1 flooding, which I think the
23 direction was to revisit what I would call the design
24 basis, not beyond design basis, but the design basis,
25 to take a look at that. Revisit that based on the

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1 insights from Fukushima. That the design basis of
2 Fukushima was inadequate, okay.

3 So under 2.1 and in my frame, you re-look
4 at the design basis to see whether it has to be
5 changed or not. And what the COMSECY is suggesting is
6 that we forego that look back at where the split
7 between design basis and beyond design basis is. And
8 we don't have to go back and look at whether we need
9 to beef up the design basis.

10 Now if there are design basis issues, then
11 in my opinion, a FLEX like approach is not enough.
12 You know, a single commercial grade or two or three
13 commercial grade pumps stored in protective locations
14 is not the same as an ECCS. It's not the same as
15 safety grade diesels and multiple electrical
16 distribution systems.

17 VICE CHAIRMAN RAY: Okay. One thing you
18 left out though I believe is that in the COMSECY
19 approach, we get the mitigating equipment, mitigating
20 strategies equipment upgraded to the reevaluated
21 flooding hazard. At least that was my understanding.
22 It wasn't just to the current design basis.

23 MS. BENSI: Correct.

24 VICE CHAIRMAN RAY: One of the appeals, if
25 I can say it that way, is at least the notion that

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1 that's now on the table to be ordered.

2 MS. SCHROER: And I think that that's
3 something -- that's a good point. And in the
4 nonconcurrence we actually wrote that we support
5 protecting the mitigating strategies --

6 VICE CHAIRMAN RAY: Understand.

7 MS. SCHROER: Equipment up to the
8 reevaluated hazard. So that's not something that you
9 know, we have a problem with the COMSECY. We think
10 that's a really good step forward.

11 MS. BENSI: And they're often treated as
12 mutually exclusive for some reason. And that's a
13 troubling point I think.

14 MEMBER RICCARDELLA: You know, I question
15 -- you seem to be saying well the COMSECY eliminates
16 the integrated assessment. And I judge what I heard
17 this morning from industry was that it's not that
18 they're eliminating the integrated assessment, they're
19 just doing it differently than ISG-12-05.

20 And specifically what I thought I heard
21 them say was well, we're going to -- 12-05 requires
22 you to evaluate all plant SSCs. And they said well,
23 we're only going to evaluate the SSCs that are
24 essential to containment and for core cooling
25 capability.

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1 So they are doing somewhat of what they
2 call an integrated assessment. It's just a different
3 integrated -- just a -- perhaps a little less
4 comprehensive than the one that we're asking for here.

5 MR. MITMAN: Well, we've got a little bit
6 of a moving target problem here. You know, the
7 nonconcurrences were written, I don't know, six weeks
8 ago. And the industry is I think starting to respond
9 to that.

10 So what we saw today is not in 12-06 today
11 that's been endorsed -- written by NEI and endorsed by
12 the NRC. It's a new revision to NEI-12-06 that the
13 staff hasn't -- I don't think the staff has seen yet.

14 So we don't know what's in that. And so
15 we're a little bit at a loss to how to respond. But
16 --

17 MEMBER RICCARDELLA: So but maybe we are
18 moving in somewhat to a -- to some middle ground here.

19 MS. BENSI: Because see I think in a part.
20 But you said it's not as comprehensive. But there's
21 more than just comprehensiveness. There's rigor. You
22 know, there's the systematic approach.

23 MEMBER RICCARDELLA: Yes. I don't know if
24 you were here this morning, but I asked them were they
25 going to do a peer review?

1 MS. BENSI: Yes.

2 MEMBER RICCARDELLA: Were they going to do
3 Appendix B and they said no. But they are going to
4 submit it for review.

5 MS. BENSI: Yes. You know, and I think
6 though that there's an important distinct -- you know,
7 you submit it for review, but we have to decide on
8 what our standard of review is, right? And you know,
9 in the sta -- the interim staff guidance outlines
10 that.

11 And I'll give an example, the evaluation
12 of manual actions in accordance with the FLEX
13 validation guidance is not as rigorous as the Appendix
14 C evaluation. It uses a feasibility target. Not a
15 reliability target. That's a very different
16 threshold.

17 And so I think you know, we have -- those
18 specific technical details are very important. And
19 even if they submit it for staff review, I'm concerned
20 about what we're going to use in order to review that.
21 And if it's going to deviate significantly from what
22 the technical experts have said today.

23 MS. SCHROER: And I would just like to
24 point out that on enclosure two of -- page one of
25 enclosure two of the COMSECY, and I mentioned this in

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1 the Subcommittee briefing, that it does say focusing
2 the flooding reevaluations on the SSCs serving key
3 safety functions within the mitigating strategies
4 could in many cases improve the efficiency of the
5 NRC's regulatory process by eliminating the need for
6 a broader assessment of the plant response as
7 described in current plans and staff guidance for
8 integrated assessments.

9 So it's kind of buried back in the
10 enclosures. But that is definitely the intent.

11 MS. BENSI: All right, so you had cued in
12 here and we're talking about the fact that the COMSECY
13 eliminates, removes the assessment. We're not longer
14 systematically considering flood protection of safety
15 related equipment, EDGs as an example there, we are
16 not performing a flood specific evaluation mitigating
17 and you see that asterisk's there.

18 And so it has been alluded previously,
19 when we say mitigating under the integrated
20 assessment, this is not synonymous with mitigating
21 strategies. Mitigation is defined more broadly than
22 mitigating strategies.

23 This is an important point. You know, we
24 view it commensurate with the use of miti -- if they
25 were to credit any portion of mitigating strategies,

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1 it would be reviewed commensurate with issues as a
2 first line of defense against the reevaluated hazard.

3 The COMSECY approach of course results in
4 these non-safety related mitigating strategies as
5 prescribed in the order as the only defense against
6 the reevaluated hazard. This includes the potentially
7 less severe, more frequent event.

8 So we keep talking about the reevaluated
9 hazard which comes from these stylized events. But
10 having -- keeping in mind that there may be consequen
11 -- significant consequences to plants at more
12 frequent, less severe events.

13 Jeff brought up, looking at comment
14 earlier today that there was a plant that loses its
15 ECCS at a flow half of the PMF. So I think that's an
16 important consideration. It's something we will not
17 know without the performance of the integrated
18 assessment.

19 A couple of notes there that I wanted to
20 draw your attention to, is that the reevaluated
21 hazards are based on present day design basis methods.
22 You know we refer to these as beyond design basis
23 events. And it's sort of a chronological distinction.
24 These are design basis methods.

25 The other thing we need to -- I think is

1 important to emphasize, is that some of these events
2 that are more severe than the design basis are the
3 same events that are appearing in the FSAR. It's just
4 we've reevaluated that event and found out the flood
5 is higher or there's more debris.

6 So these -- you know, we call them beyond
7 design basis events, but keeping in mind the context
8 and the fact that these may be the same events that
9 are part of the current design basis of the plant. We
10 just -- you find new methods -- you know, new tools in
11 developing more severe flood events.

12 The other note you'll see there is that
13 you know, mitigating strategies were intended to be
14 additional defense in depth for these beyond design
15 basis rare events. We're now proposing to use them as
16 the primary first line of defense against this
17 reevaluated hazard based on design basis methods.

18 And so we think -- that's the crux of the
19 matter is that we believe they need to be reviewed --
20 even if mitigating strategies does become the
21 solution, it needs to be reviewed in a way that's
22 commensurate with that use.

23 And then you just heard the presentation.
24 We talk about this undefined approach. This well,
25 don't worry, we've got something in our back pocket we

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1 can always use later. We don't have confidence in
2 this undefined approach.

3 We believe it relies on an undefined staff
4 process to initiate regulatory action. It assumes
5 that we already know what plants have problems without
6 doing an evaluation to ascertain that information.
7 And in the end, if the approach is taken as described
8 in the COMSECY, we just won't -- we don't believe
9 we'll have sufficient information to know whether a
10 regulatory decision is needed in order to modify,
11 suspend or revoke a license in accordance with the
12 50.54(f) letter.

13 VICE CHAIRMAN RAY: So the picture that
14 ends in a box called disposition, presumably a written
15 disposition, that's what we're talking about now.
16 What is the process for getting there?

17 MS. BENSI: And you don't know what you
18 don't know.

19 MEMBER SCHULTZ: Well, but all of what you
20 described in terms of identifying the hazard and
21 performing an evaluation pre or post or -- can be done
22 anywhere along the way. But the way it's described in
23 the COMSECY is it's done as part of the process.

24 MS. BENSI: It was -- I'm confused by the
25 question. Because it first requires --

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1 MEMBER SCHULTZ: The charge that we just
2 showed --

3 MS. BENSI: Yes.

4 MEMBER SCHULTZ: It did show an assessment
5 process as an integral part of the overall evaluation.

6 MS. SCHROER: And I think that's a great
7 point Dr. Schultz. Because that process that was
8 depicted on the slides that you just saw, is not at
9 all discussed in the COMSECY.

10 So there's been this illusion that there
11 will be you know, this defined process. But when you
12 actually read the COMSECY, it says it's going to be on
13 a case by case basis, scenario specific like Bill
14 mentioned.

15 So if there is a clearly defined process
16 within the COMSECY, I think that we would be -- maybe
17 have a little different opinion. But since it's so
18 vague in the actual COMSECY, there's no confidence
19 that it will be implemented in such a structured way.

20 MEMBER RICCARDELLA: And you're referring
21 to the latest version of the COMSECY that was
22 submitted?

23 MEMBER SCHULTZ: Yes, I didn't find it
24 that vague. But I think that perhaps I'm depending
25 upon the extra clarity that was provided this morning.

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1 But what you're saying is that it -- if
2 it's not sufficient clear that it's an integral part
3 of the overall process. That staff reviews associated
4 with the process described in the COMSECY is
5 insufficient in your view.

6 MS. BENSI: I think that the crux of the
7 matter is whether we would have sufficient information
8 at that point in order to perform that evaluation. So
9 you -- all we would have at that point would be the
10 reevaluated hazard. We would know what the
11 reevaluated hazard is. But we would not have accessed
12 the impacts of that on the plant.

13 So it's -- you're actually putting this
14 decision point in before you perform the assessment of
15 the impacts of that flood on the plant. And so it's
16 a bit -- it's the issue is about you know, do we have
17 sufficient information at that point to inform a
18 regulatory decision.

19 MS. SCHROER: And I think one thing that
20 Bill just mentioned that was a little confusing for
21 me, is that he said one of the reasons that this
22 COMSECY was initiated was because it was -- there was
23 this fear that we would get to the end and not be able
24 to make a regulatory decision because we wouldn't have
25 the information in that little box that was on the

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1 side.

2 But I think the COMSECY approach proposes
3 that we use less information to make a regulatory
4 decision. So I think that's the concern here.

5 VICE CHAIRMAN RAY: Okay, but if -- if one
6 were to imagine, and I did ask some question about
7 this, what is the process that one uses to -- and I
8 realize this isn't in the record, but any event, I'll
9 just -- to follow this path over here in the unit
10 disposition, what is the process?

11 The answer was, well this is what we do
12 all the time. That comment was made often. Or
13 several times. What do you feel about that being
14 true?

15 MR. MITMAN: I work for NRR, okay. And to
16 take an issue, there was a short discussion earlier
17 today about a plant that had an increased flood
18 evaluation. It took a long time to get where we
19 finally got.

20 But that was an incredibly difficult
21 process to go through because there is no requirement
22 to take those actions. You know, there's a
23 presumption of adequate protection since we've
24 licensed the plant.

25 And so with that particular plant that the

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1 flooding issue a couple of years ago, you know, the
2 staff had to come forward and make the case that you
3 know, there's a problem here. And we really think we
4 need to dig deeper. And it was very difficult to get
5 the agency to move to investigate that case.

6 And so what Bill has suggested is we'll
7 just use that process. And what 2.1 Phase Two has
8 done, is it says every plant has to revisit that if
9 the hazard has gone up. Then every plant has to go
10 back and look at that.

11 And so now there's -- it's incumbent upon
12 the staff now to do the evaluation. Look at what the
13 protections and the mitigation capabilities are. And
14 decide whether that level of protection and mitigation
15 is acceptable.

16 MS. BENSI: And I would further note that
17 I think that we already have exercised that process.
18 The event at Fukushima happened. We had the NTTF you
19 know, who talked with many of the technical staff,
20 determined that this type of action was needed.

21 That was then followed up on by subsequent
22 actions by the staff in communications with the
23 Commission. And in the end we said, this you know, we
24 have a basis to go forth and ask this question.

25 So I think -- I would argue that we've

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1 already exercised that process. And our technical
2 staff has come to the conclusion along with managers,
3 that this is the appropriate path forward.

4 So I would say that we've already
5 exercised the process that we have in place to kind of
6 see.

7 MS. SCHROER: And I would just say not
8 just the technical staff, but also we had several
9 communications with industry developing that process.
10 Shelby and I were talking the other day and I think we
11 have something like 12 public meetings.

12 MS. BENSI: 14.

13 MS. SCHROER: Oh, 14 -- big industry --

14 MEMBER BLEY: At the Subcommittee meeting,
15 Jeff described the integrated assessment as a graded
16 one. And said it already does that.

17 Some folks from industry have indicated
18 they don't think it's sufficiently graded. That it
19 pushes you to do a lot of work in cases where the
20 potential scenarios might be much more easy to handle
21 or describe or maybe they're not that far beyond their
22 original design basis. And some simpler approaches
23 could be applied.

24 Do you have any thoughts about that?

25 MS. BENSI: So the integrated assessment

1 is graded. So if you're -- if we're talking about
2 conventional flood protection permanent passive
3 barriers, we're talking about conventional engineering
4 evaluations of that flood protection, including
5 crediting what you've already got on the books to the
6 extent that it's applicable. And as you move towards
7 less conventional strategies, higher reliance on
8 manual actions, the burden does increase.

9 We still think that we're in the right
10 place. We have asked industry a number of times at
11 public meetings and said if something is coming across
12 in that guidance as unnecessarily onerous, please
13 bring that specific text to our attention so we can
14 make sure that everybody's interpreting it
15 appropriately.

16 So we have not had that communication with
17 -- no matter how many times we've asked that, almost
18 every public meeting that this has come up, we've
19 asked for specific examples. And we have not received
20 specific examples of what is causing things to be
21 unnecessarily onerous.

22 So you know, we don't intend it to be
23 unnecessarily onerous in simple cases. So we had some
24 examples that industry has developed that seemed to
25 exercise that graded approach you know, simple cases

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1 had simple evaluations. And the complex case had a
2 much longer evaluation. So it seems to be working in
3 the sense that we are seeing a graded approach.

4 So I guess that's where I stand.

5 MR. MITMAN: I think, if I could add to
6 that please. If there are ways to streamline the
7 process, I don't think there's anybody on the staff
8 that would argue with faster, easier, cheaper ways to
9 do the process.

10 But I think what's being proposed in the
11 COMSECY is to throw the baby out with the bath water.
12 It's -- what you've got is too hard. Let's not do
13 anything. Let's just use FLEX. Protect it against
14 the hazard and call it a day.

15 To me that's not enough.

16 MEMBER CORRADINI: You answered my
17 question. And so let me ask one final one which is,
18 so North Anna was brought up as an example this
19 morning. Has that been looked at by the staff? Or
20 has that been officially submitted yet?

21 MS. BENSI: It has not been officially
22 submitted as an integrated assessment.

23 MEMBER BLEY: Have any?

24 MS. BENSI: We have one integrated
25 assessment that was submitted. The licensee opted to

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1 submit it right along with their hazard reevaluation
2 report.

3 MEMBER REMPE: And were you given a copy
4 of it?

5 MS. BENSI: Yes. But they're not official
6 -- they were not officially -- were not officially due
7 until March 2015. And as I think you know, that
8 there was a letter that was issued that granted a six
9 month extension on that.

10 MEMBER SCHULTZ: That is not dispositioned
11 yet? That's not gone through your process. It's been
12 submitted.

13 MS. BENSI: Correct. We have been asked
14 to pause that process.

15 MR. MITMAN: And I think you know, I don't
16 know where North Anna sits on the spectrum of
17 protection and mitigation capabilities. But I have a
18 high degree of confidence that it's not on the bad end
19 of the spectrum.

20 And to come in and use a plant that they
21 know is pretty well protected already and to try to
22 use that as an illustration about how the whole
23 industry should respond, I think is insufficient.

24 MEMBER SCHULTZ: Other questions from the
25 Committee? You have one more slide. But I think it

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1 says summary slide that's there now.

2 MS. BENSI: Yes, this was -- this slide
3 simply summarizes our concerns.

4 MEMBER SCHULTZ: We saw that in the
5 Subcommittee meeting that points to the five and six
6 as the key elements that you wanted to focus on. I
7 think you've done a good job doing that today. Thank
8 you.

9 MR. MITMAN: Could I add one last point?
10 There's a lot of talk earlier today about doing --
11 looking at the frequency of the events. Under
12 mitigating strategies, under 2.1 as it currently
13 exists with the integrated assessment, there's no
14 requirement to look at frequencies.

15 As a PRA guy, I'd love to see frequencies.
16 I'd love to see a hazard curve. But there's currently
17 no plans and no direction and no requirement that the
18 industry do that.

19 MS. BENSI: And we structure the
20 integrated assessment with knowledge of that
21 limitation. But also to provide us with the
22 information that would be useful if we needed to go
23 down the backfit route.

24 So that was always in the back of our mind
25 when we structured the guidance.

1 MEMBER SCHULTZ: Thank you. We have one
2 more presentation.

3 Gary also provided his presentation -- or
4 a presentation to the Subcommittee. And we had a
5 longer time to discuss your comments and thoughts and
6 recommendations Gary.

7 We'd like to give you the opportunity
8 again to summarize that for the Committee because not
9 everyone in the room was present at that presentation.
10 And we want to get it on the record again. Or any
11 other thoughts that you might provide today.

12 MR. HOLAHAN: Thank you, very good. And
13 with me is Scott Flanders, who is the Division
14 Director responsible for flooding and seismic
15 assessment in most of these things you've heard today.

16 MEMBER SCHULTZ: Thank you.

17 MR. HOLAHAN: And he and I and our office
18 director, Glen Tracy, submitted a nonconurrence on
19 the paper as it existed in I think around the 10th of
20 November. So in part, there are some differences
21 between the official paper that everyone has
22 publically available and the version that was non-
23 curative.

24 So I thought I would touch upon that.
25 Because that's something that we didn't have at the

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1 time of the Subcommittee meeting. So I'd just like to
2 start with thanking the Committee for the opportunity
3 to speak to them. This is a very important issue, not
4 just because flooding and external events are
5 important, but also because there's quite a lot of
6 regulatory philosophy involved in the changes that are
7 going on.

8 To me some of it is unfamiliar
9 interpretations of regulatory requirements and
10 mitigation in place of protection. And beyond design
11 basis in place of design basis, of look like strange
12 regulatory thoughts. And I think that's part of the
13 reason that a nonconcurrence at this level, at the
14 senior management level is unusual.

15 I think usually issues are worked out if
16 it's a matter of what is the most efficient or
17 sufficient way of dealing with technical issues.
18 Those can usually be worked out.

19 I think this nonconcurrence in a way
20 represents a matter of principal. There are some
21 regulatory and safety principals at stake here that I
22 think couldn't be compromised. And I think that's why
23 it's unusual, but an important to state these
24 positions.

25 I have the same slides I presented with

1 the Subcommittee, but I propose to go three times a
2 fast through. The next one -- the next slide please.

3 CHAIRMAN STETKAR: You -- you --

4 MR. HOLAHAN: Oh, I have them? Oh, wait,
5 and make sure we have this. I was trained the last
6 time, okay.

7 CHAIRMAN STETKAR: Remember, this is lean
8 and mean.

9 (Laughter)

10 MR. HOLAHAN: Just a reminder that the
11 Near Term Task Force recommendations were for safety
12 through defense in depth. In fact that's even the
13 name of the chapter where all of these requirements or
14 recommendations reside.

15 And the recommendations were spanning
16 protection, some say prevention of events. But
17 usually we say protection from external events.
18 Mitigation, dealing with severe accidents. And
19 emergency preparedness. It's -- next.

20 So this is meant, and it was meant to be
21 a collection of recommendations with defense in depth
22 in mind. The Task Force recommendations do see the
23 value of mitigation strategies. And there's -- but
24 they don't see them as a substitute for prevention or
25 in fact for emergency preparedness or for any other

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1 levels of defense in depth.

2 In fact it seemed to me you could make a
3 perfectly rational argument, at least according to
4 what is presented in the SECY paper. If the
5 mitigation strategies used are so good, I don't know
6 why we are working on emergency preparedness
7 improvements either, right?

8 So either you're looking at a full range
9 of defense in depth or you've picked on and you're
10 going to rely on it at the expense of what you might
11 do in others. But also remind the Committee that not
12 only with the Committee's input and other stakeholder
13 meetings, the Commission did support the full range of
14 Task Force defense in depth recommendations either
15 through orders, rule making or at least for the
16 information requests that you've heard for 50.54(f)
17 for the 2.1 issues.

18 Okay. And what you heard about this
19 morning was how the COMSECY proposes to change what
20 was the path that the staff was originally on. And it
21 in fact limits the way flooding events were dealt with
22 by focusing -- and I think the paper even uses the
23 word like primarily focusing, in fact it's mentioned
24 over and over again, that the refocus of the flooding
25 concerns is on mitigation strategies.

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1 At the draft -- at the nonconcurrent
2 stage, and in fact even the "white paper" that was
3 presented to the Committee in its meetings in
4 November, I think we would interpret that that was
5 pretty close to eliminating the systematic
6 reconsideration of external events.

7 One difference between the paper as it was
8 discussed before and as it has finally come out is,
9 there is further discussion of the need -- and it's a
10 new section in the paper actually, which talks about
11 -- it's on page eight if you ever want to look at it.
12 It says the staff will address as a separate matter,
13 the existing design basis and licensing basis for
14 flooding and to see if it continues to be acceptable.

15 So there -- presumably that sounds like
16 looking at prevention. It says it will be done
17 through the backfit process. It then goes on to say
18 that we will include the effectiveness of what was
19 done in mitigation strategies to make some judgement
20 about that. Which seems to be they're mixing these
21 issues again, right?

22 So either you're going to judge the design
23 basis, the importance and the value and the
24 appropriateness of protecting the plant against floods
25 on its basis. Or you're going to use mitigation as a

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1 substitute.

2 And the paper -- part of the difficulty
3 with the paper, is it's a bit confusing. And in fact
4 I think even the presentation -- sorry Bill, and these
5 are all staff that I work with very much and I know
6 very well. But I think this paper is inherently
7 confusing on how it deals with some regulatory issues.

8 It treats backfit in an odd way. In one
9 sentence it will say of course backfit means adequate
10 protection and compliance and cost justified. And in
11 the next sentence the compliance and adequate
12 protection are never seen again. And we're very close
13 to you know, back to cost justified.

14 You heard the answer to questions. We're
15 going to be talking about ten to the minus something
16 and safety goals in judging protection. Well, that's
17 not entirely -- Mr. Flanders has been --

18 MR. FLANDERS: Not intentionally.

19 MR. HOLAHAN: Been elevated to yellow-card
20 status pretty good.

21 CHAIRMAN STETKAR: He now officially
22 exists.

23 MR. HOLAHAN: He's been yellow-carded.

24 MEMBER CORRADINI: Ah, now but it's got to
25 work.

1 MR. HOLAHAN: Yes. Yes. Very good.
2 Well, he's going to say he agrees with you. But yes,
3 that's right.

4 So I think -- I would comment on the
5 current paper in a different way from the second
6 bullet. Rather than say it eliminates the systematic
7 reconsideration. I'm still not sure there's
8 systematic reconsideration. There is a commitment to
9 do something, to address in some way every plant that
10 has a flooding reevaluation beyond its design basis.

11 But I think it's fair to say it's a less
12 defined, maybe ill-defined process. It's certainly
13 not the integrated assessments that were -- that were
14 discussed this morning.

15 So it moves from a more defined to a less
16 defined process. And it's not to say that a -- such
17 a process couldn't be developed. Perhaps one that's
18 more efficient than the current path. These are all
19 possibilities. But I just don't see them ever being
20 worked out.

21 VICE CHAIRMAN RAY: Gary, this is the same
22 matter I was asking about at use?

23 MR. HOLAHAN: Yes. Absolutely.

24 VICE CHAIRMAN RAY: Okay. Just want to
25 make sure I'm -- hearing you talk about the same thing

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1 I was.

2 MR. HOLAHAN: Absolutely. And you asked
3 the question at the Subcommittee, I thought it was
4 quite appropriate to say how does backfit fit into all
5 these arguments? And what does backfit mean?

6 And so long as you think that -- if you
7 think that backfit means cost justified backfit, you
8 see this whole issue in a different light, which says
9 I'm going to do something to reduce risk. I'm going
10 to pick the thing that costs the least and has the
11 most effect.

12 But if you think that adequate protection
13 and compliance with the licensing basis of a plant is
14 important, and the reason it's important is because
15 it's a fundamental element of defense in depth, then
16 I think you see an entirely different picture of how
17 you should balance these issues.

18 So I don't need to reiterate this too
19 much. Can we go to the -- I do want to make two
20 points. The nonconcurrence filed by Scott and myself
21 and Glen does specifically acknowledge that we do
22 support the idea of moving forward with the 4.2
23 mitigation strategy using the reevaluated flood level.

24 And I think you heard today, there's -- no
25 one disagrees with that. And we ought to be moving

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1 forward. You could say that some people say we
2 intended to do that all along.

3 Some people say that's a change in
4 position and that -- but it seems to me that is
5 consistent with the orders. It's consistent with the
6 expectation of the orders. It's possible that some
7 other approach to establishing a beyond design basis
8 flood could have been done.

9 You could say well look what they do in
10 Japan, they say 15 meters, high flood and just
11 everyone does the same thing. I think this is
12 entirely a reasonable and rational approach to
13 establishing a mitigation strategy protection.

14 But we think -- even though we think that
15 that's a good step, we think this step is not enough.
16 It's also necessary to worry about protection of a
17 plant. That's a fundamental part of the licensing
18 basis. It's in every license. It's in the
19 regulations. It is general design criteria too.

20 And to step back from protection because
21 mitigation seems to be such a desirable thing, to me
22 this is not an either/or issue. It should be -- it
23 should be appropriate level of protection and
24 mitigation. Let's see what else I will say. Okay.

25 So, it's the simplest version of this.

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1 And I think this whole issue could use a little more
2 simplicity. There's an awful lot of confusion and
3 complication in it.

4 It is in a simple basis for saying we
5 can't support this paper because it doesn't value both
6 mitigation and protection prevention to it. And we
7 think that that is an important thing to do.

8 Both are important. They're both of them
9 are essential. They're both old, ancient and well
10 established regulatory principals. And I think they
11 should both be treated and dealt with in a way.

12 It doesn't mean they have to be dealt with
13 at the same time and in the same way. And I can -- I
14 think some of us could even be supportive of -- well
15 the fact that even now, you heard Shelby mention that
16 the dates -- the mitigation strategies and the 2.1
17 reevaluation of design basis were never on exactly the
18 same schedule.

19 And that's not such a problem. And if we
20 can find better ways of doing things that might be a
21 little slower or maybe more efficient in some other
22 ways. Or if we could bring some other technology to
23 them, then all these are good alternatives.

24 But right now we don't have clear
25 alternatives. We have do mitigation and do perhaps

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1 something. But something not well enough defined in
2 the protection area. So I --

3 MEMBER SCHULTZ: Gary, one question on
4 this slide.

5 MR. HOLAHAN: Please.

6 MEMBER SCHULTZ: We have confused the
7 terminology and we talked about that. So it -- you
8 said mitigation and then you said protection and
9 that's prevention.

10 MR. HOLAHAN: Yes.

11 MEMBER SCHULTZ: Now, in the mitigating
12 strategies, mitigation is prevention.

13 MR. HOLAHAN: Okay, let me try. Because
14 this is -- this is a confusing topic. I can tell you
15 that on the Task Force there was a discussion of how
16 to talk about these things.

17 If you go to an IAEA standard or something
18 that talks about levels of defense in depth, it's
19 usually in terms of prevention, mitigation and then
20 you get to severe accident and emergency preparedness.

21 MEMBER SCHULTZ: Correct.

22 MR. HOLAHAN: In our own Reg guides that
23 deal with the -- deal with like flooding and things
24 like that, with external events, they use the
25 terminology protection. So in my mind, I understand

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1 that prevention of events is the first level of
2 defense in depth.

3 When we talk about external events, we
4 usually talk about protection of the facility from
5 those events as a way to get to -- right, to
6 prevention. And the word mitigation I think is used
7 in different ways, right.

8 We have design basis mitigation and we
9 have beyond design basis mitigation. So in these
10 senses, protection means keeping the water out or
11 making the plant at least tolerant to flooding
12 conditions. And mitigation in this sense means
13 basically beyond design basis mitigation strategy that
14 is talked about in Recommendation 4.2.

15 MEMBER SCHULTZ: And the intention of that
16 is to protect the core of the spent fuel pool and all
17 that?

18 MR. HOLAHAN: Yes. And in all of it of
19 course is to protect the public health and safety.
20 And so --

21 MR. FLANDERS: If I could add?

22 MR. HOLAHAN: Prevention, protection,
23 mitigation, everything really has protection in some
24 sense there.

25 MR. FLANDERS: If I could add. In 2.1 the

1 focus was on protecting the plant in flooding and
2 looking at how potentially you would need to mitigate
3 it. So the scope of it is much broader than the scope
4 for which you're talking about in terms of mitigating
5 strategies.

6 Where mitigating strategies really talk
7 about prevention in that context, is primarily focused
8 as you said on core cooling. And they're protecting
9 certain equipment associated with supporting their
10 ability to maintain core cooling.

11 In the context of flooding, as Gary said,
12 we're looking at protection of the facility,
13 prevention. So there's an aspect of protection that
14 we would look at in terms of other safety related
15 components that may prevent you from needing to go to
16 and actually use that FLEX equipment.

17 And I think one of the fundamental
18 challenges we have with the approach in the paper is
19 that it just says it's not necessary to actually look
20 to see if you can protect for example, your diesel
21 generators or some of your other electrical
22 distribution systems or things of that sort that would
23 prevent you from even needing to rely on your FLEX
24 equipment.

25 So you're ability of your defense in depth

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1 you've essentially -- you're not going to look at that
2 at all, you're just going to accept that those things
3 are lost. And then the next step is okay, so now how
4 do I maintain core cooling using solely our mitigation
5 strategies equipment?

6 And you know, going back and looking at
7 the recommendations, if you see -- Recommendation 2
8 and Recommendation 4 are separate recommendations.
9 Recommendation 2 as Gary was saying, was looking at
10 how to -- reevaluating the hazard from flooding or
11 seismic events and saying what does that mean to the
12 plant? Is the plant's design basis not adequate at
13 this time?

14 And to look at this integrated assessment
15 that the staff spoke of, was to look at that in the
16 sense of trying to figure out how much protection, how
17 much mitigation needed. And then to make some
18 judgements on how you protect the facility.

19 As opposed to -- and then recognizing that
20 mitigating strategies was something that would be for
21 events that are beyond line based events. As staff
22 said earlier, the reevaluated hazard is using the same
23 criteria used to license plants today. The same
24 criteria that we pretty much used, Regulation 1.59 has
25 been out since 1973, right.

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1 The draft Regs in 1973, official final
2 version 1975, it's pretty much the same guidance. And
3 so many -- that's why many of the hazards are in fact
4 the same. And so it was a question of okay, do we
5 have it right now, recognizing that we have more
6 information, we have better tools to assess how these
7 events could potentially affect the site.

8 So I think as the staff talked about, the
9 scope is much broader when we talk about protecting
10 and mitigation here as opposed the mitigating
11 strategies.

12 MEMBER SCHULTZ: A simple question. Just
13 looking at the hazard, back in 1975 did we use the
14 hazard that we discussed this morning with regard to
15 that level of rainfall in that period of time?

16 MR. FLANDERS: So in 1975 -- I wasn't here
17 for the first part of that. But if I understand
18 correctly, North Anna, they were talking about the
19 local intense precipitation on it.

20 MEMBER SCHULTZ: Yes. Correct.

21 MR. FLANDERS: Okay, and I'll look to my
22 staff to make sure I have this right. But for local
23 intense precipitation that was an issue that was I
24 think recognized in the '80s time frame. And so for
25 some plants, local intense precipitation is an issue

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1 that was not necessarily looked at when these plants
2 were licensed.

3 So as a part of this reevaluated hazard,
4 activity that is new for many of these plants. But
5 when we talk about the other events such as riverine
6 flooding, a dam failure, hurricane events, seiche, all
7 of those are the same basic events that we looked at
8 when plants were originally licensed.

9 And in many cases for those plants who
10 were GDC-2 plants, they pretty much use the same
11 criteria that we use today to establish a hazard. So
12 in many cases a hazard is exactly the same with our
13 understanding that the water level and the debris and
14 other associated effects is different. We have a
15 better understanding.

16 So local intense precipitation is a unique
17 piece. It was interesting that they brought that as
18 an example. But that's a unique aspect. It is new
19 for all -- for many of these plants.

20 MEMBER BLEY: Can I ask you a language
21 question? We have a design basis. Now we have a
22 reevaluated hazard.

23 MR. FLANDERS: Yes.

24 MEMBER BLEY: Some people say that's part
25 of the licensing basis, which I haven't seen

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1 completely defined somewhere. And the real point is,
2 at what point would one think in a reevaluated hazard
3 ought to get rolled back into a design basis and you
4 know, plant modifications be there to provide the
5 protection that you're talking about in this chart?
6 And is it important to deal with those language
7 issues?

8 MR. HOLAHAN: Let me add some confusion
9 before I try to clarify. That is there's also
10 difference between design basis and design basis
11 events.

12 So as you heard, the reevaluated hazard
13 would the basis for protecting mitigation strategy
14 equipment. That is a design basis, right. It would
15 be whatever levels or timing or whatever.

16 If that goes into building a wall or
17 placing a piece of equipment that is design basis. It
18 doesn't make the event the design basis event.

19 MEMBER BLEY: Okay.

20 MR. HOLAHAN: It seemed to me the
21 reevaluated hazard becomes a design basis event when
22 we go through some regulatory process that forces it
23 to do that, right. And it seems to me that that isn't
24 entirely necessary, right.

25 What's important is that the design basis

1 gets a reevaluation. That we decide whether it's
2 adequate or not. To the extent that a different
3 flooding level from some other event ought to be the
4 design basis event providing adequate protection that
5 does redefine it as, right.

6 There is something else called a licensing
7 basis which means it's not the design basis event, but
8 it is in the regulatory process. It has some other
9 role. And it is captured as a requirement in some
10 way. And it is possible to do that as well.

11 But whether that is an appropriate
12 substitute for a design basis event, I think is part
13 of the back end of this process. First you understand
14 what could happen and what are the consequences. And
15 then you decided how do I want to deal with this in a
16 regulatory process?

17 So the Commission decided that extended
18 station blackout should be an adequate protection
19 issue. And that gives it a certain role. That didn't
20 exactly put it in Chapter 15. It's not a design basis
21 event.

22 And the assessments you can be quite sure
23 are not being done by single failure criteria or
24 Appendix B quality or reviewed and approved
25 methodologies. It has none of those design basis

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1 event characteristics.

2 So I would say it's certainly the
3 reevaluated flood as it plays into the design
4 conditions for the equipment is all -- is in the
5 requirements. It's all licensing basis. But doesn't
6 have the same role as what you would think of as a
7 classic Chapter 15 you know, ECCS kind of treatment.

8 MEMBER SCHULTZ: Other questions by the
9 Committee?

10 (No response)

11 MEMBER SCHULTZ: All right, I'd like to
12 ask for public comments. And we'll turn on the phone
13 line, bridge line so that individuals on the bridge
14 line can speak if they wish.

15 While we're doing that, if there's anyone
16 in the room that would like to make a comment for the
17 Committee, now would be the time to do so.

18 (No response)

19 MEMBER SCHULTZ: Hearing none in the room,
20 the bridge line should be open momentarily. Is the
21 bridge line open?

22 If you're on the bridge line, could you
23 please just make some noise so that we know that you
24 are there. Is anyone on the bridge line, if so?

25 PARTICIPANT: Yes I am.

1 MEMBER SCHULTZ: Hi. Would you like to
2 make a comment for the Committee? If you'd like to,
3 please state your name.

4 PARTICIPANT: No thank you. I just wanted
5 to let you know that there is still someone here.

6 (Laughter)

7 MEMBER SCHULTZ: We appreciate that.

8 CHAIRMAN STETKAR: And we really
9 appreciate that, thanks.

10 MEMBER SCHULTZ: For anyone else on the
11 bridge line, we know that it is open now. This is how
12 we find out. Is there anyone who would like to make
13 a comment? And if so, please state your name and do
14 so.

15 (No response)

16 MEMBER SCHULTZ: Hearing no comments at
17 this time, John, I'll turn the program to you.

18 CHAIRMAN STETKAR: Thanks, Steve. We --
19 we'll keep on our schedule. I apologize, eat quickly,
20 we will recess until 1:15.

21 (Whereupon, the above-entitled matter
22 went off the record at 12:46 p.m. and
23 resumed at 1:19 p.m.)

24 CHAIRMAN STETKAR: We are back in session.
25 The first topic of the afternoon is regulatory gap

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1 analysis of the NRC's Cost Benefit Guidance and
2 practices, and Harold Ray will lead us through that
3 session.

4 Harold, it's yours.

5 VICE CHAIR RAY: Thank you, Mr. Chairman.
6 in August 2012 the staff recommended for Commission
7 approval updating of the existing framework for
8 consideration of economic consequences. In approving
9 the proposal in March 2013, the Commission also
10 directed the staff to provide a regulatory gap
11 analysis prior to developing new cost benefit analysis
12 guidance.

13 Earlier this year the staff issued a plan
14 for this work which is to be conducted in two phases.
15 The first phase focuses on structural changes,
16 incorporation of cost estimating best practices and
17 administrative issues. The second phase addresses the
18 enhancements that need further consideration prior to
19 being included in Cost Benefit Guidance.

20 Recently the Committee reviewed and
21 commented on the qualitative consideration of factors.
22 Now we have an opportunity to review the staff
23 response to the Commission direction to provide a
24 regulatory gap analysis. This is being provided to
25 the Commission for information. Both the qualitative

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1 consideration of factors and the results of the gap
2 analysis will provide input to the second phase of the
3 staff plan for updating the guidance.

4 The Regulatory Policies and Practices
5 Subcommittee reviewed an earlier version of the draft
6 gap analysis paper. Mike Snodderly sent members a
7 redline markup of this version to reflect the version
8 available earlier this week. As of then the paper had
9 not completed the management concurrence process.

10 Finally, we will discuss at P&P tomorrow
11 if and when the Committee will respond to the final
12 SECY that we'll hear about today as it is sent to the
13 Commission.

14 With that, we'll begin the presentation
15 and Aby Mohseni will lead us off.

16 MR. MOHSENI: Thank you. Appreciate it.
17 Good afternoon. Hopefully this particular meeting
18 will not be as controversial as the earlier one in the
19 morning. I'm Aby Mohseni, deputy director for the
20 Division of Policy and Rulemaking in NRR. And Thank
21 you for the opportunity to brief you today on the
22 staff's regulatory gap analysis cost benefit practices
23 across the Agency. We met with the Subcommittee on
24 this very topic in October and we did receive some
25 very constructive feedback that we have incorporated.

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1 Staff presenters today are Alysia Bone,
2 project manager in my division, who will provide a
3 presentation on this paper. And then Fred Schofer,
4 the team lead for the Regulatory Analysis Team. And
5 Alysia will answer questions on the analysis
6 throughout the presentation.

7 A little bit of background. This paper is
8 in response, as you said, to SRM-SECY-12-0110,
9 Consideration of Economic Consequences within the U.S.
10 NRC's regulatory framework. The NRC's Cost Benefit
11 Working Group comprised of representatives from seven
12 different offices performed the analysis. The staff
13 wanted to use this analysis to not only identify
14 differences in cost benefit practices across the
15 Agency, but to also internalize the messages the staff
16 has received from ACRS and the Commission in the past.

17 For instance, in this paper the staff
18 emphasizes the importance of quantifying uncertainties
19 associated with reg analysis. Also the staff notes
20 the importance of making improvements to its
21 quantitative estimates in general. The staff has
22 incorporated additional feedback received from ACRS
23 members on this paper from our last October meeting,
24 and the staff will highlight some of those examples in
25 today's presentation. This gap analysis is a step in

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1 the staff's overall plan to update Cost Benefit
2 Guidance.

3 Thank you again for the opportunity to
4 brief you on this information SECY.

5 MS. BONE: Thank you, Aby. As Aby
6 mentioned, my name is Alysia Bone and I am the project
7 manager for this initiative. We do have several
8 members of our working group here in the audience to
9 help answer questions as we go through the
10 presentation.

11 On slide 2 the purpose of today's briefing
12 is to provide you an overview with the SECY paper
13 regulatory gap analysis of the NRC's Cost Benefit
14 Guidance and practices. So for our outline we'll
15 first start with a brief overview and status of the
16 package. Then we'll go into the background gap
17 analysis scope and methodology. I'll talk about a
18 couple of key results from our analysis and then I'll
19 highlight some of the differences and enhancements for
20 Cost Benefit Guidance that we uncovered during our
21 analysis. And then I'll close with some remarks on
22 our path forward.

23 On slide 3, overview and status, I just
24 want to point out here that this SECY paper is an
25 information SECY paper, so it doesn't contain any

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1 options or recommendations at this time. There are
2 three associated enclosures which I'll go through in
3 more detail. We touch on the purpose of each of those
4 enclosures in this presentation.

5 The status of the paper is that it is near
6 completion. We have a few final edits and updates and
7 comments to incorporate, but we anticipate that the
8 SECY paper will be finishing up very shortly and go to
9 the Commission soon. However, for the purposes of
10 this meeting we have made a version publicly
11 available, a draft version publicly available, and
12 that is found in ADAMS. I can give you the ML number
13 right now. It's at ML-14266A233. And that's the SECY
14 paper itself. This is a version that was also
15 provided to you earlier for review again.

16 On slide 4 we have a few notes --

17 VICE CHAIR RAY: Not a lot earlier I must
18 add.

19 (Laughter)

20 MS. BONE: Happy Thanksgiving.

21 (Laughter)

22 MS. BONE: So we did receive the benefit
23 of having early ACRS Subcommittee feedback from some
24 of the members, which we really appreciated. And we
25 wanted to provide a slide here that highlights a few

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1 of the changes we did make in response to that
2 feedback.

3 So I will step through the rest of the
4 presentation and highlight where we made those
5 changes, but just to start off we did complete a
6 summary table of the differences in NRC cost benefit
7 regulations, practices and guidance, which we
8 understood would be kind of a handy tool to highlight
9 some of the staff's findings in our analysis. That's
10 in Enclosure 2.

11 We clarified the basis for one of the key
12 conclusions we made, which is that the statement that
13 the cost benefit regulatory framework is sound. We
14 provide a little more context for that. And we
15 expanded the discussion on the use of PRA and other
16 studies in regulatory analysis, as we as clarified
17 some of our next steps.

18 On slide 5 we dive right into the content
19 of the paper. As was mentioned a couple of times
20 during the opening remarks, this all started with
21 SECY-12-0110, Consideration of Economic Consequences
22 Within the NRC's Regulatory Framework. And in that
23 the staff recommended enhancing Cost Benefit Guidance
24 to harmonize across the Agency.

25 In that SECY paper from August of 2012 we

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1 noted that for regulatory analyses, backfit analyses
2 and NEPA cost benefit analyses across the NRC business
3 lines and programs we use the same main guidance
4 documents, which are NUREG/BR-0058, the Regulatory
5 Analysis Guidelines, and NUREG/BR-0184, the Technical
6 Handbook. So we recommended that we should look into
7 those guidance documents, update them to better
8 reflect and harmonize across business practices.

9 We received the Commission direction on
10 this I believe March of last year, and this approved
11 the staff's recommendation and directed the staff to
12 among other things provide the Commission with a
13 regulatory gap analysis prior to developing new
14 guidance for application across business lines. And
15 the Commission provided a few of the examples here in
16 the parenthetical.

17 VICE CHAIR RAY: Because I've been asked
18 this question, let me ask you, Alysia.

19 MS. BONE: Yes.

20 VICE CHAIR RAY: Let's say a -- in any
21 form that you want, what do we mean by "gap analysis?"

22 MS. BONE: I appreciate the question. We
23 go into that in a little bit with our methodology --

24 VICE CHAIR RAY: All right.

25 MS. BONE: -- and scope.

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1 VICE CHAIR RAY: I can defer it until
2 then.

3 MS. BONE: And maybe I can defer it until
4 then and then we can get into a lot more detail.

5 VICE CHAIR RAY: All right.

6 MS. BONE: So as we also mentioned during
7 the opening remarks, the staff provided a plan for
8 updating cost benefit analysis in SECY-14-0002, which
9 was provided in January of this year. And in this
10 information SECY paper we described this two-phase
11 process. The first phase as Aby mentioned was more
12 editorial administrative changes, really nothing that
13 rises to the level of major methodological changes.
14 But in parallel to that, the staff performed this gap
15 analysis which we're talking about today, which really
16 kicks us off into Phase 2, which addresses any
17 methodological changes, any potential policy issues
18 regarding cost benefit analyses.

19 So the last bullet here, we just note that
20 Phase 2 is of course informed by this gap analysis as
21 well as the Commission direction following SECY-14-
22 0087, Qualitative Consideration of Factors in the
23 Development of Regulatory Analyses and Backfit
24 Analyses.

25 Any question on the background?

1 (No audible response)

2 MS. BONE: So gap analysis scope. We have
3 a couple of slides on scope and methodology. I think
4 you've seen this table before. The blank table is
5 just to illustrate kind of what our scope was. It is
6 a multi-dimensional scope that we looked at cost
7 benefit practices across the various purposes of cost
8 benefit analyses in the NRC, regulatory analyses,
9 backfit analyses and environmental analyses for NEPA,
10 specifically SAM and SAMDA.

11 And then we looked across the business
12 lines and programs: operating reactors, new reactors,
13 materials, fuel cycle facilities, etcetera. Within
14 each of these cells we wanted to look at the
15 regulatory requirements that are required or lack
16 thereof. So for instance regulatory analyses of
17 course there are no regulatory requirements for this,
18 but any associated federal agency guidance, what our
19 internal guidances are and some of the assumptions or
20 practices that are applicable for each of the cells.
21 So this is just to give you an example that we were
22 looking across the Agency out of many different facets
23 here.

24 MR. MOHSENI: And so, Alysia, to answer
25 Dr. Ray's question --

1 MS. BONE: Yes.

2 MR. MOHSENI: -- the spectrum of scope
3 that is applied across the different lines, is the gap
4 you're looking for -- is that what the regulatory gap
5 analysis is about?

6 MS. BONE: Yes, we were looking --
7 exactly. So we were looking at what are the
8 differences and similarities in how cost benefit
9 analyses are conducted throughout all of these
10 different applications. And so we were looking at --
11 because we were tasked to perform a regulatory gap
12 analysis, we first looked at regulations, right? That
13 was kind of the first look. And we wanted to know if
14 there were gaps in the way -- I have an upcoming slide
15 in just a second. But the way we were interpreting
16 that was were there any constraints imposed on the
17 staff by regulations that would prohibit us from
18 performing a sufficient cost benefit analysis?

19 We also looked at differences. So that's
20 where we kind of -- how we defined a gap. Now a
21 difference, we recognized that there could be
22 differences across business lines, across analyses,
23 but in many cases these differences are warranted.
24 They're very different intrinsic characteristics
25 within these different analyses. And so just because

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1 you have a difference doesn't mean there's a
2 regulatory gap. Does that make sense?

3 So I know it's a little bit nuanced, but
4 we thought it was important to make that point in the
5 paper that differences do not always constitute a gap
6 or a problem.

7 VICE CHAIR RAY: Yes, oftentimes people
8 would think a gap is something that's missing.

9 MS. BONE: Right. Exactly.

10 VICE CHAIR RAY: That there is a
11 difference.

12 MS. BONE: Exactly.

13 VICE CHAIR RAY: But I assume you would
14 include, oh, we don't have any guidance here.
15 Recognize that as a difference.

16 MS. BONE: Exactly.

17 VICE CHAIR RAY: Call that a gap.

18 MS. BONE: Yes.

19 VICE CHAIR RAY: And another way of
20 thinking of gap would be a gap between methodologies
21 that we use and those that are in common use
22 elsewhere. Is that --

23 MS. BONE: We did. In fact we did.

24 VICE CHAIR RAY: -- included as well?

25 MS. BONE: And in that latter example that

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1 you use posed of maybe what our guidance says and if
2 that differs from the current state of knowledge, we
3 call that an enhancement. And the reason we did that
4 is because again our primary purpose was looking
5 across the Agency. Maybe these are the same thing.
6 Maybe we are consistent with our guidance and we're
7 consistent across the board, but we just recognize we
8 need better guidance, period. We need to enhance
9 this. So that's why we called it an enhancement.
10 Does that help?

11 VICE CHAIR RAY: Yes, sure.

12 MS. BONE: Okay.

13 VICE CHAIR RAY: Like I said, I was just
14 asked how constrained the notion of gap --

15 MS. BONE: Sure.

16 VICE CHAIR RAY: -- was and what we based
17 it on.

18 MEMBER SCHULTZ: Alysia, I heard you say
19 two things.

20 MS. BONE: Yes.

21 MEMBER SCHULTZ: One was that you fill the
22 matrix to identify what is done --

23 MS. BONE: Yes.

24 MEMBER SCHULTZ: -- within each of the --
25 call them business lines and in each of the

1 applications. And then you also indicated that you're
2 going to talk about why it's done that way. And then
3 you talked about regulatory constraints. Are there
4 any regulatory constraints?

5 MS. BONE: Right.

6 MEMBER SCHULTZ: So that's the second
7 question.

8 MS. BONE: Yes.

9 MEMBER SCHULTZ: And then I would presume
10 that you would try to identify from that why question
11 why might there be differences?

12 MS. BONE: Right.

13 MEMBER SCHULTZ: So all of that is a
14 picture of what you set out to do?

15 MS. BONE: Right. Yes.

16 MEMBER SCHULTZ: Thank you.

17 MS. BONE: So on slide 7; I recognize this
18 is a bit difficult to see, but this is an excerpt just
19 to show you that this is how -- we took from the
20 earlier slide that we just had the scope, and then we
21 filled it out in various tables, which is from
22 Enclosure 2.

23 Slide 8 talks a lot about some of the
24 things that we were just discussing about our
25 methodology. So to start with our analysis, or the

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1 goals for our analysis. First and foremost, we're to
2 identify the similarities and differences in cost
3 benefit regulations guidance and practices across the
4 Agency. That was what our initial tasking was to do.
5 And then to the degree possible we did want to discuss
6 the potential implications of these similarities and
7 differences. So what this might mean for our path
8 forward. But I do want to just point out that this is
9 the first step. Identifying them was the first step
10 as we move forward with our Phase 2.

11 For our tools, our analysis tools, we had
12 used many different tools. We first started with a
13 staff subject matter expert questionnaire, so the
14 actual practitioners within the Agency who conduct
15 these analyses. We created a questionnaire of what
16 are some of the assumptions? What are some of the
17 guidance documents that you use just to develop a sort
18 of common baseline understanding? And this teed us up
19 for a series of internal workshops that we focused on
20 the various analyses.

21 So for instance, we had a regulatory
22 analysis work shop. We had subject matter experts
23 from each of the business lines walking through kind
24 of their process for performing this analysis. In
25 this way we were identifying some, like I mentioned,

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1 similarities and where there were some differences
2 either in terminology or larger differences in
3 assumptions.

4 In parallel we also performed a literature
5 review and a limited review of other federal and
6 international agency practices. I'm sorry, that
7 should be international rather than internal agency
8 practices.

9 The last bullet is that the terminology
10 gets kind of to the question that we were just going
11 over. Gaps, we really wanted to kind of limit that
12 term for the purposes of this analysis to the
13 constraints imposed by regulations.

14 MEMBER SKILLMAN: Could you give an
15 example of that, please?

16 MS. BONE: Sure. Well, and in fact that
17 gets to our next slide, which is the results, that we
18 didn't really find any. We looked at the cost benefit
19 regulations that are applicable for these analyses,
20 for the backfit requirements. So in Part 50, 70, 72,
21 76, the backfit requirements, and then the NEPA
22 requirements in Part 51. And we didn't see that there
23 were actually any constraints posed by the regulations
24 that we could -- there was sufficient flexibility to
25 update our guidance, to update our practices to better

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1 harmonize without having to go through rulemaking. So
2 that was really the purpose of defining this term
3 here.

4 MEMBER SKILLMAN: Thank you.

5 VICE CHAIR RAY: It's not a definition you
6 can come up with --

7 MEMBER SKILLMAN: Intuitively.

8 VICE CHAIR RAY: No, but that's what
9 they've used here. I guess that's was the origin of
10 the question I asked in the first place.

11 MEMBER SKILLMAN: Yes, I was just trying
12 to think of an example of where our regulation would
13 constitute constraint to doing benefit analysis.

14 MS. BONE: If there were regulations that
15 impeded us from considering one of these attributes
16 that we'll discuss later on, some of the enhancements,
17 I guess that's what we would maybe constitute -- or if
18 we were thinking just if there were a regulation that
19 we would need to promulgate based on the fact that we
20 saw differences in practices. I guess it gets to the
21 fact that we did identify differences, but we can work
22 to harmonize these differences without rulemaking,
23 that we can use guidance documents, we can use
24 practice improvements, that kind of a thing.

25 MEMBER SKILLMAN: Okay. Thank you.

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1 MS. BONE: Yes.

2 MEMBER REMPE: So I've got to ask, back on
3 page 7 --

4 MS. BONE: Sure.

5 MEMBER REMPE: -- when you look at the
6 first column on the slide that had the regulatory
7 requirements -- and I was a little puzzled why the
8 regulatory requirements, especially those for severe
9 accidents, are the same for materials facilities. And
10 I was relieved when I went over to the far column to
11 know we weren't doing anything for severe accidents
12 and materials facilities in practice, but --

13 MS. BONE: Right.

14 MEMBER REMPE: -- is that what you meant
15 to have in that first column? Are there regulatory
16 requirements that are the same related to severe
17 accidents for materials, or is that just a typo or
18 something?

19 MS. BONE: I think when we say "same,"
20 we're just trying to note that the NEPA requirements
21 in general are in --

22 MEMBER REMPE: Oh, okay.

23 MS. BONE: -- Part 51. Yes. Yes, but of
24 course we don't perform SAMA or SAMDA for materials.

25 (Laughter)

1 MEMBER REMPE: Yes. Good.

2 MS. BONE: Okay.

3 MEMBER SKILLMAN: On that slide for fuel
4 cycle facilities isn't there at least an analog to the
5 accident analysis in the centrifuge plants? You have
6 your IROFS, you've got fire, you've got just a number
7 of issues. They don't have the enthalpy release to
8 the public mass and energy issues that we have in the
9 reactor plants, but they certainly have chemical
10 issues.

11 MS. BONE: Yes.

12 MEMBER SKILLMAN: Hexafluoride release and
13 potential criticality issues.

14 CHAIRMAN STETKAR: I'm not sure that the
15 ISAs are required by regulation. I'm not sure that
16 they are or they're not, but --

17 MEMBER BLEY: I should be sure.

18 CHAIRMAN STETKAR: You should be, but
19 that's why I said I'm not sure. But the notation here
20 regulatory requirements, which means rule, not --

21 MS. BONE: Right.

22 CHAIRMAN STETKAR: -- staff guidance,
23 which is not a regulatory requirement.

24 MEMBER BLEY: I believe they are, but they
25 don't have to be quantified.

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1 CHAIRMAN STETKAR: You think that there
2 is --

3 MEMBER BLEY: I'm pretty sure.

4 CHAIRMAN STETKAR: -- a rule that requires
5 an ISA? If there is, then that's it.

6 MEMBER BLEY: I think so.

7 CHAIRMAN STETKAR: That's it.

8 MEMBER BLEY: I think so.

9 CHAIRMAN STETKAR: Because I don't know.

10 MEMBER BLEY: We'd have to look.

11 MEMBER SKILLMAN: That wasn't intended to
12 be a challenge question. That was a curiosity
13 question.

14 MS. BONE: Yes.

15 MEMBER SKILLMAN: Seems like at Hobbs I
16 know that we treated those accidents. Now they're
17 different than what we treated in the PWRs and BWRs,
18 that they are taken just as seriously.

19 MS. BONE: Yes. Thank you for that
20 question. We'll come back to you with an answer.

21 MEMBER SCHULTZ: Just staying on that
22 slide.

23 MS. BONE: Yes.

24 MEMBER SCHULTZ: So what I'm seeing here
25 in terms of the guidance for new reactors and

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1 operating reactors, it is different. That is, we've
2 got supplement 1 applied in one case. One in revision
3 for the new reactors. Can one still conclude that the
4 guidance is the same, or are there differences?

5 MS. BONE: There are some -- I should say
6 similar. I guess I should say guidance documents are
7 similar. We do have those main 005A and 0184 that are
8 primarily kind of what we are honing in on.

9 MEMBER SCHULTZ: Okay.

10 MS. BONE: But for completeness I think we
11 wanted to incorporate all of the guidance documents in
12 this table.

13 MEMBER SCHULTZ: Thanks.

14 MS. BONE: Yes.

15 MR. MOHSENI: I think the question is do
16 they rise to the same level of quality of guidance?
17 Do we have evenness across operating reactors and new
18 reactors, I mean, even though they were developed
19 historically at different times and therefore you have
20 a collection of historical documents out there which
21 you have inventoried here? But at the end of the day
22 they basically cover more or less the same areas,
23 right? That's the --

24 MS. BONE: Go ahead.

25 MR. SCHOFER: They cover the same areas.

1 The primary difference between the two is, one,
2 SAMDA's is the design alternatives versus SAMA. The
3 additional 20 years is looking at a review of the
4 environmental at that point without design
5 alternatives.

6 MEMBER SCHULTZ: Yes.

7 MR. SCHOFER: But if anyone in the
8 audience wants to further clarify that?

9 (No audible response)

10 MR. SCHOFER: No? Okay.

11 MS. BONE: Anymore questions?

12 (No audible response)

13 MS. BONE: I think we finished
14 methodology. So key results. The first key result
15 that we wanted to put up front is that we again
16 reaffirm that the current cost benefit regulatory
17 framework is found, which is a statement we also made
18 in SECY-12-0110. And one of the feedbacks that we got
19 from the ACRS Subcommittee was really clarify what we
20 mean by that. What did we look at to have the basis
21 for this conclusion?

22 So what we mean by that is that no NRC
23 regulation impedes the staff from performing cost
24 benefit analyses. What we looked at, as I mentioned
25 before, were the various requirements associated with

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1 cost benefit analyses. In NEPA cost benefit analyses
2 requirements are in 10 CFR 51. The backfitting
3 requirements are found in 10 CFR 50, 72, 76. And then
4 we have analogous requirements for issue finality in
5 Part 52. And of course there are no NRC regulations
6 that require performing regulatory analyses.

7 We also determined that there is
8 sufficient flexibility to allow for updating and
9 harmonizing NRC Cost Benefit Guidance, which we note
10 before primarily we're looking at the Regulatory
11 Analysis Guidelines, which are more -- I guess maybe
12 would be better called Cost Benefit Guidelines because
13 they apply to all of these different applications and
14 the Technical Handbook. We added some words in the
15 draft SECY paper to kind of give better context and
16 more framework for that statement, that conclusion.

17 Then the next key result is that even
18 though we don't see that there's any rulemaking
19 necessary, that there aren't any constraints proposed
20 by the regulations, we did identify that there are
21 differences in cost benefit practices within the NRC.
22 And as I mentioned, we fully acknowledge that several
23 times these differences are warranted based on the
24 intrinsic differences in application or analyses, but
25 that some differences may constitute work guidance

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1 updates and practice updates for greater
2 harmonization.

3 And I just want to take a second to define
4 what I mean by harmonization here. And we added some
5 words in the SECY paper to say this, too, that by no
6 means do we mean harmonization is that every analysis
7 for every application should be performed identically.
8 Rather, the intent for that -- and as we're moving
9 ahead with our guidance updates we want to incorporate
10 best practices to produce an accurate and realist cost
11 benefit analysis that also considers the nuances of
12 the various applications without making the process
13 and the analysis overly burdensome and cumbersome.

14 So we talked about that before, that we
15 don't want to make this process so onerous that it's
16 impeding the staff from performing -- wanting to
17 perform at all. It's finding a fine balance between
18 making your analysis as accurate as possible and still
19 understandable and user friendly. So that's just a
20 moment about what we mean by harmonization here.

21 MEMBER SCHULTZ: Are you defining
22 differences when you say within the NRC from box to
23 box new reactors versus operating reactors, for
24 example --

25 MS. BONE: Yes.

1 MEMBER SCHULTZ: -- or are you also
2 looking at differences within operating reactors or
3 within new reactors?

4 MS. BONE: I would say --

5 MEMBER SCHULTZ: You know, project by
6 project, per se.

7 MR. SCHOFER: We were focusing more
8 between offices versus internal to an office. The
9 groups that performed the analysis are small, so you
10 can have less differences within an office.

11 MR. MOHSENI: There is another -- not only
12 do you look at the variation across business lines,
13 the offices, as mentioned, but also regulatory
14 analysis cost benefit may be different from an
15 environmental review cost benefit analysis. The two
16 are different, and that's --

17 MEMBER SCHULTZ: Yes, along the different
18 purposes --

19 (Simultaneous speaking)

20 MR. MOHSENI: Yes, the purposes. The
21 backfit analysis may have a different methodology and
22 purpose. All are intended to inform the policy makers
23 about the impacts of their decision, but each one in
24 the contour and the context of its own purpose. NEPA,
25 for example, is much broader in context across the

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1 agencies of the Federal Government. And there's much
2 more guidance developed by other federal agencies
3 elsewhere where one is compared with, whereas
4 regulatory analysis is kind of unique to NRC. And
5 it's not a requirement, but we developed it. And that
6 disciplines us to actually understanding the impact
7 for our policy makers as we go forward.

8 MS. BONE: We have a few examples of these
9 differences that we identified, which I'll talk about
10 in each slide moving forward.

11 The first is regarding a substantial
12 safety enhancement screen. And this involves
13 differences from NRC business lines and programs
14 subject to the backfit requirement. As I mentioned,
15 Parts 50, 70, 72 and 76. And each of those backfit
16 requirements follow the general same format of
17 determining whether or not the backfit is needed for
18 -- first, if it falls under an exemption to performing
19 the analysis. So if it's needed for adequate
20 protection, compliance or redefining adequate
21 protection. If it's not and then the staff then
22 determines if the backfit would constitute a
23 substantial increase in public health and safety, or
24 common defense and security. And then if it's
25 determined that yes it is, then the staff performs a

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1 cost benefit analysis.

2 So this involves that second step I just
3 talked about with determining if it's needed for
4 substantial safety enhancement. And to perform that
5 screen for power reactors the safety or regulatory
6 actions analyses involve the use of the Safety Goal
7 Policy. However, the safety goals do not apply to the
8 other regulated activities, specifically those that
9 also are subject to the backfit requirements.

10 So in our Cost Benefit Guidance, the
11 NUREG/BR-0058, it's really very heavy on the Safety
12 Goal Policy Statement, very heavily leaning towards
13 the reactor safety regulatory actions. And so the
14 staff is considering whether to update the Cost
15 Benefit Guidance to more accurately reflect the
16 current practices of all of these different business
17 lines just to so that this safety screen does apply to
18 the other backfit requirements, but the Safety Goal
19 Policy usage is applicable to only the power reactor
20 -- to the operating reactor power reactors.

21 MEMBER SCHULTZ: Alysia, not to draw you
22 back too far, but you mentioned that you did look at
23 other agencies --

24 MS. BONE: Yes.

25 MEMBER SCHULTZ: -- to see what other

1 agencies were doing. And then on the chart you had
2 indicated that in the approach associated with the way
3 NRC does the work that the external influence is all
4 none and external guidance was marked none.

5 MS. BONE: Yes.

6 MEMBER SCHULTZ: So that means that at
7 some point we have incorporated and developed our own
8 guidance with reference to what is done in other
9 agencies and we no longer do that. You'd think
10 perhaps we might have developed our approaches
11 understanding general concepts that are used by other
12 agencies and perhaps provided some linkage to those so
13 that as those methodologies improved we would know
14 about it and we would consider changes in what we do.
15 And I'm guessing that's not done.

16 MS. BONE: Well, I will say -- so not
17 specific to this --

18 MEMBER SCHULTZ: Yes.

19 MS. BONE: -- difference here, right?
20 Just kind of more globally? Is that --

21 (Simultaneous speaking)

22 MEMBER SCHULTZ: Yes, I wasn't --

23 MS. BONE: Okay.

24 MEMBER SCHULTZ: I had to back up and --

25 MS. BONE: Okay.

1 MEMBER SCHULTZ: -- focus into my
2 understanding.

3 MR. SCHOFER: I think the key is that the
4 reg analysis guidance conforms with OMB guidance that
5 has been put forth that is required to be a -- and is
6 enforced for other federal agencies.

7 MEMBER SCHULTZ: Yes.

8 MR. SCHOFER: It's only because we're an
9 independent agency that we don't fall under that
10 umbrella.

11 MEMBER SCHULTZ: Right.

12 MR. SCHOFER: However, we voluntarily
13 conform our guidance with what is put forth for all
14 other federal agencies and --

15 MEMBER SCHULTZ: And watching and
16 reviewing and --

17 MR. SCHOFER: Correct.

18 MEMBER SCHULTZ: -- looking for changes
19 and direction and so forth?

20 MR. SCHOFER: And when Executive Orders
21 come out we also look at those. So as things evolve
22 we're continuing to look to see what we need to do
23 different.

24 MEMBER SCHULTZ: So there's a dotted line
25 to external? I mean, there's an external dotted line

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1 to the OMB --

2 MR. SCHOFER: Oh, yes, absolutely.

3 MEMBER SCHULTZ: -- related activities?

4 Thank you.

5 MS. BONE: Any questions?

6 (No audible response)

7 MS. BONE: The next difference that we
8 highlighted is the approach to time horizon. And this
9 is a difference that the staff identified --

10 VICE CHAIR RAY: I do have a question.

11 MS. BONE: Oh, sure.

12 VICE CHAIR RAY: Took me awhile. Back up.
13 When you say for power reactor safety regulatory
14 actions analyses involve the use of a Safety Goal
15 Policy, a substantial enhancement, is it cost-
16 justified or not, one would think it's independent of
17 the safety goal, but are you saying even if it is a
18 substantial safety improvement that's cost beneficial,
19 if the safety goal is being met, it's doesn't pass the
20 backfit test? Is that what you mean by use of the
21 Safety Goal Policy?

22 MS. BONE: No. I mean using the Safety
23 Goal Policy to determine if the change would
24 constitute a substantial safety enhancement.

25 VICE CHAIR RAY: Well, it's the change

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1 that defines how much safety enhancement it's going to
2 result in, right?

3 MS. BONE: Yes.

4 VICE CHAIR RAY: I'm just trying to figure
5 out how the safety goal is used in that.

6 MS. BONE: Okay.

7 VICE CHAIR RAY: If the substantial safety
8 enhancement is in a range in which you're not meeting
9 the safety goal but it gets you closer to it, that's
10 one thing. If you're meeting the safety goal and it
11 just makes you more safe, that's another thing.

12 MR. SCHOFER: It's the latter. What is
13 done is when we do the safety goal screen, we're
14 looking to see what delta improvement in risk results.

15 VICE CHAIR RAY: Yes, right.

16 MR. SCHOFER: And our guidance says that
17 if you have an increase in risk of one-tenth of the
18 safety goal, we should continue to consider that. In
19 some cases we evaluate the alternatives which are even
20 less than that.

21 VICE CHAIR RAY: So it's used to determine
22 a threshold?

23 MR. SCHOFER: That's right.

24 VICE CHAIR RAY: It's a threshold?

25 MR. SCHOFER: Yes. But if we're far

1 removed from that threshold, meaning that we're much
2 safer and we don't see significant incremental safety
3 improvements, that serves also as a limit to say we're
4 safe enough.

5 VICE CHAIR RAY: Well, the last time we
6 talked about I think how this would apply to a
7 passive --

8 MR. SCHOFFER: Yes.

9 VICE CHAIR RAY: -- plant, for example.

10 MR. SCHOFFER: Sure.

11 VICE CHAIR RAY: And you talked about
12 that, I think. And it just -- as you were going
13 through this I started wondering if this was a point
14 at which that issue is most obvious. So that if
15 you're talking about apply backfitting to a passively
16 safe plant, it's almost -- you come up with a
17 different answer even though the safety benefit might
18 be the same.

19 CHAIRMAN STETKAR: I mean, the example I
20 always use is that if you have plant X where their
21 baseline core damage frequency is; I'll pick a number,
22 8 times 10 to the minus 5, and they increase that
23 baseline core damage frequency by 2 times 10 to the
24 minus 5, or 2.1 times 10 to the minus 5, that would
25 probably trigger the fact that that -- I'm sorry.

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1 Well, you do it in the reverse.

2 MR. SCHOFER: That's a very good example.
3 You would continue to evaluate that.

4 CHAIRMAN STETKAR: You continue to
5 evaluate. On the other hand, if my baseline core
6 damage frequency was 10 to the minus 7 and I increased
7 it by a factor of 500 to 5 times 10 to the minus 5,
8 that still wouldn't trigger further evaluation despite
9 the fact that I would consider a factor of 500 a
10 substantial change in risk.

11 VICE CHAIR RAY: Yes, and --

12 (Simultaneous speaking)

13 CHAIRMAN STETKAR: And I'm doing it the
14 wrong way, because you would look at --

15 MR. SCHOFER: In that case we're not
16 looking --

17 CHAIRMAN STETKAR: -- reductions at least.

18 MR. SCHOFER: -- to make plants less safe.
19 So if the example --

20 CHAIRMAN STETKAR: No, it's --

21 MEMBER SCHULTZ: -- that you just provided
22 was the change would result in a 500 times increase --

23 CHAIRMAN STETKAR: Increase --

24 MR. SCHOFER: -- in risk --

25 CHAIRMAN STETKAR: Yes.

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1 MR. SCHOFER: -- the that would be a
2 problem.

3 CHAIRMAN STETKAR: That's right. And it's
4 the inverse relationship.

5 VICE CHAIR RAY: All right. Well, I guess
6 I got to ponder it. I was just comparing it to --
7 that the only place that we use it is in power reactor
8 safety --

9 CHAIRMAN STETKAR: Well --

10 VICE CHAIR RAY: -- and does it cause a
11 substantial increase in safety to meet the threshold
12 for a conventional plant but not meet the threshold --

13 (Simultaneous speaking)

14 CHAIRMAN STETKAR: And, well, in mine I
15 guess I wasn't thinking straight. I'll use the
16 inverse. If it was my core frequency is 1.1 times 10
17 to the minus 4 and I get a 20 percent reduction, that
18 could be considered substantial increase because it
19 will drop me --

20 MR. SCHOFER: Yes.

21 CHAIRMAN STETKAR: -- below. Whereas if
22 my core damage frequency was 5 times 10 to the minus
23 6, I could get a 200 percent or a 10,000 percent
24 reduction and that still wouldn't trigger this because
25 my absolute is low enough --

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1 MR. SCHOFER: Yes.

2 CHAIRMAN STETKAR: -- despite the fact
3 that a 2,000 percent reduction in my mind is
4 substantial.

5 MR. SCHOFER: Unless it was little money
6 to achieve that improvement.

7 CHAIRMAN STETKAR: Yes, but you don't get
8 to answer that part of the question. You'll never the
9 answer to that part of the question.

10 VICE CHAIR RAY: Yes, that's really what
11 I was aiming at was do we wind up --

12 CHAIRMAN STETKAR: You never get to answer
13 that part of the question, right?

14 MR. SCHOFER: We do. I mean when we do
15 the screen, we're looking at that, but for the most
16 part if you're that low it would probably screen out.

17
18 MR. SCHOFER: So the filtration, you do
19 some screening up front just to be sure that you're
20 not missing a big item in there that would influence
21 the equation. But you're right, the logic, that's why
22 it's important to have this reference point that the
23 safety goal is here and where are you relative to
24 that? Not all increases in substantial safety benefit
25 is equal, because if you're way, way down there in

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1 terms of risk, increasing it by maybe an order of
2 magnitude versus being closer to the safety goal, they
3 carry to different ways.

4 CHAIRMAN STETKAR: And that's why I think
5 the notion of substantial change is not very
6 transparent, because most folks who don't deal with
7 this would consider a few hundred percent reduction as
8 substantial.

9 VICE CHAIR RAY: But I don't need to do it
10 if I'm --

11 (Simultaneous speaking)

12 CHAIRMAN STETKAR: But I don't need to do
13 it because I'm low enough to begin with.

14 VICE CHAIR RAY: Correct. Correct.

15 CHAIRMAN STETKAR: I'm safe enough.

16 MR. MOHSENI: We just saw that application
17 in containment protection and release reduction. We
18 showed where the QHOs were and how far in the worse
19 case scenario you were.

20 CHAIRMAN STETKAR: Yes. Yes.

21 MR. MOHSENI: And so, that would be --

22 MR. SCHOFER: And in that we did look at
23 cost.

24 MR. MOHSENI: Yes, we did because clearly
25 the attention and the -- you had --

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1 (Simultaneous speaking)

2 CHAIRMAN STETKAR: Well, but -- yes.

3 MR. MOHSENI: Yes.

4 CHAIRMAN STETKAR: But in terms of going
5 forward one -- my own opinion, one ought not to have
6 that sort of, well, but because of the attention on
7 this one and it was important we did something a
8 little bit different.

9 MR. MOHSENI: Correct.

10 CHAIRMAN STETKAR: One ought not to have
11 to invoke that sort of notion that we --

12 MR. MOHSENI: Ideally --

13 CHAIRMAN STETKAR: -- address other things
14 where we think that perhaps we're going to get
15 questioned about it, but don't where we think we are
16 not going to get questioned.

17 MR. MOHSENI: Correct. Yes, that's it.
18 Ideally, if we had full discipline and everyone
19 agreed, okay, this methodology will answer yes or no
20 tot go forward, we would be in a different place. But
21 reality is that we aren't. As you can --

22 VICE CHAIR RAY: Okay, Alysia. Thank you.

23 MS. BONE: The next difference highlighted
24 was the staff identified a difference among business
25 lines in the approach to analysis time frame of

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1 regulatory analysis. So how far your analysis goes
2 out. We note -- and this gets to your earlier
3 question about how we looked at other agencies. And
4 we note that the Office of Management and Budget OMB
5 Circular A-4 does state that the time frame should
6 cover a period long enough to encompass all the
7 important benefits and costs.

8 The approach is a little bit different
9 between power reactors and material licensees. For
10 nuclear power plants the analysts assumed one license
11 renewal term and takes the average of the remaining
12 life of the class of plants, but for materials
13 licensees the analysts evaluates based on the license
14 term. We note that it may be a bit more difficult for
15 the materials licensees to determine the time horizon.
16 So there is a difference here, but it might be
17 justified based on the difference in application. And
18 we would just want to make sure as we're moving
19 forward with our guidance that we address this and
20 harmonize it moving forward.

21 MEMBER SKILLMAN: How will subsequent life
22 renewal be considered as we're moving ahead here, you
23 know, 60 plus 20 SLR?

24 MR. SCHOFER: I guess we'll know when the
25 Commission --

1 (Laughter)

2 CHAIRMAN STETKAR: You're obviously going
3 to have to take that into account.

4 MR. SCHOFER: Oh, obviously. I mean, we
5 always take into account the term of the license. So
6 if the term of the license changes for whatever
7 reason, longer or shorter, we take that into
8 consideration.

9 MEMBER SKILLMAN: I'm just thinking there
10 are plants that are coming up on the end of their
11 first 20-year license renewal and there's chatter that
12 some of those might come forward for another one. So
13 when you say it takes the average of the remaining
14 life of the class of plants, that is going to become
15 a fairly variable term in the numerator or the
16 denominator --

17 MR. SCHOFER: Yes.

18 MEMBER SKILLMAN: -- however you figure
19 this number.

20 MR. SCHOFER: And we do track that.
21 That's a continual calculation depending upon
22 announcements.

23 MEMBER SKILLMAN: Thank you.

24 MS. BONE: The third different that we
25 highlight is the use of sensitivity analyses. And

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1 this difference is applicable for regulatory analyses
2 or across business lines. And we noted that the
3 sensitivity analyses can examine the extent to which
4 the uncertainty of each element affects the cost to
5 achieve the regulatory objective being examined, but
6 that they're not performed as consistently across the
7 board as they probably should be for the NRC to
8 conduct a benefit from a harmonized approach in the
9 use of sensitivity analyses across business lines.

10 The last difference that we highlighted
11 was quantification of benefits. This was one that we
12 identified across business lines regarding the extent
13 to which we quantify benefits and costs, but in this
14 case we just are talking about benefits within
15 regulatory analyses. This of course is related to a
16 previous SECY paper for which we briefed you on of the
17 qualitative consideration of factors in the
18 development of regulatory analyses and backfit
19 analyses.

20 And we note that modeling tools and
21 techniques for quantifying benefits used for power
22 reactor safety regulations are typically not available
23 for other business lines and programs. So the extent
24 to which benefits are qualitatively discussed for
25 other business lines can be more extensive than for

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1 power reactors at time. We are awaiting the
2 Commission direction on this and we'll incorporate the
3 Commission direction on this moving forward in the
4 guidance updates, but we did want to capture it for
5 completeness within this gap analysis as well.

6 So those are just some of the high-level
7 examples of differences that we noted. Of course we
8 have an enclosure, Enclosure 2. That provides these
9 as well as a few other more minor I think terminology
10 differences that we know, as well as that completed
11 table that we discussed before.

12 Moving on we have that --

13 MEMBER SCHULTZ: So just a moment.

14 MS. BONE: Oh, sure.

15 MEMBER SCHULTZ: Flipping through some
16 comments here. On time horizon you're looking at the
17 differences. In other words, the material licensees
18 the analyst evaluates based on license term. Well,
19 many of those licensees can be renewed.

20 MS. BONE: Yes.

21 MEMBER SCHULTZ: And we have a particular
22 formulation that we've used for the plant.

23 MS. BONE: Yes.

24 MEMBER SCHULTZ: Was the why question
25 asked here to identify what caused that process to be

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1 put in place for the material licensees and not take
2 into account the fact that the licenses might be
3 renewed?

4 MS. BONE: We -- oh, did you --

5 MR. SCHOFER: Yes, for material licensees
6 we're talking in the order of thousands to ten
7 thousands of licensees. Everything from a medical lab
8 who has a source to a fuel fabrication facility. So
9 there's quite a bit of difference. And in terms of --

10 MEMBER SCHULTZ: And we're not talking
11 about general -- we're talking about generic or
12 general --

13 MR. SCHOFER: Exactly.

14 MEMBER SCHULTZ: -- types of evaluations
15 and analyses here.

16 MR. SCHOFER: Exactly.

17 MEMBER SCHULTZ: We're not talking about
18 a licensee-specific evaluation for a particular
19 application.

20 MR. SCHOFER: Yes.

21 MEMBER SCHULTZ: Okay. Thank you.

22 VICE CHAIR RAY: On that last point, I
23 mean, why did you --

24 (Simultaneous speaking)

25 MR. SCHOFER: But in terms we have to look

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1 at the term of that group of licensees. So typically
2 it's like 1, 3, 5, 10, maybe 15 years, and we do the
3 analysis within that time period to calculate the
4 effects.

5 MS. BONE: Moving on to our next category
6 of items that we identified, this falls into the
7 enhancements category. So these aren't necessarily
8 differences across business line or analyses, but
9 these are just enhancements that the staff identified
10 that may be considered as we update our guidance and
11 practice. We have several examples here that we'll
12 move through, but again these don't really represent
13 the inconsistencies across the analyses. There's ways
14 that we can improve our guidance.

15 In general in this section of the SECY we
16 talk about some general conclusions that we recognize
17 the need to generally improve the accuracy of our
18 Agency's quantitative estimates. This is feedback
19 that we've received during various -- from
20 stakeholders. We do recognize that up front. And
21 then we have these more specific enhancements that we
22 identify in the paper.

23 The first is treatment of uncertainty. As
24 was mentioned in opening remarks, this is one that
25 we've received from ACRS in the past that we need to

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1 enhance the way we treat and consider uncertainty in
2 our regulatory analyses. Discussion of uncertainty is
3 often not included in NRC regulatory analyses,
4 however, it is an estimating best practice which is
5 acknowledged and addressed in many guidance and
6 references. We found the importance of uncertainty
7 and it's informing the decision making process
8 holistically.

9 And we do note again that there is
10 Government-wide guidance on this. OMB requires a
11 formal quantitative analysis of uncertainties or rules
12 with annual economic effects of \$1 billion or more.
13 So this is just to acknowledge that the importance of
14 uncertainty is well-known out the Federal Government.

15 CHAIRMAN STETKAR: Alysia, why in the
16 revised paper did you in my mind substantially soften
17 the discussion of this? And I'm obviously sensitive
18 to it, but if I read the draft we had for the
19 Subcommittee meeting, the first sentence says, "A
20 discussion of the uncertainty and benefit in cost
21 estimates is a critical part that is missing in most
22 if not all NRC regulatory analyses." And the revised
23 version says, "Some NRC regulatory analyses do not
24 contain an analysis of uncertainties. NRC regulatory
25 analyses may benefit from additional discussion about

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1 uncertainty inherent in some benefit cost estimates."

2 That to me is -- and the rest of it is
3 essentially the same.

4 MS. BONE: Yes.

5 CHAIRMAN STETKAR: But as introductory
6 remarks on this, that to me sounds a lot different.
7 And maybe I'm too sensitive to it, but it sounds like
8 going from something that says not many people do this
9 and it's important to, well, some people don't do it
10 and you might benefit from doing it.

11 MS. BONE: I'm trying to remember all of
12 the discussion we had as we were developing the paper,
13 and the word "soften" -- I don't think that ever was
14 our intent was to soften it, but --

15 CHAIRMAN STETKAR: It certainly is -- As
16 I read it, and I just quoted from the two versions --

17 MS. BONE: Yes. Yes.

18 CHAIRMAN STETKAR: -- and to me they sound
19 different.

20 MS. BONE: Yes.

21 CHAIRMAN STETKAR: Given the fact that
22 essentially the rest of the words in these two --
23 there's only two paragraphs -- they're not precisely
24 the same, but the rest of the discussion is for all
25 practical purposes the same. They're examples, for

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1 example.

2 MS. BONE: Yes.

3 CHAIRMAN STETKAR: And they make the point
4 that there is guidance for how to do this. Take that
5 into --

6 MS. BONE: Okay.

7 CHAIRMAN STETKAR: It just struck me.

8 MS. BONE: Okay.

9 MEMBER SCHULTZ: I wanted to comment also
10 that earlier on your slide talked about the
11 differences related to sensitivity analysis and
12 indicated that there was not a consistent application
13 of sensitivity analysis. I think that's a nice way of
14 saying it.

15 (Laughter)

16 MEMBER SCHULTZ: My impression was that
17 lots of folks do not do sensitivity analysis at all.
18 And it was tied to a way in which to evaluate
19 uncertainty, and yet under treatment of uncertainties
20 we're not offering that as both evidence that
21 treatment of uncertainty is not consistent or as a way
22 in which to perhaps even promote a graded approach to
23 treatment of uncertainty versus a more formal
24 application.

25 And I would say kind of in concert with

1 John that if -- not to pick the words apart, but when
2 you say a discussion of uncertainty has not always
3 been included in the NRC regulatory analyses, I could
4 interpret that as saying, well, way back when we
5 didn't do it, but --

6 MS. BONE: Yes.

7 MEMBER SCHULTZ: -- we really began to
8 come together here. And I just don't think that's
9 what you intend by the point.

10 MS. BONE: Right.

11 MEMBER SCHULTZ: I think you have to be
12 clearer to say it's just not happening. It ought to
13 happen. There are different ways to do it. I would
14 not say several. I think you could limit it to a
15 sensitivity analysis and describe that. You could
16 talk about more formal uncertainty analysis and
17 perhaps something in between. But it doesn't seem
18 right --

19 MS. BONE: Right.

20 MEMBER SCHULTZ: -- not to examine the
21 uncertainties when you're trying to make a decision.
22 But I think of all that we've talked about wanting to
23 come out of this, I would say that would be a
24 fundamental area of focus.

25 MS. BONE: Thank you.

1 MR. SCHOFER: We agree with that.

2 MEMBER POWERS: Do sensitivity analyses
3 really help?

4 MEMBER SCHULTZ: I think they do. I think
5 when you're trying to make a decision, if you're
6 performing an analysis and you don't look at the
7 uncertainties associated with the parameters --

8 MEMBER POWERS: That's not what I asked.
9 I asked about the sensitivity analysis. It seems to
10 me --

11 (Simultaneous speaking)

12 MEMBER SCHULTZ: No, I see what you're
13 saying.

14 MEMBER POWERS: -- I can abuse sensitivity
15 analyses.

16 MR. SCHOFER: I think the key use of
17 sensitivity is to understand the drivers that could
18 cause a significant change in the answer, but that
19 doesn't preclude you from then doing something more in
20 uncertainty space to address the central tendencies of
21 the results.

22 MEMBER POWERS: It seems to me that
23 they're subject to a substantial abuse --

24 MR. SCHOFER: I agree with that. Oh, yes.

25 MEMBER POWERS: -- that I can take

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1 something that's uncertain by an order of magnitude
2 and adjust it by 50 percent and say, gee, there's not
3 much of an effect and say it's not very sensitive and
4 say I don't have big uncertainties here.

5 On the flip side I have actually seen
6 someone looking at computer codes and doing
7 sensitivity analysis, and he was interested in the
8 sensitivity of the surface to volume ratio. And so he
9 varied that, even to lower values than what a sphere
10 has, and found indeed the code was fairly sensitive to
11 that, once you got below the value for a sphere.

12 (Laughter)

13 MEMBER POWERS: And so, he was using that
14 as the basis for wanting to rewrite this computer
15 code.

16 CHAIRMAN STETKAR: I've seen people do it
17 with human reliability analysis where the estimated
18 human error probability would be on the order of like
19 five.

20 MEMBER POWERS: Yes.

21 (Laughter)

22 CHAIRMAN STETKAR: Every time you tried
23 something --

24 (Simultaneous speaking)

25 CHAIRMAN STETKAR: -- you fail five times.

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1 (Laughter)

2 (Simultaneous speaking)

3 CHAIRMAN STETKAR: Honestly. I mean,
4 that's the type of thing that --

5 (Simultaneous speaking)

6 MEMBER POWERS: Yes, and it seems to me
7 that if I was -- I mean, I don't disagree with your
8 point.

9 MEMBER SCHULTZ: I agree. I think that
10 option is certainly --

11 MEMBER POWERS: But if I was going to say
12 there are -- I'm sure there are occasions when
13 sensitivity analyses aren't totally appropriate, but
14 I would certainly put in the admonition that they're
15 also subject to substantial abuse. And similarly,
16 when you do the quantitative uncertainty analysis --
17 I've been reading a lot of them lately -- that I also
18 know how to manipulate and get the results I want out
19 of those. And it's the parameters you pick and their
20 ranges.

21 MR. SCHOFER: Sure, and the distributions.
22 I mean --

23 MEMBER POWERS: The distributions, by
24 entropy, you don't really care. I mean, since they're
25 uncertain, you don't give a damn. I mean, you don't

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1 know what the distribution is because the parameters
2 are uncertain. But the ranges are the ones that I
3 find people will be less effusive in describing how
4 they got that range, and yet I can make the outcome --
5 by just adjusting those ranges I can get any outcome
6 I want to out of --

7 (Simultaneous speaking)

8 MR. SCHOFER: Certainly.

9 CHAIRMAN STETKAR: At least oral feedback
10 you hear a little bit of what we're saying, I think.

11 MS. BONE: Yes. Anything else on
12 uncertainty?

13 (No audible response)

14 MS. BONE: Slide 16. This is a new
15 heading, but it encompasses a couple of the examples
16 we've had in the previous draft of the paper. So we
17 got the feedback that we needed to kind of have a more
18 holistic view of how we use PRA and other studies in
19 regulatory analyses. And we thought that was really
20 good feedback.

21 And so we restructured a bit the paper to
22 give more of an introductory statement that PRA and
23 other related severe accident studies may improve the
24 fidelity of regulatory analyses. We acknowledge that
25 resource limitations may necessitate the use of

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1 limited scope or historical PRA studies. And if the
2 analysts were to use a legacy study, then it is very
3 important to be cognizant of the underlying
4 assumptions noting that past PRA studies referenced in
5 regulatory analysis guidance for NPPs are typically
6 partial-scope PRAs.

7 So this gives kind of more of the context,
8 sort of a high-level view of the discussion. And then
9 we provide two specific examples of the analysis
10 choice, including time truncation and distance
11 truncation, which remain for the last version of the
12 paper as well.

13 MEMBER POWERS: Those are excellent
14 points.

15 MS. BONE: Pardon?

16 MEMBER POWERS: Those were excellent
17 points to make on the historical uses of PRA, because
18 for instance using the IPEs and IPEEEs a heck of a lot
19 of steam has gone through the turbines since those
20 were done.

21 (Laughter)

22 MS. BONE: Yes. The first example that we
23 note under this discussion of PRA and other studies is
24 the time truncation assumption. The staff identified
25 that there is a difference among the modeling

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1 assumptions for severe reactor accident analysis, that
2 our guidance does not currently specify a truncation
3 time and that the state of practice has varied over
4 the years. So for instance, in NUREG-1150 24 hours
5 was used. And then the state of the art reactor
6 consequences analysis, SOARCA, 48 hours was used. So
7 we acknowledge that there is a difference here, but we
8 do not have a specific specified truncation time.

9 MEMBER POWERS: And in fact they're now
10 doing them at hundreds of hours. I mean, 72 hours
11 would just get you part way through Fukushima 3.

12 MS. BONE: The second example we note is
13 distance truncation, that the NRC regulatory analyses
14 have historically considered health and economic
15 consequences within 50 miles of a plant site. I meant
16 to change that. This should not say "facility." It
17 should say "plant site" here. This is clearly
18 guidance-specific to reactors. It's not for materials
19 facilities.

20 This is consistent with the NUREG/BR-058,
21 our Regulatory Analysis Guidance. We note that OMB
22 Circular A-4 in regards to distances notes that
23 analysis should focus on benefits and costs that
24 accrue to citizens and residents of the United States.
25 OMB Circular A-4 is pretty high-level and this is

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1 their guidance on --

2 MEMBER POWERS: I would also bring to your
3 attention the recommendation from the Health Physics
4 Society that you not attempt to quantify consequences
5 at doses less than one rem.

6 Did I quote that correctly, sir?

7 MEMBER RYAN: Yes, sir. Well done.

8 MEMBER POWERS: The trouble is when you go
9 beyond 50 miles --

10 MS. BONE: Yes.

11 MEMBER POWERS: -- you're putting one
12 millirem on a billion people. Yes. So I mean, I would
13 --

14 MS. BONE: Right.

15 MEMBER POWERS: -- balance this. And
16 before I did too much about that 50-mile limit, I
17 would make sure I understood its history really well,
18 because you have the potential of stepping on people's
19 toes outside of the Agency.

20 MS. BONE: Yes, absolutely.

21 MEMBER RYAN: Yes, just one example is
22 people sometimes have a tendency to us direct
23 radiation ratings like millirem per hour or something
24 like that and then they use some kind of a blend
25 conversion factor to turn that into radioactivity

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1 content and you can immediately see that that
2 conversion could be at great risk of being way off.
3 So I think that's Dana's point and that's a little bit
4 more -- how you can get into trouble, people using the
5 wrong kind of measurement to assess risk when in fact
6 all they can assess is either dose rate from whatever
7 is there, due a little sampling and figure out a
8 little bit about what's there and go from there. So
9 that's just a little extra. Thank you.

10 MEMBER POWERS: And I think that helps you
11 having this Health Physics Society position paper,
12 because if you make decisions in this area you can
13 blame it on them and you don't have to defend it.

14 (Laughter)

15 MEMBER POWERS: I'm dead serious. This is
16 a highly controversial area, and so if you can blame
17 it on the Health Physics Society and say I'm just
18 following the guidance from this learned society
19 rather than having to defend it yourself, I think
20 you're miles ahead. I mean, if you happen to be a
21 specialist in that area, then I think you can probably
22 mount a defense. But if you're not a specialist, then
23 I wouldn't try to -- I'd blame it -- go talk to the
24 Health Physics Society. I'm just doing what the
25 learned society told me to do.

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1 MEMBER RYAN: Dana, we'll count on you
2 setting the rates, okay, when we get started?

3 MEMBER POWERS: Yes. Well, I mean, it is
4 a thorny and difficult area, and to the extent that I
5 can blame somebody else, I sure as hell would.

6 MEMBER RYAN: I mean, the bottom line,
7 it's a very complex mix of variables, as you all know,
8 per millicurie, microcurie, sievert, whatever you
9 want. The number of radiation units with the amount
10 of activity doesn't really correlate in any really
11 useful way, so you have to kind of make that work for
12 you as you figure out the circumstances you're in.

13 MEMBER POWERS: And you can already see
14 what a quagmire this is. So to the extent that you
15 can shift the blame --

16 CHAIRMAN STETKAR: And the fact of the
17 matter is somebody has to address it sometime and this
18 is the only arena -- this is the most visible arena
19 where those kind of considerations actually come into
20 play.

21 MS. BONE: Right.

22 CHAIRMAN STETKAR: You can argue that,
23 well, this would be -- others within the Agency rather
24 than you folks, but the fact of the matter is it's on
25 -- on sort of a day-to-day regulatory basis you're the

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1 folks who actually use those metrics to make
2 decisions, or to at least make recommendations.

3 MEMBER RYAN: Just one last point. That's
4 why you'll often see people trying to very quickly get
5 to dose or dose equivalent, because that way if they
6 can sort of lump it all together or parse it out in
7 manageable enough pieces, they can get estimates of
8 dose or risk to people more quickly than if they spend
9 a lot of time picking the last picocurie off the
10 forest floor. So just a little something to think
11 about. That's what Fukushima has been wrestling with
12 because they've got these really nice pine trees that
13 are sucking up cesium like nobody's business and they
14 want to use it for decorative wood instead of
15 firewood.

16 (Laughter)

17 MEMBER RYAN: Firewood would be a whole
18 new problem. And then the wild boar running around
19 and cleaning the forest floor off, so they've got an
20 uptake issue there. That's just two of the small ones
21 they're dealing with. So, anyway.

22 VICE CHAIR RAY: What is meant by the last
23 bullet? Have you gotten to that? I mean, I can read
24 it.

25 MS. BONE: Yes.

1 VICE CHAIR RAY: I understand what it
2 says. But does it mean in terms of what you intend to
3 do?

4 MS. BONE: So we do acknowledge the great
5 complexity of this issue and we -- the bullet is just
6 meant to kind of tee us up for some of the
7 conversations that we're having, that analysis of off-
8 site consequences of beyond-design-basis events have
9 shown that consequences of severe accidents involving
10 very large releases could extend beyond 50 miles under
11 certain conditions. And so, we recognize that in many
12 cases 50 miles encompasses -- would accurately reflect
13 what we need for the analysis, but that other severe
14 accidents under specific situations show that maybe
15 should -- have extended beyond 50 miles, or should
16 extend beyond 50 miles the consideration.

17 And so, it's just really to add the note
18 that we realize it's complex, but we are now because
19 of the various nuances of this issue considering if
20 the 50-mile limit should be reaffirmed or modified, or
21 the 50-mile guidance should be reaffirmed or modified.
22 So it's really just identifying the issue.

23 VICE CHAIR RAY: Okay. Fair enough. What
24 would you expect to happen as a result of this
25 observation going forward? You haven't gotten to the

1 plan yet, but this is an open item that's to be
2 resolved. Is it? Or how should we look at this?

3 MR. MOHSENI: We should probably have
4 thought about it enough that when it comes up,
5 whichever position the staff takes, one has a
6 rationale for the position you take given the
7 calculations and the tools that would one way or the
8 other show whatever you do you might always have a
9 mechanism of calculating beyond what you have
10 calculated in terms of impact.

11 VICE CHAIR RAY: Okay. But would you
12 expect, Aby, for this to be in the guidance, what you
13 just said, or something like that?

14 MR. MOHSENI: Perhaps wherever they end
15 up, the staff ends up agreeing on, perhaps a rationale
16 has to be understood of why we're at that point. It's
17 not just that. It's also not just distance, but it's
18 also the timing truncation. Wherever we truncate we
19 probably have to have a rationale for why it's good
20 science at this stage for adequate information. This
21 is adequate for the kind of information you want for
22 the regulatory policy making decision. It's not an
23 act of assessing exactly everything you need to know
24 about risk, but where is it enough to truncate to be
25 able to adequately inform policy makers.

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1 VICE CHAIR RAY: All right. I'm going to
2 understand what you're telling me is this is an open
3 item to be addressed in the guidance update, the Phase
4 2 work. It's not just an observation that ends here.

5 MR. SCHOFER: Everything was identified,
6 what we tracked and eventually dispositioned in some
7 fashion. This particular one is tied to the same
8 issue we just talked about with regard to radiation
9 dose. And a lot of this goes back to the Safety Goal
10 Policy because these same issues were addressed in
11 that policy, in the NUREG-0880, I think?

12 VICE CHAIR RAY: That's right.

13 MR. SCHOFER: Safety Goal Policy is the
14 title. These same issues were there and decisions
15 were made.

16 VICE CHAIR RAY: Yes, I know, that's why
17 I'm wondering are we meaning to revisit that now as a
18 result of this gap analysis?

19 MR. MOHSENI: Well, disposition is. It
20 means basically either you confirm is there anything
21 that causes us to take another position? But I doubt
22 that we're not. But now that we're looking at so-
23 called variation of across business lines, we don't
24 have a choice but to address -- explain the
25 differences adequately that we can actually continue

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1 with some credibility because now it's on the table.

2 VICE CHAIR RAY: Okay. Well like I say,
3 I'm going to believe that it's, as you said, on the
4 table and to be dispositioned.

5 MEMBER SCHULTZ: So this is a statement.
6 I just want to reinforce what Dana has said about the
7 Health Physics Society position paper. You've already
8 referenced that there's a historical basis, but the
9 Health Physics Society position paper wasn't available
10 to support those. Now it is. I think it's very
11 important to put that on the top of the reference list
12 to study carefully before any further action is taken.
13 If you go in a different direction based on where
14 there is not a common worldwide philosophy here, you
15 will always be wrong.

16 (Laughter).

17 MEMBER SCHULTZ: You couldn't defend
18 either side based on which side is trying to come up
19 with the policy, but this is one way the Health
20 Physics Society has found to address it and it could
21 be depended upon to address this issue.

22 MR. MOHSENI: Appreciate the point.

23 MS. BONE: Slides 19 through 21 for the
24 next three or so examples of enhancements we have kind
25 of fall under the category of something called

1 Attribute 18, could be in Attribute 18 and from our
2 NUREG/BR-058. And attribute 18 is defined as that any
3 particular regulatory analysis can identify attributes
4 unique to itself and that this attributes be
5 appropriately described and factored into the
6 analysis. So essentially a catch-all that would
7 incorporate specific attributes that would be
8 appropriate for the analysis.

9 Distribute impacts and equity is one that
10 we do not currently consider. The Executive Order
11 2866 does note that when an agency determines that a
12 regulation is the best available method of achieving
13 the regulatory objective, it shall design its
14 regulations in the most cost-effective manner to
15 achieve the regulatory objective. In doing so each
16 agency shall consider incentives for innovation,
17 consistency, predictability, the cost of enforcement
18 and compliance, flexibility and distributive impacts
19 and equity.

20 We do not that as an independent
21 regulatory agency the NRC is not required to comply
22 with this Executive Order. I know there is no
23 statutory requirement to consider distributive impacts
24 or equity, but the OMB Circular -- OMB guidance states
25 that this term is referred to the description of the

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1 net effects of an action, regulatory action across the
2 population and economy divided up in various ways,
3 whether it be for income groups, race, sex, industrial
4 sector, etcetera.

5 So this is something that's on the table
6 that we're considering moving forward with. It's not
7 in our guidance. We haven't considered it in the
8 past. We do consider environmental justice concerns,
9 and so there could be some overlap in that respect,
10 and we would need to -- if we move forward with any
11 work with this, we would need to obviously define our
12 terms very concretely moving forward.

13 Other federal agencies including the EPA
14 have incorporated such considerations in their
15 guidance, so we just note that that is something that
16 we discovered in our literature review of other
17 federal agencies.

18 MEMBER SCHULTZ: In addition to
19 environmental justice?

20 MS. BONE: I believe so as a separate --
21 another example of what could fall under this
22 Attribute 18 is offsite properties with iconic value.
23 We currently have no NRC guidance on this topic. An
24 example of this would be impacts of the action on
25 offsite properties with iconic value or unique value

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1 to a particular community or group. And really one of
2 the main drivers for putting this in, we got this
3 comment several times at various public meetings from
4 a member of a Native American tribal concern that
5 raised this. So this is something that we've tracked
6 throughout the process since SECY-12-0110, in our
7 public meetings, and we've captured it here in the
8 paper.

9 MR. MOHSENI: It should be noted that in
10 the area of uranium mining, milling there is always
11 this National Preservation Act that kicks in in
12 Wyoming areas where in fact this is done under NEPA
13 and not necessarily under a regulatory analysis. So
14 duplication and all that stuff will certainly cost
15 more, be more burdensome. And again, I go back to the
16 earlier comment: It's just recognizing that these
17 things have a place somewhere and someone is doing
18 them. It doesn't mean everyone has to do them
19 repeatedly in a particular -- so we'll find a way to
20 disposition those as well.

21 MR. SCHOFER: And to be fair, this may be
22 a derivative-type issue, a second derivative issue in
23 that when we site facilities we're siting them away
24 from infrastructure, typically rural areas. And so,
25 by doing such you're not going to have historical

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1 monuments or items close by because that is part of
2 the siting review.

3 MEMBER SCHULTZ: Including materials
4 facilities?

5 MEMBER RYAN: I mean, that's one of those
6 arguments, too, that can kind of go all over the map
7 on whether you've got -- just take the material. You
8 could have this disequilibria or equilibria anywhere
9 up and down the uranium chain. So first of all, what
10 you've got radiologically, not necessarily atom-by-
11 atom and curie-by-curie are becquerel-becquerel,
12 whatever you like, it's going to be a new ball game
13 every time you get into a site. So the uranium mill
14 tailing sites, the FUSRAP sites look dramatically
15 different in terms of risk and in terms of content.
16 So it looks easy when you walk up to a place and say
17 dig this up and take it to the waste site. It's
18 really not as easy as you might think.

19 So all those things come into play in a
20 way that's I think -- I don't want to say impossible.
21 Nothing's impossible, but it's very hard to assess the
22 risks without some very intrusive and investigative
23 work to figure out what you've got, how much physical,
24 chemical, geohydrologic regime at the ground, below
25 the ground and above the ground. You did all that

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1 just to begin to understand that mini-ecosystem of
2 radiological material, what's going to happen to it
3 over time. I hope that's helpful.

4 MS. BONE: Thank you. The last
5 enhancement that we note in the paper is the impact on
6 critical infrastructures, which the DHS defines as the
7 asset systems and networks, whether physical or
8 virtual so vital to the U.S. that their incapacitation
9 or destruction would have a debilitating effect on the
10 security, national economy's security, national public
11 health and/or safety, or a combination thereof.

12 We currently do not consider impacts on
13 critical infrastructures within our cost benefit
14 analyses. And if we did, if these were considered
15 impacts to critical infrastructures, it could affect
16 the outcome of a cost benefit analysis.

17 CHAIRMAN STETKAR: Alysia?

18 MS. BONE: Yes?

19 CHAIRMAN STETKAR: And this in principle
20 could creep into something like -- a reactor accident
21 anywhere in the U.S. could cause a 1,000-point drop in
22 the Dow Jones industrial average that could persist
23 for three or four years? Is that considered part of
24 our critical infrastructure?

25 MR. SCHOFER: It has not.

1 CHAIRMAN STETKAR: Since it says the asset
2 systems and that -- assets being physical assets?

3 MR. SCHOFER: We're thinking more about
4 radiologically contaminated versus --

5 CHAIRMAN STETKAR: Okay.

6 MS. BONE: Right.

7 MEMBER RICCARDELLA: Sometimes at Indian
8 Point it could cause that.

9 CHAIRMAN STETKAR: Well, no, it's -- but
10 I -- debilitating effect on security, national
11 economic security. Is a 1,000-point drop in the Dow
12 Jones industrial average that persists for two or
13 three years --

14 MEMBER POWERS: Less than 10 percent, it's
15 not significant for --

16 (Laughter)

17 MEMBER SCHULTZ: No, but I'm serious.

18 MS. BONE: It's a great question.

19 CHAIRMAN STETKAR: Is that --

20 MS. BONE: Well, and I should say --
21 pardon me. I should say we've identified these
22 things; and it's probably trite to say, but none of
23 these are very clear-cut answers.

24 CHAIRMAN STETKAR: Okay.

25 MS. BONE: These are ongoing conversations

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1 of if the -- in all of these enhancements. Should
2 they be considered? If they should, what's the
3 extent? We're talking about internally where to draw
4 that line. And we recognize that.

5 CHAIRMAN STETKAR: And I don't know. I
6 mean, you cite the --

7 MS. BONE: Yes.

8 CHAIRMAN STETKAR: I get the roads and the
9 bridges and all of that kind of stuff.

10 MS. BONE: Yes.

11 CHAIRMAN STETKAR: But I don't know
12 where --

13 MS. BONE: Where that would fall.

14 CHAIRMAN STETKAR: -- other folks -- you
15 cite DHS.

16 MR. SCHOFER: And it may be different type
17 of economically -- models would need to be used,
18 input/output models versus --

19 MEMBER RYAN: One set of models you could
20 probably look at least and get some understanding of
21 how others have done it is to look at the low-level
22 waste sites that have been permitted in the United
23 States. Some are still active; some are closed. But
24 I would look at kind of three aspects of it. What was
25 required when they got started in terms of

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1 infrastructure, monitoring, all those kind of things,
2 financial assurance? And then look at them in
3 basically three phases of their life: at the start,
4 somewhere in the middle where they were half full, and
5 at closure. And then post-closure. You need to add
6 that on in there, too, because that's an important
7 place where the money ends up.

8 So if you can get a handle on those bits
9 just on regular old everyday solid low-level waste,
10 you could then at least have a start. And you're
11 going to get into semi-solid resins, other stuff.
12 Stainless steel, it's okay maybe. And iron steel is
13 not. It's going to rust pretty quick.

14 So and then of course the ultimate goal of
15 that detail is to get some strategy of fractional
16 release from the inventory as a function of time.
17 That is the ultimate goal for these investigations.
18 Fractional release from the inventory as a function of
19 time. What radionuclide comes out when and at what
20 rate?

21 So I think if you can get some insights
22 into at least a few of the key radionuclides, pick the
23 ones you like: strontium, cesium, tritium, something
24 else. You can kind of get a handle of this is a good
25 site really that's retaining most of the radioactive

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1 material in a way that's predictable, or this isn't
2 such a good site because it's popping out of the
3 ground everywhere. We had no idea it was coming out
4 that way. So that's kind of the playing field as I
5 see it.

6 MS. BONE: Yes, that's very helpful.
7 Thank you.

8 MEMBER RYAN: Anytime I can help, you know
9 I'll --

10 MEMBER SCHULTZ: Alysia, I'm sure I missed
11 it, but you had -- this was one of the list of those
12 elements that were identified by the staff as items
13 that would warrant perhaps further consideration.
14 That list came from the way that the policy or the
15 approach is written within OMB or some other -- or
16 just general practices that you might have found in
17 literature?

18 MS. BONE: All of the above. As we walked
19 through our analysis --

20 MEMBER SCHULTZ: Is it all of the above?
21 I really wanted to go back to OMB, because we talked
22 about that being --

23 MS. BONE: Right.

24 MEMBER SCHULTZ: -- an element of national
25 guidance, if you want -- whatever you want to call it.

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1 MS. BONE: Yes, exactly. OMB was a big --

2 MEMBER SCHULTZ: And so this would be in
3 there? Impact on critical infrastructure.

4 MR. SCHOFER: It was either OMB or one of
5 the Executive Orders.

6 MEMBER SCHULTZ: Okay. Thank you.

7 MEMBER SKILLMAN: It just seems
8 counterintuitive to your second bullet if these are
9 not considered in cost benefit analysis. It just
10 doesn't square with what we're trying to do here. If
11 the impact to a critical infrastructure device is so
12 great, it seems that the whole drill screens out. We
13 wouldn't do anything that could truly injure a
14 critical infrastructure component, nor would we find
15 it cost-beneficial to destroy that device. So it
16 seems as though it ought to be screened in, but it
17 ought to have treatment that respects the importance
18 of the device, whether it's a bridge or a tunnel or an
19 airport, or whatever that might be. So it just seems
20 peculiar that we would say the NRC doesn't consider
21 it.

22 VICE CHAIR RAY: Well, of course that's
23 not what's happening here. They're just observing
24 that we haven't. They're not proposing that we don't.

25 MEMBER SKILLMAN: So not presently

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1 consider?

2 MS. BONE: Yes, we should say --

3 MEMBER SKILLMAN: Do not presently
4 consider.

5 MR. SCHOFER: Yes, fundamentally it's
6 omission of specificity because we do address
7 decontamination efforts and that, but we don't
8 explicitly address whether you'd have a GDP impact as
9 a result of doing contamination during that period of
10 time.

11 VICE CHAIR RAY: Yes, you don't mean that
12 it's the policy not to do it.

13 MS. BONE: No, this is what you see.

14 MEMBER SKILLMAN: Correct.

15 VICE CHAIR RAY: This is a gap analysis.
16 It's supposed to identify what we do and what we don't
17 do. Now the real issue, we'll get to that after the
18 path forward discussion.

19 MEMBER SKILLMAN: Okay.

20 VICE CHAIR RAY: All right. Where do we
21 go with this? What's going to happen? You guys have
22 at least indicated in the last year that we expect to
23 have a continuing dialogue, and so we're trying to
24 tell you what to do before you've made up your mind
25 what you think you we ought to do is probably the

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1 question.

2 MR. SCHOFER: Okay. Thanks.

3 MS. BONE: Any other questions on this
4 enhancement or others?

5 (No audible response)

6 MS. BONE: Okay. With that, we do move to
7 the path forward. We did try and put some more beef
8 to this section in the paper itself and more
9 discussion here to clarify, but the staff will
10 continue to update Cost Benefit Guidance to harmonize
11 across business line and programs. And that's
12 consistent with what we've said in the previous SECY
13 papers, that we recognize cost benefit practices may
14 differ among business lines and programs and that we
15 will plan to document any basis for dispositioning any
16 differences in practices.

17 And that's something that we got also
18 feedback from the last ACRS meeting, that this work is
19 only as good as we're capturing what we're going, what
20 we're learning, how we're dispositioning any issues.
21 So we do plan as we are updating the guidance to have
22 a robust tracking system of how we're looking at these
23 issues and whether changing them in the guidance or
24 whether that's just reinforcing the technical basis
25 for the current guidance, which way we'd go. We will

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1 continue to track that as we move forward. Now again,
2 this is just the first step in a multi-phase effort,
3 multi-year effort. Pardon me.

4 The staff will continue to engage the ACRS
5 during the process to update the Cost Benefit
6 Guidance. As we mentioned in an earlier briefing on
7 SECY-14-002, we plan to have the -- the guidance will
8 follow the typical NUREG development format, go out
9 for public comment, engage with the ACRS, that kind of
10 thing. So there will definitely be many more
11 conversations as we produce more guidance documents
12 and move forward in this process. And the staff will
13 seek Commission guidance regarding potential policy
14 issues.

15 MR. MOHSENI: Just to another point --

16 MS. BONE: Oh, yes.

17 MR. MOHSENI: -- to add to the impact on
18 critical infrastructure and the iconic impacts, iconic
19 value. In NEPA space there's a recognition of the
20 impact of the decision that's broader than just cost
21 benefit analysis. It does assess, it does inform the
22 policy makers to go -- if you had to license a new
23 plant, the NEPA assessment would capture all of these
24 items, but in the regulatory analysis, which is really
25 our piece here, which is a small subset of policy

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1 making in a broader sense, the reactors are already
2 out there.

3 We're changing a rule, adding a
4 requirement. So it's important to realize that at the
5 beginning of siting you do all these where are you
6 located, what's the impact on infrastructure, what are
7 the accidents that could -- and the accident analysis
8 part in a NEPA environment does identify impacts on
9 infrastructure, critical infrastructure, population by
10 age group, by ethnicity, by economic segments. And so
11 it's not that these are not covered somewhere.

12 The question is when we come back next
13 time with you, if you don't see it in -- if we say
14 we've dispositioned it, it may be that this
15 disposition path is -- it's adequately covered in a
16 broader sense for the Agency for the policy makers to
17 be aware. But even though you don't do a cost benefit
18 analysis for a critical infrastructure, the
19 information is there for them to understand there
20 might be an impact.

21 CHAIRMAN STETKAR: But, Aby, in some sense
22 that's a go/no-go initial determination. Here we're
23 talking more about deltas. If you don't pass the no-
24 go filter initially, you don't have the plant to do
25 the evaluation. Here we're talking about deltas given

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1 the go.

2 MR. MOHSENI: Indeed. And to that --

3 CHAIRMAN STETKAR: And so, in terms of my
4 example of whether it's -- my economic example is
5 could a potential change reduce the risk and a
6 potential depending on how you -- I always get the
7 math wrong, but the potential benefit of that change
8 could be measured in terms of an effect on the Dow
9 Jones industrial average. Now that in principle could
10 have been considered in the initial pass/fail
11 criterion, but whether or not that was is a different
12 issue.

13 Change to a current infrastructure that
14 may have grown up around a plant that could have been
15 sited, oh, out in the middle of the desert with nobody
16 around when it was initially built and now has, oh,
17 town around it is different when you do the delta.

18 VICE CHAIR RAY: Well, this covers a lot
19 of ground and we'll discuss among the Committee
20 members where we feel we are at this point in time.
21 I guess I would just ask this question: When we next
22 look at presumably some progress you've made in Phase
23 2, can we ask that you tell us so that we don't have
24 to look to see how things were dispositioned, the
25 gaps, how they were dispositioned? Otherwise, we have

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1 to search and say, well, I guess this issue has been
2 dealt with in some certain way.

3 That way people can feel more comfortable
4 if they have a viewpoint that they might want to see
5 how you dispositioned it as against saying, well,
6 here's what we think today and we ought to take into
7 consideration. That may happen. But if we are
8 assured that we can track these things; and you've
9 already said that's what intend to do, then perhaps
10 we'll be more willing, in some cases anyway, to wait
11 and see, well, what was the outcome and then give you
12 our views about it. But as we say, we'll talk about
13 that further.

14 It's hard to get our mind around what
15 you're expectations are. I won't call it your plan
16 necessarily, but how do you see this Phase 2 now? Is
17 it going to start soon? Has it already started? When
18 do you think it might be over so that we've now
19 completed the update and it goes out for public
20 comment? Do you expect that to be a single cycle or
21 more than one? So is this a process that doesn't have
22 an end, do you think, or what?

23 MR. SCHOFER: It's a process. We're not
24 even through Phase 1 yet, so we'd like to finish, you
25 know, do the initial update of the regulatory guidance

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1 so that it's formatted differently, get rid of
2 outdated information and get that piece done before --
3 and then start working on things which are more
4 policy-oriented.

5 VICE CHAIR RAY: Can you do that without
6 public comment? Does the Agency let you do that?

7 MR. SCHOFER: No, no. No, it's done
8 through public comment. This is a NUREG, so it will
9 go out for public comment.

10 VICE CHAIR RAY: Even Phase 1?

11 MR. SCHOFER: Even Phase 1. In addition,
12 we have other guidance documents that we're updating
13 a dollar per person rem, replacement energy costs, and
14 we're working that as well. We have that as a higher
15 priority than these items which are just being
16 rediscovered, let's say.

17 VICE CHAIR RAY: Are you putting value on
18 carbon emissions, just by the way?

19 MR. SCHOFER: We do put value on carbon
20 emissions.

21 VICE CHAIR RAY: Dollar value?

22 MR. SCHOFER: There is dollar value that
23 is published by EPA.

24 VICE CHAIR RAY: Yes.

25 MR. SCHOFER: And that was a consortium of

1 various agencies, and we would use that value.

2 VICE CHAIR RAY: Okay. So replacement
3 energy costs would include both market-based costs as
4 well as carbon emission costs, whatever that is judged
5 to be?

6 MR. SCHOFER: So I mean there is a lot in
7 progress, and this is just going into that overall
8 plan and we would need to prioritize going through the
9 process.

10 MEMBER SCHULTZ: So I guess my question
11 would be when you say this is lower priority, is the
12 plan linear? Is this activity going on while you're
13 doing the update? From what we heard today, I think
14 what Harold was asking is when might we see another
15 rendition of this in terms of its next step, which
16 would be to identify the gaps? And then you have to
17 get all the whys, the whats and the hows to see if in
18 fact it all fits together in the regulatory analysis
19 or not. So I guess that's down the road --

20 MR. SCHOFER: It's down the road.

21 MEMBER SCHULTZ: -- but I don't know. I
22 have no concept of time here. Maybe you don't either.

23 MEMBER REMPE: But instead of time do you
24 have a concept of how many staff man-years it is or
25 something like that? I mean, I know other

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1 priorities --

2 MR. MOHSENI: Yes. Yes.

3 MEMBER REMPE: -- come in sometimes, so
4 have you estimated how much for Phase 1 versus a
5 subsequent phase?

6 MR. MOHSENI: See, there's two strikes
7 against this project. One is there's nothing broken
8 in the system today. It's enhancements. Most of
9 these are overlaps with other stuff. And locally we
10 improve whatever we can because the flexibility is
11 there. You don't need a new direction from everyone
12 to improve, for example, an uncertainty analysis. We
13 can do that.

14 The second strike against this is all the
15 other work we do -- and right now with Fukushima
16 stuff, it's the same group of people basically working
17 all the rules that you have been debating. And we are
18 trying to hire to get to the point where you have
19 seasoned individuals who understand all the nuances of
20 the historical evolution of where we are. We got
21 those two major challenges with us. And with that, if
22 you had to choose where he would spend his time or she
23 would spend her time, the Fukushima stuff is like
24 Congress is asking for it, everyone is asking for it.
25 We got to do the regulatory analysis for those.

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1 SAMGs, for example. It's not an easy thing. And we
2 only have seven spots, four of which are vacant today.

3 MEMBER CORRADINI: Seven what? I'm sorry.

4 MR. MOHSENI: Seven spots in the
5 regulatory analysis team.

6 MEMBER CORRADINI: Oh, okay.

7 MR. MOHSENI: Which is the backbone to
8 these rules that you are looking at. And so, it's
9 been tough. For that reason we hesitate. I know --

10 VICE CHAIR RAY: We understand that.

11 MR. MOHSENI: -- ideally --

12 MEMBER CORRADINI: Have enough information
13 so we understand.

14 MR. MOHSENI: Yes.

15 MEMBER POWERS: Fred, you can ask for a
16 raise, you know?

17 (Laughter)

18 MR. SCHOFER: If you could put that in
19 your letter.

20 (Laughter)

21 VICE CHAIR RAY: We're really somewhat in
22 the same position you are, because you were here this
23 morning. Some of you maybe understand.

24 MR. MOHSENI: Yes.

25 VICE CHAIR RAY: So we're trying to

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1 allocate our time properly also.

2 MEMBER REMPE: I guess I still haven't
3 heard does it take a staff-year to finish Phase 1 or,
4 I mean, do you have an idea of how much work scope is
5 required to get it done?

6 MR. MOHSENI: The amount of work is not
7 insignificant. As you -- dispositioning to the best
8 -- you know, public meetings, looking at public
9 comments, it's probably we're talking years, not --

10 MEMBER REMPE: Multiple staff-years?

11 MR. MOHSENI: Yes. You want to --

12 MR. SCHOFER: Yes, we do have Phase 1
13 estimated, and it's on that order, however, it --

14 MEMBER REMPE: On that order being one
15 staff-year or multiple staff-years for Phase 1?

16 MR. SCHOFER: A couple staff-years.

17 MEMBER REMPE: Okay.

18 MR. SCHOFER: The issue is that the
19 resources are redeployed for other --

20 (Simultaneous speaking)

21 MEMBER REMPE: That's fine. I understand
22 that that's happened a lot with Fukushima, but and
23 then Phase 2 could be a lot more, which we have not
24 even tried to estimate it. And do you have a feel for
25 when it's done?

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1 MR. SCHOFER: Phase 2 hasn't been
2 estimated yet. That is correct.

3 MEMBER REMPE: Okay.

4 VICE CHAIR RAY: Okay. I believe from the
5 crackling sound that the bridge line is open and we
6 invite comments from members of the public who are on
7 the line. And if there are, if one of them would just
8 speak up to verify that, we'd be most grateful.

9 (No audible response)

10 VICE CHAIR RAY: Hearing none, we will
11 then check in the room here to see if there are any
12 members of the public who would like to step forward
13 and give us comments on this subject.

14 (No audible response)

15 VICE CHAIR RAY: None? I'll turn it back
16 to you, Mr. Chairman, and thank you these folks for
17 their fine presentation.

18 CHAIRMAN STETKAR: Thank you, Harold. A
19 process issue. If you're interested, what I plan to
20 do is at 5:00 we'll have a brief discussion among the
21 Committee members whether we're going to write a
22 letter on this particular topic. So if any of you are
23 interested in that, it will be at 5:00. We're going
24 to tee that up first.

25 With that, we will recess until -- when

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1 are we supposed to recess until -- 3:30.

2 (Whereupon, the above-entitled matter went
3 off the record at 2:58 p.m. and resumed at 3:31 p.m.)

4 CHAIRMAN STETKAR: We are back in session
5 and the next topic on our agenda is the Branch
6 Technical Position 8-9 on open phase conditions in
7 electric power systems. And Dr. Dennis Bley will lead
8 us through this.

9 MEMBER BLEY: Thank you, Mr. Chairman.
10 It's good to get to an interesting session.

11 (Laughter)

12 MEMBER BLEY: We had a good Subcommittee
13 meeting a couple weeks ago and really dug into this.
14 This all started; we'll hear about all this from the
15 good folks who are going to present to us, with an
16 incident at Byron that then traced back to a series of
17 other open phase, loss of phase events, some of which
18 weren't detected for several weeks. It can be a
19 really tricky condition to detect, and it can also
20 cause some significant problems. And we're going to
21 hear from the staff on the Branch Technical Position
22 and a bit of the history, and we're going to hear from
23 NEI and from EPRI on where industry is headed and a
24 kind of unique solution that was developed for the
25 alarming such a condition.

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1 At this point I'm going to turn the floor
2 over to Jake Zimmerman and let us get started.

3 MR. ZIMMERMAN: Okay. Thank you. I'm
4 Jake Zimmerman. I'm the chief of the Electrical
5 Engineering Branch in the Division of Engineering, the
6 Office of Nuclear Reactor Regulation.

7 Today we're here to brief you on, as Dr.
8 Bley indicated, the loss of phase conditions issue.
9 We briefed the Subcommittee back on November 17th.
10 With me today is Singh Matharu. Singh is a senior
11 electrical engineer in the Electrical Engineering
12 Branch, and Singh will brief you on the status of the
13 staff's resolution of this issue, and then actions
14 we've taken and path forward to completing and closing
15 out the bulletin.

16 As many of you know, on July 27th, 2012 we
17 issued the NRC bulletin related to the open phase
18 issue. The bulletin did require a written response
19 from all operating and combined licensees for nuclear
20 power reactors within 90 days. All of them did comply
21 within that time. And the staff reviewed all of those
22 responses in detail and issued a summary report that
23 is publicly available.

24 Since that open phase issue has come up,
25 the industry and the staff have proactively engaged to

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1 address this issue. To the industry's credit, we
2 appreciate the demonstrated leadership both by Exelon
3 and the Nuclear Energy Institute and their commitment
4 to resolving this issue. To date the staff has
5 conducted 11 public meetings and supported the
6 industry initiative to resolve the open phase issue.
7 As indicated, industry representatives are here to
8 give you a sense of their efforts.

9 The staff also issued, as the title of
10 this session is, the Branch Technical Position, which
11 we know you all have a copy of and have questions
12 about that. This position is intended to provide
13 guidance for future reviews of issues that come up.
14 It is the staff's position for how to resolve this
15 issue. In addition we've developed a draft Interim
16 Enforcement Policy, IEP. That would finalize the
17 Agency's regulatory action on this open phase issue.

18 We did receive comments on the Branch
19 Technical Position and also some comments on the IEP,
20 or Interim Enforcement Policy. We are in the process
21 of reviewing those comments and finalizing the
22 position. The Interim Enforcement Policy will need to
23 be presented to the Commission as a policy decision
24 and approved by the Commission should they choose to
25 do so.

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1 Lastly, since the Subcommittee meeting we
2 issued a letter to NEI on November 25th, and this was
3 in response to two previous letters that they had
4 submitted to us. One was March 21st of this year and
5 the other on August 14th. In response to this letter
6 the staff provided our position, our formal position
7 in writing on what we believe it takes to resolve this
8 issue. The staff provided also some next steps that
9 each licensee should take to resolve the issue.

10 MEMBER BLEY: Was this the November 25th
11 letter?

12 MR. ZIMMERMAN: Yes, sir.

13 MEMBER BLEY: Okay.

14 MR. ZIMMERMAN: And you have a copy of
15 that letter. So with that kind of as a high-level
16 background overview, I'm going to turn it over to
17 Singh Matharu who will walk you through the staff's
18 presentation. Thank you.

19 MR. MATHARU: Good afternoon. Like Jake
20 said, my name is Singh Matharu. Work in the
21 Electrical Branch, NRR. And I will try and go through
22 a bunch of slides and hopefully do it in a timely
23 manner and have time for questions also.

24 Going to talk about the open phase
25 condition. Going to give you an overview of some

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1 operating experience and the type of connections that
2 have been involved. Going to briefly go over the
3 regulatory requirements, give you an overview of
4 actions that staff has taken and discuss the technical
5 position, the BTP, and looking forward where we go.

6 I've got about 16 slides. I know I don't
7 have enough time to go through all of them, so on some
8 of them I'll skip and we can discuss them as questions
9 on some of the technical issues.

10 So loss of phase condition. The open
11 phase condition, or OPC as we call it, is loss of one
12 of the three phases of the offsite power circuit on
13 the high voltage side of a transformer connecting an
14 offsite power circuit to the transmission system. And
15 we are assuming that there may be a high-impedance
16 ground fault involved or there may not be a high-
17 impedance ground fault involved.

18 There's also operating experience where
19 some licensees had loss of two phases, so two out of
20 three phases under similar condition where a breaker
21 may not close and you have a single phase supplying
22 power to the unit.

23 The consequences of loss of phase is it
24 creates an unbalance in the AC power system. The type
25 of unbalance depends on the transformer configuration,

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1 depends on the transformer loading, depends on the
2 plant configuration. And there's all the reasons
3 highlighted there that can impact what kind of
4 unbalance you get. The consequences also effect
5 rotating equipment, mainly motors that can overheat.
6 They may trip if they're core protector devices or
7 they may burn out.

8 Overview of what happened at Byron.
9 Essentially the open phase condition occurred at the
10 metering transformer and the line in red shows the
11 circuit that was only in two phases. At that time
12 Unit 2 was at full power and they had half the buses
13 being supplied by the unit aux transformer and the
14 other half of the plant was supplied from the offsite
15 source. As a consequence of this open phase
16 condition, large motors tripped, gave them a unit
17 trip. The unit trip also gave a transfer from their
18 unit aux transformer buses to the offsite buses, and
19 as a consequence some of the other loads also tripped
20 due to overload conditions. The big picture, this
21 open phase condition rendered the offsite source
22 inoperable and also rendered the onsite inoperable
23 primarily because the detection schemes on the safety
24 buses did not function.

25 So for us the connections that we are

1 really looking at, or connections of interest are
2 really on the high side of the transformers, as I
3 said, on the switchyard breakers. And on this picture
4 I've got about three transformers and we're showing
5 the connections that are of interest to us.

6 There are also connections that can be a
7 challenge. Essentially the isophase bus that goes
8 from the unit aux transformer. Sorry, from the main
9 generator to the unit aux transformer. We are not
10 particularly concerned about those.

11 CHAIRMAN STETKAR: Singh, in the
12 Subcommittee meeting we had some discussion about the
13 generator breaker-type configurations, and I thought
14 you said you were going to go back and look to see
15 whether all plants in the U.S. that had that
16 configuration have isophase bus. Did you do that?

17 MR. MATHARU: Yes, sir. Your question was
18 did I do 100 percent check on all the plants. I did
19 not do 100 percent check. I sampled about 55 of them
20 and all had the isophase connection that's shown here.
21 I have not seen -- I have not come across one. My
22 research is still going on, but I have not come across
23 one that shows anything different than the isophase
24 configuration that I'm showing here.

25 MR. GREENLEE: And the industry is doing

1 100 percent.

2 CHAIRMAN STETKAR: You have to come to the
3 microphone and identify yourself and speak with
4 sufficient clarity and volume.

5 MR. GREENLEE: And as we discussed at the
6 Subcommittee meeting the industry is doing 100 percent
7 sampling. We've already notified the industry that
8 they need to go look to see if there are any
9 vulnerabilities in the low sides.

10 MEMBER BLEY: Identify yourself for the
11 record.

12 MR. GREENLEE: I'm sorry. Scot Greenlee.

13 MEMBER BLEY: Thanks, Scot.

14 MR. MATHARU: We jumped a little ahead.
15 All I was going to give here on this slide was some of
16 the background. Eleven operating events worldwide,
17 three of them in the U.S., couple of them in U.K. and
18 Sweden and Spain. In Sweden they had two poles on a
19 breaker that did not go fully closed, and so a double-
20 phase issue.

21 So the type of circuits that exist out
22 there. Again like we said, this is the isophase
23 connection on my left picture of the isophase
24 connection inside. And we don't think it's going to
25 be a connection problem here. It's fully loaded, very

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1 heavily bolted, unlikely to have a failure in there.
2 Cable connections, breakers and bus bar connections.
3 Those type of connections are really not of a concern.
4 What we are looking at is overheads come into
5 insulators on to transformers and breakers that may
6 not close properly.

7 So where are we? We are looking at the
8 requirements in the General Design Criteria 17 that's
9 related to requirements for onsite and offsite power
10 sources. And we're also looking at 10 CFR
11 50.55a(h)(2), which essentially requires automatic
12 actions to work the safety systems, allowing them to
13 perform the safety functions. And there are tech
14 specs associated with that.

15 So far what we have done. I think Jake
16 gave an overview. Followed through with the
17 inspection at Byron. We have details on the overall
18 event that happened there. Subsequent to that we
19 issued information notice. We followed up with a
20 bulletin and we got responses to the bulletin from the
21 licensees. We have looked at the responses. We have
22 looked at the comments and we have come to a
23 resolution on where we're going.

24 In addition to that we are supporting the
25 industry in looking at the resolution. We're also

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1 participating in an international effort because it's
2 an international event. And with IEEE to develop a
3 standard or at least a method of resolving for new
4 plants.

5 So what are we asking? For the active
6 plants we are saying you should be able to detect an
7 open phase condition on the high side of the
8 transformer connected to the offsite source. We
9 expect an alarm in the main control room and we expect
10 automatic actuation to mitigate the event. For the
11 passive plants we are saying as a minimum you need to
12 detect and alarm in the control room.

13 The big question is does the detection
14 system have to be Class 1E or non-Class 1E? So what
15 we are saying is we are giving a prescription or a
16 definition of what the expectation is for the system
17 that licensees can offer. We are saying it should be
18 single-failure proof and it should not result in mal-
19 operation, mis-operation. In other words, separation
20 of onsite from the offsite. It should automatically
21 detect and alarm in the control room and if the
22 offsite power circuit is degraded due to an open phase
23 condition, the power source for the onsite safety-
24 related systems should be transferred to the onsite
25 system. And we expect tech spec surveillance

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1 requirements if the detection system is considered to
2 be inoperable.

3 CHAIRMAN STETKAR: Singh, go back to that
4 slide for a moment.

5 MR. MATHARU: Sure.

6 CHAIRMAN STETKAR: You skipped the second
7 half of the third bullet. Can you explain what that
8 really means?

9 MR. MATHARU: The --

10 CHAIRMAN STETKAR: Right.

11 MR. MATHARU: Within the time assumed in
12 the accident analysis?

13 CHAIRMAN STETKAR: That I got. It says
14 given a concurrent design basis accident. What do you
15 mean by that?

16 MR. MATHARU: So what we are assuming is
17 that in a typical design your offsite source is in a
18 standby mode. You have a design-basis event. You're
19 going to get a reactor trip, a turbine trip and
20 generator trip and you're going to transfer to your
21 offsite source.

22 CHAIRMAN STETKAR: Well, that's one
23 configuration.

24 MR. MATHARU: Yes.

25 CHAIRMAN STETKAR: There are many others.

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1 MR. MATHARU: Correct.

2 CHAIRMAN STETKAR: So go on.

3 MR. MATHARU: So this would be a generic
4 statement saying you want to transfer and allow all of
5 your sources to meet your accident analysis
6 requirements. In other words, if you assume your
7 water is in the vessel in 50 seconds or 60 seconds,
8 you want to make sure that happens.

9 CHAIRMAN STETKAR: I'll have to think
10 about that.

11 MEMBER BLEY: I've read most of this stuff
12 you've written and I have trouble finding any place
13 that requires looking at two concurrent events both of
14 fairly low probability at the same time. I'm
15 questioning the requirement for automatic transfer.
16 And you hook it to the GDC-17; I've read that pretty
17 carefully, and hook it to 50.55(h)(2), which is a
18 reference over the IEEE standard. And you hook it to
19 a couple of arguments. One was tied to the initial
20 event at Byron and said, gee, if the operators hadn't
21 been quite as fast as they were, we might have gotten
22 into a small LOCA via a sealed LOCA, but that takes a
23 little time and it's a fairly slow-evolving event.
24 And then in another place you pull this concurrent
25 thing out and effectively look at a large LOCA, which

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1 if it happened at the same the DBA, a doubled-ended
2 guillotine break, yes, we'd be stuck.

3 But if you have the open phase condition
4 and you have very reliable detection and alarm; and
5 from what we hear training and procedures for the
6 operators on how to deal with that, it's not going to
7 take very long to deal with it. So you ought to be
8 looking at, given I'm sitting there in an open phase
9 condition and it's alarmed, what's the chance over say
10 the next half our, hour, two hours that you get this
11 concurrent large LOCA? And that's pretty rare.

12 VICE CHAIR RAY: If they're caused by the
13 same event, Dennis?

14 MEMBER BLEY: Well, if they're caused by
15 the same event, that in fact would be a reason to look
16 at concurrent. But we don't usually look at
17 concurrent. And the large events that could do that
18 we look at as those large events.

19 VICE CHAIR RAY: The only reason I say it
20 is because the offsite power connection isn't
21 seismically qualified, for example.

22 MEMBER BLEY: That's true. It's not. In
23 fact, it almost always comes down completely in a
24 severe seismic accident.

25 VICE CHAIR RAY: You're darn right it

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1 does.

2 MEMBER BLEY: So we wouldn't have the open
3 phase. We'd have nothing.

4 VICE CHAIR RAY: Well, you can't guarantee
5 it. Yes, I'm sorry. Go ahead.

6 MEMBER BLEY: Yes, so I was just going
7 back to where do we come up with this concurrent
8 concept, because I don't see it elsewhere in the
9 regulation. And I don't see it for other events.
10 I'm kind of curious why we did under this one. I
11 can't quite figure it out.

12 MR. MATHARU: Well, from the requirements
13 for onsite and offsite power we postulate loss of
14 offsite power simultaneous with large-break LOCA or a
15 design-basis event be postulated degraded conditions
16 with the large-break LOCA event, design-basis event.
17 And same would apply to an open phase condition.
18 Again, Byron took eight to nine minutes I think, or
19 almost close -- it was 12 minutes before they
20 recovered. And I think they calculated --

21 MEMBER BLEY: But they didn't have this
22 new highly-reliable indication that you'd have to have
23 to have an automatic system work, too. I mean, that's
24 not going to work on its own. It's going to need to
25 be detected to actuate some actuation logic.

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1 MR. MATHARU: If we go back and look at
2 some of the plan designs that you would have, if I
3 look here, some plants would feed all safety buses
4 from this source. And they may be running. Some of
5 the safety-related equipment is operating during
6 normal plant operation.

7 MEMBER BLEY: I mean, if you lose offsite
8 power and you don't get it right back, you're sitting
9 there with no offsite power for an extended period of
10 time --

11 MR. MATHARU: Yes.

12 MEMBER BLEY: -- over which time you want
13 to be protected against the LOCA.

14 MR. MATHARU: Correct.

15 MEMBER BLEY: In this case we've got a
16 situation that's -- I won't say momentary, but it's
17 probably on the order of -- and I'd have to talk to
18 the people in the plants, but I would think it's
19 probably less than 20 minutes, given an alarm, getting
20 yourself separated from the bad feeder. So our
21 exposure time to the large LOCA is very short.

22 MR. MATHARU: Yes.

23 MEMBER BLEY: So I'm still having trouble
24 seeing where the requirement comes from and why we're
25 pushing that way.

1 MR. MATHARU: Well, again, I agree with
2 you that the probability argument is really low.

3 MEMBER BLEY: Really small.

4 MR. MATHARU: But the consequences of the
5 event -- and that's what I was going to strive here,
6 in normal operation there are some safety-related
7 loads operating on these buses, in this case, and
8 there is a potential to damage them.

9 MEMBER BLEY: There is the potential to
10 damage them.

11 MR. MATHARU: And they may not be --

12 MEMBER BLEY: The longer they run --

13 MR. MATHARU: The longer they run.

14 MEMBER BLEY: -- on that unbalanced
15 condition --

16 MR. MATHARU: Correct.

17 MEMBER BLEY: -- the more likely they are
18 to be damaged. And to me it's not likely they're
19 going to run very long if you have a real alarm, which
20 we haven't had.

21 MR. MATHARU: Well, you're talking -- in
22 electrical terms you're talking about minutes, a
23 couple of minutes to burn out. More than five
24 minutes. Depending on how much --

25 MEMBER BLEY: Well --

1 MR. MATHARU: -- what quality of
2 insulation you have.

3 MEMBER BLEY: And assuming the thermal
4 overloads don't go, which they have --

5 (Simultaneous speaking)

6 MR. MATHARU: -- overloads.

7 MEMBER BLEY: -- on some of these events.

8 MR. MATHARU: Correct. In some cases --

9 MEMBER BLEY: I mean, they're there to
10 protect you from that.

11 MR. MATHARU: That is correct.

12 MEMBER BLEY: Well, not from this
13 particular condition, but --

14 MR. MATHARU: They may or they may not.
15 We are not relying on the protective devices. We need
16 to ensure that the safety-related equipment is
17 protected.

18 CHAIRMAN STETKAR: Help me out, if you
19 can. And go back to slide 12, because I still want to
20 make sure that I understand the -- because it's
21 written you come back to individual plants always, and
22 the Branch Technical Position is written for
23 everybody.

24 MR. MATHARU: Right.

25 CHAIRMAN STETKAR: So that third bullet,

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1 if I use a logical statement, is the Branch Technical
2 Position saying that the automatic transfer is
3 required only if I have a concurrent design-basis
4 event, or is it always an automatic transfer because
5 I must anticipate a design-basis event?

6 MR. MATHARU: The Branch Technical
7 Position says you have time to respond. If your time
8 has run out, if your protective devices cannot handle
9 it, then they're asking for it.

10 CHAIRMAN STETKAR: And that's --

11 MEMBER BLEY: Can I rephrase it?

12 CHAIRMAN STETKAR: Well, you can -- yes.

13 MEMBER BLEY: I think what John's asking
14 you is are you asking for logic that given you have an
15 open phase it automatically transfers or one that says
16 given an open phase and an accident condition --

17 CHAIRMAN STETKAR: Like an ESFAS signal.

18 MR. MATHARU: Yes.

19 CHAIRMAN STETKAR: Yes to what?

20 MEMBER BLEY: For which of those two?

21 MR. MATHARU: If you have an open phase
22 condition and --

23 MEMBER BLEY: Oh, incident with --

24 MR. MATHARU: -- an ESFAS --

25 CHAIRMAN STETKAR: An ESFAS condition?

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1 Okay.

2 MR. MATHARU: -- then you --

3 (Simultaneous speaking)

4 CHAIRMAN STETKAR: Then within a --

5 MR. MATHARU: Correct.

6 (Simultaneous speaking)

7 CHAIRMAN STETKAR: And let me take an
8 arbitrary time window of 37 seconds. It's arbitrary.
9 But the condition and -- and I'll just use a generic
10 ESFAS signal, and at the end of 37 seconds under that
11 logic I would then automatically transfer?

12 MR. MATHARU: Yes.

13 CHAIRMAN STETKAR: Is that -- okay.

14 MR. MATHARU: That's a --

15 CHAIRMAN STETKAR: And that time would
16 obviously -- could be different depending on the
17 plant.

18 MR. MATHARU: Correct.

19 CHAIRMAN STETKAR: But I need that logical
20 coincidence of an ESFAS signal and the open phase to
21 initiate the automatic transfer.

22 MR. MATHARU: That's correct.

23 CHAIRMAN STETKAR: Okay.

24 MEMBER BLEY: And if you only have the
25 open phase, you don't need an automatic transfer?

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1 MR. MATHARU: Not necessarily. That is
2 correct.

3 MEMBER BLEY: Okay. I misread the way it
4 was written in the --

5 (Simultaneous speaking)

6 CHAIRMAN STETKAR: Thanks. That really
7 helps me.

8 MEMBER BLEY: Me. too. Back to you.

9 MR. MATHARU: Again, I think we consider
10 the event. We have a lot of operating experience now.
11 The BTP is going to provide guidance for future
12 licensing actions. And like I said, we're looking at
13 single open phase condition with and without high-
14 impedance ground fault. And Byron the first event
15 that happened was a high-impedance event. The second
16 event was a non-high-impedance. It was grounded. So
17 the second event was fairly regular ground fault
18 conditions that were detected and everything happened
19 as required. And we're looking at operating and new
20 reactor phase.

21 We asked questions on the draft Branch
22 Technical Position and the comments. We have resolved
23 comments that we received in the process of looking at
24 some of them. Essentially some of the questions that
25 were raised were similar to what you're asking here.

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1 Does it need to be automatic? Does it have to be
2 Class 1E? Is the OPC, the open phase condition,
3 beyond-design-basis? Again, technical specification,
4 are they applicable? Do the existing plants comply
5 with the requirements of GDC-17? And how are we going
6 to apply it to AP-1000 or the passive plants that
7 don't rely on an offsite source for the first few
8 hours?

9 Path forward. Essentially we're working
10 at the industry to figure out our optimum options. We
11 have laid our position out in the narrative NEI. And
12 essentially we're looking at a closeout letter, and I
13 think Jake mentioned the enforcement actions that we
14 are planning. That's most of what I had.

15 MEMBER BLEY: Where have you folks come
16 down on the issue of whether it needs to be safety or
17 not? Your second bullet there.

18 MR. MATHARU: We are accepting both, but
19 with the --

20 MEMBER BLEY: Is that written down?

21 MR. MATHARU: Yes, sir. It's in the --

22 MEMBER BLEY: It's in the BTP?

23 MR. MATHARU: It's in the BTP. It's also
24 in the letter.

25 MEMBER BLEY: Okay.

1 MR. ZIMMERMAN: Actually the most recent
2 letter that we issued clarifies that further. If you
3 look at the fourth page of the letter --

4 MEMBER BLEY: This is the November 25th?

5 MR. ZIMMERMAN: Yes, sir.

6 MEMBER BLEY: Okay.

7 MR. ZIMMERMAN: We do state it is the
8 staff's position that any licensee solution (Class 1E
9 or non-Class 1E) to address OPC should meet the
10 following functional requirements: And then we list
11 four functional requirements.

12 MEMBER BLEY: Now given this clarification
13 in this letter, are you intending to roll some of that
14 back into the BTP, or just leave this as clarification
15 on --

16 MR. ZIMMERMAN: No, we would revise the
17 BTP based on the comments that have been provided, the
18 feedback that we will receive from --

19 MEMBER BLEY: Okay.

20 MR. ZIMMERMAN: -- the ACRS --

21 MEMBER BLEY: So it will look like this?
22 Right now you think it will be like what's in the
23 letter?

24 MR. ZIMMERMAN: Yes, sir.

25 MEMBER BLEY: Okay. Anything else from

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1 the Committee?

2 (No audible response)

3 MEMBER BLEY: Thank you. Okay. Thank
4 you.

5 CHAIRMAN STETKAR: Thanks very much.
6 Who's coming next? NEI next?

7 MR. GREENLEE: NEI is next.

8 CHAIRMAN STETKAR: NEI is next. Great.

9 MR. GREENLEE: All right. Good afternoon.
10 I'm Scot Greenlee. I'm the Senior Vice President for
11 Engineering and Technical Services at Exelon
12 Corporation, and I've been the executive sponsor for
13 this issue since January of 2012 when Byron had the
14 event.

15 As Singh noted, the big change since we
16 had the Subcommittee meeting was the letter coming out
17 on the 25th. That was a big milestone for us and we
18 do intend to take what NRC has put in that letter and
19 we will document how our designs -- and we're going to
20 talk about those a little bit more in detail, but how
21 our designs will meet the staff requirements.

22 MEMBER BLEY: Scot, just a quick question.
23 I've seen their response. I don't think I saw the
24 letter from Tony to the NRC. Is their response much
25 as you expected, or are you guys sweating over parts

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1 of this?

2 MR. GREENLEE: It's not ideal for us, and
3 I've explained to Jake. I even talked to the EDO on
4 Tuesday about it. And we've been very open and
5 honest. For example, we don't think the Interim
6 Enforcement Policy is necessary because it tends to
7 confuse things. Our position has been all along that
8 we are licensed the way we are. We have a gap to GDC-
9 17 that we are going to close, but that doesn't mean
10 we're outside our current licensing bases. Once we
11 close that gap, we will have a new licensing basis.

12 But the Interim Enforcement Policy doesn't
13 hurt anything either, so when we've talked to the
14 Commissioners recently, we encouraged them to approve
15 it. And that also gives us a piece of paper that will
16 help us just in case there's some change down the road
17 in staff thinking. These things could always change.
18 So, but the actual requirements that Jake and his
19 staff have laid out in those four bullets, we can live
20 with those requirements.

21 MEMBER BLEY: Okay. Thanks.

22 MR. GREENLEE: Okay. The other thing I'll
23 just mention, we talked a little bit about the action
24 coming out of the last Subcommittee meeting. We have
25 notified the industry to go take a look at other

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1 connections that could be vulnerable to causing an
2 open phase that are outside of the high side of the
3 transformer. So we will do a 100 percent review of
4 that as an industry. And if we find vulnerabilities,
5 we'll review that and determine what the best --

6 (Simultaneous speaking)

7 CHAIRMAN STETKAR: For the non-electrical
8 members of the Committee, I'll translate. Other
9 places than the switchyard.

10 MR. GREENLEE: Yes, and the issue, the
11 question really is -- because if you look at the
12 pictures that Singh put up, the solid bus work design,
13 what happens when you start faulting that bus work
14 design inside what we call our non-seg bus work, it
15 faults over because you get plasma arcing very quickly
16 and you fault over and the fault detection circuits
17 will take it out.

18 CHAIRMAN STETKAR: And there's operating
19 experience for that.

20 (Laughter)

21 MR. GREENLEE: But if somebody had the
22 same design on the low side that they have on the high
23 side, they would have a different vulnerability that
24 we have to address.

25 MEMBER BLEY: And, Bob, at the

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1 Subcommittee you talked some about the other kinds of
2 faults that you either test it or analyze the new
3 solution on. Are you going to talk about that today?

4 MR. ARRITT: Yes.

5 MEMBER BLEY: Okay.

6 MR. ARRITT: I added that slide, yes.

7 MEMBER BLEY: I didn't know how many
8 slides he had results on.

9 MEMBER SKILLMAN: Scot, I found your
10 comment very important and perhaps timely given all
11 that we spoke about this morning. You said you really
12 don't believe that the Interim Enforcement Policy is
13 necessary.

14 MR. GREENLEE: Correct.

15 MEMBER SKILLMAN: Your designed and
16 licensed to General Design Criteria-17. There is an
17 increment that is still needed to completely fulfill
18 General Design Criteria-17, and by and large that's
19 not a problem. You're simply going to do it.

20 MR. GREENLEE: We're just going to do it.
21 That's correct.

22 MEMBER SKILLMAN: Just making sure I heard
23 that accurately.

24 MR. GREENLEE: That's correct. And there
25 has been some concern with some of the staff that,

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1 hey, if you can put it in, you can take it back out
2 under 50.59. But if you think about it, once we put
3 in our FSAR that we're meeting GDC-17 by this certain
4 design, you'll never be able to get it back out under
5 50.59.

6 MEMBER SKILLMAN: But you still have your
7 FSAR written from the perspective that you are
8 fulfilling your present interpretation --

9 MR. GREENLEE: That's correct.

10 MEMBER SKILLMAN: -- which is of General
11 Design Criteria-17.

12 MR. GREENLEE: That's correct. And we're
13 going to create templates for the entire industry on
14 how to fill out your FSAR, how to update your tech
15 spec bases so that it's absolutely clear where we
16 started, and this is what gap we were closing, and
17 this is our new licensing basis.

18 CHAIRMAN STETKAR: We have no idea how
19 that's going to play out for the operating plants, but
20 we've just recently seen a new reactor license, or new
21 COL applicant that amended their FSAR with that type
22 of -- they've identified this issue and essentially
23 inserted a paragraph confirming that they're going to
24 address it. So I suspect that's what you're talking
25 about.

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1 MR. CLEFTON: We're working with them as
2 well. This is Gordon Clefton, NEI. We're working
3 with the SDP folks as well.

4 CHAIRMAN STETKAR: Yes, I didn't want to
5 necessarily identify them, but that's okay.

6 MR. CLEFTON: They're probably here.

7 MR. GREENLEE: Okay. Okay. So the next
8 slide. Singh actually covered some of this, but we
9 had two events at Byron about a month apart. On Unit
10 2 that was the significant event. That was the one
11 that Singh covered. And it was different than the
12 Unit 1 event because when the line separated, the part
13 that fell on the ground and actually grounded out was
14 on the transformer side. So there was no fault
15 because there was no energy to propagate a fault. So
16 that then translated the open phase condition through
17 the transformer and gave us these unbalanced loads,
18 which caused all running three-phase equipment to trip
19 very quickly. The four kVs typically tripped on
20 instantaneous over-current. Four-eighty-volt loads on
21 thermal overloads.

22 The good news is though the operators were
23 able to diagnose it in about eight minutes, recognized
24 it separated from offsite power. All the four kV
25 loads came back on the diesels automatically, so they

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1 just came right back loaded on the diesels. The 480-
2 volt loads the operators had to go out and actually
3 reset the thermal overloads, but they got the plant
4 back pretty quickly.

5 Whereas on Unit 1 what happened when we
6 had the open phase condition, the high side actually
7 fell to the ground and faulted. And so we had fault
8 protection which sensed it, isolated the transformer
9 and the Unit 1 actually stayed online, did not trip.
10 We did have a loss of offsite power obviously, but a
11 much different event because the fault circuitry
12 detected it and protected the unit.

13 And you can see at the very bottom of this
14 slide the Ohio Brass porcelain insulator manufacturing
15 defect was the cause of the two events. And I'll show
16 you on the next page or on a subsequent slide what
17 that looks like.

18 And this just illustrates what happened on
19 Unit 2. That metering circuit on the left side you
20 see an intact system. On the right side you see where
21 the metering circuit has broken. And then the line
22 fell to the ground, grounded, but did not fault.

23 Next slide. And then you can see a kind
24 of a picture of what actually occurred on Unit 2 on
25 the left, and on the right you can see the defective

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1 insulators that actually caused this problem, an
2 original manufacturing defect. And we've gone through
3 and are eliminating all of our Ohio Brass insulators
4 because we found quite a percentage of them that
5 actually had this defect internal to the insulator.

6 Next. Just an FYI, we are --

7 MEMBER CORRADINI: The defect was what,
8 just a fracture in the ceramic?

9 MR. GREENLEE: What you can see in the
10 middle of those pictures, it's the porcelain never
11 really gelled inside. And we think, at least the
12 expert thinking was they probably got some water in
13 there when they were heating up the porcelain for
14 final manufacturing.

15 MEMBER CORRADINI: And the second question
16 I was going to ask is so has this happened at fossil
17 plants?

18 MR. GREENLEE: It's a very, very rare
19 occurrence. They don't really see this anywhere.
20 That's why it was unusual. When we first had this
21 situation on Unit 2, we looked at fossil plants and
22 everybody said, no, we don't see that sort of thing
23 happening.

24 MEMBER CORRADINI: But the root cause here
25 was this particular porcelain insulator?

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1 MR. GREENLEE: Right.

2 MEMBER CORRADINI: Which is unique to
3 nuclear plants?

4 MR. GREENLEE: No, but we've seen it
5 rarely at the fossil units. We had one of our
6 switchyards one yard out that actually had a failure
7 similar to this. It's just --

8 CHAIRMAN STETKAR: Would you pick it up
9 though on fossil units, because they might -- I mean,
10 y, they don't report stuff.

11 MR. GREENLEE: Yes, but --

12 (Simultaneous speaking)

13 CHAIRMAN STETKAR: If they burned up a
14 bunch of pumps, you would see it, but if it's just
15 switchyard work or transformer work or something like
16 that, you might not --

17 MEMBER CORRADINI: So they'd feel no need
18 to report it up from a reliability --

19 MR. GREENLEE: Well, yes, but we went out
20 -- because we switchyard companies. We own ComEd, we
21 own PECO, we own Baltimore Gas & Electric. So we went
22 to those folks and said, hey, do you see this? The
23 answer was, no, this is -- it's very rare to ever see
24 a failure like this. And that's why we weren't as
25 aggressive as we should have been to get this out of

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1 the plant before Unit 1 happened. Once Unit 1
2 happened, we shut both units down and we got rid of
3 all of the under-hung insulators in that switchyard.

4 MR. CLEFTON: It was in place 12 years
5 though. That's where it failed.

6 MR. GREENLEE: It was more than 12, yes.

7 MR. CLEFTON: Minimum 12.

8 MR. GREENLEE: Life of the plant, pretty
9 much.

10 MEMBER BLEY: Now, the staff went back and
11 found 11 others over 15, a little less than one a year
12 throughout the nuclear business, maybe. That's
13 something less than 1 in 100 a year per plant, so it's
14 not real likely, but across the whole fleet -- well,
15 unless you have 150, you wouldn't be seeing it though
16 very often. It would be pretty sparse.

17 MR. GREENLEE: No.

18 MEMBER BLEY: And yours was the only one
19 that was due to this problem, right?

20 MR. GREENLEE: That's right.

21 MEMBER BLEY: Yes.

22 MR. GREENLEE: That is right.

23 CHAIRMAN STETKAR: There are other ways
24 this can happen.

25 MEMBER BLEY: Yes.

1 MR. GREENLEE: We're very close. We tried
2 to develop some UT technology to see if we could find
3 these defects in situ. We were unable to do that, but
4 we've got a guided wave system we've been testing out
5 and we think it's going to work. So within the next
6 six months I would expect we may have something that
7 can actually test these in situ in our --

8 CHAIRMAN STETKAR: But that's particularly
9 to look at -- you know where you own these insulators
10 to look at these insulators or --

11 MR. GREENLEE: No, to look at any
12 insulator.

13 CHAIRMAN STETKAR: Look at any insulator?

14 MR. GREENLEE: Yes, just to be able to see
15 on like a 10-year basis or whatever to see if we can
16 see a fault inside our insulators in critical
17 applications.

18 MEMBER SCHULTZ: But is this something
19 that develops? I thought it was something --

20 MR. GREENLEE: No.

21 MEMBER SCHULTZ: -- original manufacture?

22 MR. GREENLEE: No, it was original
23 manufacturing, but what happens is because the
24 insulators weakened as it kind of wobbles over the
25 years, it will develop a crack and then it will

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1 propagate.

2 Okay. This is the slide that's really
3 probably of the most interest, because this is the one
4 that tells you why we ended up going the direction
5 that we went with the industry. The top presentation
6 or the top information shows what really happened at
7 Byron and what we call on a per-unit basis. And what
8 that means is one per unit would be four kV. And so,
9 when we had the event at Byron, what you see is the
10 Alpha-Bravo phase was 100 percentage voltage.

11 The Charlie phase is the one that failed,
12 and it caused about 60 percent voltage on the Bravo-
13 Charlie and the Charlie-Alpha. And as luck would have
14 it, unfortunately the under-voltage detection system
15 is a two out of two and it was looking across the
16 Alpha-Bravo phase. So it was okay. And the other
17 phase that it was monitoring was not. So we only got
18 a half-trip, in other words.

19 So what we thought when that first
20 happened was, hey, what we need to do is we can go in
21 and we can modify our under-voltage circuits to just
22 sense all phases and then we'd be okay.

23 CHAIRMAN STETKAR: Until --

24 MR. MATHARU: Until we started looking at
25 operating experience and we found the Beaver Valley

1 event. Thirty days Beaver Valley went without
2 identifying they had an open phase, and it's because
3 they were lightly loaded on the transformer and the
4 operator saw 100 percent voltage on the other side of
5 the transformer. So the only way to get that
6 situation, at least when we first started down this
7 road at Byron, was to get negative sequencing-type
8 relaying into the plant in order to sense an open
9 phase.

10 EPRI has done some pretty incredible work
11 and we now have a much simpler solution, because I
12 will tell you the Byron solution, if I could go back
13 and do it again, I would put in the EPRI solution
14 because the Byron solution is a programmable logic
15 relay. It's a great relay. Highly, highly reliable.
16 If it breaks, it won't do anything. It will stop. It
17 will tell you, hey, I'm broken; come fix me, so that
18 you don't get an inadvertent separation. But the
19 algorithms and the analysis you have to go to make
20 sure the grid modeling is correct, the transformer
21 modeling is correct and that everything works so that
22 you get this transfer over to the diesels under
23 accident conditions is extremely complex.

24 So next. This is just a picture of the
25 risk profile. We went back and Byron's probably a

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1 bounding unit for the industry because one transformer
2 feeds two safety buses. There are a number of other
3 units in the industry that do that, but with that you
4 impact two safety trains, which was the biggest issue
5 facing the operators with no running safety equipment
6 except for a diesel-driven aux feedwater pump.

7 So we went back and we said, okay, well,
8 we didn't know about this vulnerability. If we plug
9 that back into our PRA models, what would be the base
10 CDF increase? And you can see there it's fairly
11 substantial. Seven-and-a-half percent of the base CDF
12 you would add in order to bound an open phase event
13 without the operators knowing about it. And then if
14 you train the operators, the middle bar shows you the
15 decrease in risk, so you're down about $6E-7$ or 1.5
16 percent of baseline once the operators can recognize,
17 detect and separate from a faulted open phase circuit.

18 And then when you finally add on automatic
19 detection, you put the situation basically back at the
20 original baseline or $E-8$, so a very, very minor
21 increase in risk once you get the new circuitry that
22 we're going to put into the plants. And by the way,
23 Byron is the only plant in the country now that is
24 active. We activated that circuit last month, and so
25 it's not only installed, it's out of its monitoring

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1 mode. And if Byron has an open phase, that relay will
2 separate from the faulted circuit.

3 MEMBER BLEY: You didn't have any hits
4 during the run-in time, did you?

5 MR. GREENLEE: We did not. Have 20 years
6 of operating experience on these relays. Lightning
7 strikes, snow storms, open phase events, on switchyard
8 out. And the relays see it, but they're modeled
9 correctly and they're not falsely actuating.

10 CHAIRMAN STETKAR: Scott, you said -- just
11 because of my line of questioning earlier, I think you
12 said if the relay sees an open phase condition, it
13 will separate. You don't have any coincidence logic
14 with anything else? You're just --

15 MR. GREENLEE: We don't.

16 CHAIRMAN STETKAR: -- going to separate?

17 MR. GREENLEE: We don't. And the way our
18 initiative is set up, it's a little more restrictive
19 than what Singh said. Our initiative says if you have
20 a transformer which feeds two safety buses, you need
21 to be automatic because you're bordering on an event.
22 You're losing all your safety equipment. What it says
23 is if you have separate offsite feeds to your safety
24 buses such that an open phase on one of the feeds will
25 only impact one train of safety equipment, then you

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1 can tie in the ESF logic such that it only has to be
2 active if an ESF signal is present.

3 CHAIRMAN STETKAR: That's what I
4 remembered from the Subcommittee meeting. I didn't
5 realize that you were more restrictive on the single
6 -- to more than one bus.

7 MR. GREENLEE: Yes, because the theory was
8 you should never cause an event. And at plants where
9 you feed both safety buses, you can cause an event
10 without operator action. And then you have to be able
11 to protect during accident conditions.

12 And just FYI, the time frame, once you
13 throw the accident conditions in there, the time frame
14 is pretty fast. At Byron and Braidwood we had
15 dedicated operators, an extra person in the control
16 room for a couple of years just dedicated to
17 monitoring and getting off of offsite power in case we
18 had an accident.

19 CHAIRMAN STETKAR: That's an interesting
20 job.

21 (Laughter)

22 MR. GREENLEE: Yes, the operators were not
23 very happy with it.

24 Okay. Next. Okay. Go ahead. Next. The
25 Industry Open Phase Initiative. This initiative was

1 approved by all, unanimously approved last October by
2 all chief nuclear officers, which makes it a mandatory
3 initiative for the industry. So all of the nuclear
4 plants in the country have to go and put this
5 circuitry in. And we've kind of discussed some of the
6 nuances, but we have to address the issue. Our
7 initiative only applies to active safety feature
8 plants. And we discussed previously, the passive
9 plants, NRC is dealing with those one-off, so we
10 didn't put that into this initiative.

11 Next. Okay. These are the key
12 milestones. By the end of this year everybody has to
13 have done the analysis and decided what they're going
14 to do in order to solve the problem. And then we give
15 them two years to go put the design changes into the
16 plant and then an additional year of monitoring if
17 they need the monitoring. And we put that in there
18 because at the time we didn't have the EPRI solution.
19 And the Byron-type solution you definitely want to do
20 a good monitoring --

21 (Laughter)

22 MR. GREENLEE: And then of course we
23 update the FSARs and the tech spec bases in
24 conjunction with the initiative.

25 Next. Tech spec updates. This is just

1 sort of an FYI, but what we've landed on in the
2 industry is we're going to update our bases to say
3 that if the OPIS, or the system that senses an open
4 phase is inoperable, then you would say your offsite
5 power source is inoperable. And we linked it that way
6 because if you go back to the GDC and you look at the
7 single-failure criteria, once that system is
8 inoperable, you no longer can meet the single-failure
9 criterion depending on how you want to interpret the
10 GDC.

11 Next. Industry actions. I won't go
12 through all of these, but we've been as an industry
13 very engaged in this issue since it started. INPO got
14 involved early on. Wrote an EIR, a Level 2, requiring
15 all licensees to go and tell INPO how they were going
16 to fix open phase.

17 And let's see. I already talked about the
18 approval of the initiative. The big one I want to
19 mention is the third bullet up from the bottom. This
20 is an international problem. So far we don't know of
21 anybody worldwide who has open phase protection for
22 their offsite power sources for safety purposes. We
23 had a workshop in January in Paris to get the rest of
24 the international community aligned and we expect that
25 WANO will issue an SOER, a Significant Operating Event

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1 Report, that will drive the whole world to do
2 basically the same thing that the U.S. is doing.

3 Next. Okay. And I won't go through all
4 of these either, but this just lists some of the
5 different designs. We've had a number of utilities
6 looking at various design solutions. The Exelon
7 solution. Entergy has had a solution that they came
8 up with. FENOC has been working with state estimator
9 software. You know, the state estimator software is
10 what we use to monitor overall grid performance and to
11 alert operators if offsite power becomes inoperable.
12 They thought that they could come up with some things
13 where they use the state estimator to then detect an
14 open phase. And we're going to talk in detail about
15 the EPRI solution. And for my money I think the EPRI
16 solution is one of the best we've found.

17 Next. Did well. Twenty minutes.

18 MEMBER SCHULTZ: Scot, you just mentioned
19 the international activity, and the NRC staff
20 mentioned the IAEA initiative for a safety guide, and
21 also activities with IEEE for a standard. So what are
22 the industry's activities associated with those?

23 MR. GREENLEE: We honestly have not been
24 heavily involved in the IAEA, however, WANO does
25 interface with them. And so I would be pretty sure

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1 there would be an interface going on there. What will
2 likely really happen is most of the regulators
3 throughout the rest of the world will eventually get
4 involved and you'll get stuff that will be
5 considerably different depending on the regulator.
6 The different regulators are going to respond
7 differently.

8 MEMBER SCHULTZ: How about on the IEEE
9 standard? Maybe a better time to discuss that is
10 after the EPRI presentation, but is all of what you're
11 doing the influencing?

12 MR. GREENLEE: I would say that's kind of
13 a next step for us is to really -- now that we've
14 gotten the letter from NRC, I think we have pretty
15 good alignment. At least the regulatory I know knows
16 the direction we're headed. Now we're really start
17 worrying about the IEEE standard down the road.

18 MEMBER SCHULTZ: Thank you.

19 MEMBER BLEY: Okay.

20 MR. ARRITT: My name is Bob Arritt. I'm
21 with EPRI. I'll give some background and talk a
22 little bit how EPRI has been involved from the
23 beginning and some of the work that we have done as
24 far as addressing the open phase condition.

25 Okay, Gordon. EPRI has been involved

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1 since the beginning, since what I'll call the
2 beginning of the Byron event, and since the Byron
3 event we've put out four publicly available documents
4 with analysis. The first analysis was looking at
5 transformer types similar to the one at the Byron
6 event to get an understanding and try to come up with
7 some detection method to determine an open phase. The
8 second report we modeled an entire plant, looked at
9 different loading scenarios, looked at different motor
10 starting scenarios, all looking at defining a
11 detection method for determining an open phase
12 condition.

13 And from those two reports we saw that the
14 real difficulty was detecting an open phase event
15 during a low or no-load or moderately loading, as Scot
16 was saying, because you don't have any voltage
17 distortion. I'm going to give a little bit of
18 background on that. But this is really makes this a
19 unique problem to the station auxiliary transformers
20 because the prevalent condition of these is they're
21 sitting there unloaded or lightly loaded and in
22 standby mode.

23 And we released to other reports after
24 this. We did another study similar to the first
25 report, but we looked at all the different transformer

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1 configurations to determine which station auxiliary
2 transformers out there had the issue of not
3 translating the open phase event to a voltage
4 condition. And we also looked at the double-open
5 phase event which was talked about earlier.

6 Okay. We talked about this in the
7 Subcommittee, but for those folks that weren't here,
8 just to give you a little bit of an idea of what the
9 problem is and why this is a unique problem in
10 particular to the generators and the transformers in
11 the switchyard, is that when you get this open phase
12 condition under a light load or even under a
13 moderately-loaded condition, what happens is is you
14 get the voltage from the two phases that are still
15 intact. They couple over to say a secondary delta or
16 tertiary delta, or if you have a three-legged core,
17 it's the same phenomena that occurs. And with that
18 open phase the only solution to that closed loop is
19 what that voltage would be, the exact magnitude and
20 phase angle as if that phase was still intact. So you
21 don't have the voltage distortion and there's
22 essentially no load there to detect. So this makes it
23 a very difficult condition to detect in particular at
24 the low and no-load conditions.

25 MEMBER CORRADINI: What transformers would

1 have low or no load?

2 MR. ARRITT: Great question. I'll show
3 you on the next slide.

4 MEMBER CORRADINI: It was a great
5 question. I don't --

6 (Laughter)

7 MEMBER CORRADINI: -- understand half of
8 what you're saying, so I'm just trying to keep up.

9 MR. ARRITT: Oh, okay.

10 CHAIRMAN STETKAR: Now you know how we
11 deal when you and Sanjoy get going.

12 (Laughter)

13 MEMBER BLEY: But just for the non-double
14 Es who weren't at the Subcommittee, you saw that zero
15 sequence. That's a mathematical trick that was
16 invented a long time ago to take an unbalanced system
17 -- if it's a three-phase, you can represent it as
18 three balanced systems and each of those is called a
19 sequence. So there's a zero sequence, a negative
20 sequence and a positive sequence. And those three
21 balanced systems give you exactly the same conditions.
22 So that's what that's about. If you're in balanced
23 condition, you don't have the negative sequence or the
24 zero sequence. You only have the positive sequence,
25 yes. So it's a mathematical trick so that you can

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1 analyze this stuff with some ease, a lot more ease
2 than without it.

3 (Laughter)

4 MEMBER BLEY: And they're going to say you
5 can detect it because of this, too.

6 MEMBER CORRADINI: That's wonderful.
7 Thank you.

8 (Simultaneous speaking)

9 MEMBER RICCARDELLA: Next thing you know
10 they're going to start talking about imaginary
11 numbers.

12 (Laughter)

13 MR. GREENLEE: We actually know what -- a
14 lot of the plants in the country, what we do is you
15 take all of your loads and shift them over to what you
16 call your unit auxiliary transformers. The generator
17 feeds those. That way you don't have you to pay the
18 offsite power company to bring power in all the time.
19 So that transformer just sits there in a standby
20 emergency mode.

21 MEMBER CORRADINI: That's the one that
22 could be faulted and you would never know about it?

23 MR. GREENLEE: And you would never know
24 it.

25 MEMBER CORRADINI: And I'm sorry, I'm

1 still back at the root cause sort of thing. And the
2 fault is in your case the insulators because they were
3 sitting there dangling in a certain physical
4 configuration for years and years and years and
5 wiggling around and eventually crack, crack, crack and
6 bang?

7 MR. GREENLEE: Then the cables came down
8 with --

9 MEMBER CORRADINI: The cables came down.
10 Yes, that part I got.

11 MR. GREENLEE: Correct. But with an
12 original manufacturing defect.

13 MEMBER CORRADINI: Right.

14 MR. GREENLEE: Otherwise the insulator
15 would have been fine.

16 MEMBER CORRADINI: Thank you.

17 MR. ARRITT: And like I said, a good lead-
18 in question for the next slide as far as the
19 transformers that have this particular issue. You
20 could see that the three transformers that I've
21 highlighted below in red there are the ones that
22 regenerate this voltage so you can't detect this
23 unbalance under this light load/no-load case. And the
24 ones above that are transformer types and core types
25 where an open phase is translated to a low-voltage

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1 condition. That's the reason the ones in white are
2 the ones that you would see on a distribution system
3 because of the protection issues associated with these
4 particular types of transformers.

5 MEMBER CORRADINI: Okay.

6 MR. GREENLEE: And this is also why you'll
7 see some of the industry is actually solving the
8 problem by putting instrumentation on the four kV
9 buses because they have a different transformer type
10 that will translate the voltage to the buses.

11 MR. ARRITT: Okay. And with the part of
12 our research that we did with the reports that we
13 released was because we identified this issue
14 detecting how difficult it is to detect his event
15 under a no-load/light-load condition was that we
16 looked at different detection methods that we looked
17 at internally. One was voltage imbalance. And just
18 like Scot just said, that's the reason under some
19 transformer configurations you can us voltage
20 imbalance, however, those transformers are
21 susceptible. You can't use that because Scot showed
22 in his presentation how there's very little voltage
23 distortion, if any.

24 The sequence-current detection. Again,
25 this is acceptable for loaded conditions, however, for

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1 light, moderate and low conditions it's difficult.

2 Phase-current detection. This is
3 something that we looked at obviously first, but there
4 were a lot of issues that we saw as far as complexity
5 of trying to determine backfeed with that.

6 And we also looked at power line carrier-
7 type where we're actually sending signals down each
8 individual conductor. And I'll get a little bit into
9 that.

10 The issue with using a voltage imbalance
11 we looked at. This here's a study that we did in the
12 second report we released. This was here you're
13 sitting here with an open phase condition and all your
14 voltages are at one per unit. There's no imbalance.
15 And then you go to start your 6,000-horsepower motor
16 in this case and it's unable to come up to full speed
17 and eventually drops out. And again, it's inherently
18 unstable, too, because as soon as it drops out, all
19 your voltages return to normal. So it takes some
20 operator action to understand what's going on.

21 Okay, Gordon. The phase-current
22 detection. This is the method we looked at first, but
23 we saw issues with the complexity because you have to
24 determine backfeed. In particular, if you have a
25 high-impedance ground fault, that's comparable to your

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1 magnetizing impedance, or in the case where at very
2 high voltages parasitic capacitance is very comparable
3 to what you magnetizing current would be, say in the
4 case of a CVT, which is about 10 nanofarads, at 230
5 kV. That's about an order of what you'd have as a
6 magnetizing current. So you would have to have some
7 sort of current direction, and it's a very noisy
8 environment and you're magnetizing current isn't
9 predominantly 60 hertz. It's predominantly 180 hertz,
10 which is a zero sequence-type current.

11 Okay. And then the PLC. This is one of
12 the things that we looked at. The challenges that we
13 saw with this you'd have to have one on each
14 individual conductor coming in. And also you didn't
15 have the 100 percent coverage because you can check it
16 between the transmitter and the receiver, however,
17 there's a gap between where that receiver is and where
18 that transformer is. And that's an area that's
19 vulnerable that you can have an open phase that you
20 wouldn't be able to detect that.

21 Okay, Gordon. So the EPRI open phase
22 detection. What we did was knowing that from the
23 analysis that we performed that we took advantage of
24 the known characteristics of the transformer and we
25 exploited this by doing a detection method. We're

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1 actually doing an active injection along with a
2 detection on the neutral, the transformer, because
3 this is monitoring the zero sequence network. And in
4 essence what it's doing is is when you get an open
5 phase, that neutral conductor becomes like your third
6 current carrying conductor, if you have enough low
7 current. However, if you don't have enough low
8 current, you get a very high impedance state and it's
9 very -- you can determine that by using some form of
10 a signal injection where your monitoring the impedance
11 of that transformer.

12 We proved this theory out in early 2013 in
13 the laboratory. We provided a Webcast in November
14 2013. We did a field test. It was actually the first
15 ever field test of an open phase, and we'll get into
16 a little bit of that in the later slides. And we've
17 released a technical document on this particular
18 method, and I believe it's being made public, isn't
19 it, for everyone to be able to view that? Yes.

20 Okay, Gordon. So essentially how this is
21 working, when you're sitting there --

22 MEMBER BLEY: That's the one that was not
23 yet published at our last meeting?

24 MR. ARRITT: Yes. Yes, and we're making
25 that --

1 MEMBER BLEY: Okay.

2 MR. ARRITT: -- public. So essentially
3 what you're doing is with the active current injection
4 is you're sitting there and you're monitoring this
5 transformer impedance continuously while it's sitting
6 there unloaded, lightly-loaded or during loaded
7 conditions. And what we're doing is we're monitoring
8 that impedance network.

9 Go ahead. Next slide, Gordon. And when
10 you get an open phase, you from a relatively low-
11 enhancement network to a relatively high-impedance
12 network with a very discernible change in that signal
13 level and we're able to detect that. And we're also
14 doing detection on the neutral too to look at load
15 current and to give us a very robust and secure
16 detection method.

17 Go ahead, Gordon. And this came up in the
18 last presentation of what we were designed to detect.
19 Any open phase, any phase open and solidly grounded.
20 There aren't any blind spots. You have two phases
21 open, two phases grounded. So we have full coverage
22 without any blind spots in the coverage.

23 Okay, Gordon. And what we had done is
24 that we married the active injection with the neutral
25 detection that allows for a very robust secure

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1 detection method. The prototype was fail-safe. It
2 would tell you if a component failed in its design
3 where if you need to you can make it redundant. Also,
4 there's a system test button where you can go test all
5 the components of your network while it's in service
6 without having to take it out of service where you can
7 test the CTs and the transducers and the controller.

8 And this met all our design criteria that
9 we had going into the design. We wanted to design
10 this with COTS equipment, commercial off-the-shelf
11 equipment, to reduce the cost and lead times and to
12 provide minimal maintenance and also to deal with the
13 obsolescence issues that do come up from time to time.
14 These are very common components in this detection.

15 MR. GREENLEE: And I think it's an
16 important point to note that what he's saying you got
17 to have two things -- it's got to sense two things in
18 order to trigger, so you can't have a single failure
19 inside this unit that gives you an inadvertent
20 separation. And so, it's got positive confirmation.

21 MR. ARRITT: Right. Yes, Scot's talking
22 about there's also a harmonic component that we're
23 looking at harmonics along -- because you get a
24 harmonic signature when you get this open phase event.

25 Okay, Gordon. One of the things that we

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1 looked at is we knew this had to go into existing
2 design, so we wanted to make it as less painful as
3 possible to retrofit it and we're only utilizing the
4 neutral conductor. There's benefits to that. You can
5 put provisions in place to install it at your
6 convenience and coordinate with your outages. The
7 seismic concern is less since the cabinet is on the
8 ground. And there's much less fault current
9 contribution neutral than say the phase conductors.
10 And also, you have less exposures to lightning and no
11 impact to the terminals of the transformers.

12 And as I said earlier, this was the first
13 ever open phase field test. This was conducted at
14 TVA. I really appreciate TVA's efforts in this and to
15 make this possible. It was the first ever intentional
16 open phase test, I should say.

17 (Laughter)

18 MR. ARRITT: And this test was done with
19 various plant loads. It was tested under no load and
20 lightly-loaded, and we loaded it as much as we could
21 and it was able to detect under all those scenarios.
22 And the NRC staff was there. TVA personnel. Southern
23 Company was there. INPO and several A&E firms.

24 And it was a successful detection and
25 performed as predicted. And something I want to point

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1 out too is because of the -- we're just monitoring a
2 change and there's overlapping protection and plenty
3 of design margin that the only information that we had
4 going into this field test was the transformer name
5 plate data. And from that we were able to set the
6 settings accordingly and have a successful test.

7 And as Scot was saying, we also had
8 passive at the no-load condition. We had the
9 injection signal, but we also monitor the current
10 signature when you get this event because you do have
11 a change in your harmonic spectrum that's unique to
12 this open phase event.

13 Okay, Gordon. And these are the steps
14 that we went through. We constructed a prototype for
15 field testing. We had the lab demonstration meeting.
16 We chose a representative field test site at
17 Bellefonte and we completed that field testing. And
18 we have since then completed the commercial licensing
19 to hand this over to a commercializer.

20 Questions?

21 CHAIRMAN STETKAR: Thank you very much.
22 Any questions from the Committee?

23 MEMBER SCHULTZ: On the field
24 demonstration you indicated, with some pleasure I'm
25 sure, that the only information you had was the

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1 transformer name plate data.

2 MR. ARRITT: Yes.

3 MEMBER SCHULTZ: You wanted to demonstrate
4 that you could do it that way. Ordinarily what
5 benefit -- would you do other testings so that you
6 would determine more information that could be helpful
7 to provide additional assurance of successful
8 detection?

9 MR. ARRITT: The design to achieve in our
10 detection method was to have plenty of margin,
11 overlapping margin where you know approximately what
12 the zero sequence impedance is of the transformer
13 without having to have the test data sheet, something
14 that's very difficult to get. And you can estimate
15 basically what that is and give you a comfortable
16 margin to feel assured that you can detect that open
17 phase event.

18 MEMBER SCHULTZ: So you not only feel you
19 could do it in this test case, but you can install it
20 in the same way on other transformers and have the
21 same results?

22 MR. ARRITT: Correct.

23 MEMBER SCHULTZ: Have a confident result?

24 MR. ARRITT: Correct.

25 MEMBER SCHULTZ: Thank you.

1 CHAIRMAN STETKAR: I think, for the lay
2 people, that the problem is some of the other
3 potential solutions you had to know a heck of a lot
4 more about the transformers than you could because --

5 MR. ARRITT: It gets very challenging if
6 you have to set absolute values at very low current
7 levels because there are so many different things that
8 can impact that, say an un-transposed line coming into
9 your system. You want to be able to get above that
10 margin to where you can feel comfortable.

11 MEMBER SKILLMAN: I have just a curiosity
12 question. Will you detect SMD? Will that react?

13 MR. ARRITT: To SMD?

14 MEMBER SKILLMAN: Solar magnetic
15 disturbance?

16 MR. ARRITT: That's a great question.

17 MEMBER SKILLMAN: The big transformers
18 will.

19 MR. ARRITT: Yes.

20 MEMBER SKILLMAN: They'll talk to you.

21 MR. ARRITT: That's a great question. And
22 I worked some on the geomagnetic disturbance project
23 at EPRI, and as you know, the actual field path that
24 it takes is through the ground and through the phase
25 conductor. So what we have this is an actual project

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1 to put GIC, geomagnetically-induced current sensors in
2 this device to give you a monitoring. Because we
3 already have the brains there anyway. We could put a
4 transducer there and give that information at the
5 switchyard and they can see a GIC -- a GMD event
6 measuring those GIC currents in the device to give the
7 switchyard operator the knowledge that, hey, this
8 actual event is occurring.

9 MEMBER SKILLMAN: So I take it the answer
10 is yes?

11 MR. ARRITT: Yes. Yes.

12 MR. JOHNSON: Yes, this is Wayne Johnson.
13 Yes, we're planning -- that's a project we have on the
14 table to do and we're hoping to come up with a proper
15 transducer to be able to give us a head's up on that.

16 MEMBER SKILLMAN: Okay. Thank you.
17 Do you think it would actuate?

18 MR. ARRITT: No, it won't actuate.

19 MEMBER SKILLMAN: It won't actuate.

20 (Simultaneous speaking)

21 MR. ARRITT: The learning would be
22 sufficient. I mean, that's --

23 (Simultaneous speaking)

24 MR. ARRITT: -- the way it is on the big
25 transformers. You're aware of it, but you're hoping

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1 nothing is going to happen.

2 MEMBER SKILLMAN: Right.

3 MR. ARRITT: You know?

4 MEMBER SKILLMAN: Yes. Thanks. Thank
5 you.

6 MR. JOHNSON: But that's something we did
7 look at, yes.

8 MEMBER BLEY: Well, thank you. Can we get
9 the line open? Is it open?

10 While we're waiting for that, are there
11 any comments from anyone in the room?

12 MEMBER POWERS: I guess I have a question
13 that this all provokes. This is kind of a surprise.
14 And I'm wondering are there other surprises of this
15 general nature with the electrical system out there
16 that we're going to surprised at?

17 MR. GREENLEE: We don't think so.

18 (Laughter)

19 MR. GREENLEE: And I only say that because
20 I've had a very, very large team of experts between
21 the folks I've used at Exelon and the folks at EPRI
22 looking every which way at this sort of stuff, and I
23 think we've known this is not an unknown phenomenon
24 because you can go back into old text books and find
25 that it's just something that we didn't adequately

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1 factor into the designs of the nuclear plants. But I
2 don't know of anything else. I mean, we've had a lot
3 of experts looking.

4 MEMBER POWERS: Not one of those we don't
5 know what we don't know? You have unknown unknowns.

6 MEMBER SKILLMAN: To Dana's point, if we
7 go back 10-15 years, we've taken off pressure
8 switches, we've done -- created relaying for grounds
9 on the big transformers. So this is one of a number
10 of learnings that we've tumbled to mainly through
11 operating experience. So we've done a whole lot of
12 stuff, but as Dr. Powers says, there's probably
13 something out there lurking that we're just not quite
14 aware of right now, but it'll find us.

15 MR. ARRITT: Yes, open phase events, they
16 happen on the distribution system, but however, you're
17 normally loaded and you can easily detect that. Or
18 you have a transformer that translates to an under-
19 voltage condition. Just this is a very unique case to
20 a standby generator sitting there that's able to
21 recreate those voltages.

22 MEMBER SKILLMAN: Thank you.

23 CHAIRMAN STETKAR: Go ahead.

24 MR. COLAIANNI: Yes, this is Paul
25 Colaianni, Duke Energy. And just to feed off of what

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1 Scot and Bob were saying, early research did look at
2 and acknowledge open phases, and what we found out is
3 that, like Scot was saying, a lot of that knowledge
4 got imbedded into the motor standards and other
5 standards, so to the transformer design standards.
6 Like some have the certain windings that reproduce the
7 voltage on the secondary. So people knew about it and
8 they took steps to engage in it, but like Bob was
9 saying, the standby transformer is an example of where
10 that's the piece that's sort of missing in this.
11 Thank you.

12 CHAIRMAN STETKAR: Just an aside for Dana,
13 the balance circuit analysis stuff that let's you deal
14 with dates back to 1913, I think.

15 MEMBER POWERS: Yes, but you see what my
16 concern is, that we keep getting surprises and
17 whatnot. And we've recognized that problem in the
18 corrosion area, but we have a similar kind of issue
19 here where there lots of little niggly things that
20 keep popping up at us. We need to have somebody start
21 looking in the 1913 text books and see if they can't
22 find things.

23 CHAIRMAN STETKAR: Most of the
24 universities have gotten rid of their power
25 engineering courses.

1 MEMBER POWERS: Oh, absolutely.

2 CHAIRMAN STETKAR: They're gone.

3 MEMBER POWERS: I saw a school putting out
4 an advertisement for trying to attract students to its
5 power engineering course and one of the things it
6 noted was that it was one of the few schools that was
7 offering the power engineering course.

8 MEMBER BLEY: We now hear that there are
9 people on the bridge line. If anyone out there on the
10 bridge line would like to make a comment, please
11 identify yourself and make a comment.

12 MR. LEWIS: Marvin Lewis, member of the
13 public.

14 MEMBER BLEY: Thank you, Marvin. Go
15 ahead.

16 MR. LEWIS: May I comment now?

17 MEMBER BLEY: Go ahead.

18 MR. LEWIS: Yes, I'm very worried about
19 what you're saying, but it does not limit it to just
20 power engineering. We have a lot of mischief and --
21 well, take a look at the way we're listening up --
22 farming on this call. I mean, it sounds like a
23 chicken farm. And it's very difficult to hear it.

24 And this is a surprise. And we're getting
25 surprises throughout. Waste we're getting surprises.

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1 Even from the courts. We're getting surprises from
2 the casks, the storage casks. We're looking at a
3 storage cask with a half-inch steel membrane as the
4 outer shell that's open to metal fatigue and has never
5 been looked at for metal fatigue. This is a surprise.

6 And so we've got a surprise with a Russian
7 reactor going off somewhere in the Crimea and nobody
8 knows about it. It isn't hitting the papers. And
9 we're living in surprises. This is not what I want
10 from nuclear plant. Thank you for allowing me my
11 comment.

12 MEMBER BLEY: Thank you, Marvin. Is
13 anyone else out there who would like to make a
14 comment? Please go ahead.

15 MS. THOMAS: Yes, Ruth Thomas --

16 MEMBER BLEY: Yes, Ruth. Go ahead.

17 MS. THOMAS: -- with Environmentalists,
18 Incorporated. And now I was on the first part of this
19 call. Did it go into proprietary or something,
20 because all of a sudden I wasn't on anymore.

21 MEMBER BLEY: No, there was a break for
22 half an hour and then we started this session.

23 MS. THOMAS: Oh, because I noticed that
24 you have a different subject, and it relates to
25 transformers.

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1 MEMBER BLEY: And actually I have some
2 experience with General Electric transformers. I
3 don't know if that's one of the ones that was on the
4 list that has problems.

5 But you spoke about the Branch Technology
6 Position, which I think was prepared by Exelon and
7 NIE, or was it prepared by the Nuclear Regulatory
8 Commission?

9 MEMBER BLEY: This session is on Branch
10 Technical Position 8-9. Is that correct? And that
11 was prepared by the NRC. If you have a comment,
12 please provide it for us.

13 MS. THOMAS: Well, my comment is I'd like
14 to have a hard copy sent to me. And is there --
15 should I give it to somebody now, or --

16 MEMBER BLEY: No, if you would call
17 Christina Antonescu. And she will give you her phone
18 number right now.

19 MS. THOMAS: Okay. Good.

20 MS. ANTONESCU: My phone number is 415-
21 6792.

22 MEMBER BLEY: Area code 301.

23 MS. ANTONESCU: Three-zero-one.

24 MEMBER BLEY: Did you get that, Ruth?

25 MS. THOMAS: Six-seven -- what's the last

1 four numbers?

2 MS. ANTONESCU: (301) 415-6792.

3 MS. THOMAS: Okay. Thank you, Christina.

4 MEMBER BLEY: Okay. Thank you. Anyone
5 else care to make a comment?

6 (No audible response)

7 MEMBER BLEY: Hearing none, I guess we can
8 close the bridge line again. And, Mr. Chairman, it's
9 back to you ten minutes --

10 MR. ISHOLASHARAH: -- from NextEra Energy.

11 MEMBER BLEY: Please say your name again.

12 MR. ISHOLASHARAH: Iyodeli Isholasharah
13 from NextEra Energy, St. Lucie Power Plant.

14 MEMBER BLEY: Please go ahead.

15 MR. ISHOLASHARAH: My question: On page
16 4 of the letter, the bullet No. 4, states that tech
17 specs are the last requirement and limiting from the
18 operations by equipment used for mitigation of OPC
19 should be consistent with the probability requirements
20 specified in the tech spec.

21 So my question is I want to assume that we
22 do not need any lab submission to implement the open
23 phase inspection teams.

24 MEMBER BLEY: We're not really open for
25 questions now. We're open for comments. If you'd

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1 contact the staff, I think they can help you with the
2 requirements.

3 MR. ISHOLASHARAH: Well, this is in
4 response to Matharu's presentation.

5 CHAIRMAN STETKAR: That's true, but we're
6 the Advisory Committee on Reactor Safeguards and we
7 not answer questions to the NRC staff. We'll
8 entertain comments and indeed our transcript from this
9 meeting will note your question, but we don't enter
10 into those types of discussions.

11 MR. ISHOLASHARAH: Thank you.

12 CHAIRMAN STETKAR: Thank you.

13 MEMBER BLEY: You're welcome. Any further
14 comments on the bridge line?

15 (No audible response)

16 MEMBER BLEY: Going, going, gone. Back to
17 you, Mr. Chairman, 10 minutes early.

18 CHAIRMAN STETKAR: Well, thank you, Dr.
19 Bley. Thanks very much. For those of us
20 electrically- oriented, it was a really good
21 presentation. The rest of you can learn.

22 CHAIRMAN STETKAR: We are off the record
23 for today. Let's reconvene at 5:00.

24 (Whereupon, the above-entitled matter went
25 off the record at 4:51 p.m.)

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Mitigation of Beyond-Design-Basis Events (MBDBE) Proposed Rulemaking

Advisory Committee on Reactor Safeguards

Fukushima Full Committee

December 4, 2014

Purpose



- Provide the ACRS full committee with an overview of the draft proposed rule language
- Focus on central/key requirements in paragraphs (b), (c), and (d) and the connection to NTTF 2.1
- Provide remaining portions of the presentation for information (not to be presented – due to limited time)

Background



- Consolidation of post-Fukushima regulatory efforts:
 - COMSECY-13-0002: Consolidates 4 and 7 into SBOMS rulemaking
 - COMSECY-13-0010: Consolidates EP-related with EA-12-049 implementation
 - SECY-14-0046 enclosure 6: Consolidates SBOMS and Onsite Emergency Response capability rulemakings
- Scope of proposed rulemaking as it relates to originating Near-Term Task Force (NTTF) recommendation:
 - All of recommendations 4, 7, and 8
 - All of 9.1, 9.2. and 9.3 – except long term Emergency Response Data System(ERDS)
 - 10. 2 (command and control/decision maker qualifications) and 11.1 (delivery of equipment to site - phase 3 portion of EA-12-049)
 - Includes NTTF 9.4 (ERDS modernization)
- In terms of post-Fukushima already underway:
 - Makes generically-applicable EA-12-049 and EA-12-051
 - Addresses staffing and communications 10 CFR 50.54(f) request
 - May also address feedback from NTTF 2.1 (flooding)

Proposed Rule Language

Paragraph (a) - Applicability



- Applicability
 - Current operating reactors
 - New reactors
 - Decommissioning reactors
- All requirements apply to both current and new reactor licensees and applicants
 - Additionally: New reactors have an additional assessment requirement (forward fit)
- Decommissioning provisions:
 - Once fuel is permanently removed from the reactor , no reactor requirements
 - Once irradiated fuel is removed from the spent fuel pool, all requirements cease

Proposed Rule Language

Paragraph (b) – Integrated Response



- Integrated Accident Response Capability to develop, implement, and maintain an accident response capability that includes:
 - Beyond-design-basis external event mitigation
 - Would make EA-12-049 generically applicable
 - Formerly referred to as SBOMS (industry’s “FLEX” program)
 - Extensive Damage Mitigation Guidelines (EDMGs)
 - Would move § 50.54(hh)(2) requirements to this rule
 - No substantive changes to requirements
 - Severe Accident Management Guidelines (SAMGs)
 - Currently voluntary
 - Regulation would require SAMGs
 - No additional equipment requirements

Proposed Rule Language

Paragraph (b) – Integrated Response



- Integrate with Emergency Operating Procedures (EOPs)
 - Would not revisit any 1980s EOP work or requirements

- Supporting staffing and command and control
 - Both staffing and command and control should be in place after EA-12-049
 - Recognizes challenge of a site-wide event that could lead to core damage and involve offsite assistance

Proposed Rule Language

Paragraph (c) – Equipment Requirements



- Functional capability and capacity of proposed (b)(1) mitigation strategies equipment
- Reasonable protection requirements for proposed (b)(1) mitigation strategies equipment
 - Protect against external events including any reevaluate hazards (Note – revised since subcommittee meeting)
- Maintenance requirement for proposed (b)(1) mitigation strategies equipment
- Spent fuel pool level wide range instrumentation requirement
- Proposed requirements would:
 - Make EA-12-049 and EA-12-051 equipment requirements generically applicable
 - Language reflecting NTTF 2.1 re-evaluated hazards is offered (pending Commission direction on associated COMSECY)

Proposed Rule Language

Paragraph (d) – New Reactor Requirements



- Assessment requirements:
 - Only applies to applicants listed in paragraph (a)(4)
 - Would require a design-specific assessment of the effects of an extended loss of all ac power concurrent with a loss of normal access to the ultimate heat sink
 - Based on the results of the assessment, the applicant would incorporate into the design those features that:
 - Minimize reliance on human actions
 - Enhance coping durations
 - Demonstrate ability to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities
- Intent:
 - Implement the Commission’s advanced reactor policy statement
 - “...longer time constants and sufficient instrumentation to allow for more diagnosis and management before reaching safety systems challenge or exposure of vital equipment to adverse conditions.”
 - “simplified safety systems that, where possible, reduce required operator actions”
 - New reactors would be better able to address effects of extended loss of ac power

Proposed Rule Language

Paragraph (e) – Training Requirements



- Training
 - Training of personnel for activities not already addressed in current regulations or as a result of the recent orders
 - Systems approach to training
 - Expect most training already addressed as part of EOPs and EA-12-049 implementation
 - New training should be focused in the SAMG area
 - Identify new job tasks required
 - Develop training for new tasks
 - Complete training

Proposed Rule Language

Paragraph (f) Drills and Exercises

Paragraph (g) – Change Control



- Drills provide assurance that guideline sets are integrated and can be used
 - Initial drill(s) to show use and transitions
 - Follow-on drill(s) to provide assurance of continuing capability
 - Complex drill schedule: Initial drill within 2 refueling outages (RFs) and follow-on in 8 calendar years
 - Current operating licensees/holder of combined license (COL) after 52.103(g) finding:
 - 1st drill within 2 RFs – after that 8 year period
 - Applicants for a part 50 operating license (OL) or holder of COL before 52.103(g) finding:
 - Demonstrate use and transitions – initial drill(s)
 - Subsequent drills - 8 year period
- MBDBE Change Control
 - Facility changes can impact multiple regulatory areas; all change controls must be applied
 - No threshold criterion; must comply with requirements

Proposed Rule Language

Appendix E, Application, Implementation



- New Appendix E requirements
 - Multi-source term requirements are incorporated directly into current Appendix E
 - New Section VII requirement for staffing and communications
 - Technology-neutral ERDS
- Application requirements
 - Submittal information to support part 50 and part 52 applications for new reactors
- Implementation: Compliance dates, will use the Cumulative Effects of Regulation (CER) process to inform establishment of dates
 - Change control
 - Training
 - Command and control, staffing
 - SAMGs
 - Guideline integration
 - Equipment requirements
 - Multi-source dose assessment

Backfit Considerations

- The MBDBE rule has different supporting backfit bases:
 - Proposed rule requirements are severable
 - EA-12-049 and EA-12-051 requirements are not backfits
 - All other requirements need justification under Part 50 backfitting provisions (operating reactors) and Part 52 issue finality provisions (new reactors) are “forward fits”
 - Items supporting EA-12-049 are technically backfits without impact
 - SAMGs and supporting requirements (drills and training that involve SAMGs)
 - Multi-source dose assessment (voluntarily implemented): Is a backfit but should not cause additional impact
 - New reactors requirements (forward fit)
 - Technology-neutral Emergency Response Data System (ERDS) remove specification of technology, no backfit

SAMGs Backfit

- Qualitative basis for imposing SAMG requirements:
 - Guideline set used by operators and decision-makers following onset of core damage
 - SAMGs support making optimal decisions concerning containment
 - SAMGs support informing the emergency response organization with regard to protective actions (e.g., fission product barrier integrity)
 - The value of SAMGs, pre-planned guidelines for best use of all available resources to mitigate the accident
- Quantitative analysis: drawing conclusions from recent Mark I and II CPRR effort
 - Measuring the benefit to public safety of strategies for Mark I and II plants implemented after core damage – “SAMGs” for Mark I and II
 - Quantitative results: High level conservative estimate is over an order of magnitude below the Quantitative Health Objectives (QHOs)
- Staff is proposing that Commission issue proposed MBDBE rule for comment with SAMGs as requirements
 - Allow stakeholder feedback to inform final decision

Draft Regulatory Guidance



- DG-1301 “Flexible Mitigation Strategies for Beyond-Design-Basis External Events”
 - Current draft guidance endorses NEI 12-06 rev 0 with clarifications
 - NEI is revising NEI 12-06 to reflect feedback and lessons-learned from implementation of EA-12-049 to develop rev 1
 - Include guidance for new reactors assessments (paragraph (d))
- DG-1317 “Reliable Spent Fuel Pool Instrumentation”
 - Would endorse NEI 12-02 with exceptions and clarifications
- DG-1319 “Enhanced Emergency Response Capabilities for Beyond-Design-Basis Events”
 - Would endorse NEI 12-01 and NEI 13-06
 - Considering endorsement of NEI 14-01
 - Not an endorsement of Owners Group SAGs

Status and Path Forward



- Current focus:
 - Completing the proposed rule package
- Future ACRS interactions
 - Full committee – TBD (final rule)

NEI 12-06 Integrated Assessment

Joseph Pollock

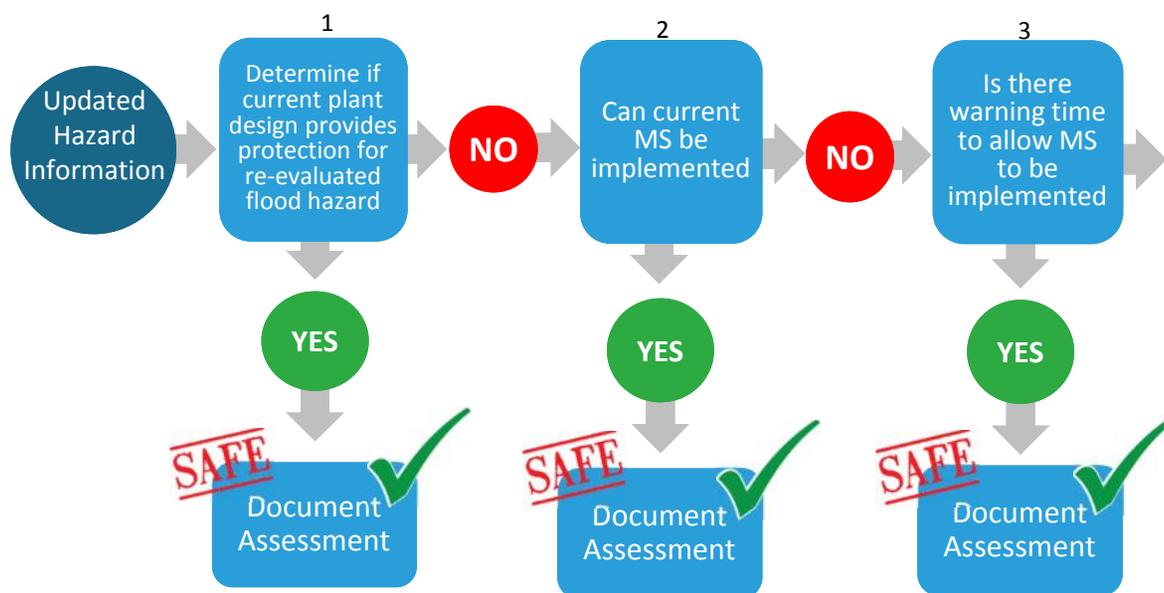
NEI Vice President Nuclear Operations

ACRS Committee Meeting

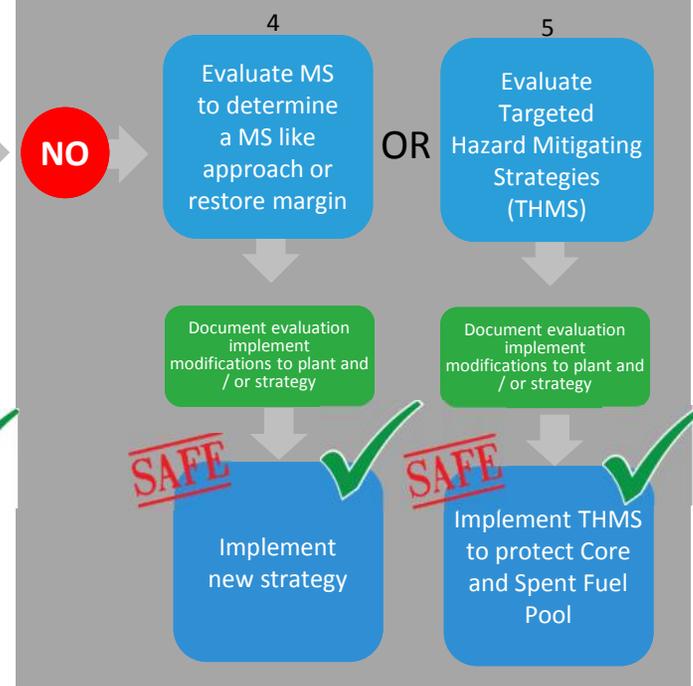
December 4, 2014

NEI 12-06 Integrated Assessment

New Hazard Information Bounded by Design Basis (DB) or Mitigating Strategy (MS)



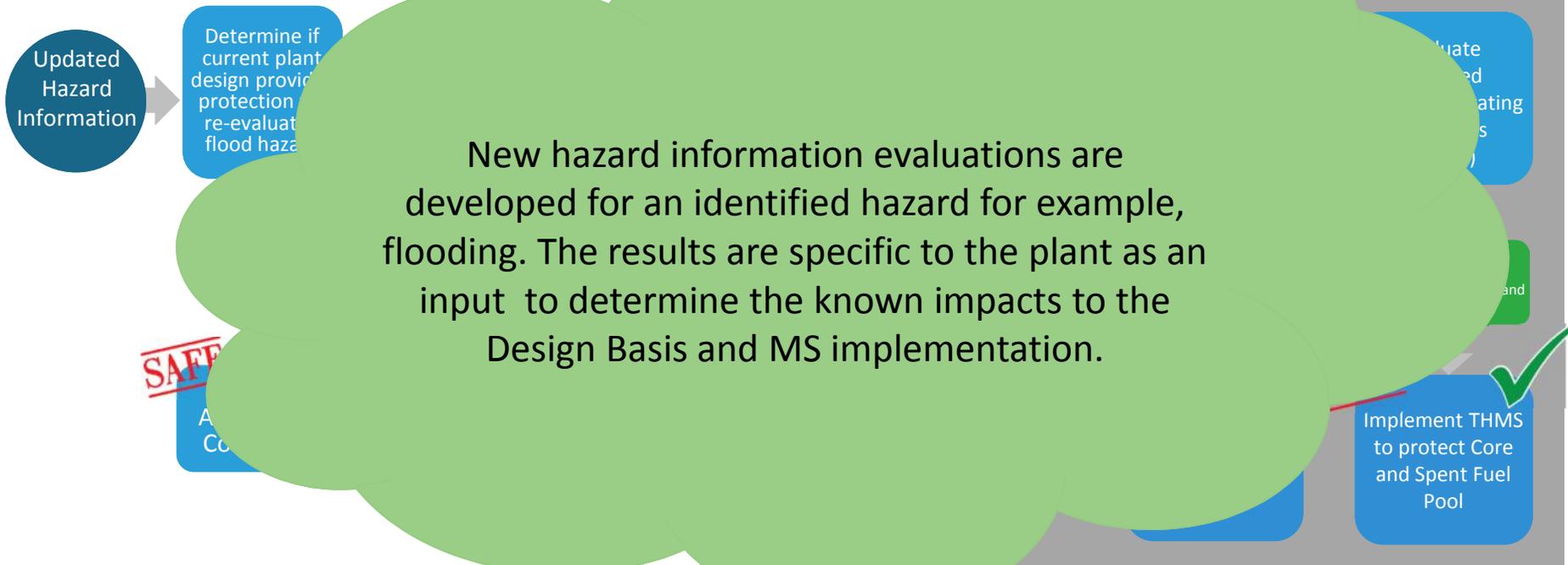
New Hazard Information Not Bounded by DB or MS



NEI 12-06 Integrated Assessment

New Hazard Information Bounded by Design Basis (DB) or Mitigating Strategy (MS)

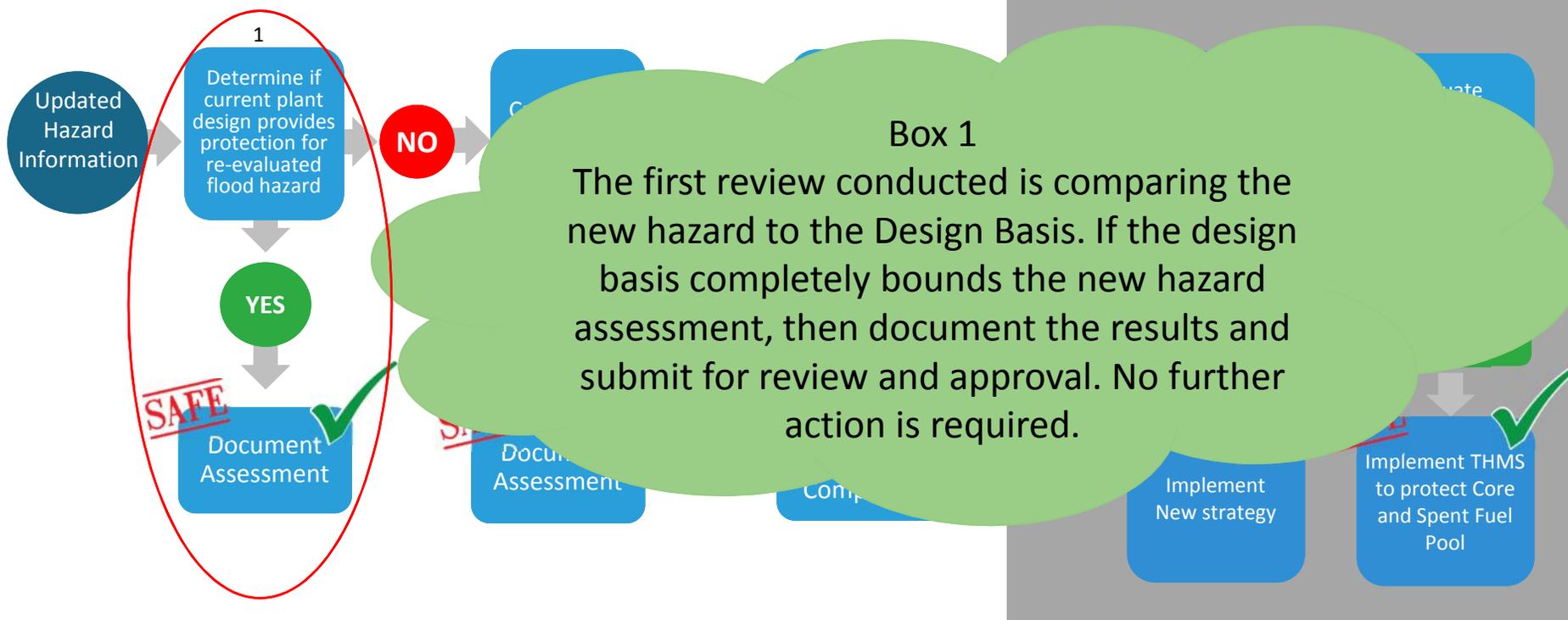
New Hazard Information Not Bounded by DB or MS



NEI 12-06 Integrated Assessment

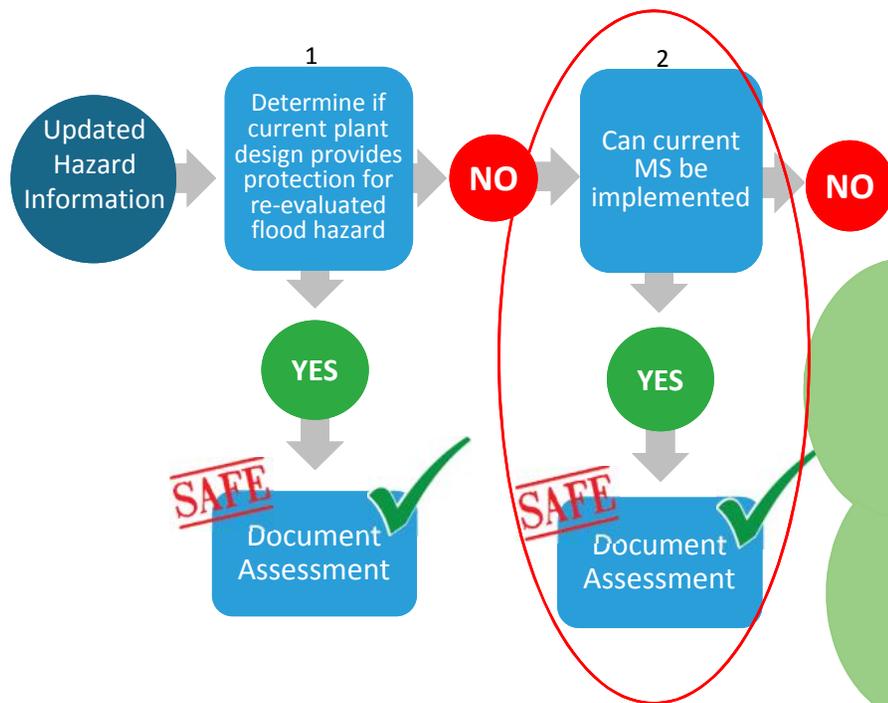
New Hazard Information Bounded by Design Basis (DB) or Mitigating Strategy (MS)

New Hazard Information Not Bounded by DB or MS



NEI 12-06 Integrated Assessment

New Hazard Information Bounded by Design Basis (DB) or Mitigating Strategy (MS)



New Hazard Information Not Bounded by DB or MS

Box 2

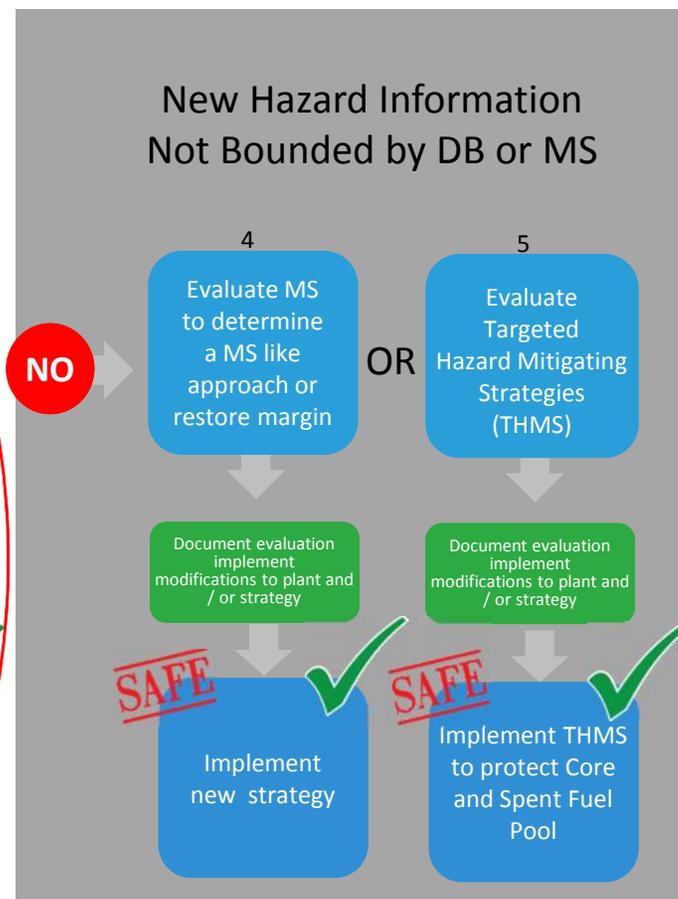
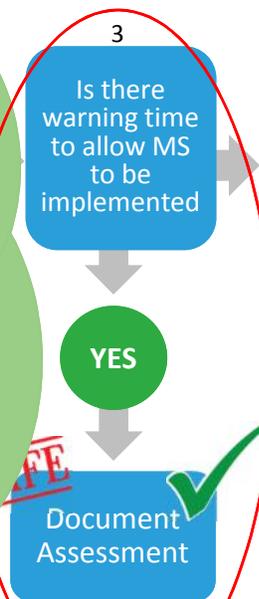
Perform an Integrated Assessment IAW NEI 12-06 using the updated hazard information, evaluate all 3 phases of MS. If the approved MS can be implemented using protected permanent equipment in combination with portable equipment, then document and submit the results for approval.

NEI 12-06 Integrated Assessment

New Hazard Information Bounded by Design Basis (DB)
or Mitigating Strategy (MS)

Box 3

Perform an Integrated Assessment IAW NEI 12-06 of the new hazard and determine if sufficient warning time is available to deploy MS, using protected permanent equipment in combination with portable equipment then document the results and submit for review and approval.

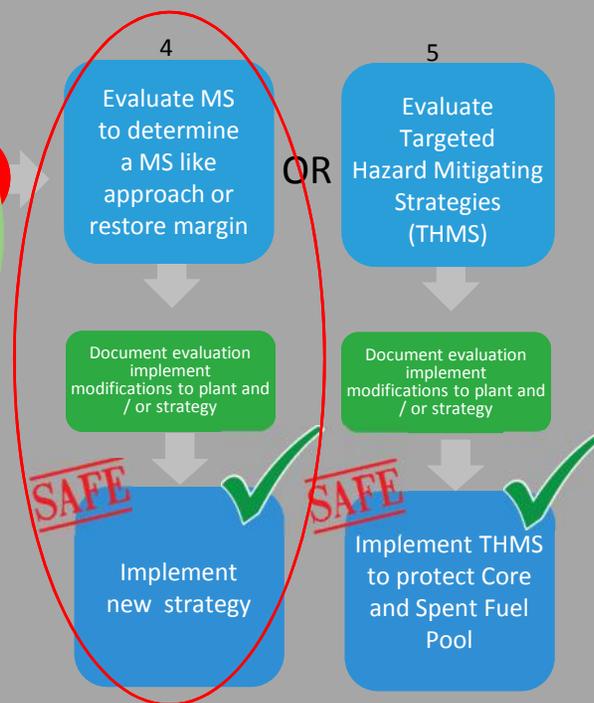


NEI 12-06 Integrated Assessment

Box 4

If MS cannot be implemented due to the new hazard impact then determine modifications required to protect plant and/or develop new mitigating strategy guidance to ensure continuity of key safety functions identified in NEI 12-06 to address the specific hazard. Perform an integrated assessment of the resulting configuration IAW NEI 12-06. If the new or revised MS can be implemented, then implement and document the results. Submit for review and approval.

New Hazard Information Not Bounded by DB or MS



NEI 12-06 Integrated Assessment

New Hazard Information

Box 5

If the new hazard cannot be mitigated with phase 1 installed equipment, then a THMS approach to protect the core and spent fuel pool needs to be developed. The THMS will apply the new hazard information to develop a response specific to the hazard. This THMS approach must continue to function throughout the event until recovery actions are initiated. Perform an integrated assessment of the resulting configuration. If the new or revised MS can be implemented, complete necessary changes, and document the results. Submit for review and approval.

New Hazard Information Bounded by DB or MS

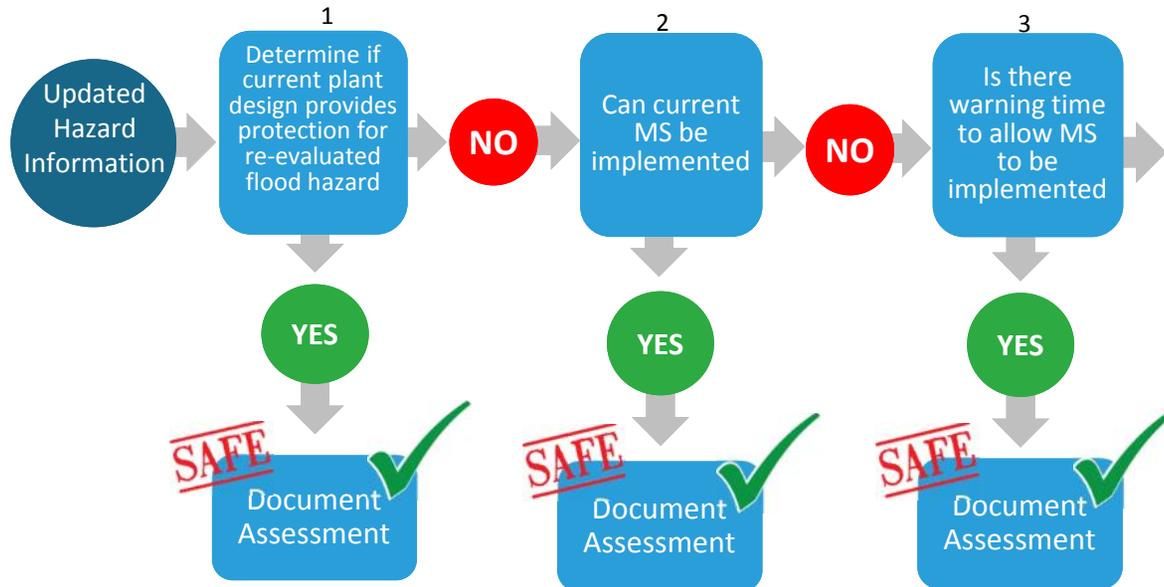


NUCLEAR ENERGY INSTITUTE

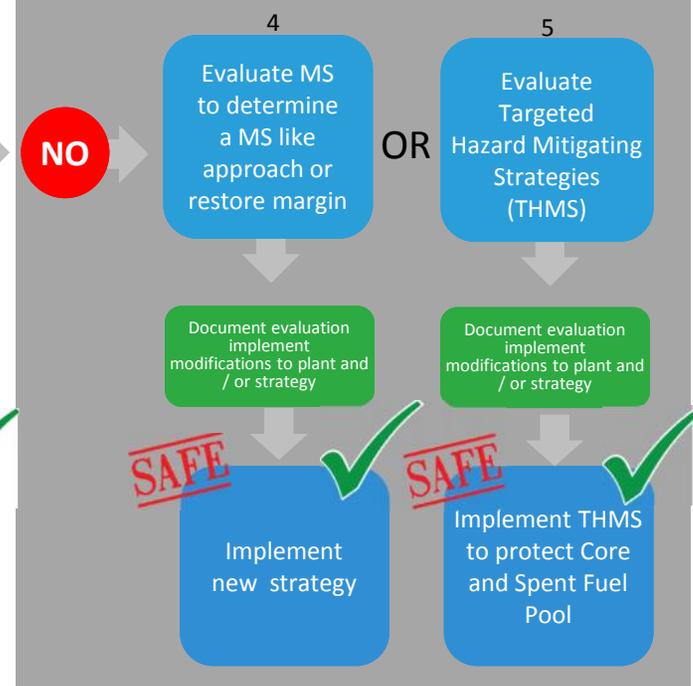
nuclear. clean air energy.

NEI 12-06 Integrated Assessment

New Hazard Information Bounded by Design Basis (DB) or Mitigating Strategy (MS)



New Hazard Information Not Bounded by DB or MS



NEI 12-06 Integrated Assessment Example

Scott Bauer, NEI
Bill Webster, Dominion
ACRS Meeting
December 4, 2014



NUCLEAR ENERGY INSTITUTE

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NEI 12-06 IA Example

FLEX

- Undefined hazard
- Established event conditions (ELAP)
- Developed mitigating strategies for those conditions

Reevaluated Flood Hazard

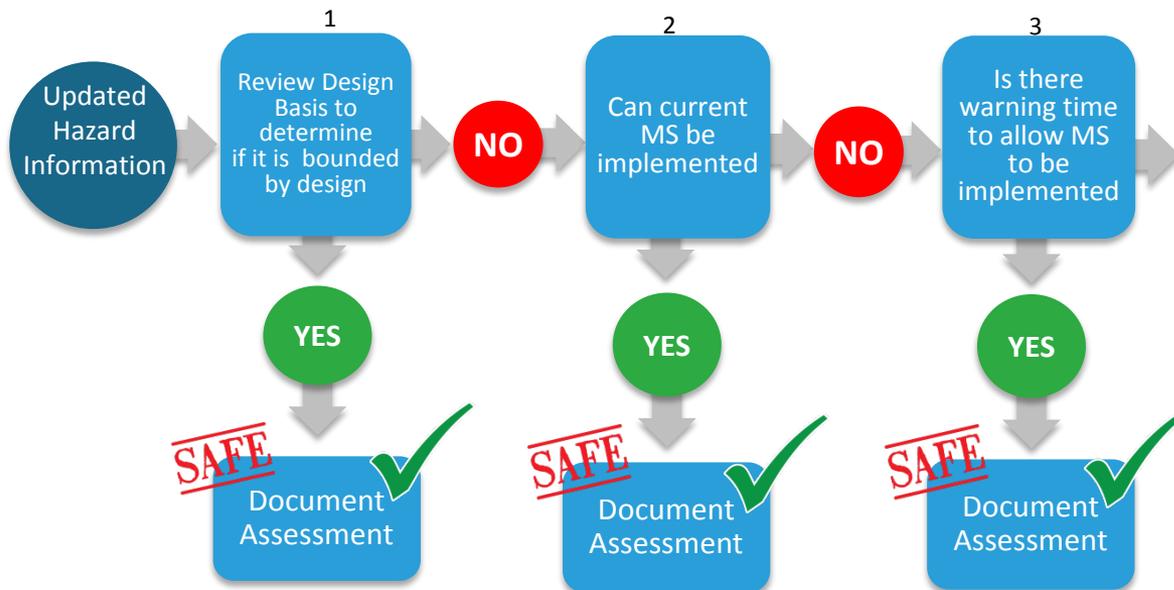
- Defined hazards
- Known conditions (not necessarily an ELAP)
- Develop specific mitigating strategies for known conditions

Plant Example Background

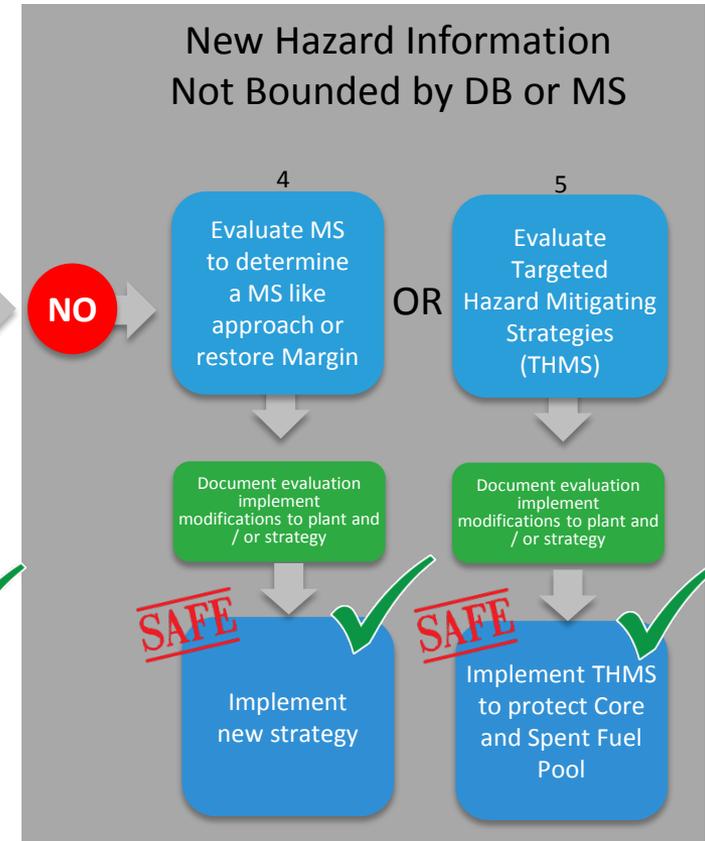
- Reevaluation performed and LIP (29 inches in 6 hours) exceeds what was considered in DB
- Preliminary flood hazard assessment performed to determine impact on mitigating strategies
- Determined that flooding would impact multiple areas

Example NEI 12-06 Integrated Assessment

New Hazard Information Bounded by Design Basis (DB) or Mitigating Strategy (MS)



New Hazard Information Not Bounded by DB or MS



NEI 12-06 Integrated Assessment Example

- Plant is in Block 4- Evaluate mitigating strategy
- The flood reevaluation mitigating strategy will be to protect the FLEX capability
- The flooding MS will enable the plant to answer Yes to block 2 or 3 depending on the extent of the flooding MS modifications and actions

NEI 12-06 Integrated Assessment Example

- Objective- to maintain or restore key safety functions through:
 - Protection of the plant, and/or
 - Diverse and flexible mitigating strategies
- Determining the flooding MS modifications and actions
 - Determine the sequence of events (timing of water level accumulation on site and sequence of mitigating actions)
 - Determine what equipment needed for key safety functions is impacted by the event

NEI 12-06 Integrated Assessment Example

- Determining the flooding MS modifications and actions (continued)
 - Determine what modifications or strategies were needed to protect that equipment and the capability to implement FLEX strategies
 - Also identified other simple modifications/actions to protect other equipment that provides greater diversity

NEI 12-06 Integrated Assessment Example

- Additional mitigating strategy modifications or actions needed:
 - Install portable flood dikes around doorways
 - Use installed sump pump capability to keep water out of the key areas (available because ELAP not assumed for this defined event)
 - 3 pumps available
 - Pumps have two power sources above flood height
 - Pumps are submersible
 - Use FLEX pump as backup

NEI 12-06 Integrated Assessment Example

- Additional mitigating strategy modifications or actions needed (continued):
 - Modify abnormal operating procedures to integrate with new mitigating strategy procedures
 - Develop procedure for new mitigating strategy
 - Conduct training on new procedures and strategy
 - Validate strategy per FLEX validation guidance

NEI 12-06 Integrated Assessment Example

- Additional mitigating strategy modifications or actions needed (continued):
 - Roof modifications to keep water from entering buildings
 - Added operator actions to close doors, etc. to minimize water intrusion
 - Review existing maintenance requirements for new MS equipment
 - Reevaluate deployment routes for onsite FLEX equipment



Advisory Committee on Reactor Safeguards

COMSECY-14-0037, “Integration of Mitigating Strategies for Beyond-Design-Basis External Events and Flooding Reevaluations”

ADAMS Package ML14309A256

December 4, 2014



- **Contents**
 - Background
 - Discussions
 - Proposed Path for MBDBE Rulemaking
 - Evaluation of Requirements Beyond MBDBE Rulemaking
 - Recommendations
 - Enclosures
 - 1) Background (Design-Basis Events, Design Basis)
 - 2) Coordination and Clarification
 - 3) Non-Concurrence Package NCP-2014-010
 - 4) Non-Concurrence Package NCP-2014-011



Proposed Path for MBDBE

- Mitigating Strategies Address Evaluated Flooding Hazards
 - Implement under adequate protection provisions used for Order EA-12-0049
 - Mitigating strategies would need to respond to and be protected against reevaluated flooding hazards
 - Timing would help determine requirements for installed equipment
 - Possible use of scenario-specific strategies



Evaluation of Requirements Beyond MBDBE Rulemaking

- Assess need for additional information, assessments, and potential plant-specific backfits based on reevaluated hazards, event frequencies, response times, licensing history, and other available information
- Follow established process
- Will consider benefits from requirements for mitigating strategies
- Document disposition of evaluation
- Complicated by state of probabilistic flood hazard analysis and related research plan



Recommendations

Recommend the Commission affirm:

- 1) Mitigating Strategies need to address reevaluated flooding hazards
- 2) Targeted or scenario-specific strategies may be needed for some scenarios that could significantly damage a site
- 3) Flooding assessments and decision-making to be integrated into the development and implementation of mitigating strategies



Integrated Assessments

- Reevaluation of flooding hazards
- Assess vulnerabilities (challenges to SSCs important to safety)
- Identify possible protection and/or mitigation measures
 - Not necessarily relying on mitigation strategies from Order EA-12-049 and MBDBE rulemaking
- Phase 2 decision-making on possible regulatory actions based on information and assessments from request for information

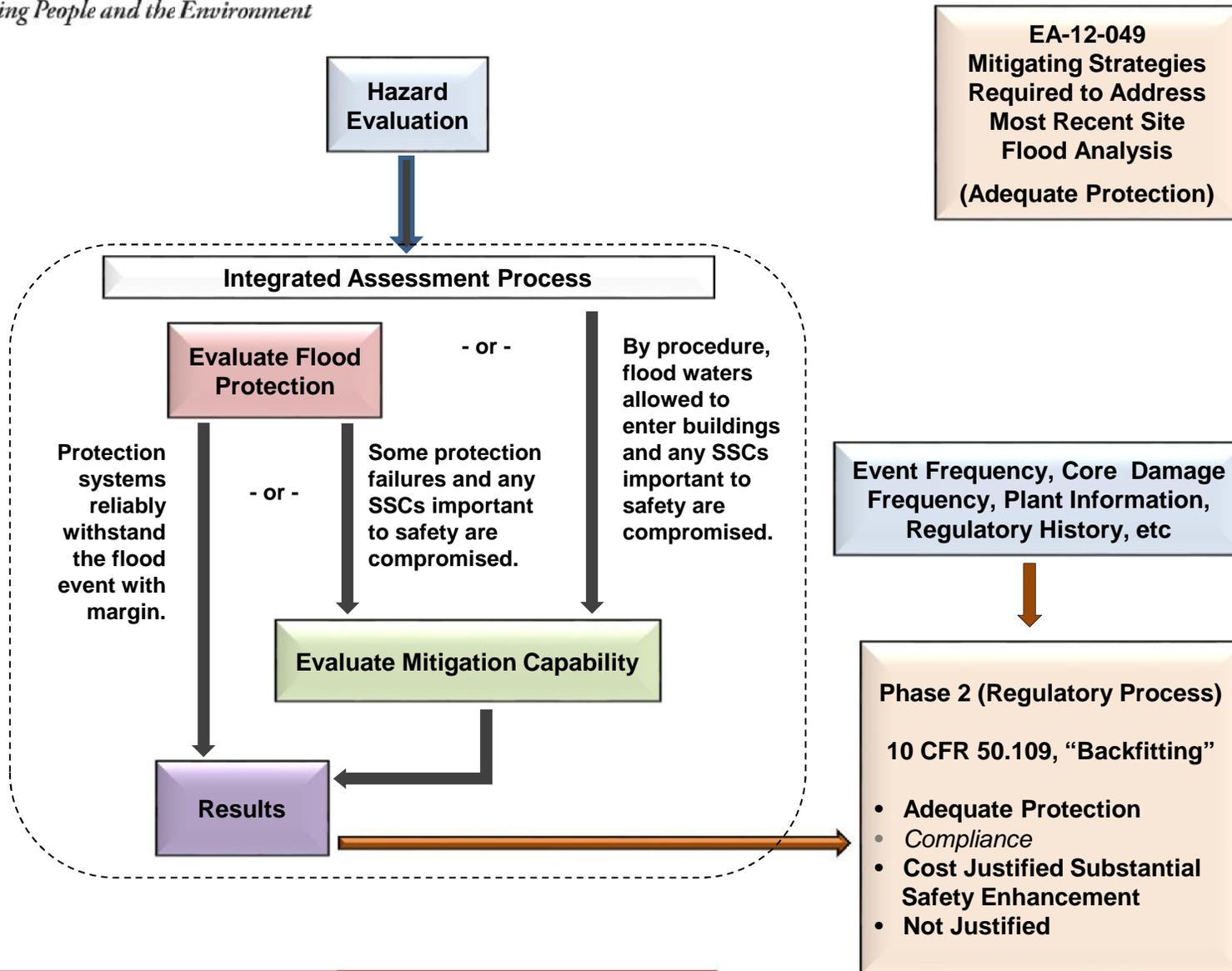


COMSECY Approach

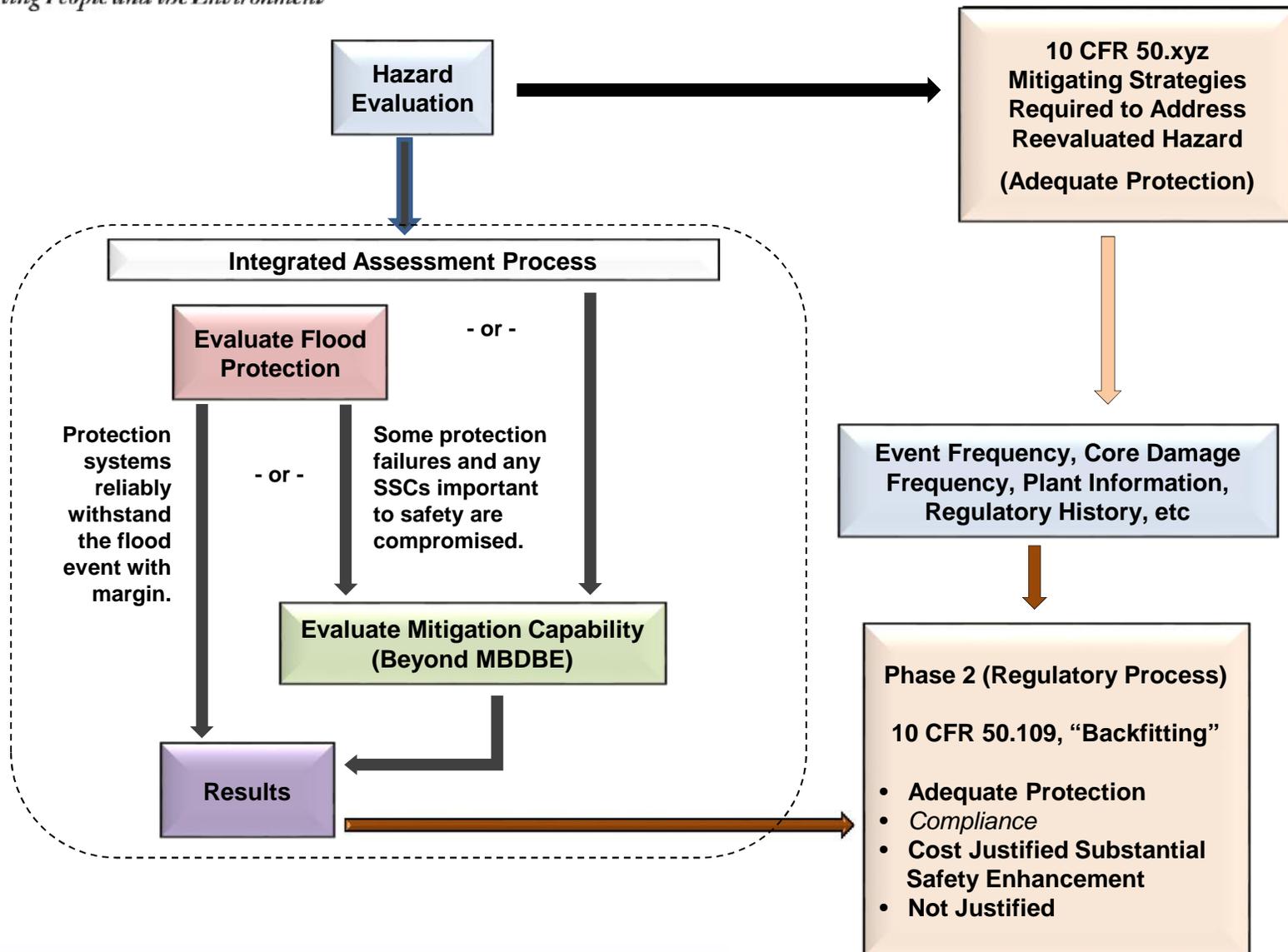
- Develop flexible, all-hazard mitigating strategies (Order EA-12-049)
- Reevaluation of flooding hazards
- Require success path to address reevaluated flooding hazard in MBDBE rulemaking
- Licensees develop and implement; NRC reviews and inspects for regulatory compliance
- Evaluate potential need for more information and plant-specific backfit
 - Where warranted, pursue with appropriate assessment process and regulatory actions
 - Consider with longer-term development of probabilistic flood hazard analysis and related research plan



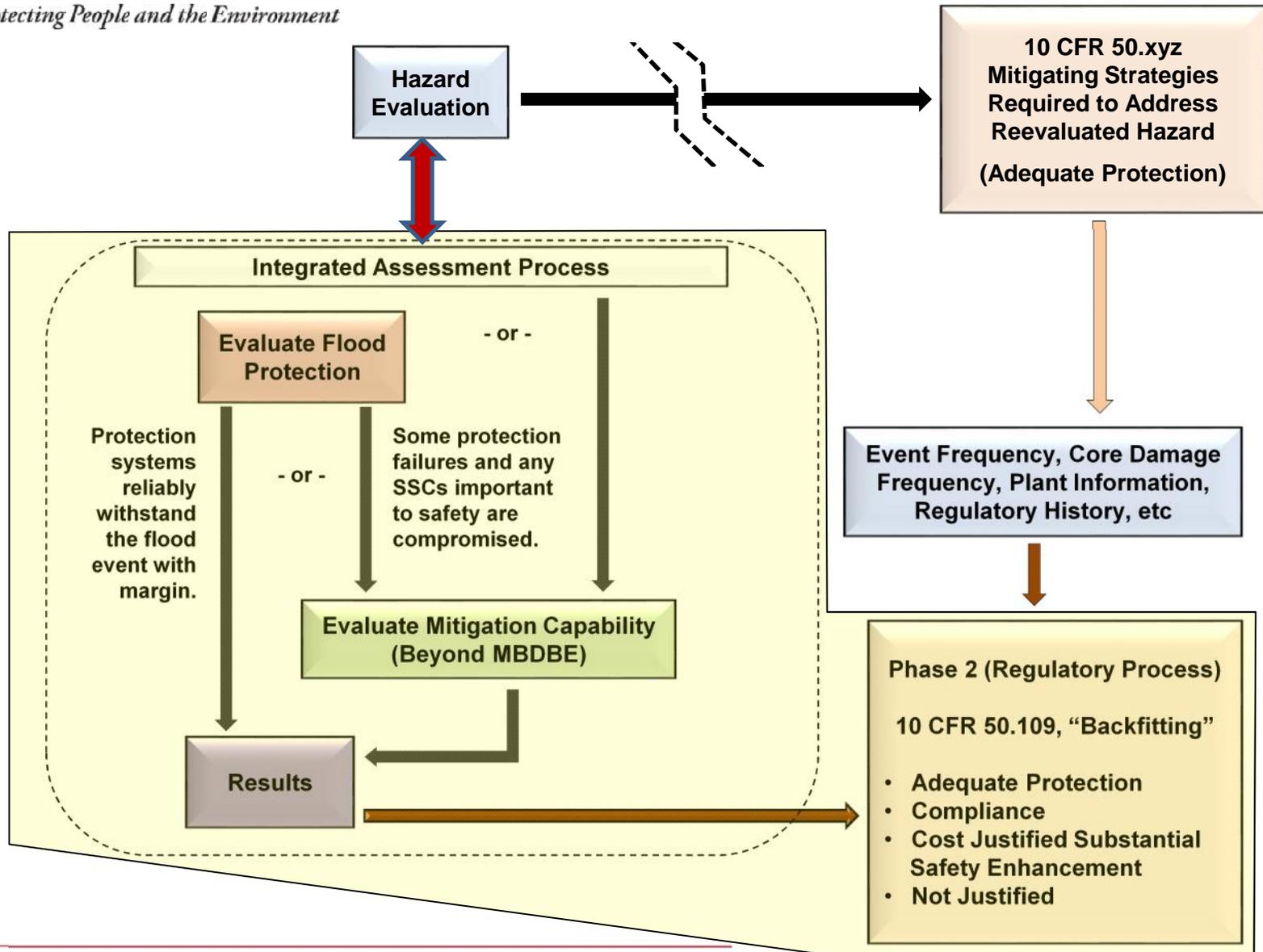
Current Paths



Revise Only Mitigating Strategies



Concern – Timely Regulatory Action



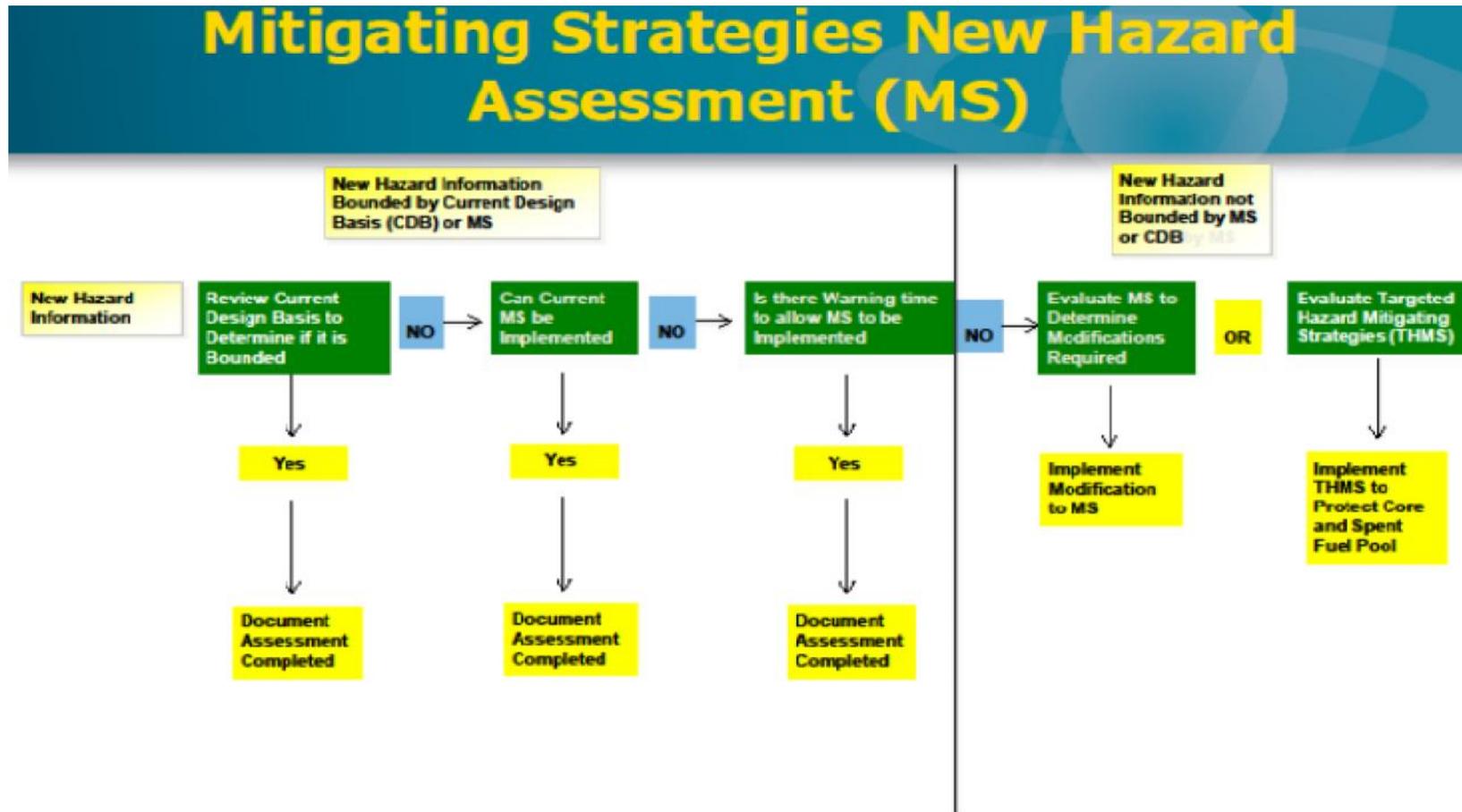
Summary

- Recommendations
 - 1) Mitigating Strategies to address reevaluated flooding hazards
 - 2) Targeted strategies; Some scenarios may damage sites
 - 3) Integrate mitigating strategies and flooding reevaluations
- Focus on mitigating strategies to achieve timely safety enhancements, with plant-specific consideration of additional evaluations/actions
- Decisions to be incorporated into MBDBE rulemaking
 - Revisions to mitigating strategies and flooding-related plans and guidance
 - Assess implications for other hazard reevaluations and NRC activities

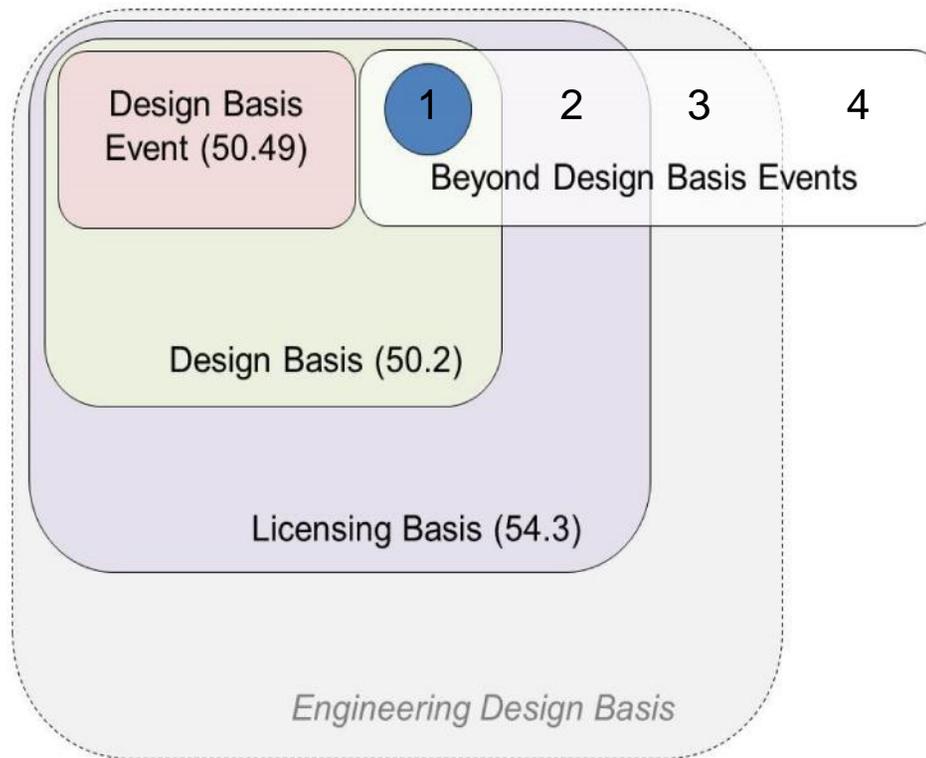


Backup Slides





Design Basis

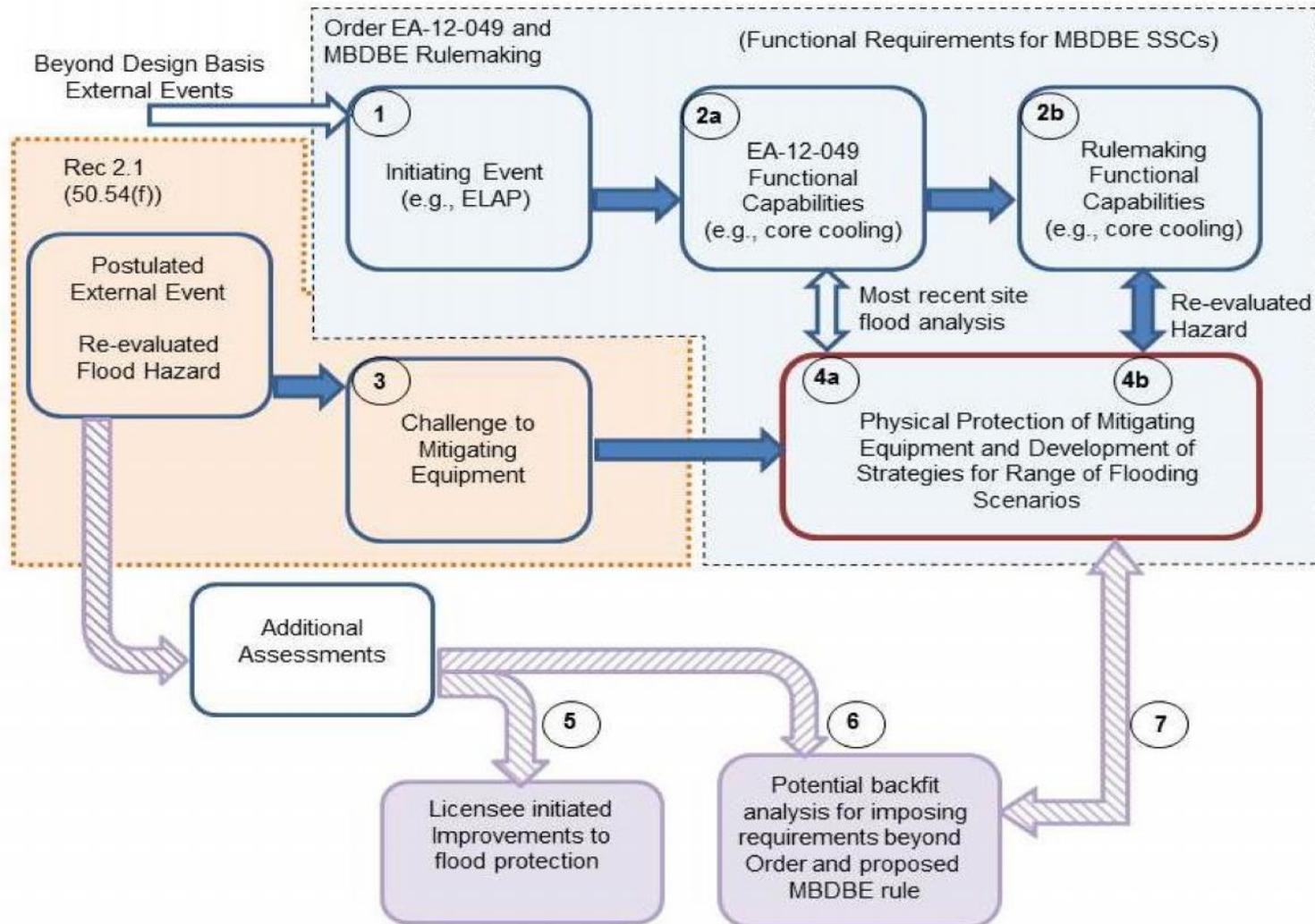


Note that beyond-design-basis events might warrant:

- 1) establishing design basis requirements for affected SSCs (e.g., mitigating strategies for flooding reevaluations),
- 2) a feature or action documented in the licensing basis (e.g., flooding enhancement or interim action captured as regulatory commitment in 50.54(f) response),
- 3) inclusion in licensee programs (engineering design basis) outside of regulatory controls (e.g., flood protection for SSCs not important to safety for asset protection reasons), or
- 4) No action or documentation (e.g., event considered not credible)



COMSECY Flow Chart



Summary of NCP-2014-010

Non-Concurrence on COMSECY Titled “Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards”

Presentation to ACRS, December 4, 2014

Michelle Bensi, Ph.D., Civil Engineer, NRO/DSEA/RHM1

Suzanne Schroer, Technical Assistant, RES/DRA (formerly NRO/DSRA/SPRA)

Marie Pohida, Senior Reliability and Risk Analyst, NRO/DSRA/SPRA

Malcolm Patterson, P.E., Reliability and Risk Analyst, NRO/DSRA/SPRA

Valerie Barnes, Ph.D., Senior Human Factors Analyst, RES/DRA/HFRB

Joseph Kanney, Ph.D., Hydrologist, RES/DRA/ETB

Jeffrey Mitman, Senior Reliability and Risk Analyst, NRR/DRA/APHB (on rotation to RES/DRA/PRAB)

David Desaulniers, Ph.D., Senior Technical Advisor for Human Factors, NRO/DCIP

George Lapinsky, Human Factors Specialist, NRR/DRA/APHB

Fernando Ferrante, Ph.D., Reliability and Risk Analyst, NRR/DRA/APHB

Kenneth See, P.E., Senior Hydrologist, NRO/DSEA/RHM1

Jacob Philip, P.E., Senior Geotechnical Engineer, RES/DRA/ETB

Primary Safety Concerns in Non-Concurrence

With the systematic, graded integrated assessment (JLD-ISG-2012-05), we will:

- Understand the impact of reevaluated flood hazard on plant safety
- Understand potential vulnerabilities and cliff-edge effects
- Determine whether protection is adequate
- Identify safety enhancements and determine their significance
- Gather information to support a decision to modify, suspend, or revoke a license

COMSECY removes this systematic assessment

- COMSECY approach will not systematically consider flooding protection of safety-related equipment (e.g., EDGs, ECCS) or perform a flood-specific evaluation of mitigation*
- COMSECY approach results in non-safety-related mitigating strategies as the **only** defense for reevaluated flooding hazards
 - Reevaluated flood hazards are based on present-day (design basis) guidance and methods
 - Mitigating strategies are intended for additional defense-in-depth for a beyond-design-basis external event

No basis for confidence in undefined approach advocated by COMSECY

- Relies on an unspecified staff process to initiate new regulatory actions
- Assumes NRC already knows which plants will require additional action

*The term “mitigation” in the integrated assessment ISG is not synonymous with the term “mitigating strategies” used in conjunction with Order EA-12-049

Specific Concerns Regarding COMSECY [as Described in NCP-2014-010]

1. It departs from the intent of NTTF Recommendation 2.1.
2. It departs from previous Commission and Congressional direction.
3. It deviates from the implementation process currently established for reevaluating flooding hazards and plant response.
4. It may create regulatory inconsistencies.
5. **It presumes a conclusion that adequate protection has been achieved and, in most cases, additional regulatory actions are either not expected or not warranted.**
6. **It does not elicit sufficient information to support a staff conclusion regarding the need for additional regulatory action.**
7. It does not incorporate lessons learned from operating experience.
8. It fails to distinguish between the intended purpose of the integrated assessment and activities for mitigating strategies and does not recognize the differences between guidance associated with the two activities.
9. It does not adequately distinguish between consequential floods and the reevaluated flood hazard.
10. It is vague in its description of “targeted mitigating strategies.”
11. It is not responsive to external recommendations by regarded experts.
12. It creates inconsistency regarding the manner in which different external hazards are treated by NRC under Recommendation 2.1.

Supplemental Information

Plant-specific examples

Plant 1

	Hazard information*	Plant response information
Current licensing/design basis	<ul style="list-style-type: none">Nominal river level: 0 ftSite grade elevation: 13 ftDesign basis flood (PMF): 23 ft	Protected from a design basis flood by a full set of safety grade ECCS and onsite electrical safety grade distribution system (i.e., diverse, redundant, single failure proof)
Reevaluated hazard	<ul style="list-style-type: none">More than 20 feet greater than design basisDisables the ECCS and Class IE electrical distribution system	?

*All elevations are normalized to nominal river level

Key questions:

- Are mitigating strategies appropriate for reevaluated hazard (including less severe but more frequent events)?
- Are there efficient/effective protection options?
- Should we consider changing the design or licensing basis?
- Is this an adequate protection issue?

Integrated Assessment is needed to answer these questions.

Plant 2

	Hazard information*	Plant response information
Current licensing/ design basis	<ul style="list-style-type: none"> Nominal river level: 0 ft Site grade elev: 22.5 ft Original design basis flood: 17 ft Later revision: ~29ft 	<p>Under original design basis: Full set of safety grade ECCS (i.e., diverse, redundant, single-failure-proof) because flood is below site grade</p> <p>Under later revisions to hazard: “There are no incorporated/exterior or temporary flood protection features designed to protect the site against a flood greater than [plant grade elevation].”</p> <ul style="list-style-type: none"> Reactor shutdown is followed by reactor disassembly and cavity flood up “All station loads are de-energized and all plant doors are opened ...” Gasoline driven pumps provide makeup to pools and reactor
Reevaluated hazard	PMF normalized level slightly higher than 29 ft	?

*All elevations are normalized to nominal river level

Key questions:

- Are mitigating strategies appropriate for reevaluated hazard (including less severe but more frequent events)?
- Are there efficient/effective protection options?
- Should we consider changing the design or licensing basis?
- Is this an adequate protection issue?

Integrated Assessment is needed to answer these questions.

Plant 3

	Hazard information*	Plant response information
Current licensing/ design basis	<ul style="list-style-type: none"> Nominal river level: 0 ft Site grade elev: 25 ft PMF: 34 ft <ul style="list-style-type: none"> Elevation would be reached in ~12 days Elevation would be sustained for ~11 days 	<ul style="list-style-type: none"> Licensee flood protection procedure requires construction of a ring levee to protect the plant. If construction of the levee is not completed or the levee fails (neither of which are low probability events), station blackout will occur. Backup is to run RCIC without dc power.
Reevaluated hazard	PMF has increased	?

*All elevations are normalized to nominal river level

Key questions:

- Are mitigating strategies appropriate for reevaluated hazard (including less severe but more frequent events)?
- Are there efficient/effective protection options?
- Should we consider changing the design or licensing basis?
- Is this an adequate protection issue?

Integrated Assessment is needed to answer these questions.

Integrated Assessment

Systematic review of all plants with more severe flooding hazards yields information needed to support regulatory decisions:

- the **extent** of flooding issues at plants with known issues
- the **number** of plants that may have issues (including plants not yet identified)
- whether **protection** is adequate under all realistic flooding scenarios
- whether cost-effective, efficient flood protection measures (e.g., sandbags to protect EDG building) offer substantial **safety enhancements**

COMSECY eliminates the integrated assessment

Supplemental Information

Summary of Specific Concerns in
NCP-2014-010

1—Departs from the Intent of NTTF Recommendation 2.1

Task Force recommends that the Commission direct the following actions to **ensure adequate protection** from natural phenomena...

NTTF 2.1 Order licensees to reevaluate the . . . flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs important to safety to protect against the updated hazards. ...

- NTTF recognized that flooding hazards must be accurately characterized to determine whether it is necessary to
 - update the design basis
 - modify SSCs important to safety
- For flooding that was not considered in the licensed design, the COMSECY proposes to **substitute** mitigation for protection in all cases.
- The COMSECY **assumes** that the mitigation strategy will be adequate and **eliminates** the flood-specific assessment required to validate that assumption.

2—Departs from Commission and Congressional Direction

- COMSECY does not clearly describe previous direction
- COMSECY does not clearly acknowledge that the proposed path forward represents a significant deviation from previous direction

SRM on SECY-11-0093

SRM on SECY-11-0124

SRM on SECY-11-0137

SRM on SECY-12-0025

Consolidated Appropriations Act

NTTF Report

“Identify actions...to address plant-specific vulnerabilities”

NTTF Prioritization

“....necessary to confirm the adequacy of the hazards assumed for U.S. Plants and their ability to protect against them.”

“The [NRC] shall...require licensees to reevaluate the...flooding ...hazard...The Commission shall require the licensees to update the design basis...if necessary.”

3—Deviates from Established Implementation Process

Current NTTF R2.1 implementation process:

- Phase 1: Information Gathering:
 - Stage 1: Hazard Reevaluation using present-day licensing criteria (i.e., present-day design basis methods)
 - Stage 2: Integrated Assessment if reevaluated hazard > design basis*
- Phase 2: Regulatory Decisionmaking (e.g., change design or licensing basis)

The COMSECY does not:

- clearly articulate a sound basis, technical or otherwise, for the changes to the NTTF R2.1 implementation process
- completely describe the consequences of the proposed changes to the implementation process

4—Creates Regulatory Inconsistencies

The proposed path forward may lead to several regulatory inconsistencies:

1. The treatment of increased flooding hazards from dam failures may differ between:
 - sites for which there is ongoing regulatory activity that may lead to changes in the protection of the plant or other backfits
 - sites for which regulatory activity is not already ongoing
2. The treatment of new information about different flood mechanisms may differ.

Ex: NRC may treat new information about increased flooding hazards from dam failures (at some sites) differently than new information about increased flooding hazards from other mechanisms such as storm surge and local intense precipitation.

5—Prejudges Safety Conclusions

Previous version of COMSECY:

“. . . the NRC staff does not expect the reevaluated flooding hazards for most plants to affect the design-basis flood against which safety-related SSCs would need to be protected.”

Current version of COMSECY:

“The flooding reevaluations would be used to define functional requirements and reference bounds for those specific SSCs used to support key safety functions within the mitigating strategies ... Exceptions to this approach might be taken on a plant-specific basis if justified by the NRC evaluations performed in accordance with 10 CFR 50.109, “Backfitting.”

- Previous version of COMSECY prejudged the outcomes of regulatory decisions made in response to flood hazard reevaluations
- Final version of COMSECY notes NRC’s responsibility of consider changes to licensing or design basis in some cases
- Eliminating systematic integrated assessment means information will not be collected to understand whether additional regulatory actions (e.g., changes to design or licensing basis) are needed and justified.

6—Insufficient Information To Support a Staff Decision

COMSECY states:

- “Focusing the flooding-related Phase 2 decision-making on mitigating strategies means that **the integrated (total plant) assessment in Phase 1 is no longer needed...**”
and
- “...the NRC staff would evaluate the need to perform a broader assessment of how beyond-design-basis flooding scenarios might impact plant features beyond mitigating strategies **on a case-by-case basis...**”

- A systematic evaluation of the impacts of the flood hazards from different flooding mechanisms on plant safety-related SSCs will not be performed.
- Staff cannot determine whether additional regulatory actions are needed regarding adequate protection or safety enhancements.
- Proposed approach is undefined and sufficient information **will not be** available to systematically know when to pursue further assessments.

7—Lessons Learned from Operating Experience Are Not Incorporated

- Since 2010, there have been:
 - 6 actual flooding events
 - 9 identified flooding issues related to flood protection or flood mitigation
 - 6 non-cited violations or green findings related to flood protection or flood mitigation
 - 12 greater-than-green findings related to flood protection or flood mitigation
 - 1 notice of violation
 - 8 white findings
 - 3 yellow findings
- The integrated assessment was developed with knowledge of operating experience.
- The COMSECY approach would reduce or eliminate the assessment of total plant response.

8—Differences Between Integrated Assessment and Mitigating Strategies Are Unclear

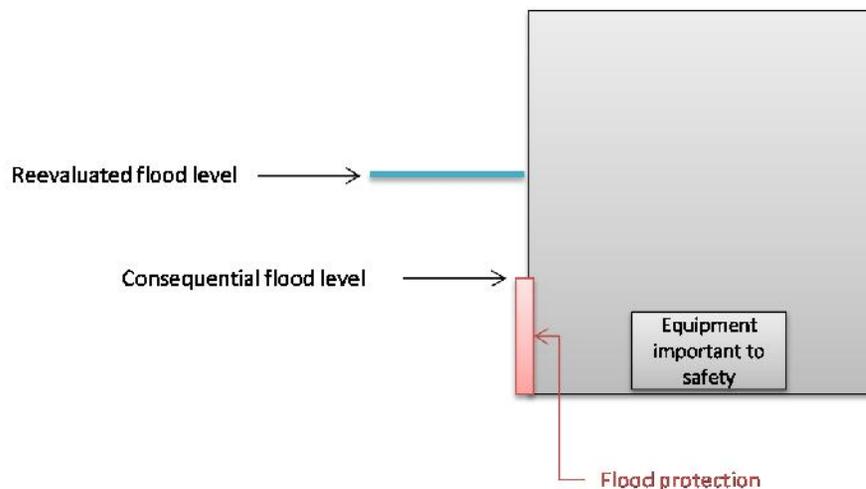
	Integrated Assessment	Mitigating strategies
Initiator	Flooding events (e.g., flood height, associated effects, flood event duration)	Extended loss of AC power and loss of normal access to ultimate heat sink
Purpose	Support decision to modify, suspend, or revoke license, if necessary	Provide additional defense in depth
Focus	Effects of flooding on total plant response, including safety-related SSCs	Effects of flooding on mitigating strategies equipment
Scope	Protection or mitigation,* as needed	Mitigating strategies only
Review criteria	Rigorous, systematic, and flood-specific assessment of total plant response Supports regulatory decision regarding need to change DB/LB	Relies on considerable engineering judgment Substantially different from the review of design basis accidents
Review criteria - Manual actions	Feasibility and reliability of manual actions, when used	Feasibility of “representative” manual actions
Outcomes	Confidence that site can withstand reevaluated flood hazard; information to support regulatory decision	Evaluate compliance with Order EA-12-049 for additional defense in depth

*The term “mitigation” in the integrated assessment ISG is not synonymous with the term “mitigating strategies” used in Order EA-12-049 and the COMSECY

9—Lack of Understanding of Consequential vs. Maximum Credible* Flood

* Maximum Credible Flood \equiv Reevaluated Flood

- NRC flood hazard regulatory guidance currently uses deterministic framework
 - Limited number of stylized event combinations used to develop estimates of “maximum credible” flooding hazard for each SSC important to safety
 - Such combinations are considered appropriate for establishing sufficiently severe flood for design purposes
- Operating reactors may be vulnerable to events that are smaller in magnitude than these “maximum credible” events
 - This insight is important to support regulatory decisionmaking
- COMSECY focuses on single maximum credible flood but does not address the importance of smaller events that still may be consequential to a site.



Source: USACE, via Wikimedia Commons

10—Vague Description of Targeted Mitigating Strategies

- FLEX guidelines proposed by industry and endorsed by the NRC staff are *function-based*.
 - “The FLEX strategies are focused on maintaining or restoring key plant safety functions and are not tied to any specific damage state or mechanistic assessment of external events.” (from NEI 12-06)
- “[T]argeted mitigating strategies” as described in the COMSECY are described as *scenario-specific*.
 - Scenario-specific strategies are not addressed in
 - existing regulatory guidance related to mitigating strategies
 - NEI 12-06 (FLEX Implementation Guide)
 - JLD-ISG-2012-01 (Compliance with Order EA-12-049)
 - What triggers a targeted strategy is not specified.
- Integrated assessment ISG provides scenario-specific evaluation guidance that is flood-specific and systematic.

11—Responsiveness to External Recommendations

NRC response to Government Accountability Office report

“The NRC staff will evaluate the licensees’ responses to this request for information, and will determine whether additional regulatory actions are necessary to provide additional protection against the updated hazards.”

The COMSECY reverses, without technical justification, the NRC position documented in response to a recent report from the Government Accountability Office.

National Academies of Sciences report

“Failure of the plant owner...and the principal regulator...to protect critical safety equipment at the plant from flooding in spite of mounting evidence that the plant’s current design basis for tsunamis was inadequate.”

Despite key Fukushima-related observations from a National Academies of Sciences report, the COMSECY reverses direction from NTF recommendation.

12—Inconsistencies in the Treatment of External Hazards

- Parallel implementation processes are being used for both seismic and flooding
- The COMSECY proposes significant changes to the implementation process for flooding
- The COMSECY does not describe whether similar changes will be implemented for other external hazards
- It remains unclear why flooding hazards should be treated differently (and potentially less rigorously)
- The impacts of these inconsistencies have not been appropriately evaluated and could result in inefficiencies

Supplemental information

Background

Mitigating Strategies (Order EA-12-049)

- Purpose of mitigating strategies:
 - Provide “strategies and guidance for **additional defense-in-depth measures** to supplement the capabilities of permanently installed plant structures, systems, and components that could become unavailable following a **beyond-design-basis [external] event**”
- Rigor of staff reviews:
 - Substantially less rigorous than the review of design-basis accidents
 - No diversity
 - No redundancy
 - Single failure criteria do not apply (and all plant equipment assumed available)
 - Relies considerably on engineering judgment and existing knowledge and expertise in determining the acceptability
- Level of review is commensurate with the intended use of mitigating strategies as a **defense-in-depth measures** for **events that are expected to be rare**.
 - Note: Consequential flooding is not rare at all plants.

NTTF Recommendation 2.1

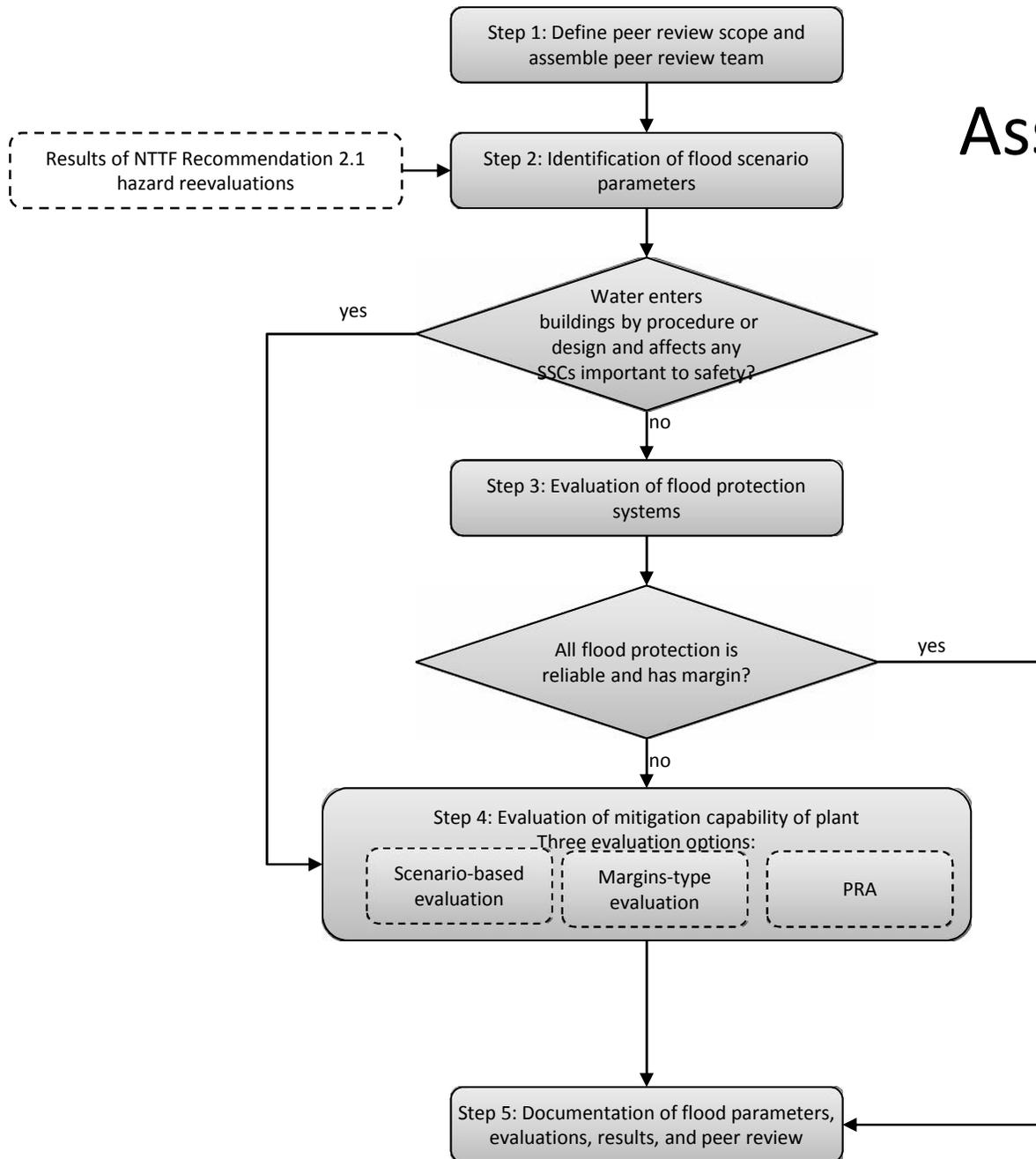
- NTTF Recommendation: Ensure that plants have **adequate protection** from seismic and flooding hazards, consistent with the current state of knowledge and analytical methods
- Actions are required by Congress
- Implementation:
 1. Reevaluate flood hazards using present-day guidance and methods used to site new reactors (i.e., design basis methods)
 2. Perform integrated assessment (IA) if reevaluated hazard is not bounded by the design basis
 - IA involves:
 - Consideration of complete flood characterization when evaluating plant response
 - Flood protection evaluation
 - Mitigation evaluation (if needed)
 3. Staff makes regulatory decision (e.g., update the design basis, including protection of SSCs important to safety)
- Recognizes that operating reactors cannot be resited/redesigned
 - IA provides systematic, flood-specific evaluation
 - IA adequately informs a regulatory decision

COMSECY goals

[Interpretation by authors of non-concurrence]

1. Mitigating Beyond Design Basis Events (MBDBE) Rule requires mitigating strategies to address reevaluated hazard
2. Recognize unconventional measures may be used for certain flood events
3. Truncate R2.1 process and re-define purpose of mitigating strategies
 - Specifies mitigating strategies as the way to address the reevaluated hazard
 - Typical principles of defense-in-depth and other traditional requirements not applied
 - No systematic consideration of flood protection or flood-specific evaluation of mitigation
 - No systematic evaluation of the impacts of the flood hazards
 - Undefined process for initiating regulatory decision making
 - Information not collected to understand plant response and decide whether additional actions are needed

Integrated Assessment Concept



Key definitions

- Per Integrated Assessment interim staff guidance:
 - **Flood protection:** An incorporated, exterior or temporary structure SSC (e.g., barrier), or an associated procedure that protects safety-related SSCs against the effects of external floods, including flood height and associated effects.
 - **Mitigation:** The capability of the plant to maintain key safety functions in the event that flood protection systems fail (or are otherwise not available).
 - Note: The term “mitigation” in the integrated assessment ISG is not synonymous with the term “mitigating strategies” used in conjunction with Order EA-12-049 and COMSECY



NON-CONCURRENCE 2014-011 RELATED TO
“INTEGRATION OF MITIGATING STRATEGIES
FOR BEYOND-DESIGN-BASIS EXTERNAL
EVENTS AND RE-EVALUATION OF FLOODING

Submitted by: Glenn Tracy, Gary Holahan,
and Scott Flanders

Background

- NNTF recommended “Safety Through Defense-in-Depth”, including:
 - Recommendation 2: enhanced protection from design-basis floods and seismic events, where warranted.
 - Recommendation 4: enhanced mitigation, for both design-basis and beyond design-basis events.
 - Recommendation 8: enhanced severe accident mitigation capability, and
 - Recommendation 9: enhanced emergency preparedness

Background

- These recommendations constitute a rational set of enhancements, strengthening defense-in-depth, with each recommendation having a specific nexus to the Fukushima Daichi accident.
- The Commission supported these recommendations, in whole or in part, through various mechanisms: Orders, rule-makings, or information demands.

COMSECY proposal

The fundamental changes being proposed in the COMSECY are:

- 1) to limit staff and industry efforts on flooding to a confirmation that mitigation strategies can cope with the reevaluated flooding hazard; and
- 2) to eliminate (in our view) the systematic re-consideration of any other external flooding protection.

Consequences

1. The post-Fukushima recommendations would no longer constitute a full set of potential enhancements consistent with the Commission's defense-in-depth safety philosophy;
2. A systematic evaluation of the total plant response to flooding, addressing both protection and mitigation would be curtailed. This would constitute a lost opportunity to identify potential plant vulnerabilities and to implement practical measures to protect key safety-related equipment; and
3. A non-safety-related system or collection of systems, intended for beyond design-basis events would be used to compensate for potential weaknesses in or even non-compliances with flooding design-basis protection requirements.

NRO Position

- We support the paper's approach on one specific issue; namely, reaffirming the issue of flooding protection for mitigation equipment (i.e. using the 2.1 re-evaluated flooding levels in the 4.2 mitigation strategy).
- We believe it is also necessary to conduct a thorough and systematic re-evaluation of protection of the normal, design-basis safety equipment used for decay heat removal (e.g. the first line of defense including: diesel generators, electrical distribution equipment, motor-driven auxiliary feedwater, service water and other support systems) .

Summary

- Simply stated, we do not believe that mitigation is an appropriate substitute for protection.
- Both mitigation and protection are essential, but separate, elements of the Commission's defense-in-depth safety philosophy and should be treated as such.



Regulatory Gap Analysis of the NRC's Cost-Benefit Guidance and Practices

ACRS Full Committee Meeting
December 4, 2014

Purpose/Outline

- Purpose
 - Provide an overview of SECY-14-XXXX, “Regulatory Gap Analysis of the Nuclear Regulatory Commission’s Cost-Benefit Guidance and Practices.”
- Outline
 - Overview and Status
 - Background
 - Gap Analysis Scope and Methodology
 - Key Results
 - Differences in Cost-Benefit Practices Within the NRC
 - Enhancements to Be Considered in Future Guidance Updates
 - Path Forward

Overview and Status

- Staff developed an information SECY paper, “Regulatory Gap Analysis of the NRC’s Cost-Benefit Guidance and Practice”
- There are 3 associated enclosures
 - Scope and Methodology
 - Differences in NRC Cost-Benefit Practice
 - Enhancements to Be Considered in Future Cost-Benefit Updates
- Staff revised paper based on ACRS subcommittee feedback.

SECY Revisions Based on Subcommittee Feedback

- Completed summary table of differences in NRC cost-benefit regulations, practices, and guidance (Enclosure 2)
- Clarified basis for statement that the cost-benefit regulatory framework is sound
- Expanded the discussion on the use of PRA and other studies in regulatory analyses
- Clarified next steps

Background

- SECY-12-0110, “Consideration of Economic Consequences within the U.S. NRC’s Regulatory Framework” recommended enhancing cost-benefit guidance to harmonize across the agency.
- SRM-SECY-12-0110 approved the staff’s recommendation and directed the staff to “provide the Commission with a regulatory gap analysis prior to developing new guidance for application across business lines (e.g., materials, fuel cycle facilities, or emergency preparedness.”
- SECY-14-0002, “Plan for Updating NRC’s Cost-Benefit Guidance” described the two-phased approach to revise NRC guidance
- Phase II is informed by the gap analysis and Commission direction from SECY-14-0087, “Qualitative Consideration of Factors in the Development of Regulatory Analyses and Backfit Analyses.”

Gap Analysis Scope

NRC Business Lines and Programs	Regulatory Analyses	Backfit Analyses	Environmental Analyses
Operating Reactors	<u>For each cell:</u> •Regulatory Requirements •Guidance •Practice (e.g., assumptions, data source, use of qual. factors)		
New Reactors			
Materials			
Fuel Cycle Facilities			
Emergency Preparedness			
Security			

Differences across business lines and programs



Differences across cost-benefit analyses



Excerpt from Enclosure 2

Environmental Analysis			
	Regulatory Requirements	Guidance	Practice
Operating Reactors	Severe Accident Mitigation Design Alternatives: 10 CFR 51.30(d) & (e); 51.31(b)(ii) & (c); 51.50(c); 51.54; 51.55; 52.171(a)(3). Cost Benefit Analysis: 10 CFR 51.45(c); 51.49(f); 51.50(b)(2); 51.53(c)(2); For DEISs: 51.71(d) & (f); 51.75 (b); 51.76(f); For FSEISs: 51.92(e)(4); For post-construction SEISs: 51.95(c)(2) Environmental Report: 52.17(a)(2), 52.47(b)(2), 52.80(b)	External: None NRC: NUREG-1555 Supplement 1; RG 4.2 Supplement 1; NUREG/BR-0058; NUREG/BR-0184; NUREG-1530	Assumptions: license life, waste confidence, purpose and need, fuel cycle generic, design specific information (PRA & SAMDAs), emergency response modeled, meteorology data for the airborne plume modeled, other pathways release data (generic or site-specific, economic data (generic or site-specific))
New Reactors	Same	External: None NRC: NUREG-1555; RG 4.2 (in revision), NUREG/BR-0058; NUREG/BR-0184; NUREG-1530	Same as operating reactors. Note: A cost-benefit analysis is required for radwaste systems in the safety review of a new reactor application by Section II.D of 10 CFR Part 50 Appendix I
Materials	Same	External: None NRC: NUREG-1748; NUREG/BR-0058; NUREG/BR-0184; NUREG-1530	No severe accident analyses or use of PRAs. No SAMDAs.
Fuel Cycle Facilities	Same	External: None NRC: NUREG-1748; NUREG/BR-0058; NUREG/BR-0184; NUREG-1530	No severe accident analyses or use of PRAs. No SAMDAs.
Emergency Preparedness	Same	External: NRC:	No severe accident analyses or use of PRAs. No SAMDAs.

Analysis Methodology

- **Goals for the analysis**
 - Identify similarities and differences in cost-benefit regulations, guidance, and practices across the agency
 - Discuss potential implications of similarities and differences
- **Analysis tools**
 - Staff subject matter expert questionnaires
 - Internal workshop series
 - Literature review
 - Limited review of other federal and internal agencies practices
- **Terminology**
 - Gaps: Constraints imposed by regulations
 - Differences: variances in approach, guidance, practice
 - Enhancements: potential improvements

Key Results

1. **Current cost-benefit regulatory framework is sound**

- No NRC regulation impedes the staff from performing cost-benefit analyses
- NEPA cost-benefit analysis requirements are in 10 CFR 51
- Backfitting requirements are in 10 CFR 50, 70, 72, 76 (analogous requirements for issue finality are in 10 CFR 52)
- No NRC regulations require performing regulatory analyses
- Sufficient flexibility to allow for updating and harmonizing NRC cost-benefit guidance (NUREG/BR-0058, NUREG/BR-0184)

2. **There are differences in cost-benefit practices within the NRC**

- Substantial Safety or Security Enhancement Screen
- Time Horizon
- Sensitivity Analyses
- Quantification of Benefits

Substantial Safety or Security Enhancement Screen

- Staff identified a difference between power reactor safety and all other NRC business lines and programs subject to a backfit requirement
- For power reactor safety regulatory actions, analyses involve the use of the Safety Goal Policy
- Safety Goals do not apply to other regulated activities
- Staff is considering whether cost-benefit guidance should be updated to more accurately reflect the current practices of all business lines and programs

Time Horizon

- The staff identified a difference among business lines in the approach to analysis timeframe of regulatory analyses
- The Office of Management and Budget (OMB) Circular A-4 states that the time frame should cover a period long enough to encompass all the important benefits and costs
- For nuclear power plants, the analyst assumes one license renewal term and takes the average of the remaining life of the class of plants
- For materials licensees, the analyst evaluates based on the license term

Sensitivity Analyses

- The staff identified a difference in the application of sensitivity analyses across business lines for regulatory analyses
- Sensitivity analyses can examine the extent to which the uncertainty of each element affects the cost to achieve the regulatory objective being examined
- The NRC can benefit from a harmonized approach in the use of sensitivity analyses across business lines

Quantification of Benefits

- Staff identified a difference among business lines regarding the extent to which benefits are quantified in regulatory analyses
- Modeling tools and techniques for quantifying benefits used for power reactor safety regulations are typically not available for other business lines and programs
- Staff is currently seeking Commission approval for updating guidance as stated in SECY-14-0087, “Qualitative Consideration of Factors in the Development of Regulatory Analyses and Backfit Analyses”

Enhancements

- During the analysis, staff identified enhancements in guidance and practice that may need further consideration
 - Treatment of Uncertainty
 - Use of PRA and Other Studies in Regulatory Analyses
 - Distributive Impacts and Equity
 - Offsite Properties with Iconic Value
 - Impact on Critical Infrastructures
- In general, the staff recognizes the need to improve the accuracy of the agency's quantitative estimates

Treatment of Uncertainty

- A discussion of uncertainty has not always been included in NRC regulatory analyses
- Uncertainty is an estimating best practice, which is addressed in many guides and references
- A discussion of uncertainty informs the decisionmaking process
- OMB requires a formal quantitative analysis of uncertainties for rules with annual economic effects of \$1 billion or more

Use of PRA and Other Studies in Regulatory Analyses

- PRA and other related severe accident studies may improve the fidelity of regulatory analyses
- Resource limitations may necessitate the use of limited scope or historical PRA studies
- The analyst must be cognizant of underlying assumptions
 - Past PRA studies referenced in regulatory analysis guidance for NPPs are typically partial-scope PRAs
- Examples of analysis choices include time truncation and distance truncation

Time Truncation

- The staff identified a difference among modeling assumptions for severe reactor accident analysis
- Guidance does not currently specify a truncation time
- The state of practice has varied over the years, from 24-72 hours

Distance Truncation

- NRC regulatory analyses have historically considered health and economic consequences within 50 miles of a facility
 - Consistent with NUREG/BR-0058
- OMB Circular A-4 states that the “analysis should focus on benefits and costs that accrue to citizens and residents of the United States”
- Analyses of offsite consequences of beyond-design basis events have shown that the consequences of severe accidents involving very large releases could extend beyond 50 miles under certain conditions

Distributive Impacts and Equity

- Executive Order 12866 - the consideration of “distributive impacts” and “equity”
 - As an independent regulatory agency, NRC is not required to comply with EO 12866 and there is no statutory requirement to consider “distributive impacts” or “equity”
- OMB guidance states:
 - The term "distributional effects" refers to the description of the net effects of a regulatory [action] across the population and economy, divided up in various ways (e.g., income groups, race, sex, industrial sector).
- Distributive impacts and equity may overlap with environmental justice concerns
- Other federal agencies, including the EPA, have incorporated such considerations in their guidance

Offsite Properties with Iconic Value

- Currently no NRC guidance on this topic
- NUREG/BR-0184 attribute 18, “other considerations”
- An example would be impacts of the regulatory action on offsite properties with iconic value or a unique value to a particular community or group
- This potential enhancement is driven in part by a Native American tribal concern raised during NRC public outreach

Impact on Critical Infrastructures

- The U.S. Department of Homeland Security defines critical infrastructure as “the assets, systems, and networks, whether physical or virtual, so vital to the United States that their incapacitation or destruction would have a debilitating effect on security, national economic security, national public health and safety, or any combination thereof.”
- The NRC does not consider effects to critical infrastructure in cost-benefit analyses
- If considered, impacts to critical infrastructure could affect the outcome of a cost-benefit analysis

Path Forward

- The staff will update cost-benefit guidance to harmonize across business lines and programs
- Staff recognizes cost-benefit practices may differ among business lines and programs
- The staff will document bases for dispositioning any differences in practice
- Staff will continue to engage the ACRS during the process to update cost-benefit guidance
- The staff will seek Commission guidance regarding potential policy issues

References

- SECYs available at <http://www.nrc.gov/reading-rm/doc-collections/commission/> or in ADAMS
- SECY-12-0110 available at ML12173A478
- SRM-SECY-12-0110 available at ML13079A055
- NUREG/BR-0184 available at ML050190193
- NUREG/BR-0058 available at ML042820192
- NUREG-1409 available at ML032230247
- NUREG-1530 available at ML063470485

References (cont'd)

- EO 12866, 58 FR 51735 (October 4, 1993) and http://www.whitehouse.gov/omb/inforeg_riaguide/
- OMB Circular A-4, available at ML11231A834
- OMB, Economic Analysis of Federal Regulations Under Executive Order 12866, January 11, 1996 accessible at http://www.whitehouse.gov/omb/inforeg_riaguide

Acronyms

- ACRS Advisory Committee on Reactor Safeguards
- SECY NRC commission paper
- CFR Code of *Federal Regulations*
- DEIS Draft Environmental Impact Statement
- EO Executive order
- EPA Environmental Protection Agency
- FSEIS Final Supplemental Environmental Impact Statement
- NEPA National Environmental Policy Act
- NPP Nuclear power plant
- NRC Nuclear Regulatory Commission
- NUREG NRC staff report
- OMB Office of Management and Budget
- PRA Probabilistic risk assessment
- SEIS Supplemental Environmental Impact Statement
- SAMDA Severe Accident Mitigation Design Alternative



Advisory Committee on Reactor Safeguards

Open Phase Initiative Update

December 4th, 2014

Scot Greenlee – Executive Sponsor
Exelon Senior Vice President
Engineering & Technical Services

Agenda

- Byron Station Open Phase Events
- Industry Open Phase Condition Initiative
- Industry Actions

Byron Station Open Phase Events

Byron Event Description

Unit 2

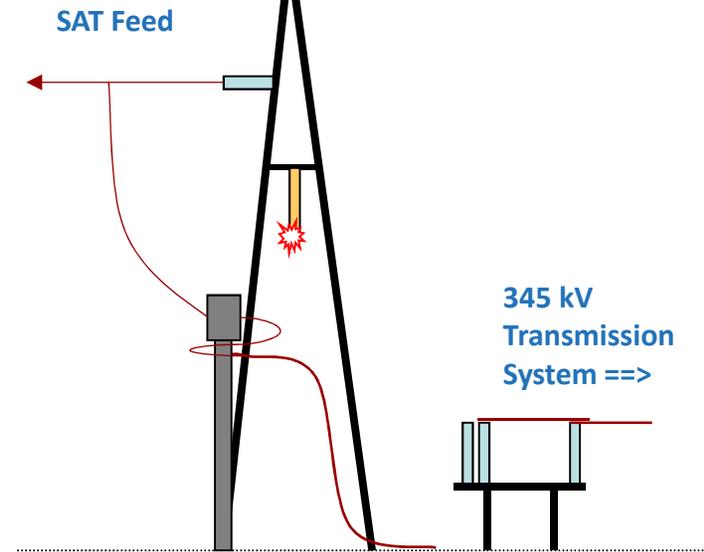
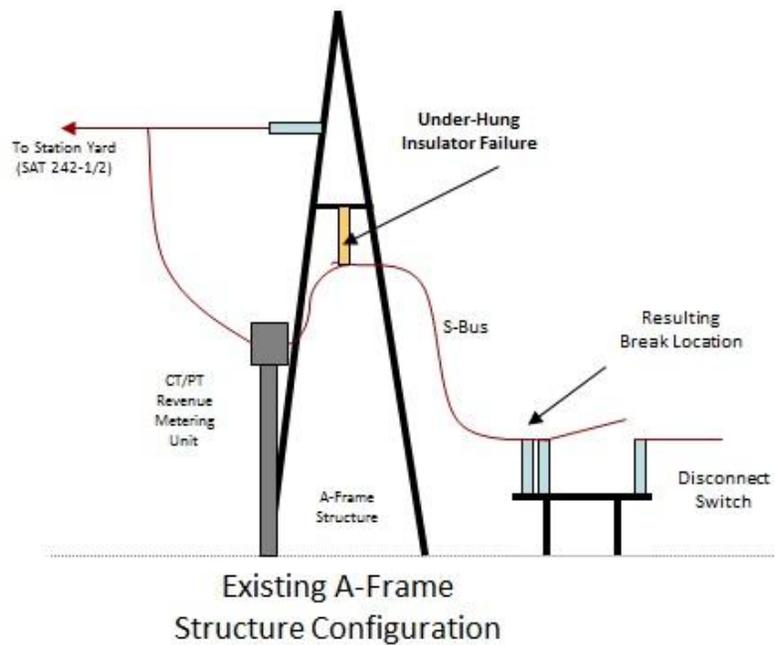
- January 30, 2012
- Mechanical failure of 345 kV under-hung porcelain insulator on system aux transformer (SAT) A-frame structure creating a line to ground fault on the SAT side
- Open phase condition - protective relaying not designed to detect / isolate
- Result was a reactor trip on reactor coolant pump (RCP) undervoltage
- Loss of off-site power (LOOP) resulted
- Unusual Event declared
- Loss of all operating motor driven safety loads
- Loss of RCP seal cooling for eight minutes
- Manual operator action restored safety systems

Unit 1

- February 28, 2012
- Mechanical failure of under-hung porcelain insulator on SAT A-frame structure creating a line to ground fault on the system side
- Protective relaying isolated the faulted component and transferred power to the alternate supply
- Systems worked as designed and Byron station generating units remained on-line
- LOOP resulted
- Unusual Event declared

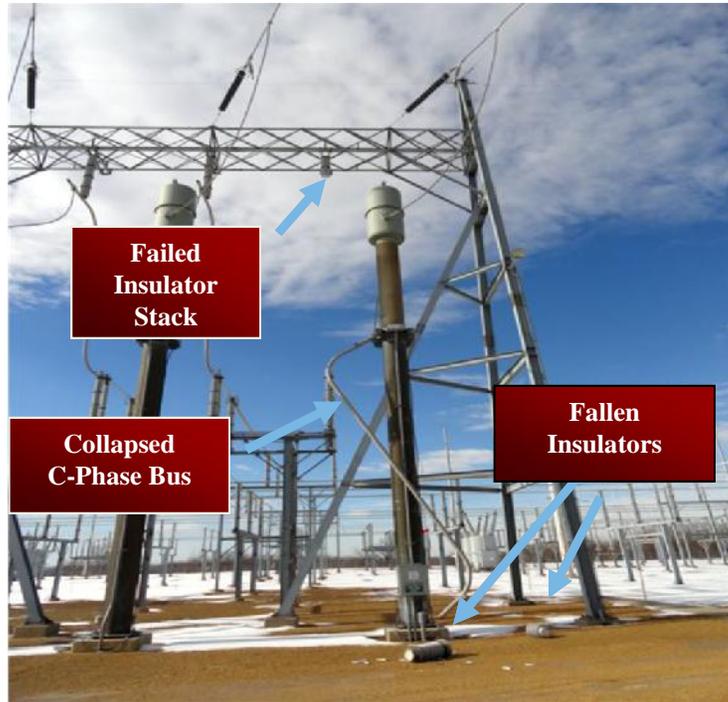
- **Ohio Brass porcelain insulator manufacturing defect**
- **Design vulnerability - failure to automatically detect / isolate an open phase condition**

Byron Unit 2 Event Description (January 2012)



Byron Event Description

Unit 2



Unit 2 Failed Insulator



Unit 1 Failed Insulator



Insulator failure due to poor quality porcelain

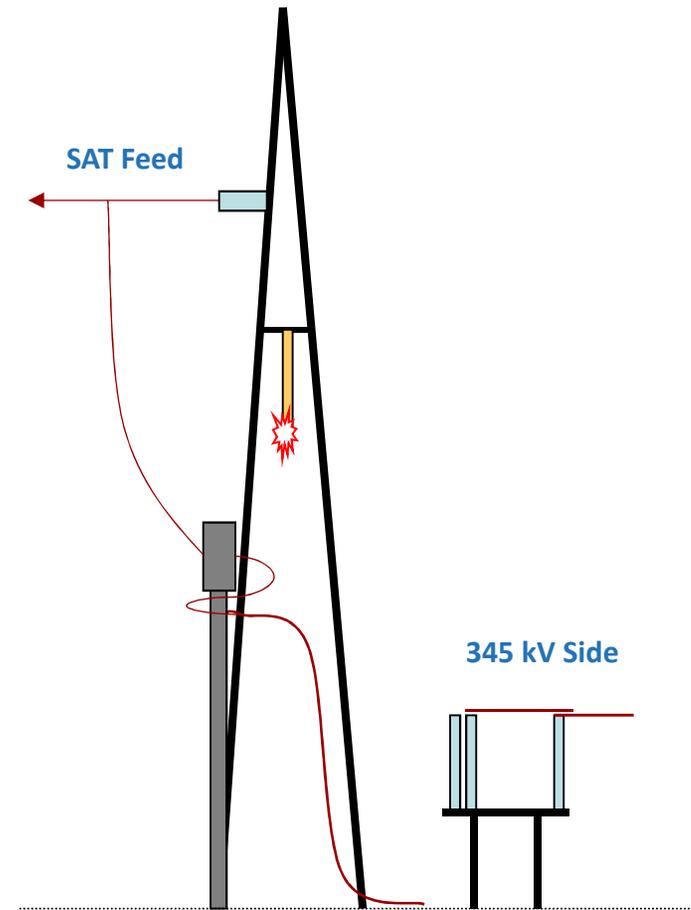
Impact of Open Phase

Grounded – Byron Unit 2

- Significant voltage imbalance due to ground on transformer side
- 4.16 kV safety bus per unit (pu) voltage
 - V_{ab} 1.0142 pu
 - V_{bc} 0.5912 pu
 - V_{ca} 0.5870 pu

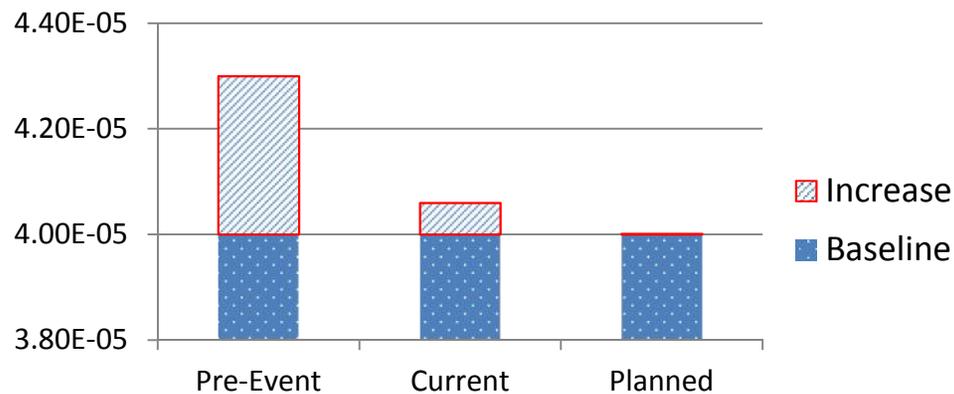
Ungrounded – Byron Unit 2

- 4.16 kV safety bus per unit voltage under light loading
 - V_{ab} 1.0408 pu
 - V_{bc} 1.0407 pu
 - V_{ca} 1.0180 pu
- Cannot detect by voltage magnitude



Byron Station Risk Profile Example

Core Damage Frequency (CDF) Impact as a Function of Plant Configuration



Condition	Failures Modeled	Approximate Increase in CDF
Pre-Event	Operator action	3E-6 or 7.5%
Current Configuration	Alarm or operator action	6E-7 or 1.5%
Planned Configuration	Automatic actuation and operator backup	1E-8 or 0.03%



Industry Open Phase Condition Initiative

Open Phase Condition Initiative - Goal

An open phase condition (OPC) will not prevent functioning of important-to-safety structures, systems and components. An open phase condition is defined as an open phase, with or without a ground, which is located on the high voltage side of a transformer connecting a General Design Criterion (GDC) 17 off-site power circuit to the transmission system.

- The OPC initiative only applies to “active” safety features plants
- The initiative includes requirements to address two open phases (based on the Forsmark event)
- The initiative allows use of non-safety related circuits

OPC Initiative Key Milestones

Operating Plants

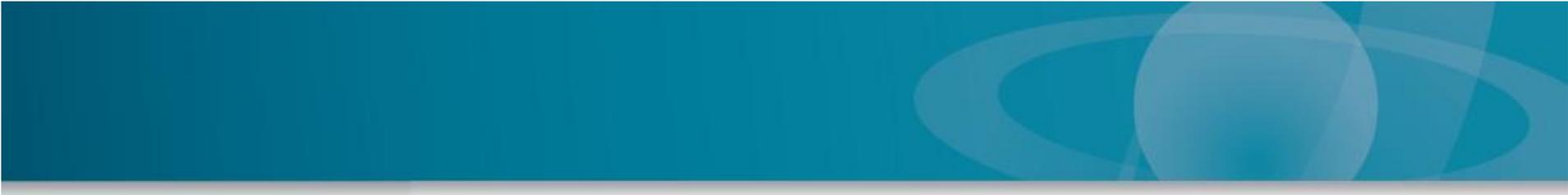
1. December 31, 2014 - Demonstration of compliance with the open phase condition criteria through analysis or identify appropriate actions required to demonstrate compliance.
2. December 31, 2016 - Implementation of design changes, if necessary, to comply with the open phase condition criteria. The “active” actuation features of new technology designs may be installed in a monitoring mode, with adequate justification, to demonstrate reliability.
3. December 31, 2017 - If a monitoring period was deemed necessary, completion of any design adjustments identified during the monitoring period and enabling all “active” actuation features needed to demonstrate compliance with the open phase condition criteria.
4. Updated Final Safety Analysis Report (UFSAR) Updates - Completion in conjunction with the timelines noted above, but no later than December 31, 2017.

OPC Initiative Milestones

Operating Plants

5. Technical Specifications Updates - Submitted by December 31, 2017, if required.
 - a) Most solutions will require a Technical Specifications Bases change to describe the requirement for a functional Open Phase detect / isolate system.
 - b) If a Technical Specifications Task Force (TSTF) traveler is available, submittal to adopt the TSTF traveler is planned to be within six months of the issuance of the notice of availability of an NRC-approved TSTF traveler.

This schedule assumes license amendments are not required to install any design changes.



Industry Actions

Industry Actions

- February 2012 - Posted OE 35219, documenting the Byron event on the INPO website
- February 2012 - Industry briefing via INPO webcast to alert the industry to the vulnerability
- February 2012 - INPO issued Level 2 IER; industry responses by August 2012
- On-going - NEI working group weekly meetings to evaluate vulnerability solutions
- January 2013 - Industry standard ETAP software upgraded to enable single and double open phase conditions
- October 2013 - Industry issues Chief Nuclear Officer approved OPC Initiative
- December 2013 - NEI issued OPC Industry Guidance document
- January 2014 - WANO workshop on open phase for international plans
- On-going - Many industry workshops and NRC public meetings have taken place over the past two years; others are projected
- December 2014 - WANO expected to issue SOER that will drive worldwide actions similar to what is being done in the U.S.

Industry Actions

The many designs and hybrids presented at the industry workshop will address the vulnerability discovered through operating experience and ensure that an OPC on the transmission system feeds to a station do not result in the coincident failure of the onsite electric power system or prevent it from performing its safety function. Five different design solutions were presented along with blended designs:

- Transformer High-side Detection with Magnetic Sensors (PCS2000)
- Transformer High-side Detection with Programmable Relay (Exelon)
- Transformer High-side Detection with Optical Sensors (Alstom)
- Class 1E Bus ABB 60Q Phase Unbalance Relay (TVA)
- Transformer Neutral Injection Detection (EPRI, PssTech)
- Blended / Hybrid Design using two solutions

Open Phase Initiative Update

Questions ??



EPRI Open-Phase Detection (OPD)

Bob Arritt / Wayne Johnson

Project Manager - Power Systems Studies / NMAC Sr.
Project Manager

December 4, 2014

EPRI Research – Initial Projects

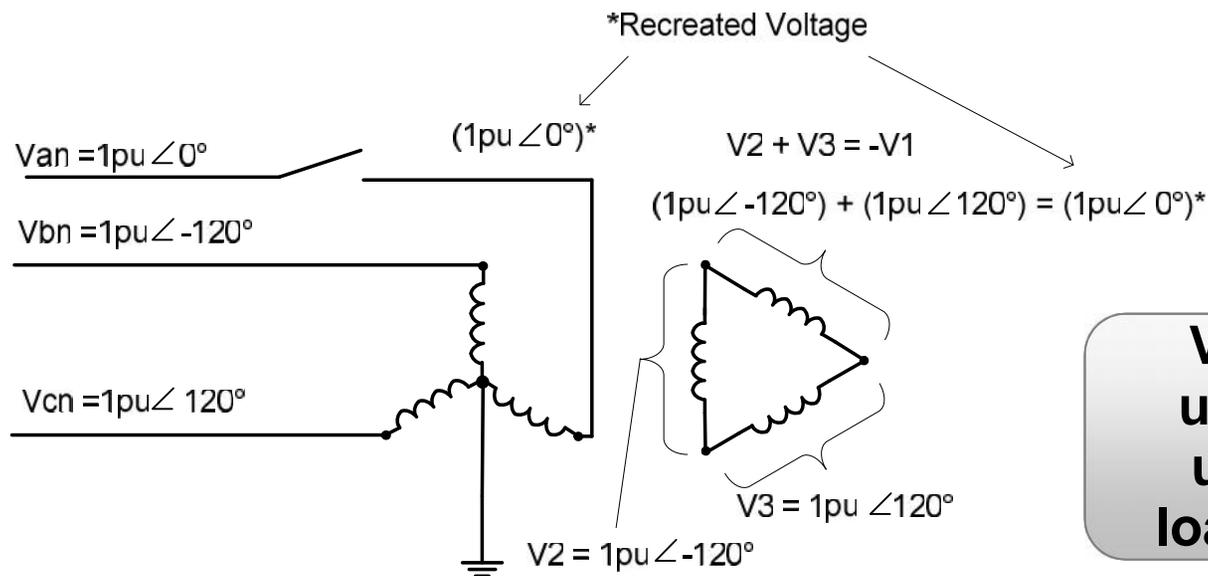
- Address many of the technical issues associated with detecting an open-phase condition of a station auxiliary transformer (SAT)
 - Identified difficulty in detecting event during a low or no-load level state.
 - Low and no-load condition is the prevalent condition for most SATs.

Released 4 publicly available documents on the open-phase issue since the Byron event.



Problem Description

- Transformers with wye connected primaries that have a zero-sequence impedance path i.e. secondary/tertiary delta or 3-legged core



Voltage remains undistorted even under moderate loading conditions

Problem Transformers (No Load)

- Phase A opened on high side

Identified which transformer types exhibited this issue

	Primary Voltage (pu)			Secondary Voltage (pu)		
	Phase A	Phase B	Phase C	Phase A	Phase B	Phase C
Wye-Wye (Shell Core)	0	1.0	1.0	0	1.0	1.0
Wye-Wye (3-Single Phase Cores)	0	1.0	1.0	0	1.0	1.0
Wye-Wye* (5-Legged Core)	0.54	1.0	1.0	0.54	1.0	1.0
Delta-Wye (Any Core Type)	0.5	1.0	1.0	0.5	1.0	0.5
Wye-Delta (Any Core Type)	1.0	1.0	1.0	1.0	1.0	1.0
Wye-Wye (3-Legged Core)	1.0	1.0	1.0	1.0	1.0	1.0
Wye-Delta-Wye (Shell Core with Buried Delta)	1.0	1.0	1.0	1.0	1.0	1.0

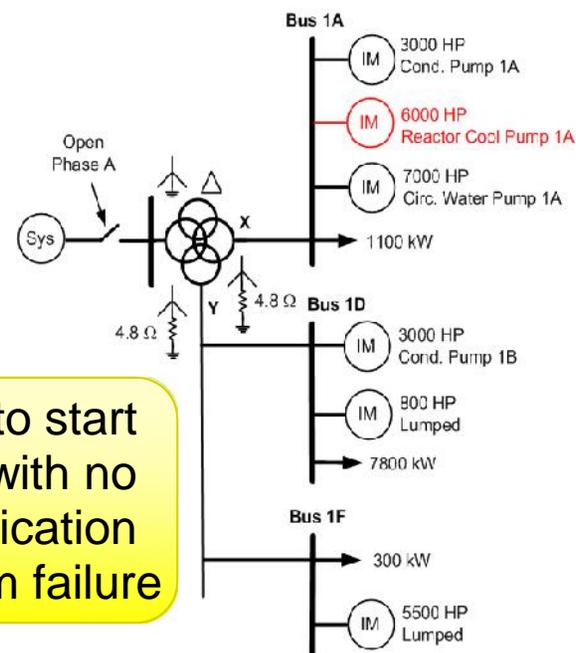
Industry Survey of Detection Methods

- Voltage Imbalance
 - Works for some transformer types for all loading conditions.
 - For susceptible transformers:
 - Cannot detect whether or not the electrical system provides sufficient capacity.
- Sequence-Current Detection
 - Acceptable for loaded conditions; however, would not work at moderate, low, or no-load.
- Phase-Current Detection
 - Very complex, costly, and unreliable design due to measuring low level currents in presence of backfeed and system noise.
- Power Line Carrier Capacitive-Coupled Method
 - Cannot obtain 100% coverage
 - Installation cost was a concern

**Researched multiple
solution approaches.**

Industry Survey of Detection Methods, cont.

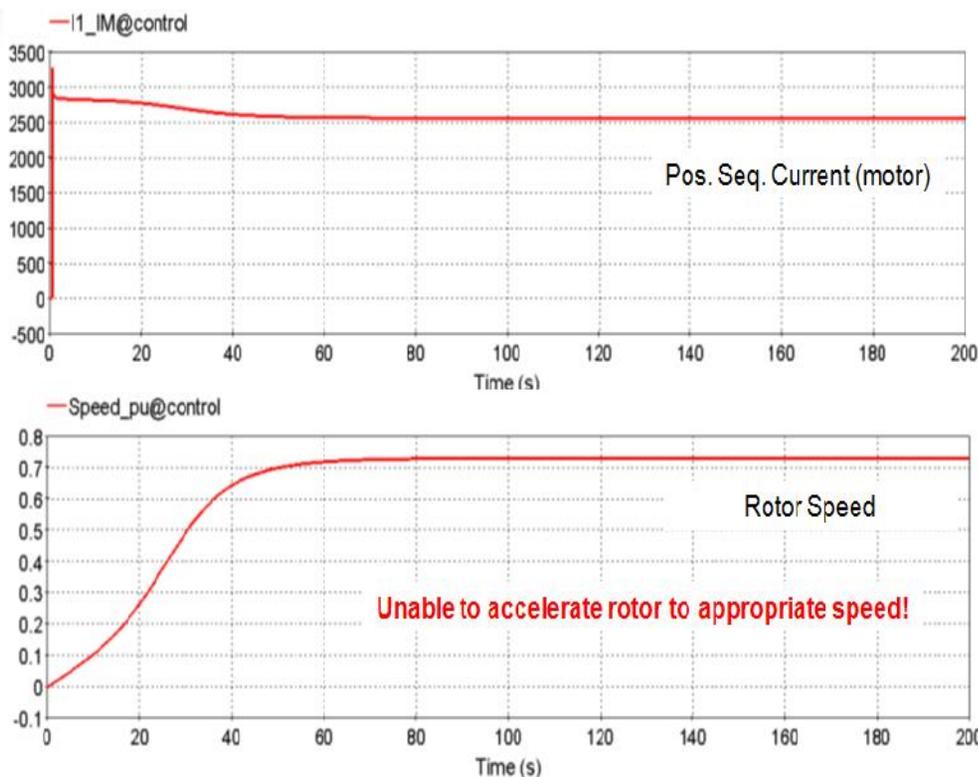
- Voltage imbalance relaying
 - No indication of system capacity.



Unable to start motors with no prior indication of system failure

Negative Sequence Voltage on X & Y Bus = $V2/V1 = 2\%$

	I0 (%I1)	I2 (%I1)
X	0.0	2%
Y	0.0	7%

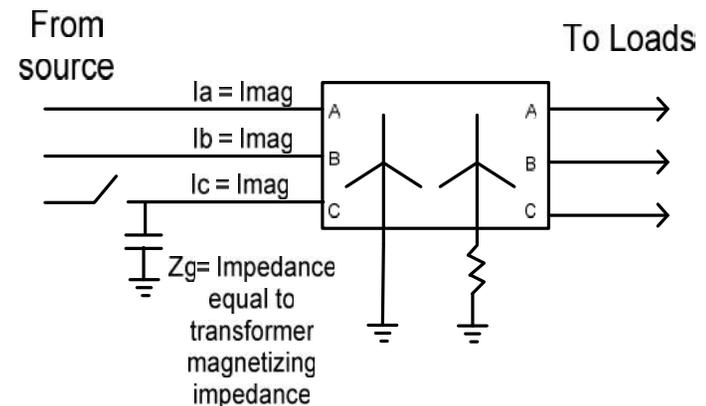
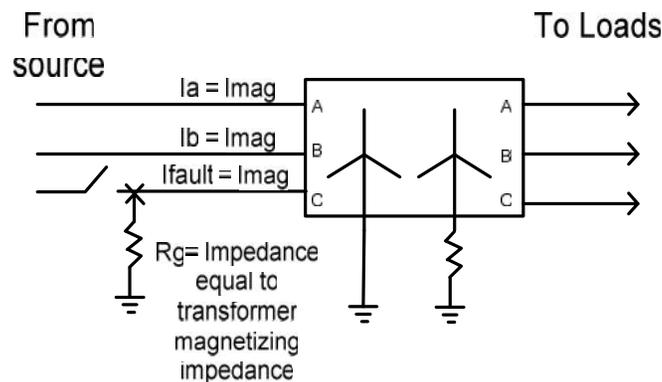


Industry Survey of Detection Methods, cont.

- Phase-Current Detection

Very complex and unreliable design

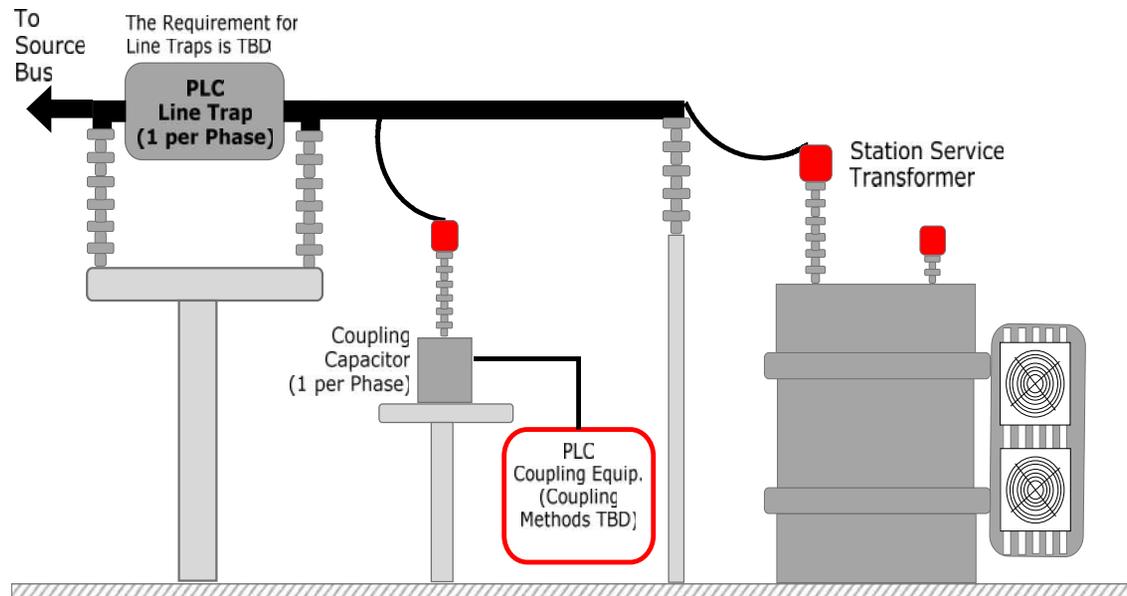
- Custom high voltage CTs would have to be designed.
- In the presence of an open phase, this detection method becomes very difficult due to back-fed current.
- Directional current sensing at these low magnitudes would be unreliable.



Industry Survey of Detection Methods, cont.

- Power Line Carrier Capacitive-Coupled Method
 - This method was dismissed because the technique left gaps where the conductor was not protected.

Cannot achieve 100% coverage



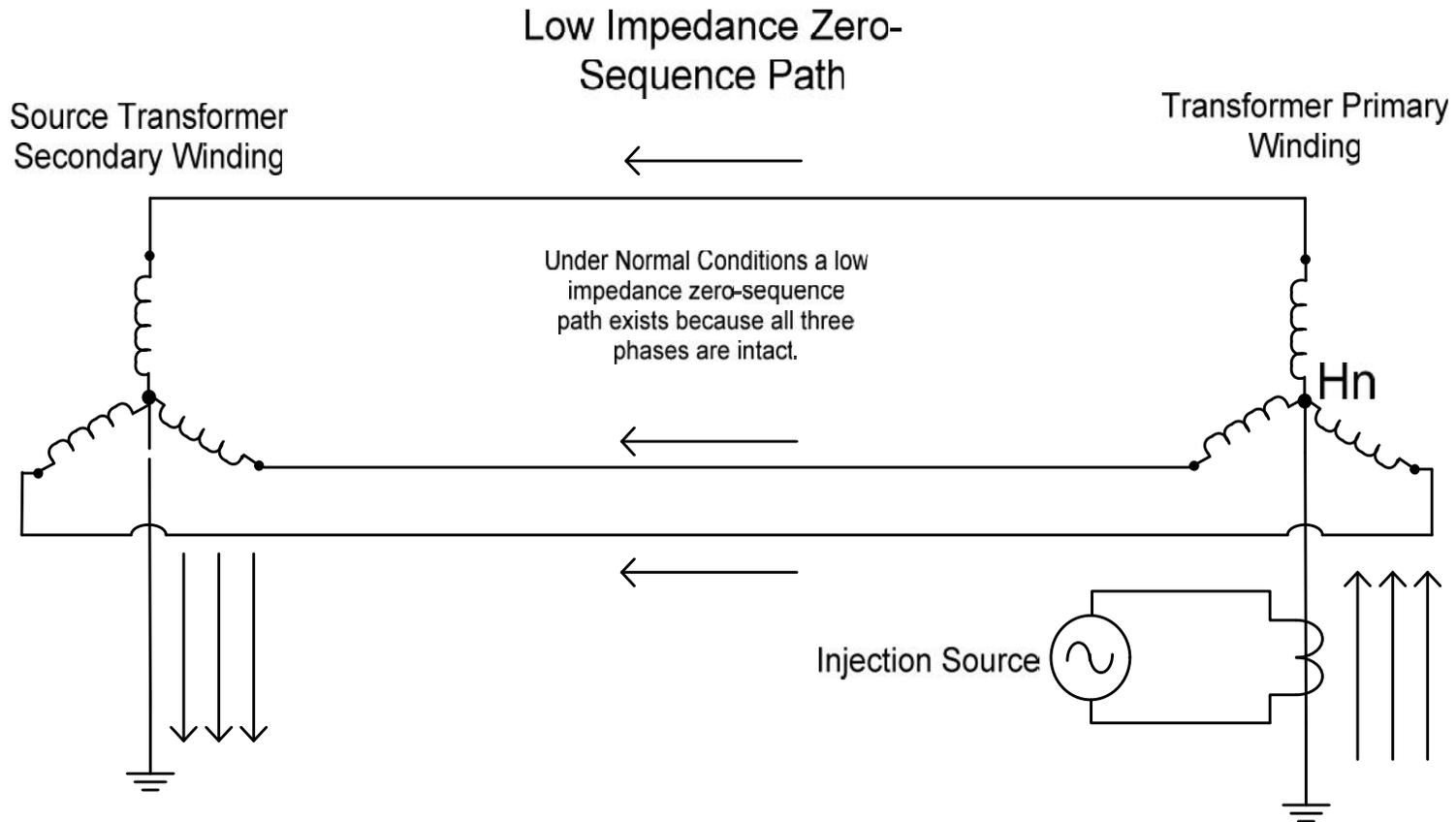
EPRI Open Phase Detection

- Transformer Neutral Detection/Injection
 - Takes advantage of the known characteristics of the transformer.
 - To exploit these results in developing an open-phase detection scheme, a transformer neutral current injection/detection method was developed.

- Proved theory with lab testing and extensive modeling in early 2013
- Provide Webcast in November 2013
- Field Tested in May 2014
- Released EPRI Technical Document in 2014 – 3002004432

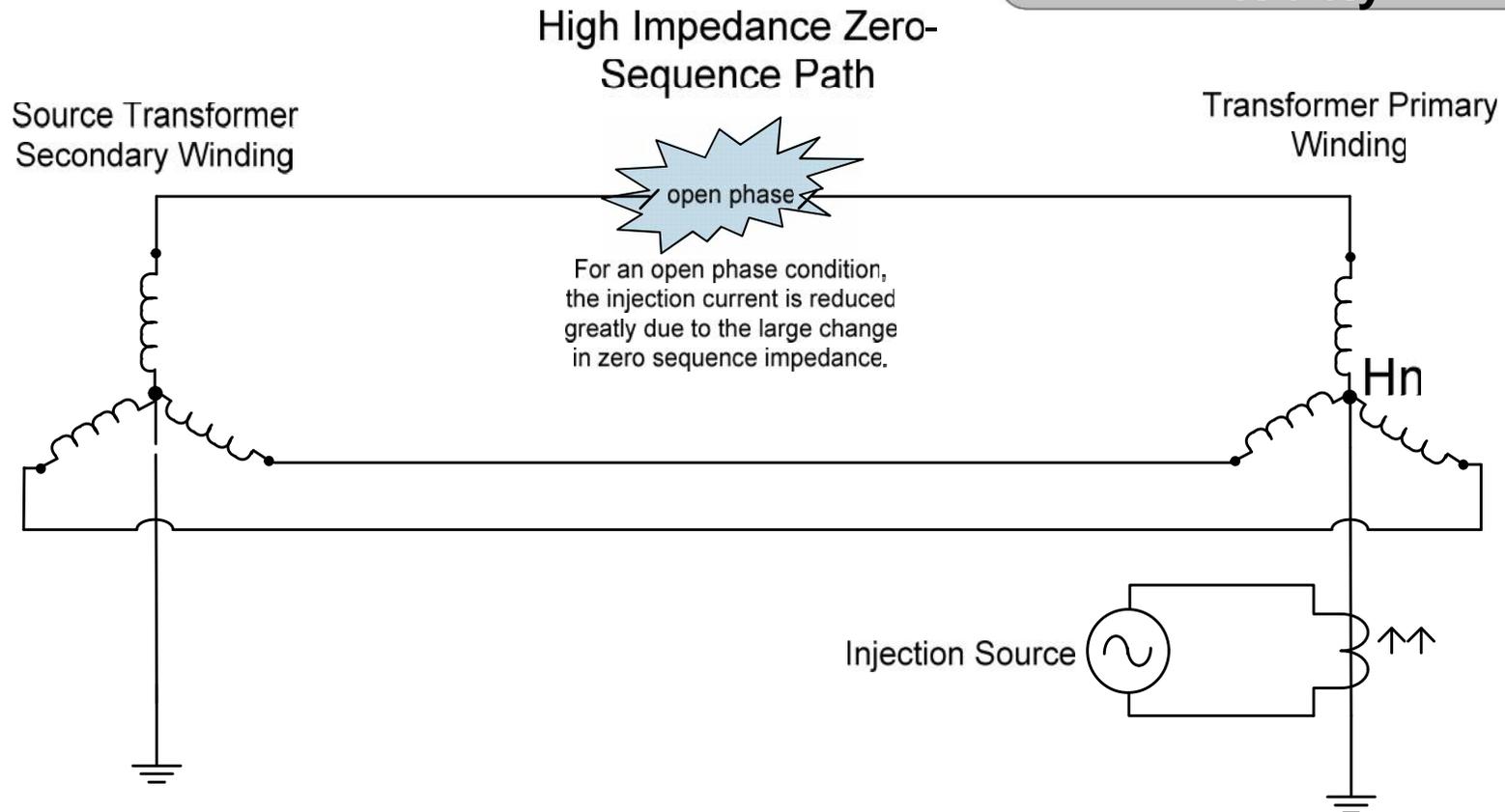
Transformer Neutral Injection

Immune to normal system imbalances



Transformer Neutral Injection

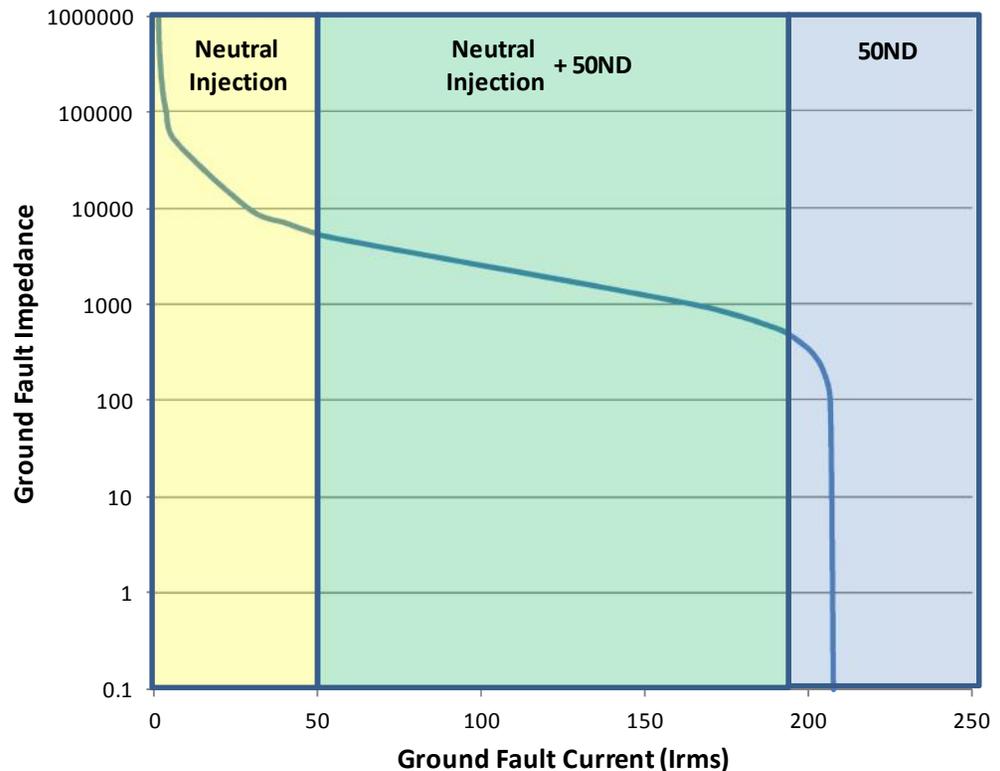
Detects an open phase condition reliably



Open Phase with Ground Fault

- Design to detect:
 - Any phase open
 - Any phase opened and solidly grounded or impedance grounded (any impedance)
 - Any two phases opened
 - Any two phases opened, one or both which are solidly grounded or impedance grounded (any impedance)

Ground Fault Current with Varying Ground Impedance

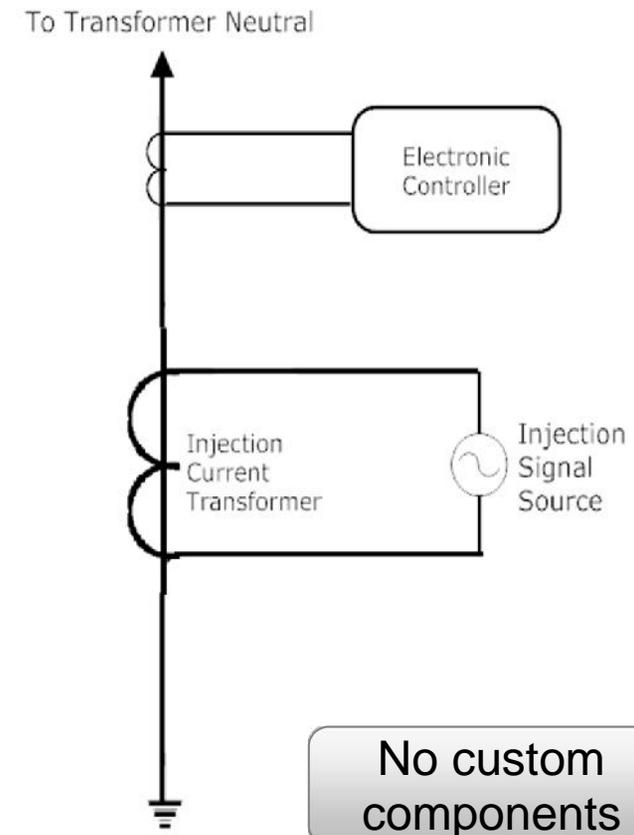


System designed to have no blind spots

Neutral Detection/Injection

- Combined the neutral detection along with neutral injection to provide a robust/secure detection system.
 - Benefits of active detection
 - Allows for a fail safe and redundant detection design.
 - Allows for a system test scheme to monitor all major system components.
 - Only requires monitoring of a change in signal level.
 - Active protection is the preferred method over passive only protection.
- Design meets all project constraints and goals.
- Uses all commercial-off-the-shelf components.
 - Reduces cost and lead times
 - Minimal maintenance
 - Easily replaced parts to reduce downtime

Drastically reduces modeling and analysis required



Open Phase Detection Implementation, cont.

- Installation utilizes neutral conductor only.
 - Requires minimal outage time and minimal maintenance
 - Designed for ease of installation
 - No seismic concerns for transformer's high voltage bushings
 - Much lower fault current level exposure compared to phase conductors
 - Less exposure to lightning
 - No impact on the BIL, creepage, and clearance of the transformer's high voltage bushings

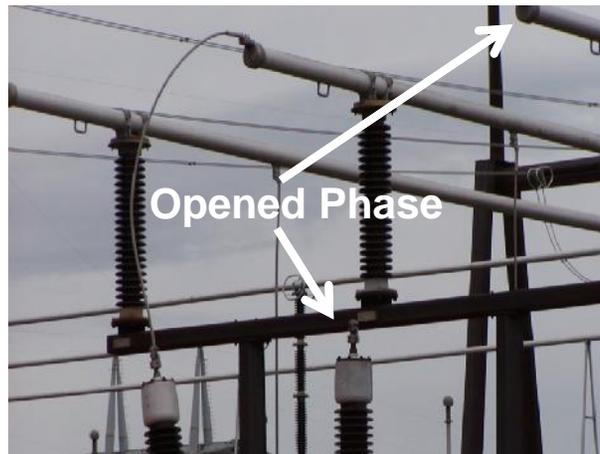
Field Demonstration

- Conducted at Bellefonte Nuclear Plant in May 2014
- First ever open phase field test
 - TVA opened a 161 kV conductor to a 36 MVA Station Auxiliary Transformer (SAT).
 - Various plant buses were loaded during the test
- Test was witnessed by many
 - TVA Personnel
 - NRC Staff
 - INPO
 - Several AE firms



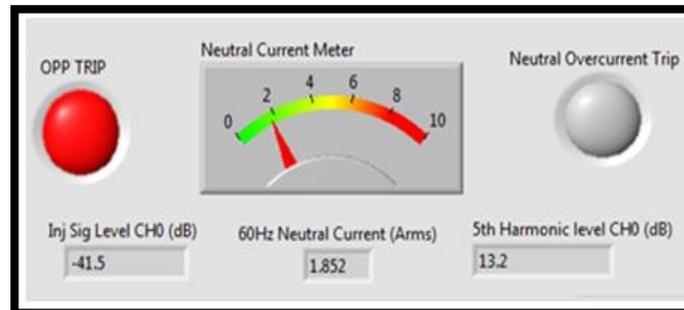
Field Demonstration – Successful Detection

- Successfully detected an open-phase event under no-load and loaded conditions.



Only information had before test was transformer nameplate data

Performed as predicted.



Completed Steps

- Construct prototype for field testing ✓
- Laboratory demonstration meeting ✓
- Choose a representative field test site ✓
- Complete field testing ✓
- Complete commercial licensing ✓

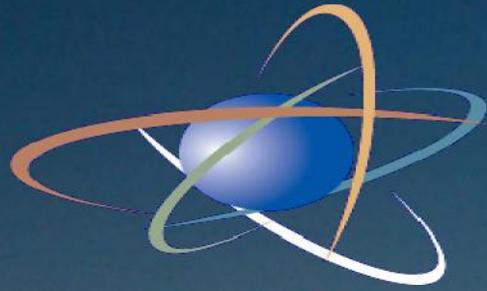


Questions





Together...Shaping the Future of Electricity



U.S.NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

OPEN PHASE CONDITIONS IN ELECTRIC POWER SYSTEM – STAFF POSITIONS AND PATHFORWARD

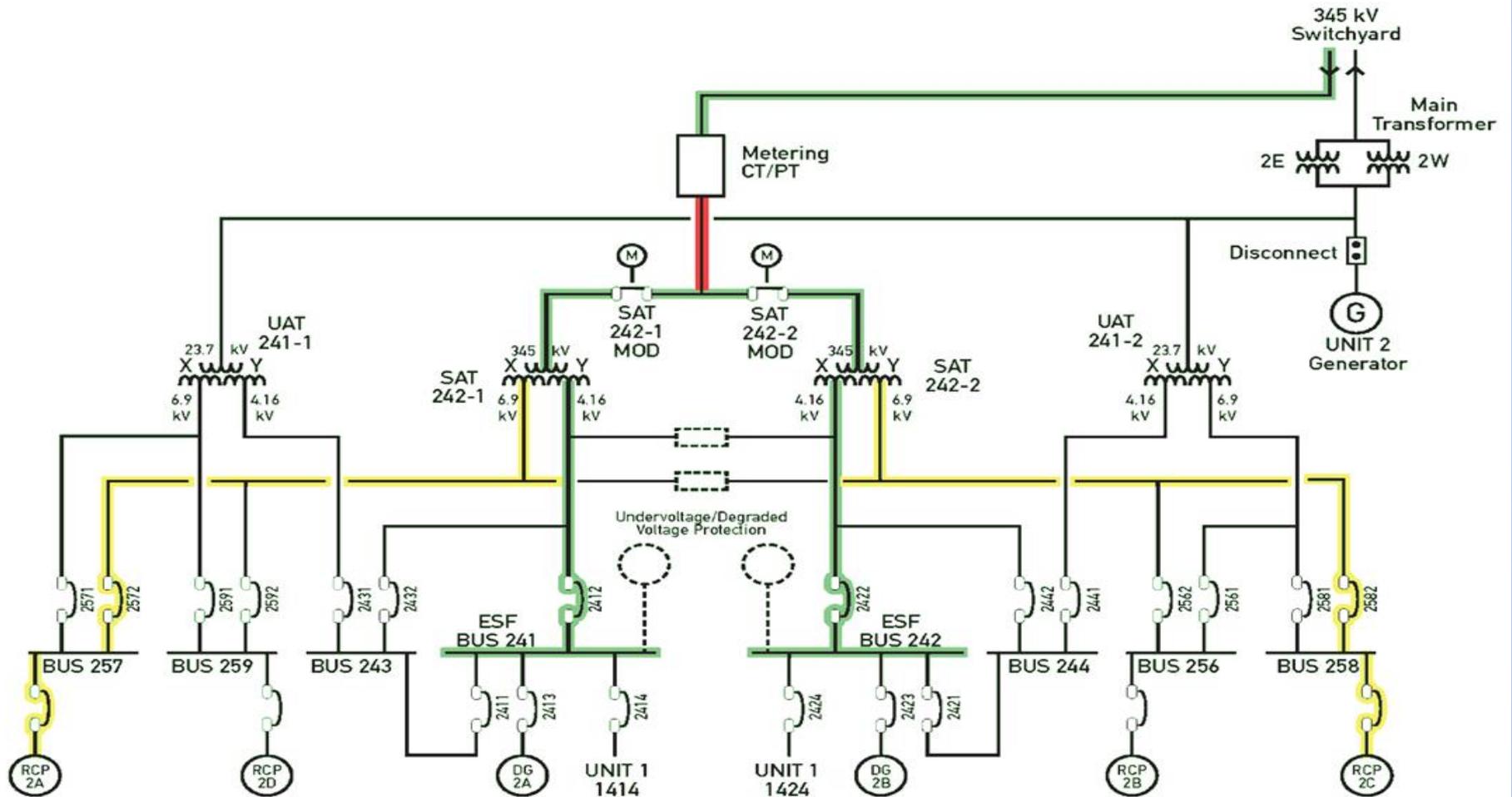
G. Singh Matharu
Electrical Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation
December 4, 2014

AGENDA

- **Open Phase Condition (OPC)**
- **Operating Experience**
- **Connections**
- **Regulatory Requirements**
- **NRC Actions**
- **Staff Position**
- **Draft Branch Technical Position (BTP 8-9)**
- **Path Forward**

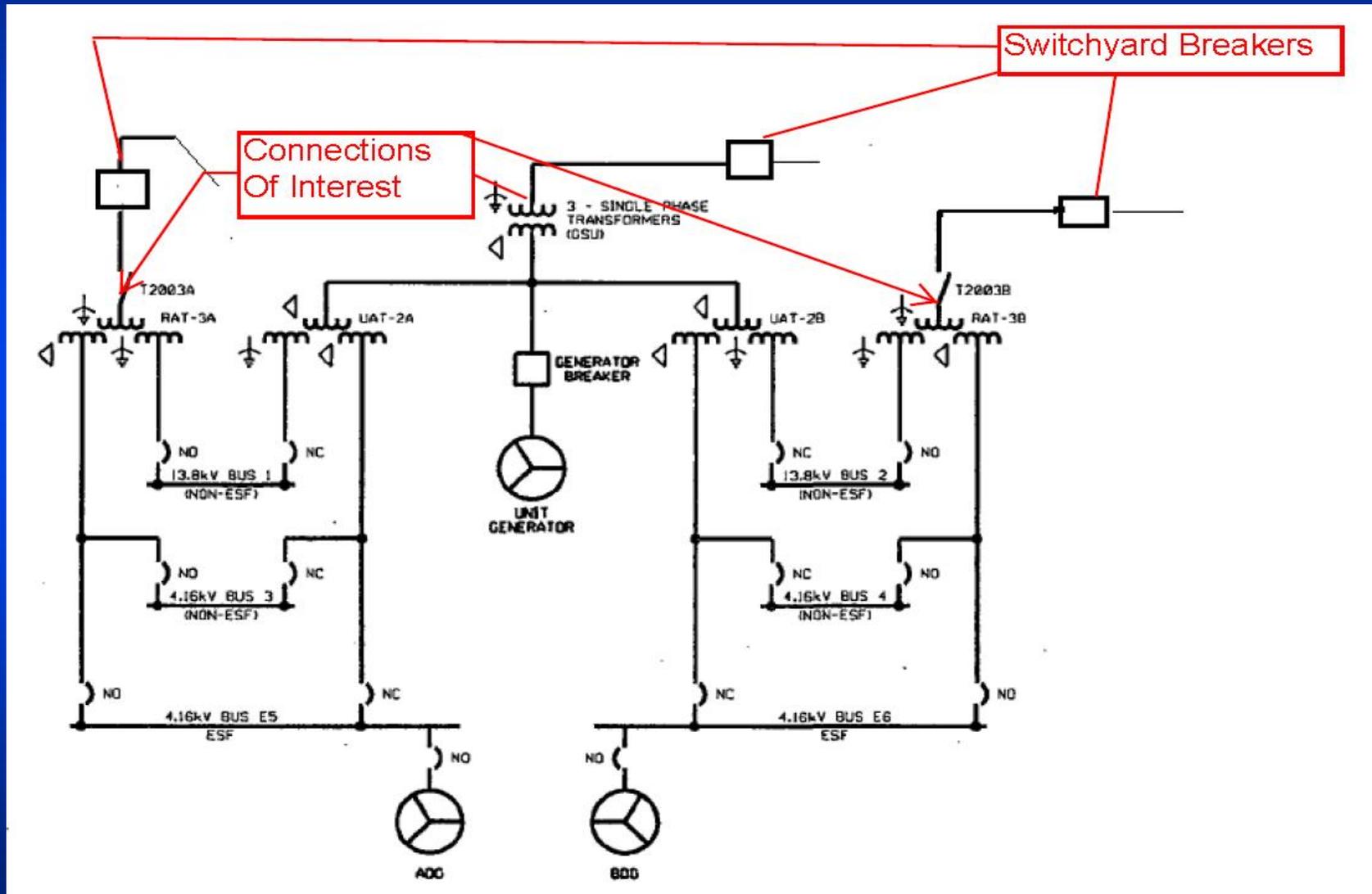
- **Loss of one of the three phases** of the offsite power circuit on the high voltage side of a transformer connecting an offsite power circuit to the transmission system coincident with or without a high-impedance ground fault; or
- **Loss of two of the three phases** of the offsite power circuit on the high voltage side of a transformer connecting an offsite power circuit to the transmission system
- **Creates Unbalance in AC power system** (sequence voltages and currents)
 - Transformer winding configuration (Wye-Wye-Wye, Delta-Wye-Wye, Wye-Delta-Delta, Wye-Wye-Buried Tertiary Delta, Delta-Wye, Wye-Delta, Wye-Wye-Delta, and Wye-Wye with Delta stabilizing winding)
 - Grounding (solid or resistance ground)
 - Type of transformer core (Shell or Core)
 - Loading condition and operating configuration (standby/no load/lightly loaded)
 - Phase angle shift
 - Reduced starting torque for motors
 - Overheating of motors/overload/loss of life/damages to rotating machines
 - Protective device actuation and lock out

OPC (Cont.)



BYRON UNIT 2
 Electrical Distribution

OPC (Cont.)



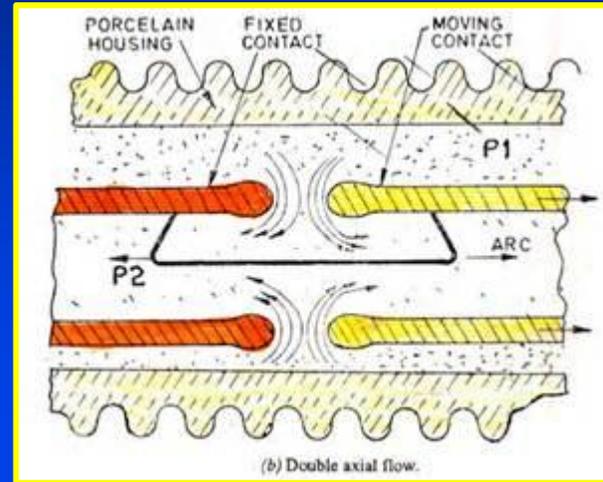
- **Eleven operating events (2001-2014)**
 - Failure of insulators and switchyard connections
 - Malfunction of breakers

 - ❖ South Texas Project Unit 2, US – March 1, 2001
 - ❖ Koeberg, South Africa – November 11 2005
 - ❖ Fitzpatrick/Nine Mile, US – December 19, 2005
 - ❖ Vandellos, Spain – August 9, 2006
 - ❖ Dungeness A, UK – May 14, 2007
 - ❖ Beaver Valley Unit 1, US – November 1, 2007
 - ❖ Byron Unit 2 – January 30, 2012
 - ❖ Byron Unit 1 – February 28, 2012
 - ❖ Bruce Power Unit 1, Canada – December 22, 2012
 - ❖ Forsmark Unit 3, Sweden – May 30, 2013
 - ❖ Dungeness B, UK - April 2014

TYPES OF CONNECTIONS



CONNECTIONS OF INTEREST



REGULATORY REQUIREMENTS

- **General Design Criterion (GDC) 17**, “Electric Power Systems,” or the applicable principal design criteria in the updated final safety analysis report
- **Design criteria for protection systems** under 10 CFR 50.55a(h)(2) or 10 CFR 50.55a(h)(3)
- **Technical Specification (TS) requirements**
 - 10 CFR 50.36(c)(2) & (3)
 - TS LCO 3.8.1 – offsite and onsite power systems
 - TS Surveillance Requirements

NRC ACTIONS

- **NRC Special Inspection¹** at Byron Station
- **Information Notice 2012-03²**
- **Bulletin 2012-01: Design Vulnerability in Electric Power System³**
- **Summary Report** - documented NRC staff review of licensee responses and staff recommendations⁴
 - All operating nuclear power plants susceptible to OPC except Seabrook Station
 - SF6 insulated Switchyard
 - Single pole breaker failure protection scheme
 - Existing protection schemes based on voltage magnitude cannot identify OPC and take appropriate mitigation measures (i.e., automatically transfer power to ESF buses from an alternate offsite or onsite power source)
 - Staff recommended regulatory action to address the open phase issue
- **Supported development of industry initiative** to resolve OPC
- **Participating in an IAEA effort** to issue a Safety Report and also an IEEE working group to develop a Standard.

1. Agencywide Documents Access and Management System (ADAMS) Accession No. ML12087A213
2. ADAMS Accession No. ML120480170
3. ADAMS Accession No. ML12074A115
4. ADAMS Accession No. ML13052A711

STAFF POSITION

CURRENT Operating Reactors and ACTIVE New Reactor Designs

Must be able to:

- 1) Detect an open phase condition on the high side of the transformer connected to the offsite power system;
- 2) Alarm in the main control room; and
- 3) Automatically Actuate and Mitigate the event.

Bases: The isolation and actuation of onsite power system have to be automatic to satisfy the time criteria specified in Chapter 15 as required by GDC 17 to meet fuel design limits, core cooling and maintaining containment integrity

PASSIVE New Reactor Designs

Must be able to:

- 1) Detect an open phase condition on the high side of the transformer connected to the offsite power system; and
- 2) Alarm in the main control room.

Bases: Design Certification requires, in accordance with GDC 17, onsite AC power distribution system to be powered from either from one offsite circuit or onsite diesels for all modes of operation, including during a safe shutdown, and the offsite circuit serves a defense-in-depth function for maintaining reactor safety and charging safety-related batteries.

STAFF'S POSITION (Cont.)

Licensee solution (Class 1E or non-Class 1E) to address OPCs, should meet the following functional requirements:

- The design should address single failure criteria as outlined in the GDCs or the principal design criteria specified in the updated final safety analysis report for the specific nuclear power plant (i.e., for an OPC, a non-Class 1E circuit should not preclude the onsite electrical power system from being able to perform its safety function given a single failure in the onsite power system).
- The OPC should be automatically detected and alarmed in the main control room under all operating electrical system configurations and loading conditions
- If offsite power circuits are degraded due to OPC, the power source should be transferred automatically to the onsite power system within the time assumed in the accident analysis and without actuating any protective devices, given a concurrent design basis event.
- TS Surveillance Requirement and Limiting Condition of Operation for equipment used for mitigation of OPC should be consistent with the operability requirements specified in the existing plant TSs.

DRAFT BRANCH TECHNICAL POSITION (BTP 8-9)

- OPC is a credible event of safety significance and must be considered in the electric power system design for nuclear power plants
- The purpose of this BTP is to provide guidance to the staff in reviewing **future licensing actions** related to OPCs in electric power systems
- Single OPC with and without high impedance ground fault conditions and two OPCs (without ground fault) considered for resolution of OPC
- Design criteria specified for both operating and new reactor fleets

PUBLIC COMMENTS

- Many comments related to **clarifying the guidance in BTP**
- **Key comments:**
 - Protection system requirements (10 CFR 50.55a(h)(2) or (3)) are not required
 - Class 1E detection and actuation circuits are not appropriate
 - The treatment of OPC is beyond current plant design and licensing basis
 - 10 CFR 50.36, “Technical specifications,” is not applicable to OPC
 - Existing plants comply with GDC requirements
 - GDC 17 requirements do not apply to passive plant designs (AP1000)
 - Passive plant designs (AP1000) do not require AC power sources to mitigate design-basis events

PATH FORWARD

- Staff provided response to NEI regarding regulatory requirements for OPC Detection and Isolation (See ADAMS Accession Package No. ML14120A196)

To continue the NRC and industry's efforts to resolve and close-out Bulletin 2012-01, each licensee should do the following:

- Provide a Commitment letter to the NRC stating that the OPC issue will be resolved in accordance with the schedule established in the industry initiative and how the solution addresses GDC 17 or the principal design criteria specified in the updated final safety analysis report for their specific nuclear power plant
- Develop and maintain detailed a plant-specific analysis and documentation which established the resolution of the OPC design vulnerability, including failure mode analysis that is available for NRC staff's audits or inspections
- Provide a close-out letter to the NRC when full compliance is achieved

QUESTIONS ?