



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

May 9, 2013

MEMORANDUM TO: ACRS Members

FROM: Antonio Dias, Technical Advisor **/RA/**
Office of the Advisory Committee on Reactor Safeguards

SUBJECT: CERTIFICATION OF THE MINUTES OF THE ADVISORY COMMITTEE
ON REACTOR SAFEGUARDS FUKUSHIMA SUBCOMMITTEE,
DECEMBER 4, 2012

The minutes for the subject meeting were certified on May 9, 2013. Along with the transcripts and presentation materials, this is the official record of the proceedings of that meeting. A copy of the certified minutes is attached.

Attachment: As stated



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

MEMORANDUM TO: Antonio Dias, Technical Advisor
Office of the Advisory Committee on Reactor Safeguards

FROM: Stephen P. Schultz, Chairman
Advisory Committee on Reactor Safeguards
Fukushima Subcommittee

SUBJECT: CERTIFICATION OF THE MINUTES OF THE MEETING OF THE
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
FUKUSHIMA SUBCOMMITTEE ON DECEMBER 4, 2012

I hereby certify, to the best of my knowledge and belief, that the minutes of the subject meeting held on December 4, 2012, are an accurate record of the proceedings for that meeting.

Stephen P. Schultz, Chairman
Advisory Committee on Reactor Safeguards
Fukushima Subcommittee

Date

**ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
MINUTES OF THE (ACRS) FUKUSHIMA SUBCOMMITTEE MEETING
DECEMBER 4, 2012
Rockville, MD**

The ACRS Fukushima Subcommittee held a meeting on December 4, 2012 in Room T2B1, 11545 Rockville Pike, Rockville, Maryland. The meeting convened at 8:31 a.m. and adjourned at 12:06 p.m. The entire meeting was open to the public. Antonio Dias was the Designated Federal Official for the meeting.

ATTENDEES

ACRS Members

Stephen Schultz, Chairman
J. Sam Armijo, Member
Dennis Bley, Member
Charles Brown, Member
Harold Ray, Member
Joy Rempe, Member
Michael Ryan, Member
William Shack, Member
Jack Sieber, Member
John Stetkar, Member
Mario Bonaca, Consultant

Ed Hackett, ACRS Executive Director
Antonio Dias, ACRS staff
Hossein Nourbakhsh, ACRS staff

NRC Staff

Charles Ader, NRO
Sher Bahadur, NRR
Michel Call, NMSS
Mark Caruso, NRO
Patrick Castleman, OCM
Stephen Dinsmore, NRR
Richard Correia, RES
Dan Doyle, NRR
Mary Drouin, RES
Richard Dudley, NRR
Christopher Fong, NRR
Mike Franovich, OCM
Shana Helton, NRR
Tom Kevern, NRO
Rob MacDougall, FSME
Geary Mizuno, OGC
William Reckley, NRR
Fred Schofer, NRR
Mike Snodderly, NRR

Other Attendees

Jana Bergman, Scientech

Edward Burns, Westinghouse

SUMMARY OF MEETING

The purpose of the meeting was to review and discuss the NRC staff's development of a notation vote paper with possible options for addressing the Near-Term Task Force (NTTF) Recommendation 1: establishing a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations. This paper is due to the Commission in February 2013. The briefing was provided by NRC staff, members of the Japan Lessons Learned Directorate. The meeting transcript is attached and contains an accurate description of each matter discussed during the meeting. The presentation slides and handouts used during the meeting are attached to the transcript.

No comments were presented by members of the public.

SIGNIFICANT ISSUES/TOPICS DISCUSSED	Reference Pages in Transcript
Comparison with early draft of paper, presented to ACRS in August 2012. Initial paper considered 3 options (do nothing, do little, do a lot) making use of 12 regulatory framework improvement activities. That was very vague. Current paper shows improvement, thanks to meetings with senior management and commissioners. No chosen recommendation yet.	6-8
What is the problem? NTTF made it clear that NRC's existing power reactor regulatory framework does not have a logical and systematic way addressing the need or the existence of requirements that reduce the risks of beyond-design-basis accidents and severe accidents. Existing regulatory framework is OK for design-basis events. Improvements would allow existing framework to provide structure and set of criteria to identify and categorize unanticipated events or accidents that might require regulatory action. Structure and criteria can be developed to predictably and consistently evaluate how NRC should balance risk and defense-in-depth when providing regulatory response to unforeseen events. Also need to improve the regulatory process to better ensure licensee implementation and consistent long-term maintenance of initiatives currently addressed by voluntary industry initiatives. Question from Member Ray: Can the concept of design basis be affected by the proposed options? Answer: One of the options will do that. Another option would also allow us to modify the design basis to use risk information to move activities or sequences events out of the deterministic design basis and into another category that would allow different treatment requirements and less severe mitigation requirements.	9-11

<p>Four options being proposed:</p> <p>Option 1: to maintain our existing regulatory framework</p> <p>Option 2: clarify the role of voluntary initiatives</p> <p>Option 3: establish a decision-making process and criteria that would allow us to more effectively and predictably make decisions balancing risk, defense-in depth and safety margins</p> <p>Option 4: establish an additional regulatory category for requirements that would address beyond design basis events and severe accidents</p> <p>Option 4a: using a generic basis</p> <p>Option 4b: using a plant-specific basis</p> <p>These four options are by no means a full set of options. They're intended to represent a very broad spectrum of actions from which the Commission may choose. Some of these options have sub-options among them; so numerous other options could be crafted that would fit in between these original options. This is not an exhaustive set of ways to address regulatory framework improvements.</p>	<p>12-13</p>
<p>Comments received during November 8th public meeting:</p> <ul style="list-style-type: none"> • Selecting/recommending Option1 would mean reliance on luck • Option 4a would force FLEX to be revisited, after millions of dollars being spent. The same applies to Options 3 and 4b • Commission must be told that Option 4b will take long time to implement • Under Option 4a, NRC already has the tools to take action • Option 4b will be very expensive due to PRA cost 	<p>15-17</p>
<p>Question from Member Shack: Do you really think you can do Option 4 without Option 3? Answer: No, it would not be a good job. But Option 3 could be done without Option 4.</p>	<p>17-18</p>
<p>Option 1 title “maintain existing regulatory framework” is carefully crafted. It is not a “do nothing” option. It mainly means we would not strive towards goal of creating a new category of components in the new regulatory framework. In fact, one could chose Options 2, 3 and 1. The only ones that do not work together are Options 1 and 4.</p> <p>Members Shack, Armijo, Skillman and Brown provide comments on the logic of treating Option 3 as part of Option 1.</p> <p>Option 3 would provide the actual formal process and the decision criteria for making decisions. Instead of doing it on an ad hoc basis each time, we would have a formal structure. It does not change how we do business. It provides a mechanism so that we aren't doing it on an ad hoc basis every time.</p>	<p>19-24</p>

Option 2 would clarify the role of voluntary initiatives and how we put them into the regulatory requirements. NUREG/BR-0058 has a convenient and accurate description of voluntary industry initiatives. And those are broken into three categories:

- 1) Initiatives that relate to an existing regulatory requirement and it describes a means of compliance, an agreement between the staff and the industry
- 2) Initiatives that are used basically in lieu of a regulatory requirement⁴ being put into place
- 3) Initiatives that are undertaken by the industry, sometimes with or without the involvement of the NRC, but they involve matters for which we would be unlikely to put a new regulation in place

Issue of clarifying role of voluntary initiatives has come up several times before. From mid '90s to early 2000s staff pursued an agreement between the NRC, industry, and other stakeholders on how voluntary initiatives should work. SECY 01-0121 documented us giving up on that approach and basically maintaining the programs we had in place.

Commission may choose to go ahead with Option 2 as stand-alone initiative. Options 3 and 4, if chosen by the Commission, can influence and maybe even largely address voluntary initiatives without needing to do more.

Question from Member Stetkar: Does the NRC actually have the authority to inspect things that are not directly related to licensing commitments?
Answer: Yes, but the problem is what can be done if an issue is identified. This is where some clarification may be needed. Licensees' commitments would have to be added to their dockets.

Regardless of whether there is a rule or a commitment or something in the licensing basis for a particular licensee, the NRC always has the regulatory capability to inspect or audit or to look into something if there is some potential nexus to radiological health and safety or common defense and security. But to look at something is not the same as being able to take action. If there is nothing in the current licensing basis or if there is no regulatory requirement, either in the form of an order, license condition, technical specification, or rule, the NRC has no authority by itself to enforce or require the licensee to do something without taking the additional regulatory action of imposing that regulatory requirement on the licensee. The burden is on the NRC to justify the imposition of that requirement.

26-35

<p>Option 3 would establish the Commission's expectations with regard to balancing risk, defense-in-depth, and safety margins. The definitions of defense-in-depth and safety margins would be clearly established. A decision process would be developed for balancing risk, including how one achieves "adequate." The resulting policy statement and implementation guidance would be only associated with power reactors.</p> <p>There's been a lot of history on defense-in-depth, going all the way back to the 1950s. Over the years the consensus was to deal with and to compensate with our lack of knowledge with uncertainties. Until around the 2000 era, defense-in-depth was strictly looked at from a deterministic perspective. PRA may not be helpful in reducing uncertainties in and of itself, but it can point them out and so show us where deterministic defense-in-depth can be enhanced.</p> <p>Safety margins are closely tied to defense-in-depth. They play a role in the decision criteria for determining whether enough margin exists and therefore how much more defense-in-depth is needed.</p> <p>Option 3 also supports NUREG-2150 (Risk Management Regulatory Framework), as it would help consistently define defense-in-depth.</p> <p>Comments by Member Stetkar: there's a lot of verbiage in the description of Option 3 that reads like a very good marketing approach. The following statement is troubling: "The policy statement would clearly state that the deterministic criteria for defense-in-depth and safety margins must at the most fundamental level to compensate for <u>all</u> uncertainties, including those in the PRA models or other risk assessments." It should say "... will compensate for uncertainties ..." Some hazards (such as a meteorite or a large earthquake) have very, very large uncertainties.</p> <p>Question from member Stetkar: If implemented as a stand-alone, would Option 3 require the existence of plant-specific PRA. Would it have to be level 2 or 3? This is somewhat vague right now but it must be clearly stated in the SECY paper to the Commission. Answer: Cannot see how a licensee can use Option 3 without a licensee having a PRA. Even if coupled with other Options, Option 3 would probably require plant-specific PRA.</p> <p>Question from Member Ray: This would involve backfitting. How would the NRC address this? The Commission could suspend or exempt that particular rule from the purview of the backfit rule, just like they did for the AIA rule.</p> <p>Question from Member Rempe: Would there be a need to significantly upgrade the PRA tools and models currently used by the staff? Answer: the staff would have to have to think about what is the quality of the PRA that's needed before being able to answer that.</p> <p>Comments by Member Schultz: Besides the need for PRA tools, the licensees will also have to pay for or hire staff to perform analyses. This will add to the cost.</p>	<p>40-61</p>
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<p>Option 4 (need to create a more systematic and logical approach for dealing with beyond design basis events) addresses both NTTF and RMRF. Historically, the Commission has relied on design basis events and accidents to demonstrate robustness of a plant. Over the years we've addressed different safety concerns in various ways by creating different requirements. Sometimes those requirements were cost-beneficial safety-enhancement, some other times they were adequate protection. Sometimes we used voluntary initiatives, and in some cases we used Generic Letters.</p> <p>Question from Member Ray: Very troubled by lack of clarity in the discussion. Do we know when we want to move the design basis line and when we want to simply enhance our ability to deal with problems that are beyond the design basis, like Fukushima? Answer: Option 4a addresses the first portion of your question. It's more about changing the design basis, extending it, bringing into the design basis events that we always felt were outside. Station blackout is a good example since it involves multiple failures of safety systems which were not traditionally a part of the design basis.</p> <p>Pages 66 through 119 of the transcript contain a very involving discussion between the members and the staff regarding the differences between Options 4a and 4b and when/how they can be developed and applied. Any attempt to summarize this discussion would not be successful. The reader is advised to read those pages in the transcript.</p>	<p>62-119</p>
<p>Cost Estimates are expressed in 2013 dollars, accounting for annual recurring cost as well as those items that are on a one-time implementation bases. Resource estimates are preliminary. Potential benefits are not accounted for yet.</p> <p>Question from Member Sieber: Do these cost estimate account for any physical changes to the plant? Is it assumed that all these regulatory changes will be implemented and everything will be perfect? Answer: That's correct.</p> <p>Question from Member Bley: Are all the costs incurred by the licensee accounted for? Answer: Probably not.</p> <p>Requiring plant-specific PRA results in a significant cost increase. Costs associated with NRC acceptance of PRAs performed by industry have not been accounted for. Cost associated with hardened vents and severe accident management guidelines are also not considered since they will be under independent programs.</p>	<p>119-138</p>
<p>The path forward is to prepare a SECY paper describing the proposed options addressing NTTF Recommendation 1 and the Risk Management Task Force recommendations. This SECY paper is due by Feb 19, 2013.</p> <p>Question from Member Armijo: How many years would it take to complete the work? Answer: Anything requiring rulemaking takes at least 3 years. This applies to Option 3. Option 4a would take more than 3, less than 5 years. Option 4b could take from 5 to 15 years.</p>	<p>140-144</p>

<p>Closing remarks provided by the members:</p> <p>Member Ray: At some point a decision must be made whether it's better to avoid an accident versus mitigate its consequences. This is not clear at the moment.</p> <p>Member Bley: Most SECY papers have mutually exclusive options. This paper is quite different. A fair discussion of that will be important to make the paper clear. Take, for example, the discussion we had about the interdependence between Option 3 and Options 4a or 4b. This should be captured in the text of the paper. Also, the relationship with the RMTF report should be enhanced.</p> <p>Member Schultz: Some of the time frames associated with completion of the proposed options would affect new reactors much more than currently operating reactors. The paper must clearly address this detail.</p>	147-150
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Documents provided to the Subcommittee:

1. DRAFT Document on Recommendation 1 Nov_08_2012 (ML12296A096)
2. NUREG-2150, "A Proposed Risk Management Regulatory Framework," April 2012
<http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2150/>
3. NTTF Report, July 12, 2012 (ML111861807)
4. SRM to SECY-11-0093, August 19, 2011, (ML112310021)
5. Tasking Memorandum, June 14, 2012 (ML121660102)
6. Transcript of August 15, 2012 Fukushima Recommendation 1 Subcommittee Briefing (ML122370345)
7. ACRS Fellows Report: History of Defense in Depth, October 15, 1997

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards
Fukushima Subcommittee

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Tuesday, December 4, 2012

Work Order No.: NRC-2063

Pages 1-150

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
+ + + + +
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
(ACRS)
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FUKUSHIMA SUBCOMMITTEE
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TUESDAY
DECEMBER 4, 2012
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ROCKVILLE, MARYLAND
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The Subcommittee met at the Nuclear Regulatory
Commission, Two White Flint North, Room T2B1, 11545
Rockville Pike, at 8:30 a.m., STEPHEN P. SCHULTZ,
Chairman, presiding.

COMMITTEE MEMBERS:

STEPHEN P. SCHULTZ, Chairman
J. SAM ARMIJO, Member
DENNIS C. BLEY, Member
CHARLES H. BROWN, JR. Member
HAROLD B. RAY, Member
JOY REMPE, Member
MICHAEL T. RYAN, Member

1 WILLIAM J. SHACK, Member
2 JOHN D. SIEBER, Member
3 GORDON R. SKILLMAN, Member
4 JOHN W. STETKAR, Member
5

6 DESIGNATED FEDERAL OFFICIAL:

7 ANTONIO DIAS
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Adjourn	

P R O C E E D I N G S

8:31 A.M.

CHAIRMAN SCHULTZ: Good morning. I'd like to call the meeting to order this morning. This is a meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Fukushima. I am Stephen Schultz, chairman of the Subcommittee.

ACRS members in attendance today are Jack Sieber, Dick Skillman, Harold Ray, Dennis Bley, Sam Armijo, John Stetkar, Mike Ryan, Bill Shack, Charlie Brown, and Joy Rempe.

The purpose of today's meeting is to review and discuss the NRC staff's development of a notation vote paper with possible options for addressing the Near-Term Task Force Recommendation 1 which is establishing a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations. This paper is due to the Commission in February, 2013.

Our first subcommittee meeting on the subject was held on August 15th. We also have another subcommittee meeting scheduled for January 18, 2013. By that time, we should be able to discuss in more details the proposed notation vote paper.

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1 The entire meeting today is open to the
2 public. Rules for the conduct of and participation in
3 the meeting have been published in the Federal
4 Register as part of the notice for this meeting.

5 Today, the subcommittee will gather
6 information, analyze relevant issues and facts, and
7 formulate proposed positions and actions as
8 appropriate for deliberation by the full committee.

9 Antonio Dias is the Designated Federal
10 Official for this meeting.

11 A transcript of the meeting is being kept
12 and will be made available as stated in the Federal
13 Register notice. It is requested, therefore, that
14 speakers first identify themselves and speak with
15 sufficient clarity and volume so that they can be
16 readily heard.


17 We have received no written comments or
18 requests for time to make oral statements from members
19 of the public regarding today's meeting. However, I
20 understand that there may be individuals on the bridge
21 line who are listening on today's proceedings and will
22 have an opportunity for public comment later in the
23 meeting.

24 Again, we have an opportunity today in
25 this meeting to discuss the topics of interest. This


1 is a report that's being provided as a result of work
2 having been done on this topic. I understand much
3 work has been done by the staff in this area and it is
4 a progress meeting in their deliberations in
5 preparation for the February paper.

6 We'll now proceed with the meeting. I
7 call upon Dr. Sher Bahadur, Deputy Director of the
8 Division of Policy and Rulemaking in the Office of
9 Nuclear Reactor Regulation to open the presentations
10 this morning.

11 Sher?

12  DR. BAHADUR: Thank you, Mr. Chairman.

13 I'm Sher Bahadur, Deputy Director, Division of Policy
14 and Rulemaking in NRR. And this is the second of the
15 three subcommittee meetings that we plan to have on
16 Recommendation 1.

17  When we met last time in August, we
18 described 3 options and we also gave 12 regulatory
19 framework improvement activities that we call
20 framework building blocks.

21 Now those options that we described at
22 that time were extremely vague, as I remember. The
23 first option was do none of the improvement
24 activities. The second option was do certain high
25 value improvement activities. And the third option,

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1 of course, was to do all the improvement activities.

2 Now as I recall, the subcommittee was not
3 very pleased. And we weren't really sure ourselves at
4 that time as we presented to you whether we brought
5 the stuff that we needed to bring to the attention of
6 the subcommittee.

7 The staff has come a long way since then.
8 We have evolved in a number of ways. One of the
9 reasons the evolution took place was a series of
10 presentations that we made to a number of senior
11 management in the Agency, including the individual
12 commissioners, and that really helped us to identify
13 which improvement activities to pursue and why.

14 So we now have converted those improvement
15 activities into more clearly-defined options. And the
16 options that we have defined have been described in a
17 document, about a 50-page document, which really takes
18 you through the options and then gives you the details
19 as to what those options are.

20 So we now have additional cost estimates,
21 also for those options. And we released those options
22 document for public comment. So we received public
23 stakeholder review and we discussed those options in
24 the public meeting and saw some public comments and
25 the due dates for the public comments, as I

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1 understand, is December 14.

2 So although all these activities have been
3 going on, the staff has not selected a particular
4 option that's going to be recommended to the
5 Commission. So today's briefing, as you will see, is
6 not so much as to present to you the recommendation
7 that we're going to give to the Commission, but to
8 present those options to you and get the feedback from
9 the members so we can go back and then mull over these
10 options.

11 So with that, I would say we welcome all
12 the comments that you'll receive today from the
13 subcommittee. And the staff is open for discussions
14 and open for suggestions. And with that as a
15 background, I'd like to turn it over to Dick Dudley
16 who, along with his team, is going to provide the
17 detailed description of all the options that the staff
18 has developed.

19 MR. DUDLEY: Thank you, Sher.


20 DR. BAHADUR: So if you have no other
21 questions for me, then I'll say Dick, please start.

22  MR. DUDLEY: Good morning. I'm Dick
23 Dudley, I'm the NRR Rulemaking Project Manager that's
24 leading this interoffice working group on
25 Recommendation 1. I'm going to go to Slide 3.

1 But before I start, why are we here?
2 Well, we're here to keep the ACRS informed of the
3 activities we're doing in response to the Near-Term
4 Task Force Recommendation 1. And the objective, of
5 course, is to get an ACRS letter with the committee's
6 views on the staff's proposed response to
7 Recommendation 1 and to provide that to the Commission
8 so that the Commission can factor that into their
9 deliberations.

10 Just an outline of my presentation, I'm
11 going to give a brief overview of Recommendation 1.
12 I'll review a little bit of actions we've taken and we
13 have planned. I'll discuss the options that we're
14 considering. We'll discuss then the cost estimates
15 and I'll summarize and we'll lay out the path forward
16 to complete this activity.

17 So now I'm going to go to Slide 11. A lot
18 of this is background. It's a full package, but
19 you've heard some of this before, so I'm going to skip
20 through a lot of these slides to make sure we can
21 complete this in the right amount of time.

22  But in a number of Commissioner briefings
23 and other management briefings associated with
24 Recommendation 1, people have asked the question well,
25 what's the problem? And the working group's view is

1 that -- well first, the Near-Term Task Force made it
2 clear that the NRC's existing power reactor regulatory
3 framework does not have a logical and systematic way
4 that it addresses the need or the existence of
5 requirements that reduce the risks of beyond design-
6 basis accidents and severe accidents.

7 The existing regulatory framework for
8 power reactors, the NTTF believed and the working
9 group also believes adequately addresses design-basis
10 events, but for beyond design-basis events, the
11 working group believes that the existing regulatory
12 framework could be improved and we think this would
13 facilitate more consistent, efficient, timely, and
14 transparent Commission decision making when we need to
15 address new issues or when we need to address new
16 information that comes up on issues that we've already
17 addressed.

18 So we believe that improvements would
19 allow the existing framework to provide an improved
20 structure and set of criteria to identify and
21 categorize unanticipated events or accidents that
22 might require regulatory action. We think we can put
23 together a structure and criteria to predictably and
24 consistently evaluate how we should balance risk and
25 defense-in-depth when we're making decisions for NRC

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1 regulatory responses to unforeseen events. And we
2 believe that we could also improve the regulatory
3 process to better ensure licensee implementation and
4 consistent long-term maintenance of initiatives that
5 are currently associated -- of activities that are
6 currently addressed by voluntary industry initiatives.




7 MEMBER RAY: Do you think that the concept
8 of design basis would be affected by this? In other
9 words, are we really extending the design basis
10 without saying so?

11 MR. DUDLEY: One of the options will do
12 that. Yes. And one of the options would also allow
13 us to modify the design basis to use risk information
14 to move activities or sequences events out of the
15 deterministic design basis and into another category
16 that would allow different treatment requirements and
17 less severe mitigation requirements.

18 I'm going to go now to Slide 13. And Sher
19 has talked a lot about this already. We originally
20 had three options. Don't do anything. Do just the
21 right amount of cost effective activities. And then
22 fix everything. And then we backed off from that and
23 we had these 12 framework building blocks.

24 Today, we've taken those building blocks
25 and gotten management direction on the improvement

1 activities and we put together what I'm going to list,
2  I'm going to say right now are four options, but
3 that's not really true because many of the options
4 have sub-options among them. And these four options
5 are by no means a full set of options. They're
6 intended to represent a very broad spectrum of options
7 from which the Commission may choose, but there are
8 numerous other options could be crafted that would fit
9 in between these options in this spectrum, so to
10 speak. So it's not an exhaustive set of ways to
11 address regulatory framework improvements.

12 But anyway, today, we're going to talk
13 about Option 1 which is to maintain our existing
14 regulatory framework. We'll talk about Option 2 which
15 is to clarify the role of voluntary initiatives.
16 Option 3 is to establish a decision-making process and
17 criteria that would allow us to more effectively and
18 predictably make decisions balancing risk, defense-in-
19 depth and safety margins. And Option 4 would be to
20 establish an additional regulatory category for
21 requirements that would address beyond design basis
22 events and severe accidents. And of course, you can
23 do that two ways. Option 4a, we would do that on a
24 generic basis. And Option 4b, we would do that on the
25 plant-specific basis.

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1 And also, the applicability of the
2 activities we'll discuss today, applicability is to
3 light water power reactors. This would be operating
4 reactors, evolutionary LWRs, and I think since we were
5 here last, we've had a public meeting and -- well,
6 we've had some public feedback and based on that, we
7 believe we can also include small modular light water
8 reactors in these same framework activities.

9 MEMBER SKILLMAN: When you identified
10 Option 4, please, a new regulatory category, what do
11 you envision that category to be?

12 MR. DUDLEY: We'll go -- there will be a
13 long presentation on this.

14 MEMBER SKILLMAN: Thank you.

15 MR. DUDLEY: We'll specifically address
16 that.

17 MEMBER SKILLMAN: Thank you.

18 MR. DUDLEY: And if we don't do it
19 adequately, you'll make sure we do.

20 MEMBER SKILLMAN: Thank you.

21 MR. DUDLEY: We released on November 2nd,
22 a draft option summary document. We provided that to
23 the ACRS at that time, also where we described in
24 detail the descriptions of the options, the key
25 issues, the products, preliminary cost estimates and

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1 our very first assessment of pros and cons of the
2 various options.

3 We had a public meeting on November 8th,
4 where we discussed these options. We answered
5 questions . We solicited feedback both from the
6 industry on industry implementation costs and from all
7 stakeholders on the various views that they might have
8 on the pros and cons of the various options.

9 We are accepting public comments on that.
10 We're using regulations.gov. The federal rulemaking
11 website is the tool to accept those comments. And
12 that will be open through December 14th. And we'll
13 review all the comments, but it's not like a
14 rulemaking activity. We're not going to formally
15 evaluate and disposition comments like we have to do,
16 are required to do on rulemaking.

17 At our November 8th public meeting, we got
18 some feedback from the folks that were in the room.

19 CHAIRMAN SCHULTZ: Excuse me, Dick?

20 MR. DUDLEY: Yes?


21 CHAIRMAN SCHULTZ: With regard to the
22 comments that are coming in there and we've seen the
23 activities associated with the public meeting, the
24 number of attendees and there's a lot of involvement
25 that you generated related to this topic and I'm sure

1 there are going to be many, many comments that are
2 going to be coming in, but although you're not going
3 to have a formal process to respond to that, what is
4 the plan to assure that the public comments are all
5 considered in the document? You have a formal process
6 by which that's going to be formulated?

7 MR. DUDLEY: Well, we will keep a log of
8 each of the comments with a very brief summary and
9 like the first comment came in already and it says
10 your cost estimates are too low. Well, okay. You
11 write that down, but it provides no information. So
12 we'll just keep a log of that sort.

13 And the ones from the initial screening
14 indicate need further evaluation and further
15 consideration, we'll make sure that those are
16 distributed to the entire working group and we will go
17 through them, discuss them, in a working group meeting
18 and decide whether or not we think we should adjust or
19 make changes to the plans that we have.

20 CHAIRMAN SCHULTZ: Thank you.

21  MR. DUDLEY: So at the public meeting on
22 November 8th, I believe it was Union of Concerned
23 Scientists said hey, if you select or recommend Option
24 1 which is the existing framework, aren't you just
25 relying on luck, in other words? If Fukushima hadn't

1 happened, would we be improving hardened vents like
2 we're doing now?

3 Another comment from industry was that
4 they were spending millions of dollars on the FLEX
5 mitigating strategies program and the question was
6 will FLEX be revisited under Option 4a? And that's a
7 good question. And although the commenter didn't
8 mention it, the same question would apply to Option 3
9 and Option 4b also. Those would be issues that we
10 would have to decide. If the Commission selected any
11 or all or several of those options, we'd have to
12 figure out how those would interact with the FLEX, on-
13 going FLEX program.

14 Another commenter wanted to make sure that
15 we made sure the Commission knew that Option 4b would
16 take a long time to implement. I believe that's
17 because Option 4b requires a plant-specific PRA and I
18 believe the commenter was referring to the limited
19 availability of actual PRA practitioners that could
20 perform those improvements of the existing PRAs up to
21 the level they would need to be.

22 Another comment was that under Option 4a,
23 the commenter believed that the NRC already had the
24 tools that it needed to take action without
25 rulemaking. A representative from the Office of

1 General Counsel responded to that one though and I
2 think the answer was you can't use regulatory guidance
3 or regulatory guides without an over-arching
4 regulatory requirement and so we didn't at that point
5 think that that was an option. We think we would need
6 rulemaking under that activity.

7 And of course, there was a comment by
8 industry that cost for the PRA that were required in
9 Option 4b that the estimates are too low and they
10 stated by an order of magnitude. But to support that,
11 NEI who made the comment committed to provide improved
12 PRA cost estimates to us by December 14th.



13 MEMBER SHACK: Do you really think you can
14 do Option 4 without Option 3?

15 MR. DUDLEY: I don't. I don't. I really
16 don't. I mean you could do it much better. You could
17 do a much better job of it.

18 MEMBER SHACK: We still have to make
19 decisions. Whatever you decide to do with Option 4,
20 you have to decide how to put things into it.

21 MR. DUDLEY: And Option 3 would be the
22 perfect tool to use to populate the category, I
23 believe.

24 MEMBER SHACK: I can't see them as
25 separate options.

1 MR. DINSMORE: This is Steve Dinsmore from
2 the staff. But you could do 3 without 4.


3 MEMBER SHACK: I could do 3 without 4.
4 Okay, so that's the way you're thinking about it.

5 MR. DUDLEY: So we're going to evaluate
6 the stakeholder feedback when the public comment
7 period ends. Right now we're working on the details
8 and the integration of the options, just like you
9 said.


10 We're refining our cost estimates. And
11 we're trying to make sure that the pros and cons are
12 done on a consistent and balanced manner and we'll
13 again meet with the ACRS subcommittee in January.
14 We'll finalize our SECY paper. We'll meet with the
15 full committee in early February. And the Commission
16 paper is due to the Commission in mid-February. And
17 the ACRS letter would be probably received about the
18 same time the Commission gets our SECY paper.

19 Are there any questions on my
20 introduction? Any more questions?

21 Now Steve Dinsmore will discuss Option 1,
22 maintain existing regulatory framework.

23  MR. DINSMORE: Good morning. My name is
24 Steve Dinsmore and I'm a senior reliability and risk
25 analyst in the PRA Licensing Branch in NRR. I have

1 the pleasure of presenting to you Option 1.

2  Option 1's title is kind of carefully
3 crafted. Maintain existing regulatory framework. So
4 it's actually not a do nothing option, nor is it
5 really an status quo option insofar as status quo
6 implies that nothing will be changed.

7 Our rules and guidance are constantly
8 changing to some degree. Option 1 mainly means we
9 would not strive towards a goal of creating a new
10 category of components in the new regulatory
11 framework. That wouldn't be a goal which we would be
12 striving for if you chose Option 1.

13 You could choose Option 2 and 3 and 1.
14 The only one you couldn't choose together is 1 and 4
15 because 4 would be a goal of creating this category.
16 So that's kind of where Option 1 fits in.

17 MEMBER SHACK: But 3 would give you a new
18 decision criteria which to me would seem to be quite
19 different than Option 1. I mean Option 1, I look at
20 as you're not changing the way we make decisions now
21 about --

22 MR. DINSMORE: You wouldn't change the
23 framework. You have design-basis events and you have
24 the whole process that revolves around that. Then you
25 have beyond design basis and you add things as you

1 need out there, but you wouldn't -- so the framework
2 -- but you could change how you make decisions moving
3 stuff around. But the framework would remain.

4 MEMBER ARMIJO: So Option 3 could be part
5 of Option 1?

6 MR. DINSMORE: I believe so. I guess
7 there's some discussions internally as to how that all
8 would work together, but it would seem to me you could
9 do Option 3.

10 MEMBER ARMIJO: We sort of do that now,
11 right? We try and balance risk and defense-in-depth
12 right now in some ad hoc way.

13 MS. DROUIN: Right, Option 3 would give
14 you, you know, the actual formal process and the
15 decision criteria for doing it. Instead of doing it
16 on an ad hoc basis each time, we would have a formal
17 structure. So does it change how we do business?
18 No. But it would give you the mechanism so that you
19 aren't doing it on an ad hoc basis every time.

20 MEMBER ARMIJO: So you could have an
21 Option 1 including Option 3 as a way of going forward.

22 MR. DINSMORE: As a way of helping you
23 make decisions in the future, yes, sir.

24 MEMBER ARMIJO: Yes.

25 MR. DINSMORE: Yes.

1 MEMBER SKILLMAN: Does that make Option 3
2 an option that needs to be implemented no matter what
3 occurs here? It sounds like if Option 3 is a common
4 denominator, then it's kind of a no brainer that
5 that's one that ought to be implemented no matter what
6 happens.

7 MS. DROUIN: That gets into what we're
8 going to recommend in the paper. And right now, we're
9 still deliberating within the working group. But it's
10 a good point.

11 MEMBER SKILLMAN: Thank you.

12 MR. DINSMORE: Then real quick, a summary
13 of Option 1, we retain the current regulatory
14 framework --

15 MEMBER BROWN: Can I ask one question?

16 MR. DINSMORE: Sure.

17 MEMBER BROWN: Excuse me, the Option 3
18 thing is tantalizing. Being a relatively new guy,
19 only four or five -- sat in on all these meetings, it
20 seems like almost every decision process that you all
21 bring forth or new regulation or new comments or
22 whatever in the Reg Guides, all embody some amount of
23 balancing risk, defense-in-depth, and safety margins
24 in the process. And we have those discussions over
25 and over again every time.

1 All I'm trying to do is get a calibration
2 on your comment, Mary, and that today if you went and
3 said how do we do that, you just kind of do it. But
4 if all that looks like is you would be saying okay,
5 now here we're going to lay out a formal structure for
6 doing that as opposed to just kind of letting it
7 happen as part of the overall decision process. Did
8 I get that out of your comment which to me means that
9 to be any place in all of these?

10 This is not a singular one off option per
11 se. You would not pick Option 3 by itself. It would
12 always be in concert with every other thing you do.
13 That's what I get out of your discussion.

14 MS. DROUIN: You could do Option 1 without
15 doing Option 3.

16 MEMBER ARMIJO: Sure.

17 MS. DROUIN: You don't have to go -- you
18 do it right now. Option 2 which is the voluntary
19 initiatives, you could do that without Option 3.
20 Where you really see the tight nexus is between Option
21 3 and Option 4. But you could do, as we said, Option
22 3 without doing Option 4.

23 MEMBER BROWN: But it is the formal
24 structure aspect that you mentioned before that's the
25 key, that's the main difference from what's been done

1 in the past.

2 MS. DROUIN: Yes.

3 MEMBER BROWN: Okay, all right. I'm just
4 slow. Thank you.

5 MS. DROUIN: You're welcome.

6 MR. DINSMORE: Then I'll speed up. Retain
7 the current regulatory -- summary of Option 1 is to
8 retain the current framework. The current framework
9 can add rules and requirements, address issues as they
10 arise. We use these fundamental concepts of design-
11 basis events and defense-in-depth. And we can apply
12 these concepts to develop new approaches or rules as
13 we need.

14 Backfit rule provides a structured means
15 to judge whether the proposed rule or mandated change
16 is consistent with principles of regulations and when
17 significant issues arise, the NRC process is in place
18 to issue immediately effective orders.

19 The existing framework also includes risk-
20 informed, performance-based changes to the
21 regulations. So we've got a mandatory 50.65
22 maintenance rule implementation. We have reg analysis
23 guidelines which use risk insights. We have the
24 reactor oversight process and its significance
25 determination process which both rely very heavily on

1 design basis and risk.

2 Then we have a number of voluntary
3 alternative rules, 50.69 on special treatments;
4 50.48(c) on fire protection; and the infamous 50.46a
5 which has been withdrawn while we figure out how to
6 deal with this Recommendation 1 which was risk-
7 informed definition of large break LOCA.

8 Then we have voluntary license application
9 amendments. Amendment applications like 4b risk-
10 informed completion time. So we have all these tools
11 out there and we have that framework and so we would
12 continue just to apply whatever tools are available.

13 And we could apply these tools without
14 having this new population of events. That's the only
15 --

16 MEMBER SIEBER: That's what you're doing
17 right now?

18 MR. DINSMORE: That's what we're doing
19 right now.

20 MEMBER SIEBER: Right.

21 MR. DINSMORE: But with Fukushima, we are
22 using new tools and revisiting the hazards and cost
23 benefit analysis. So we might change some of the
24 tools that we have.

25 Next slide.

1 Okay, the relationship to the two reports,
2 the Near-Term Task Force Report recommends
3 establishing a logical dah, dah, dah, appropriately
4 balance defense-in-depth. No new framework. It's
5 kind of hard to say we're not going to really fulfill
6 that recommendation because it sounds wonderful, but
7 the current framework does somewhat balance and we
8 would kind of retain the way we have been doing
9 currently.



10 Articulate a risk-informed, defense-in-
11 depth framework and initial rulemaking that includes
12 extended design-base requirements. We wouldn't define
13 this new set of components effectively and the
14 requirements that would go with them.

15 Modify reg analysis guidelines, evaluate
16 insights from IPEs and IPEEEs -- there's an E missing.
17 We might do this anyway. This could be part of the
18 current framework.

19 Risk Management Task Force has an Option
20 A in Chapter 4. Efforts related to on-going risk-
21 informed and performance-base initiatives and
22 activities related to the follow up of Fukushima
23 accident continue on their current course. That's
24 pretty much consistent with Option 1, but it's -- the
25 RMTF doesn't recommend that option.

1 So that was my presentation on Option 1.

2 MR. DUDLEY: If there are no questions,
3 Bill Reckley will talk about voluntary initiatives,
4 Option 2.

5  MR. RECKLEY: Good morning.  Option 2 is
6 related to voluntary industry initiatives and it's
7 somewhat related to the overall framework and how the
8 framework operates and it's also a little bit of an
9 orphan in that it was in the Near-Term Task Force
10 Report and people thought it should be addressed. And
11 this was a convenient place to address it. So that's
12 kind of why it's showing up here.

13 In terms of a summary of Option 2, the reg
14 analysis guidelines, NUREG/BR-0058 has a convenient
15 and accurate description of voluntary industry
16 initiatives. And those are broken into three
17 categories.

18 The first are industry initiatives that
19 relate to an existing regulatory requirement and it
20 describes a means of compliance, an agreement between
21 the staff and the industry. And two examples that are
22 given here are the BWR vessel internal program, and
23 the PWR material reliability program. There's rules
24 in place on reactor coolant integrity and these get
25 into the nuts and bolts of how industry is going to

1 comply with existing rules.

2 The second category are those that are
3 used basically in lieu of a regulatory requirement
4 being put into place. And those have varied over the
5 years. The primary examples, especially coming out of
6 Fukushima or the severe accident management guidelines
7 and the BWR MK-1 hardened vent. More recent examples
8 could include hydrogen igniters for the ice condenser.

9 The third category are those voluntary
10 initiatives that are undertaken by the industry,
11 sometimes with or without the involvement of the NRC,
12 but they involve matters for which we would be
13 unlikely to put a new regulation in place. And an
14 example of that is the ground water monitoring
15 program. That was a big issue, but after many
16 discussions, the NRC basically decided we weren't
17 going to do anything in addition to what the industry
18 was doing through their initiative.

19 So Option 2 would clarify the role of
20 voluntary initiatives and how we put them into the
21 regulatory requirements.

22 Just as a little bit of background, this
23 issue has come up before. It has come up actually
24 several times before. It was actually the subject of
25 a direction-setting initiative back in the mid-90s,

1 DSI-13. We undertook over the next -- basically
2 through the late '90s and the early 2000s, an effort
3 to come to an agreement between the NRC, industry, and
4 other stakeholders on how voluntary initiatives should
5 work. SECY 01121 documented us giving up on that
6 approach and basically maintaining the programs we had
7 in place.

8 Fukushima Near-Term Task Force again
9 primarily through the examples of the SAMGs and the
10 hardened vents, we're revisiting that. They seem to
11 come up a lot in the discussions, post-Fukushima, and
12 yet they weren't firm regulatory requirements and when
13 we did inspections of those through temporary
14 instructions, we found inconsistencies in how they had
15 been implemented, maintained, and in some cases how
16 practical their use might have actually been under
17 certain circumstances.

18 The Risk Management Task Force in NUREG-
19 2150 had a slightly different take and it was more
20 from an efficiency standpoint and that was you have
21 through voluntary industry initiatives and other
22 licensee-specific initiatives a delta that forms
23 between the requirements and the regulations and the
24 licenses and what's actually in place in the field.
25 And then when an issue comes up through the reactor

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1 oversight process, what do they evaluate against? And
2 it was just constantly raising questions.

3 So again, I just basically went through
4 the relationship to the two reports, the Near-Term
5 Task Force Report, and the Risk Management Task Force.
6 We can go to the next one.

7 So again, trying to work on the
8 recommendation from the Near-Term Task Force, we
9 decided to incorporate it into this effort and to set
10 out a goal to clarify the role of industry
11 initiatives. In doing this, there's two ways it could
12 work. It could work as a stand-alone initiative. The
13 Commission could say yes, go ahead and clarify
14 voluntary initiatives, but do nothing else. Or just
15 like the previous discussions, if you do some of the
16 other options, they can influence and maybe even
17 largely address voluntary initiatives without needing
18 to do more.

19 So the stand-alone improvement would be
20 implemented through revised guidance, for example, the
21 highest level would be a Commission policy statement.
22 It would reinforce existing guidance that says that a
23 voluntary industry initiative shouldn't be used to
24 resolve a matter of adequate protection.

25 We could come up with various factors for

1 the staff to consider when to incorporate what was up
2 to that point a voluntary industry initiative into the
3 rules. And those could be things like how important
4 is it to safety or defense-in-depth or risk? What's
5 its relationship to other requirements? Is there a
6 governing regulatory requirement that you could hang
7 your hat on if you needed to in an enforcement or
8 licensing matter?

9 The duration of the event. Something like
10 SAMGs or hardened vents that were going to be there
11 for the whole remainder of the license life or
12 facility and were somewhat important on revisiting.
13 I think most people would say we probably should have
14 done more back then.

15 So what else would be involved in the
16 stand alone? Would be just to update guidance, revise
17 the oversight process. The oversight process is one
18 in which as a matter of practice, but not necessarily
19 requirements, once a voluntary initiative was set and
20 not incorporated into the rules, we tended to walk
21 away in terms of the inspection and oversight process.

22 So SAMGs, being an industry initiative,
23 but not required, weren't periodically reviewed. The
24 inspectors didn't look at those. But we could, in
25 addition to incorporating some things, also change the

1 inspection program to make sure even when we do accept
2 a voluntary industry initiative that we monitor as to
3 whether it's performing the way it was intended.

4 MEMBER STETKAR: I wanted to ask about
5 that. I'm glad you brought up that example because as
6 I read through this, does the NRC actually have the
7 authority to inspect things that are not directly
8 related to licensing comments?

9 I understand in the report you sort of
10 subdivide voluntary initiatives that are taken to
11 comply with regulatory requirements and voluntary
12 initiatives that were adopted in lieu of the NRC
13 imposing regulatory requirements which means it's like
14 I change my oil every 2,000 miles instead of every
15 4,000 miles. Well, I decided to do that.

16 MR. RECKLEY: The answer is yes, we can
17 look at it. The question becomes what can we do with
18 it once we've looked at it and if we've identified an
19 issue. And that is where we may need to clarify.

20 There's some issues back when we looked at
21 individual licensee regulatory commitments back in the
22 -- that was also in the mid-90s where we identified
23 that we could go out and do audits of commitments. If
24 we found that a commitment had been made and not met,
25 we could issue what's called a notice of deviation.

1 MEMBER STETKAR: Is that a commitment in
2 the plant's licensing basis?

3 MR. RECKLEY: Yes.

4 MEMBER STETKAR: Okay, but I think we're
5 talking about --

6 MR. RECKLEY: And one of the things we
7 would have to do -- one of the things we would likely
8 have to do in clarifying how industry initiatives are
9 incorporated is how to bring them into an individual
10 plant's licensing basis.

11 MEMBER STETKAR: Okay.

12 MR. RECKLEY: So one easy way to do that,
13 even if we did little else, would have been to make
14 sure that every licensee had a commitment on their
15 docket to actually adopt the SAMGs or the hardened
16 vents which actually in those two cases, both of them
17 did because they were generic letters.

18 However, exactly what they committed to,
19 one can argue in retrospect because -- but anyway.

20 MEMBER STETKAR: So the process would be
21 to ensure that whatever you're inspecting is indeed
22 somehow incorporated on the docket.

23 MR. RECKLEY: Right, but again, the idea
24 would be to focus on actually looking to see if it's
25 effective. And as a secondary matter, you would

1 determine how it fits in to other things because the
2 regions can always give feedback to headquarters on
3 what they're observing, even if they're not able to
4 write a notice of violation against a requirement.

5 MEMBER SIEBER: It seems to me that if
6 it's an industry initiative that goes beyond the
7 regulations, there's no criteria or standard to
8 inspect against.

9 MR. RECKLEY: Right.

10 MEMBER SIEBER: And so you can't write an
11 inspection procedure and you can't write an inspection
12 report. And because you can't, you can't take credit
13 for it as a safety feature of the plant because you
14 can't inspect it to make sure that it's effective.

15 And so industry initiatives are nice from
16 a regulatory standpoint and from an official public
17 safety standpoint, they don't count.

18 MR. RECKLEY: Well, and that's some
19 interpretations. But that question actually routinely
20 comes up because when you do a significance
21 determination process, the question comes up what are
22 you able to credit?

23 MEMBER SIEBER: But then you've got to
24 write it into a rule some place or into a licensee
25 commitment.

1 MR. RECKLEY: Well, it's a question that
2 comes up.

3 MEMBER SIEBER: Yes.

4 MR. RECKLEY: So I'll leave it there.
5 Geary?

6 MR. MIZUNO: This is Geary Mizuno, Office
7 of General Counsel as part of the working group. And
8 I wanted to expand on what Bill Reckley was saying and
9 to clarify that. First of all, regardless of whether
10 there is a rule or a commitment or something in the
11 licensing basis for a particular licensee, the NRC
12 always has the regulatory capability to inspect or
13 audit or to look into something if there is some
14 potential nexus to radiological health and safety or
15 common defense and security. Okay? So our
16 inspection or audit authority exists regardless of
17 whether it's actually reflected in a particular
18 licensee's licensing basis. Okay?

19 But to look at something is not the same
20 as being able to take action. There you have to
21 understand, yes, if there is nothing in the current
22 licensing basis or if there is no regulatory
23 requirement, either in the form of an order, license
24 condition, technical specification, or rule, the NRC
25 has no authority by itself to enforce or require the

1 licensee to do something without taking the action,
2 the additional regulatory action of imposing that
3 regulatory requirement on the licensee.

4 So again, it would have to issue an
5 order, issue a rule, modify the license to incorporate
6 a particular license condition or some additional
7 requirement. Okay? And we can do that, but the
8 burden is on the NRC to justify that requirement, the
9 imposition of that requirement. They may have to go
10 through all of the necessary steps including
11 preparation of a regulatory analysis dealing with the
12 backfit rule or issue of finality for dealing with
13 Part 52.

14 So we need to understand that our
15 capability to take action is separate from our ability
16 to look at an issue.

17 MEMBER SKILLMAN: May I ask a question,
18 please?

19 MR. RECKLEY: Sure.

20 MEMBER SKILLMAN: Your last bullet,
21 "should NRC reevaluate existing initiatives?" Does
22 the NRC have the capability of identifying every
23 initiative?

24 MR. RECKLEY: The NRC has the capability
25 to identify the major industry initiatives, the

1 generic ones that have been sponsored by or oversaw by
2 NEI or its predecessors. When you get down to the
3 point of individual licensee commitments, that issue
4 has come up over the years and we have trouble because
5 of our record-keeping systems of identifying all of
6 those.

7 MEMBER SKILLMAN: So that would be
8 problematical at the individual plant basis?

9 MR. RECKLEY: Right, but the focus of this
10 option is on the bigger industry initiatives, not
11 individual licensee regulatory commitments.

12 MEMBER SKILLMAN: Let me ask one more
13 question. When I came on this board a year ago, one
14 of the thoughts that I had then and I continue to have
15 is a fundamental difference between a Part 50 license
16 and a Part 70 license because a Part 50 license
17 depends on SSCs to achieve a safety outcome, the pump,
18 pipe, valve, the heat exchanger, the scram system,
19 whatever.

20 Part 70 licenses require IROFS, items
21 relied on for safety. If you go into a centrifuge
22 plant, there's no safety equipment at all. You either
23 add heat or you remove heat, you add pressure, you
24 remove pressure. You make a fire barrier. You
25 provide a spray system. But there's no equipment that

1 is an SSC for safety. It's an IROFS.

2 The point I would make is I'm wondering if
3 as you consider how to proceed, if maybe one of the
4 tools that hasn't been considered on the Part 50 side
5 is the use of an IROFS. For instance, the materials
6 reliability program, someone signs up and says hey,
7 we're doing this for our materials. Ultimately, that
8 gets translated into the specifications for the
9 material or for the manufacturing process. But
10 perhaps the licensee is actually committing to an item
11 relied on for safety. So also for the BWRVIP.

12 So I'm wondering if maybe as you are
13 thinking how to proceed, there may be value in
14 considering an IROFS-type approach on the Part 50
15 side. It's not there today. It's only on the Part 70
16 side. But this may be a way to approach this that is
17 effective for the NRC, but also effective for the
18 licensees. It could be a win-win. It's a way to
19 approach this.

20 MR. RECKLEY: I think you'll get into a
21 discussion of that especially Option 4b, but also 4a.
22 So because the treatment of the equipment is a key
23 item once you get into Option 4.

24 MEMBER SKILLMAN: Is the philosophy of how
25 the equipment is used?

1 MR. RECKLEY: Yes.

2 MEMBER SKILLMAN: And that's the IROFS
3 approach?

4 MR. RECKLEY: Right.

5 MEMBER SKILLMAN: Thank you.

6 MR. RECKLEY: That's kind of a good segue
7 into the last slide on Option 2 which is that if you
8 were to pursue Options 3 or 4, you could take an
9 integrated approach and say that voluntary industry
10 initiatives were going to largely be resolved by those
11 two options.

12 Option 3, by providing additional clarity
13 on balancing risk and defense-in-depth, and Option 4,
14 as a specific way to implement that, sort of says
15 we're going to make decisions on their merits. And so
16 the equipment or the operator actions through SAMGs or
17 some other things would be identified under Options 3
18 or 4 as being important for a particular reason,
19 either they're addressing severe accidents or beyond
20 design-basis accidents.

21 And because of their importance, they get
22 brought into the licensing structure. And I use here
23 as a potential example Chapter 19 of the FSAR. So
24 this is bringing in basically what's been used for new
25 reactors, the Part 52 concept, to say even for

1 operating reactors they may end up with a Chapter 19.
2 And this thing gets brought in because of its
3 importance. Whether the industry developed it as an
4 industry initiative or not, it might be a good
5 efficiency process, but in and of itself, doesn't
6 matter in terms of whether it is or isn't brought into
7 the licensing basis. That's done based on the logic
8 in Option 3 or the handling of events in Option 4.

9 CHAIRMAN SCHULTZ: Bill, with respect to
10 that, again, I wasn't sure you were going to come to
11 the first bullet on this slide that it would rely upon
12 the outcomes of 3 and 4. I wasn't sure, but I thought
13 that's where this was going.

14 Does this mean that there is not an option
15 that is -- that Option 2 is not being developed in a
16 way that it could be a stand-alone option in
17 combination with Option 1, setting aside completely
18 Options 3 and 4?

19 MR. RECKLEY: No, we'll go ahead and
20 develop that stand-alone option. It would just be
21 more -- we would come up with guidance on the handling
22 of voluntary industry initiatives and determining the
23 importance -- using somewhat the logic of an Option 3
24 kind of logic, trying to come up with how important is
25 it. And if it's important and meets these

1 considerations, then it should not stay as a voluntary
2 industry initiative. The NRC should incorporate it
3 into a rule or order or license.


4 So yes, we'll have those developed in
5 Option 2a, if you will, stand alone. Actually, what
6 we won't develop very much is Option 2b because it
7 kind of just is subsumed into the other options.


8 CHAIRMAN SCHULTZ: But 2a will be an
9 opportunity to address the level of effort to
10 implement as well as the benefits that would be
11 achieved if one were to pursue Option 2 without moving
12 forward with 3 and 4.

13 MR. RECKLEY: Yes.

14 CHAIRMAN SCHULTZ: Other questions from
15 the committee at this point related to Option 2?
16 Thank you, Bill.

17 MR. DUDLEY: Next, Mary Druin will discuss
18 Option 3, the decision process to balancing risk,
19 defense-in-depth, and safety margins. And we're about
20 ten minutes behind schedule so keep moving.

21  MS. DROUIN: Okay, no questions.

22  Okay, just a quick summary of what Option 3 is
23 envisioned is that it would establish the Commission's
24 expectations with regard to what do we mean by
25 balancing risk, defense-in-depth, and safety margins?

1 And establishing those expectations that would include
2 defining what is the objective of defense-in-depth and
3 safety margins and what are the principal elements and
4 giving details on that.

5 It would also include developing a
6 decision process that would include criteria for what
7 do we mean by balancing. So the high level with
8 setting the expectation, but then the lower level it's
9 now developing the actual process with criteria for
10 how you achieve it. And part of that process would
11 include criteria for determining when have you achieve
12 adequate? What have you gone far enough?

13 So now if we go to the next slide, there's
14 been a lot of history on defense-in-depth, going all
15 the way back to the 1950s. And you do see a
16 commonality in the history that it all comes down to
17 how do we deal at the highest level with accident
18 prevention and accident mitigation?

19 There's also been a consensus over the
20 years that defense-in-depth, the main purpose behind
21 it is to deal with and to compensate with our lack of
22 knowledge with uncertainties, that if we were
23 absolutely certain we wouldn't need defense-in-depth
24 and we wouldn't worry about it. But it's a
25 recognition that there are unknowns out there and our

1 knowledge is not always as good as we think it is.

2 And up until the 2000 era, defense-in-
3 depth was strictly looked at from a deterministic
4 perspective that we wanted to deal with accident
5 prevention and then the criteria from a deterministic
6 view. But in around 2000 to now, a probabilistic
7 approach has factored its way into defense-in-depth
8 that it can play a major role. It recognizes that it
9 can't compensate for the unknown, but it certainly can
10 identify some unforeseen scenarios. It can identify
11 uncertainties where they lie in the plant design. It
12 can quantify the extent of the uncertainty.

13 So while PRA may not be helpful in
14 reducing the uncertainties in and of itself, it can
15 point them out and so therefore point us to where
16 deterministic defense-in-depth can be enhanced.

17 Safety margin is also closely tied to
18 defense-in-depth. Some people might consider it an
19 aspect of defense-in-depth. So when you define
20 defense-in-depth it includes safety margins. Other
21 views are that they are quite separate.

22 Our view is is that when you deal with
23 defense-in-depth you've got to deal with safety
24 margins because safety margins can have a factor in
25 your decision criteria when you're trying to determine

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1 whether you have enough, whether or not you have
2 enough margin in the design and therefore how much
3 more defense-in-depth. So they do go hand in hand.

4 And the regulations require that your SSCs
5 -- and I've just tried to list some of them there --
6 require that you have adequate margins of safety. So
7 it is also embedded throughout our regulations, the
8 use of safety margins.

9 Relationship to -- what happened to --
10 there it is.

11 MR. DUDLEY: Sorry, heavy finger.

12 MS. DROUIN: To the NTTF Recommendation 1,
13 which states to establish a logical, systematic,
14 coherent, blah, blah, blah for appropriately balancing
15 defense-in-depth and risk considerations, of course,
16 this option directly supports that recommendation.

17 With regard to the four sub-options from
18 Recommendation 1, the Commission policy statement that
19 articulates a risk-informed, defense-in-depth
20 framework, Option 3 supports that one. Initiate
21 rulemaking to implement a risk-informed, defense-in-
22 depth framework. That still needs to be evaluated to
23 determine whether from our perspective a rulemaking is
24 necessary.

25 Modify the regulatory analysis guidelines.

1 Option 3 would support that sub-option. Evaluate
2 insights from IPEs and IPEEEs. It doesn't directly
3 consider this option, but it certainly could take
4 advantage of the insights coming out of there.

5 With regard to RMTF, RMTF identified --
6 and this was one of the recommendations, both the high
7 level and across all the program offices, was the need
8 for to come up to be consistent with the definition of
9 defense-in-depth. They repeatedly pointed out that
10 there was no clear definition. And clarifying that
11 would be a major step forward. So in that regard,
12 Option 3 supports the RMTF.

13 Okay, now getting into a more detailed
14 description, at a summary, what we're talking about is
15 that Option 3 would issue a policy statement and that
16 policy statement would articulate the Commission views
17 on the need to balance risk, defense-in-depth, and
18 safety margins. The policy statement would clearly
19 describe the need for them and it would specify the
20 actual levels of defense. As I said, the highest
21 level, we said accident prevention and mitigation.
22 And when you go across the many years, you'll see that
23 people have sliced that pie many different ways. They
24 have sliced it and so there's five levels of defense.
25 Some have said there's only two, it's accident

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1 prevention and mitigation.

2 Some have said it's four. But they all
3 factor back up into accident prevention and
4 mitigation.

5 But here, the policy statement would
6 actually define the levels of defense. It would
7 clearly describe the need for safety margins. It
8 would define its objectives and the elements and
9 principles related to safety margins. And this would
10 be creating new stuff because this you don't find too
11 much in the literature on safety margins.

12 Then along with the policy statement would
13 be what I call the implementation guidance and this is
14 where it would establish the decision process coming
15 up with criteria for how you would implement the
16 Commission's expectations, how you would implement
17 these levels of defense and what that means.

18 MEMBER STETKAR: Mary, before you get into
19 the actual details of the policy statement, there's a
20 lot of verbiage in the description of Option 3 that is
21 a very good marketing approach. There's a statement
22 that really bothers me and I'll quote it. It says
23 "The policy statement would clearly state that the
24 deterministic criteria for defense-in-depth and safety
25 margins must at the most fundamental level compensate

1 for all uncertainties, including those in the PRA
2 models or other risk assessments."

3 How can one ever do that? How can one
4 ever do that? And if you can't do that, don't say
5 that the Commission will issue a policy statement
6 saying that you can because all that does is placate
7 people.

8 MS. DROUIN: I agree. Putting the word
9 "all" in there is an overkill.

10 MEMBER STETKAR: Let's take -- it
11 certainly is an overkill, so let's take "all" out.

12 MS. DROUIN: Yes.

13 MEMBER STETKAR: And just say "will
14 compensate for uncertainties." How much uncertainty?
15 Will the policy statement define that we want 95
16 percent confidence that any hazard will not cause core
17 damage or containment breach or -- how is it going to
18 compensate for those uncertainties? And if it does,
19 we need to know what those uncertainties are, don't
20 we?

21 MS. DROUIN: You cannot know what your
22 unknowns are.

23 MEMBER STETKAR: You can't know what the
24 unknowns are, but we know an awful lot about
25 uncertainties about a lot of things that we've looked

1 at.

2 MS. DROUIN: Yes.

3 MEMBER STETKAR: And these are, for
4 example, will this compensate for the uncertainties in
5 a 2G earthquake that will destroy a containment
6 building?

7 MS. DROUIN: I think if you bear with me
8 I might answer it.

9 MEMBER STETKAR: Okay.

10 MS. DROUIN: Hopefully, I will.

11 MEMBER STETKAR: Okay.

12 MS. DROUIN: Because it depends on how
13 much do you put in the policy statement versus how
14 much goes into the implementation guidance.

15 MEMBER STETKAR: Exactly, exactly.

16 MS. DROUIN: And so right now, I'm going
17 to deviate from this for a second. Right now, our
18 working group is just looking at reactors. We've got
19 the RMTF working group that's just started which looks
20 across the whole program offices and so how you would
21 deal with -- when you're thinking of writing a policy
22 statement, are you just writing it to the reactors?
23 Are you trying to write it to the Agency? Those are
24 things that need to be thought about.

25 MEMBER STETKAR: I guess perhaps you

1 misinterpreted my question because I'm thinking about
2 reactors. You seem to be thinking about things that
3 happen inside a reactor like a pump breaking. I'm
4 thinking about all of the hazards that are faced by a
5 reactor which includes being struck by a meteorite, a
6 large earthquake, flooding, all those types of things
7 that have very, very large uncertainties and bring
8 into question issues of the necessary level of
9 deterministic now, defense-in-depth, and margins to
10 provide assurance of adequate protection against all
11 of those hazards.

12 MS. DROUIN: I understand that.

13 MEMBER STETKAR: And the associated
14 uncertainties of those hazards.

15 MS. DROUIN: Yes.

16 MEMBER STETKAR: Okay.

17 MS. DROUIN: Let me just get back to this.
18 Right here, this is just an example and the policy
19 statement could include two major features, that it
20 would actually specify the level of defense. Here's
21 an example that it could define three levels, accident
22 prevention, which is to ensure that they're stable
23 operation to limit the frequency of events; protective
24 systems, to ensure that the systems are adequately
25 designed and perform adequately in terms of

1 reliability, etcetera.

2 A second level of defense is barrier
3 integrity and that doesn't necessarily mean that your
4 barrier is always a building. It could be also in the
5 form of physical and chemical form.

6 Then the third level of defense is
7 accident mitigation and that's to look at your
8 emergency preparedness and getting more into your
9 consequences.

10 And requiring the other part that would go
11 into the policy statement is requiring that the levels
12 of defense be maintained so that you don't -- you
13 can't just rely on one level of defense. You have to
14 meet all three of them.

15 Probabilistic elements which could be used
16 in there to the extent possible to search for and
17 identify unexpected scenarios, to establish adequate
18 defense-in-depth measures to compensate for those
19 scenarios and uncertainties; the ability to quantify
20 and estimate uncertainties and PRA techniques were
21 possible; and taking credit for defense-in-depth
22 measure and risk analyses, of course, allows one to
23 provide a better estimate of how much defense-in-depth
24 is enough.

25 So the probabilistic elements are doing

1 two things in the sense of allowing you to search for
2 additional things and allowing you to bring in the
3 ability to measure whether or not you have adequate
4 defense-in-depth.

5 MEMBER STETKAR: One of the questions I
6 had, Mary, as I read through this, I couldn't quite
7 understand, suppose that the Option 3 were adopted as
8 a stand-alone option, not in concert with anything
9 else. Would Option 3 require the existence of a
10 plant-specific PRA for each plant? I don't want to
11 get into whether it be level 3. You would certainly
12 need a level or something or other I would think.
13 That doesn't seem to be addressed.

14 The notion of PRA comes up in the context
15 of this slide here and it says it would be very
16 useful, but it's not at all clear how one would
17 measure the acceptability of the margins or as you've
18 characterized it, how much defense-in-depth is enough
19 without that type of metric.

20 So is it envisioned that if -- does Option
21 3 inherently include the need to have a plant-specific
22 fairly detailed level 3? I won't say level 3, fairly
23 detailed level 2 at least PRA?

24 MS. DROUIN: A key issue and I'll just go
25 ahead and talk about it right now, is when you look at

1 this is who is making the decision on whether or not
2 you have adequate defense-in-depth. And we envision
3 that this would be an NRC decision. And the criteria
4 would be through SRPs or those kind of documents. But
5 even though the NRC would be making the decision, you
6 would still have to provide guidance to the licensee
7 of here's what you need to be doing for the NRC in
8 order to make that decision.

9 So the licensee could be using a PRA as
10 part of the process and indicating that they have
11 adequate defense-in-depth to the NRC. Now NRC is
12 going to get risk insights from wherever they can, be
13 it SPAR models, wherever. So how that's going to
14 worked out, we still have to determine that.

15 MEMBER STETKAR: But that's the genesis of
16 my question, actually is --

17 MS. DROUIN: Personally, I don't see how
18 you can do this without a licensee having a PRA.

19 MEMBER STETKAR: Right. Okay, and reading
20 through it, I couldn't understand that either, quite
21 honestly, but that's my own opinion. I wanted to
22 explore though whether you've thought through this
23 enough because it could be an important criteria in
24 the decision process about selection of Option 3 as a
25 stand alone. We had some preliminary discussions

1 about well, Option 3 could actually morph with any of
2 the other options and might be an element of any of
3 them. But it was also stated that Option 3 could be
4 considered as a stand-alone option.

5 MS. DROUIN: Yes.

6 MEMBER STETKAR: And if the implications
7 of Option 3 is that the staff would expect every
8 licensee to have a fairly mature PRA for all operating
9 modes, level 2, whatever scope you felt was
10 appropriate, that expectation, I think, ought to be
11 better elaborated in the discussion, the presentation
12 of this option. Because right now it's rather vague.
13 There are these statements in here that seem to
14 indicate that use of a risk assessment is the perhaps
15 most reasonable in your and my opinion tool to use to
16 evaluate margins or whether or not you have defense-
17 in-depth.

18 MS. DROUIN: Right.

19 MEMBER STETKAR: It's fairly vague.

20 MS. DROUIN: Each level of defense,
21 whatever levels of defense that get defined, you would
22 have some type of quantitative criteria that in my
23 mind would be best coming from a PRA. You would have
24 deterministic criteria. You would have criteria for
25 safety margins. And you would look at all of these,

1 you know, in balancing them and determining whether or
2 not you have adequate defense-in-depth for that level
3 of defense. So your decision criteria would walk
4 through and be a series of questions and everything.

5 MEMBER STETKAR: I know how it would be
6 done. I'm only saying that as the staff develops the
7 final SECY paper that presents these options, if the
8 staff expectation is really that PRAs would be needed
9 to implement this as a stand-alone option, it should
10 be clarified. Or if you believe it can be implemented
11 effectively without PRAs, then that should be
12 clarified.

13 The only reason I bring that up is that we
14 heard earlier that you received some preliminary
15 feedback, for example, on Option 4b from the industry
16 saying well, this is onerous. It's going to cost ten
17 times as much money to develop these PRAs within the
18 context of 4b. If it's envisioned that PRAs are also
19 a fundamental part of 3, it seems that ought to be
20 clarified. Perhaps you're trying to actively avoid
21 it, but I don't see --

22 MS. DROUIN: If we can skip to the last
23 slide, the requirement for plants is still to be
24 determined. What we mean by that is whether or not it
25 would require the licensee or the licensee has the

1 choice of using a PRA versus whether it's required for
2 him. And that's the deliberation we're trying to
3 figure is whether or not the licensee can choose to
4 use a PRA in terms of meeting the criteria or whether
5 or not it's going to be required.

6 MEMBER STETKAR: Do you expect this to be
7 fleshed out before February or is this going to be --

8 MS. DROUIN: We would expect to be able to
9 explain the issue in detail by February, but maybe not
10 necessarily the decision because that would get into
11 the implementation criteria that hasn't been developed
12 yet.

13 MR. MIZUNO: This is Geary Mizuno, Office
14 of the General Counsel again. I just wanted to give
15 ACRS -- first of all, we haven't yet decided on this.
16 We're still looking at this, but you have to
17 understand that right now, Option 3 could be
18 implemented either as decision criteria for NRC to
19 make a determination about whether a generic
20 requirement for an order issued to all licensees or a
21 set of licensees.

22 If you were to do generic regulatory
23 action, you wouldn't necessarily need a plant-specific
24 PRA to make that decision. It's like the existing
25 situation where we have -- where the NRC is trying to

1 a make a determination as to whether to issue a rule.

2 We may have plant-specific information.

3 It would probably be useful to help us further
4 determine what the problem is and how it's manifested
5 at specific licensees as an insight, but for purposes
6 of making generic determinations, safety
7 determinations in terms of a generic requirement, you
8 wouldn't necessarily need the PRA.

9 However, if you were to implement Option
10 3 so that the NRC would expect licensees to address
11 and to present information on defense-in-depth, safety
12 margins, and risk and then proper balancing, then yes,
13 it is highly likely that you will need to have a
14 plant-specific PRA in order to do that. In fact, I
15 personally can't see how you would do that although
16 technically, I am going to leave that up to the staff.

17 MEMBER RAY: And if that were to be the
18 case, and somebody said well, that's a backfit, how
19 would the Agency respond?

20 MR. MIZUNO: Okay, keeping aside the
21 technical issue about what is necessary or not, any
22 requirement to do a backfit would have to be addressed
23 by the NRC from a backfitting standpoint. Of course,
24 how the NRC would address the backfitting requirements
25 would depend upon what the Commission is looking at.

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1 Would they consider the use of the PRA in implementing
2 Option 3 on a plant-specific basis, for example?

3 Would they --

4 MEMBER RAY: The mere existence of a
5 plant-specific PRA.

6 MR. MIZUNO: Right. You could have -- the
7 expectation is -- I mean one way you could implement
8 Option 3 on a plant-specific basis is to require by
9 rule that every licensee have a PRA of a certain kind
10 a certain quality.

11 MEMBER RAY: Right.

12 MR. MIZUNO: The adoption of that
13 particular rule would be -- have to be addressed for
14 backfitting purposes, right?

15 MEMBER RAY: Right.

16 MR. MIZUNO: And so the question that the
17 NRC would be faced with is is that rule an adequate
18 protection matter or are we doing it for substantial
19 -- because there's a substantial increase in
20 protection to public health and safety and common
21 defense and security. It would have to be one of
22 those two things, or the Commission would have to
23 decide that well, it doesn't really meet those tests,
24 but like the AIA rule or I'm trying to remember which
25 of those orders that went out, maybe it was spent fuel

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1 pool implementation, they simply suspend or exempt
2 that particular rule from the purview of the backfit
3 rule.

4 So I'm not sure how the Commission would
5 ultimately deal with that, obviously, and I'm not sure
6 how even the staff would recommend to the Commission
7 as to how to deal with the backfit rule. But clearly,
8 any regulatory requirement would have to be subject to
9 backfitting considerations. And would have to be
10 addressed as part of the regulatory -- the
11 promulgation of that regulatory requirement.

12 MEMBER RAY: Thank you.

13 MEMBER REMPE: But all the discussion of
14 the criteria and the need, perhaps, for a PRA, this is
15 the first time that I heard some talk about a
16 particular quality of PRA and has the staff spent much
17 time discussing about the adequacy of the tools that
18 would be used to judge acceptability and is there
19 anything you can share with me about what they've been
20 thinking?

21 MS. DROUIN: Yes, I mean along with this
22 is that we would have to look at to see whether the
23 given standards for PRA quality are adequate to
24 support this application of PRA.

25 MEMBER REMPE: The staff tools, are they

1 adequate or would they need to be approved to make
2 appropriate decisions?

3 MS. DROUIN: Well, the main tool we're
4 talking about is PRA here.

5 MEMBER REMPE: Okay, but the SPAR models
6 or any other -- would there need to be some
7 significant upgrades?

8 MS. DROUIN: Those we would have to look
9 into, but yes, we have dialogue that and we are
10 thinking about what is the quality of the PRA that's
11 needed.

12 Now there's a different need when you're
13 talking generic versus plant specific.

14 CHAIRMAN SCHULTZ: The other piece, Mary,
15 associated with the use of the PRA in your slide
16 sometimes it's referred to as all utilities should
17 have, a licensee should have a PRA for their plants.
18 But then you also indicate that it's going to be used,
19 meaning that not only do you need to have the PRA
20 developed, as a methodology, but you also need to have
21 either the staff or purchase the process staff to
22 perform analyses in order to investigate issues and so
23 forth. So there is -- that's where the large expense
24 comes in for the licensees to be implementing these
25 analyses and examining issues, having the staff to do

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1 that, either having or purchasing the staff to do
2 that.

3 So I think we ought to be cautious when we
4 say a utility should have a PRA and recognize that
5 that brings with it the need to have staff or purchase
6 consultants to examine issues on an on-going basis.

7 MS. DROUIN: Yes.

8 CHAIRMAN SCHULTZ: I think that's why the
9 industry is making comments about perhaps
10 underestimate by a factor of ten. You buy the PRA,
11 have it put in place, but what we're talking about
12 here is really strongly in the application and
13 understanding mode.

14 MS. DROUIN: Yes.

15 CHAIRMAN SCHULTZ: Of application.

16 MS. DROUIN: Absolutely.

17 MR. DINSMORE: This is Steve Dinsmore of
18 the staff. I guess at this point in time our general
19 process is we have to figure out what they're going to
20 use the PRA for and then we have to figure out how to
21 make sure the PRA is good enough for what they're
22 using it for.

23 So the main answer to your question is we
24 have to figure out how we're going to use it. If
25 they're going to use 4b to really drive the

1 operations, that's a certain use. If they're going to
2 use it to maybe come back and argue against or
3 discussions with the staff about potential fixes that
4 they should use, that would be a different use.

5 So I personally -- and I think many of the
6 PRA people think if we really go a long way towards
7 relying on PRA, we are going to somehow adjust the way
8 that we're currently reviewing them. But we have to
9 wait until we get to the point where we kind of know
10 how they're going to use it.

11 MEMBER STETKAR: Sorry, I forced you to
12 skip over some slides, so you probably may need to go
13 back.

14 MS. DROUIN: No, I wasn't going to.

15 (Laughter.)

16 CHAIRMAN SCHULTZ: Well, that's a good
17 thing, too. The Committee will then quickly review
18 slides 36, 37, and 38.

19 MS. DROUIN: It just gets into more detail
20 on the implication and that we would be creating these
21 decision processes with criteria and it would be done
22 for each level of defense.

23 MEMBER SHACK: If you're going to go
24 through that, you almost have to answer the first
25 bullet here yes.

1 MS. DROUIN: That is true.

2 MEMBER BLEY: Given these are options put
3 forward. Somebody else is actually doing that.

4 MEMBER SHACK: We made the argument
5 already in filtered vents, right, that these are part
6 of the regulatory analysis guidelines, at least the
7 staff has made that argument. I'm not sure the
8 Commission has accepted it. Just an observation.

9 MS. DROUIN: Any other questions?

10 CHAIRMAN SCHULTZ: Seeing none, Mary,
11 thank you.

12 MS. DROUIN: Maybe we're back on time.

13 MR. DUDLEY: Next, Mark Caruso of the
14 staff will talk about Option 4, one way -- different
15 ways to establish a new event category.

16 CHAIRMAN SCHULTZ: Dick, while Mark gets
17 settled as well, just to comment that we do have a
18 break scheduled at around 10:15. I know we're not
19 going to get through the next segment of the
20 presentation before then and we have it on the agenda
21 before and after, so we'll look for a convenient time
22 to stop.

23 MR. DUDLEY: You'll raise your hand when
24 you're ready?

25 CHAIRMAN SCHULTZ: I will.

1 MR. DUDLEY: Thank you.

2 MEMBER BLEY: Why not know?


3 CHAIRMAN SCHULTZ: Why don't we do that?


4 (Laughter.)

5 That will be better. Thank you, Mark, and
6 we'll see you in 15 minutes, we'll reassemble at
7 10:10.

8 (Whereupon, the above-entitled matter went
9 off the record at 9:55 a.m. and resumed at 10:11 a.m.)

10 CHAIRMAN SCHULTZ: We'll bring the meeting
11 back to order and begin the presentation of Option 4,
12 Mark Caruso. That's on, Mark.

13  MR. CARUSO: Yes, I'm Mark Caruso. I'm a
14 Senior Risk and Reliability Analyst in the Office of
15 New Reactors. And I think first I'll just give you a
16 brief introduction to Option 4, and then I'm going to
17 go through Option 4a in some detail.

18 I thought it would be good to start with
19 this slide. I had this in my 4a package, but I think
20 it goes better right here because it applies to both
21 4a and 4b. Just a brief, you know --  historically, the
22 Commission has relied on design basis events and
23 accidents to demonstrate the plant is robust. Over the
24 years, I've been here for 30 years, and we've
25 addressed different safety concerns in various ways,

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1 some we've created requirements. Sometimes those
2 requirements are cost beneficial safety enhancement
3 requirements, sometimes they're adequate protection
4 requirements like the requirements that were put in
5 place for addressing the post 9/11 issues, 5054-
6 H(h)(2). And sometimes we've used voluntary
7 initiatives like NEI 9106 addresses events that can
8 happen in early shutdown. And we did have proposed
9 rulemaking activities in that area but they were not
10 adopted. And in some cases we've used Generic Letters,
11 so we've had all these different ways of doing things.

12 The NTTF and the RMPF have recommended
13 that we look at trying to create a more systematic and
14 logic approach to dealing with beyond design basis
15 events, something different than what we've done
16 before.

17 In addition, the European regulators and
18 the IAEA, they recognized this idea also and are
19 embracing it. You can find some discussion in IAEA
20 safety standard about the need for a design extension
21 category of events to deal with beyond design basis
22 events, and they even talk about using best estimate
23 methods to address things. So, this is what we're
24 talking about here. Option 4 --

25 MEMBER RAY: Wait, I'm sorry. I know we're

1 in a hurry, but there was just an inconsistency in
2 that statement, I thought, that I wanted to question.

3 Recommended design basis be extended, and
4 then later on it refers to traditional design basis as
5 these events, I think we're talking about the same
6 events, are outside the traditional design basis. I'm
7 troubled by the lack of clarity that I see here
8 involving a lot of what we're talking about here, but
9 whether we change the design basis or we don't. And
10 having been involved in plants when the design basis
11 was changed and the sky didn't fall, and we actually
12 made changes to the plant to reflect a different
13 design basis than what it was built to, I never see us
14 providing that clarity about are we talking about
15 changing the design basis, or are we talking about a
16 change in the design basis now not being necessary
17 because we've got all this other stuff that is beyond
18 the design basis, and it goes by lots of different
19 names. But which -- and I know we're not talking about
20 one or the other necessarily, but I guess I'm just
21 expressing frustration here because it isn't clear to
22 me if we are abandoning the idea that yes, we need to
23 change the design basis, or if we even know when we
24 would change the design basis as opposed to dealing
25 with this new era that's outside, now that's the first

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1 time I recall seeing the word "traditional design
2 basis." I don't know what we mean by traditional
3 design basis. Well, I guess we mean deterministic
4 methodologies.

5 MR. CARUSO: Yes, I think traditional
6 design basis is the Chapter 15 events, the Chapter 6
7 events, large break LOCA. I do the analysis. I assume
8 a single failure.

9 MEMBER RAY: Well, what about what the
10 design -- the Sayshadon earthquake is, what is that?

11 MR. CARUSO: Design basis.

12 MEMBER RAY: Yes? And supposing it needs to
13 increase? Do we say well, that's an event beyond the
14 design basis. We'll deal with it that way? Or do we
15 say well, we'll increase the design basis and modify
16 the plant? Which is it?

17 MR. CARUSO: Well, you could certainly do
18 it under Option 4, and you could probably do it under
19 Option 1. I mean, you can -- if there are specific
20 things you want to do you can still do them just as
21 you've said. We have changed the design basis over
22 time --

23 MEMBER RAY: But do we know when we want to
24 move the design basis line and when we want to simply
25 enhance our ability to deal with problems that are

1 beyond the design basis, like Fukushima?

2 MR. CARUSO: Well, actually, I think 4a
3 goes to the first one you said. It's more about
4 changing the design basis, extending it, bringing into
5 the design basis events that we always felt were
6 outside. I mean, station blackout is a multiple
7 failures of safety systems. They were not
8 traditionally a part of the design basis. You bring
9 those events and --

10 MEMBER RAY: Okay.

11 MR. CARUSO: The other, 4b is a little bit
12 more about a way to be more -- more options and look
13 at specific things and fix them, I think.

14 MR. DUDLEY: If we proceed to discuss 4a
15 and 4b --

16 MEMBER RAY: Then come back.

17 MR. DUDLEY: -- and we don't answer your
18 questions, please raise your right.

19 MR. CARUSO: Right.

20 MEMBER RAY: All right. That's fine. Go
21 ahead.

22 MEMBER STETKAR: Do you have slide -- I
23 haven't looked ahead, but as you do that, the notion
24 of how the concept of adequate protection is treated
25 in each of those options?

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1 MR. CARUSO: Yes, and that's --

2 MEMBER STETKAR: Okay, good.

3 (Simultaneous speech.)

4 MEMBER STETKAR: That may help --

5 MR. SNODDERLY: Some traditional design
6 basis accidents under 4b may move into the design
7 enhancement category, which would be for beyond
8 adequate protection, additional protection. Under 4a,
9 you would extend the current design basis and put some
10 new events in there, but then we would be calling them
11 adequate protection.

12 So, for example, under 4a current safety
13 enhancement regulations like station blackout and ATWS
14 made it into this extended design basis category, now
15 you would be calling them adequate protection. In
16 other words, we need those rules for adequate
17 protection and they would get a certain set of
18 treatment. Under 4b, station blackout and ATWS would
19 be in the design enhancement category and we've get a
20 different set of treatment. So, it's --

21 MEMBER RAY: Okay, those are categories
22 accidents. I tend to think more about external events
23 because they have a continuum of probability.

24 MR. SNODDERLY: Exactly, so we --

25 MEMBER RAY: So, it's hard to -- go ahead.

1 MR. SNODDERLY: So, for -- we would have a
2 safe shutdown earthquake for design basis, and then we
3 would have another earthquake that would equate to say
4 10 to the minus 6 earthquake that you would address as
5 part of the design enhancement category, and we do
6 have different --

7 MEMBER RAY: 4a or 4b --

8 MR. SNODDERLY: 4b.

9 MEMBER STETKAR: But under 4a, that 10 to
10 the minus 6 earthquake would become -- mitigation of
11 that would become an element of adequate protection.

12 MR. SNODDERLY: Not necessarily.

13 MEMBER STETKAR: Well, go through it
14 because I want to understand the not necessarily or
15 yes.

16 MR. SNODDERLY: The basis for my answer
17 was, again, that anything that's in the design
18 extension category and to the left would be for
19 adequate protection. So, if you put that 10 to the
20 minus 6 earthquake in there, it's adequate protection.
21 If we say we're going to address those earthquakes
22 between 10 to the minus 7th, or 10 to the minus 5th, or
23 whatever we decide in the design enhancement category,
24 they would be there for additional protection, and
25 they would have an associated treatment.

1 MEMBER RAY: All right.

2 MR. SNODDERLY: And then that's really
3 where we would get into the next stage of the nitty
4 gritty and the implementation. So, what should that
5 treatment be, and how much --

6 MEMBER RAY: Okay. Well, that's what I'm
7 going to be looking.

8 MR. SNODDERLY: If we don't get to that by
9 11:30, then tell us and we'll either have to --

10 MEMBER RAY: That's all right. I'm not so
11 much concerned about categories of events as I am,
12 like I say, continuum. You've got to draw a line
13 somewhere like you just did.

14 MR. SNODDERLY: But, yes, success for this
15 briefing will be if that's clear to you guys.

16 MR. CARUSO: So, why don't you go to Slide
17 44, Dick. So, if -- 44. No, no, no.

18 MEMBER ARMIJO: 42, at least we know what
19 you are --

20 MR. CARUSO: The first -- yes, summary of
21 Option 4a. So, Option 4a is establish a category of
22 events by rule that would -- a category where you
23 would establish requirements to deal with events in
24 this category, and those requirements would be
25 adequate protection requirements.

1 You would establish the category and the
2 criteria for scoping things into the category which as
3 we've said is a very large issue. You would establish
4 requirements for applicants to show that they meet
5 acceptance criteria. They could be general acceptance
6 criteria for all the events in the category, or they
7 could be specific to the particular event and
8 requirement that you're talking about. And as Mike was
9 saying, you would establish in the regulation some
10 requirements that would address treatment of SSCs that
11 are credited and mitigating these particular events
12 that spread across the category.

13 Now, what I meant by "not necessarily,"
14 was, is that this option doesn't do -- doesn't change
15 the Backfit Rule. It doesn't take anything away from
16 allowing you to still pursue cost beneficial safety
17 enhancements. So, if you felt that some event didn't
18 belong in this category, this is raising the bar of
19 adequate protection. This is like doing -- looking at
20 a systematic broader approach of doing what was done
21 for loss of large area, which was to say this event
22 needs to be addressed and that is to assure the public
23 is adequately protected. And we came up -- there's a
24 criteria in the rule that says what applicants have to
25 meet. In effect, they had to do evaluations, show they

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1 met it.

2 So, this is talking about trying to take
3 that to a sort of a broader category to establish some
4 requirements that would go across all the events in
5 there. I think what it's trying to do is trying to say
6 that, you know, when we get to situations like that
7 where we think we have something that we should be
8 addressing in a very systematic way, and it should be
9 threat protection, we'd like to think about it in the
10 broader sense than just, you know, we thought about
11 B(5) (b), we thought about that particular event and we
12 addressed it with stuff. And then Fukushima came along
13 and we kind of looked at oh, yes, could we have used
14 all that stuff for it? And there were questions about
15 that because it wasn't designed for that event. So, I
16 think that's what 4a is about.

17 MEMBER STETKAR: But to follow-up on
18 Harold's kind of concern, because it bothers me, also.
19 Let's take seismic events as kind of the poster child.
20 What would you do? And this is going to be applied by
21 rulemaking generically across the whole industry
22 defining a set of extended design basis events, and
23 I'll call them that.

24 MR. CARUSO: Well, you don't --

25 MEMBER STETKAR: Is it a each plant must

1 now meet a peak ground acceleration that is what, 1-
2 1/2 times the current safe shutdown earthquake, 1.75
3 times, 2.0 times?

4 MR. CARUSO: You may not put anything in
5 this category at all to begin with. You may say this
6 is for the next thing we have to deal with. These are
7 for the things in the future that we have to deal
8 with.

9 MEMBER STETKAR: So, after a plant melts
10 from one of these things, then we put it into one of
11 those little --

12 MR. CARUSO: No, no, no, no. This is an
13 issue comes up, how do we address it.

14 MEMBER STETKAR: But that's -- we've always
15 been reactionary that way. I mean, that's part of the
16 reason that we're in the situation we are, that once
17 we think about something we say oh, yes, we need to go
18 pack up something for that.

19 MR. CARUSO: Well, I mean, yes, I mean, we
20 discover things from -- we do analysis, we have
21 operating experience. Yes, that's not going to change.
22 Now, we also -- in this option you can also go
23 retrospective and say why don't we go back and think
24 about should we have put station -- should station
25 blackout be dealt with differently? Should it be for

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1 adequate protection? Should it be part of the design
2 basis? Should we do things differently?

3 Let's look at what about loss of RHR and
4 decay heat removal during mid-loop operation. How do
5 we feel about that?

6 MEMBER STETKAR: Why mid-loop operation?
7 Only because someone once did a PRA that looked only
8 at that and said hey, this might be important.

9 MR. CARUSO: I'm just using it as an
10 example, I mean --

11 MEMBER STETKAR: Yes, but that's the whole
12 point.

13 MR. CARUSO: I could have said reduced
14 inventory.

15 MEMBER STETKAR: That's the whole point, is
16 that you're looking at reactions to very specific
17 issues. And when I raised the point of saying well,
18 should a -- pick any multiplier, 1.235 times the
19 current safe shutdown earthquake, should that be an
20 event that falls under the guise of requiring enhanced
21 regulations to assure adequate protection? You say
22 well, no, that's not the purpose of this.

23 MR. CARUSO: No, I didn't say that. You --
24 part of this is to establish criteria for selecting
25 events, part of it is decide if you want to go and

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1 look for events retrospectively, but the criteria,
2 like we said, could be Option 3 or whatever you want
3 to make them in terms of putting things in. So, I
4 can't -- I don't know what they are. That's a big
5 issue for this option, that's a big issue, so I can't
6 tell you. I'm not here to answer that question.

7 MEMBER STETKAR: I'm trying to understand
8 kind of the philosophy because I understand what
9 you're talking about when I can identify a very
10 specific focused issue primarily associated with
11 things that can fail inside the plant, pumps, and
12 pipes, and valves, and electricity and all that good
13 stuff. It's not clear to me how this approach
14 addresses beyond design basis external hazards that
15 are in Harold's notion continuing, whether it's
16 seismic events, or flooding, or high winds, or --

17 MEMBER RAY: Seismic-induced fires.

18 MEMBER STETKAR: Fires.

19 MR. SNODDERLY: My understanding for Option
20 4b, which is based on --

21 MEMBER STETKAR: I want to understand 4a,
22 first. I understand 4b.

23 MR. SNODDERLY: Okay.

24 MR. CARUSO: So, 4a is about having this
25 category, coming up with criteria to decide what

1 should go in there and allowing us to address things
2 we've addressed before in a more sort of siloized way
3 to try and do it a better way, to try and make sure
4 that if we address this event that we will address it
5 in a way that it could capture other events, that it's
6 done in a larger context of protection of the public
7 as opposed to let's just -- here we have a problem, an
8 event to deal with. What do we need to do, and how do
9 we get it done, and what compromises do we have to
10 make, and all that sort of stuff. This is about trying
11 to get rid of that problem.

12 Now, how you -- the implementation of it
13 I think is very difficult. And I think the criteria
14 part is the big point about this one, because it's
15 easy to talk about this philosophy and this approach,
16 but when you start to think about the criteria, is it
17 going to be frequency, is it going to be tox plants,
18 is it going to be both? How do you do?

19 MEMBER RAY: All right. But are you putting
20 enough emphasis on the problem that you've just
21 described? That's the essence. And nobody's is
22 expecting a solution at this stage, but as you say,
23 it's easy to talk about, but hard to do. And, in fact,
24 it's so hard to do that it's hard to imagine doing it.
25 And that's where I think we need to understand the

1 difficulty and focus on that.

2 MR. CARUSO: Well, I have a slide on key
3 issues, and this is the first one.

4 MEMBER RAY: Go ahead. All right.

5 MR. DINSMORE: Hi, this is Steve Dinsmore
6 from the Staff. If I could try to answer Mr. Stetkar's
7 question directly maybe, we wouldn't say you'd have to
8 go to 1.2, your design basis earthquake. It would be
9 more like your seismic risk has got to be less than 10
10 to the minus 6. You'd have -- somehow that would be
11 related back through to the design basis earthquake.
12 I believe that's -- so, when Mark is talking about the
13 decision criteria, so you start at the decision
14 criteria and you work backwards.

15 MEMBER STETKAR: But some of that, Steve,
16 and maybe we'll get into it because we're going to run
17 short on time here, some -- that, though, sounds to me
18 more like 4b than 4a. So, I want -- what I'm trying to
19 do is understand the distinction between 4a and 4b. I
20 understand that 4a, whatever this box of things is,
21 that box of things will be treated in regulatory space
22 (a) generically, and (b) as a requirement to meet
23 adequate protection. I understand that. What I'm
24 trying to understand is how that box will be populated
25 and how the framework will work to populate that box.

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1 MR. CARUSO: Well, the biggest difference
2 is that in 4a the decision about whether events are in
3 there or not is the NRC's. The NRC is populating the
4 category, so it develops criteria for that. It's done
5 on a generic basis. It's all about generic
6 requirements, not plant-specific. And that's -- some
7 of the disadvantages of 4a are is that we might miss
8 some important plant-specific things.

9 4b is more about the applicants going and
10 looking, and having criteria, and using their PRA to
11 do it. So, it's -- the implementations are very
12 different. The idea of a new category and putting
13 things in there that weren't -- that we dealt with
14 sort of ad hoc before is a similarity.

15 MEMBER STETKAR: But if I step way back
16 from this from the public's perspective, if 4a, if the
17 goals of 4a and 4b, they might be implemented
18 differently, the tools that you use and the methods
19 that you're using, how you define the box and throw
20 things into it are different. But if the goals are
21 increasing confidence that we're managing public
22 health and safety or risk for events that are beyond
23 the current design basis, that ought to be consistent
24 -- a consistent goal for both of those frameworks at
25 a very high level. And I'm trying to understand -- I

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1 understand how the -- I think I understand, maybe I'm
2 wrong, how the box will be populated, the mechanics of
3 it under 4b.

4 What I'm not so clear about is how this
5 framework will achieve that same goal, essentially be
6 populating that box that I now treat generically as
7 something that's necessary to achieve a sense of
8 assurance of adequate protection. I don't quite
9 understand how that's going to work under 4a.

10 CHAIRMAN SCHULTZ: And one would expect in
11 either case that the external event category would be
12 extremely prominent in looking at beyond design basis.
13 And we don't see much of it here until the last slide,
14 it appears, but not in a direct way. And in terms of
15 extension, but just consideration of seismic design
16 basis. And, of course, external events goes far beyond
17 that now in terms of both our consideration, as well
18 as the public's.

19 MR. CARUSO: So, where are we, key issues
20 or -- I think we've talked enough about 4a and
21 implementation of 4a.

22 MEMBER STETKAR: Maybe not for the
23 Committee, though, because I --

24 CHAIRMAN SCHULTZ: We jumped into one
25 aspect of it, Mark, so I would recommend we go

1 through.

2 MR. CARUSO: Key issues. So, we just talked
3 about the first one which is how -- you know, what are
4 the criteria, how do you select them, is it Option 3
5 or something like Option 3, or do you, you know, need
6 to think beyond that.

7 The second one is the acceptance criteria
8 for these events. Do you do it, you know, generally
9 like, you know -- do you need to be able to show that
10 you can maintain and restore core cooling for any of
11 these events, something like that, or is that plus
12 some specific things that are event-specific, or is it
13 all -- that has to be worked out.

14 The treatment of SSCs is a big issue here.
15 There's no intent with this option to go back and
16 revise the definition of safety-related, which is part
17 of the -- I'll say the traditional design basis. So,
18 you know, safety-related equipment is treated the same
19 way it's always treated. So, if they're relying on
20 safety-related equipment there's no issue.

21 Here you might imagine that for these
22 events you would now also be relying on some non-
23 safety-related equipment, so you need to decide how
24 you would treat that. Would you say that they should
25 treat it like safety-related equipment, or some graded

1 approach?

2 You know, we've sort of started to do this
3 for the passive designs when we talk about, you know,
4 an extended station blackout, an extended event of
5 what's beyond 72 hours in the passive plants. We've
6 said you need to have equipment to maintain key safety
7 functions, and we want some sort of treatment of that,
8 but we're not going to say it has to be safety-related
9 because we know you may be using non-safety equipment
10 to do that. But that's not a brand new concept, so
11 that's an issue, as to the treatment of equipment, a
12 big issue.

13 MEMBER RAY: A design extension event, just
14 to be clear, is not an event that is now included in
15 the design basis. It's not such an event. Correct?

16 MR. CARUSO: Well, there is no definition
17 in the regulation of design basis event, or design
18 basis accident.

19 MR. DUDLEY: Any event that's put into this
20 category, it would be part of the design basis of the
21 facility that is required to meet it. So, this is the
22 -- that's one of the --

23 MEMBER RAY: Why don't we call it revising
24 the design basis rather than a design extension event?

25 MR. DUDLEY: We chose to call it extending

1 the design basis, I guess. We thought perhaps revising
2 it would imply that you should have the same treatment
3 as the original -- the deterministic design basis.

4 MEMBER RAY: And that's not intended.

5 MR. DUDLEY: This is to establish the fact
6 that you can have adequate protection requirements
7 that do not need -- that can have specific mitigation
8 requirements and acceptance criteria, but they could
9 still be adequate protection.

10 MEMBER RAY: All right. So, Appendix B
11 wouldn't apply, for example, to something necessarily.

12 MR. DUDLEY: No, we'd have to develop
13 something else, another sort of criteria.

14 MR. CARUSO: Now, you would -- the idea was
15 to do this in 50.2 to actually define what a design
16 extension event or requirement is. Like I said,
17 there's no definition in there of design basis
18 accident or design basis event. Put that in there,
19 too, and make it clear what are the distinctions, the
20 similarities, how are they alike, how are they
21 different. And in doing that, it would also allow you
22 to look at the traditional events that we have and say
23 do the treatment requirements and things that we have
24 for them now, do they still really fit, or does that
25 event really fit over here?

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1 MEMBER RAY: Well, I think my original
2 comment then is still correct. You're not talking
3 about extending the design basis. You're talking about
4 creating this category of design extension events to
5 which different requirements in principle could be
6 applied.

7 MR. CARUSO: That the plants are required
8 to be designed, constructed and operated to be able to
9 mitigate these events. That would be a requirement.

10 MEMBER RAY: Yes. No, I understand that.
11 Yes, but the --

12 MR. CARUSO: That's a design extension --

13 MR. DUDLEY: To lesser degrees than the
14 deterministic --

15 MEMBER RAY: But it's not as -- it's not
16 just a simple all right, yesterday your SSC was this,
17 tomorrow it's that. Nothing else has changed.

18 MR. DUDLEY: No.

19 MEMBER RAY: And the reason?

20 MR. CARUSO: well, I think to try and, you
21 know, do this in a way that utilizes all the
22 experience and knowledge we've gained about dealing
23 with events. It has to recognize the fact that there's
24 a whole fleet of operating plants already built, so --

25 MR. DUDLEY: Most of these events would

1 have lower initiating frequencies in general.

2 MR. CARUSO: Right. Right. So, there's a
3 number of issues --

4 MR. DUDLEY: So there's a basis for
5 supporting some reduced treatment requirements.

6 MEMBER RAY: Well, I appreciate that, but
7 let's just suppose that you learn that that's not the
8 case; that, in fact, what you thought was 10 to the
9 minus 4 event is now different --

10 MR. DUDLEY: Well, one of our initial
11 decisions when a new -- a brand new event pops up, and
12 I guess we've heard you don't have to look for them,
13 they'll find you, too. And when that event pops up the
14 first decision will be is that a deterministic design
15 basis event? I mean, it is possible that that would
16 happen, so that's our first decision. But then if we
17 determine it's not, because perhaps it's a lower
18 frequency event than some of the ones in the
19 deterministic design basis, then we would be looking
20 at it potentially belonging in category -- the
21 extended design basis category of 4a.

22 MEMBER STETKAR: Rich and Mark, I'm going
23 to keep bringing you back to the seismic events
24 because I think that the public and the Commission, if
25 this option is going to be presented for decision,

1 needs to understand that type of issue. So, I'll come
2 back to something like 1-1/2 times the current safe
3 shutdown earthquake that has a frequency, it's not 10
4 to the minus 30th, it's some frequency. It's different
5 at each site. You can do generic things, but -- would
6 something like that be a candidate for population
7 under 4a of a design extension event? Yes or no?

8 MR. DUDLEY: It seems --

9 MEMBER STETKAR: I mean, you know, don't
10 hold me to 1-1/2. It could be something else, it could
11 be based on frequency, 10 to the minus -- you know,
12 five times 10 to the minus 6 event per year or
13 something like that.

14 MR. DUDLEY: I mean, the way you describe
15 it, I mean, it's a plant-specific event.

16 MEMBER STETKAR: Right.

17 MR. DUDLEY: So, each --

18 MEMBER STETKAR: All of these are plant-
19 specific events. Station blackout is a plant-specific
20 event, but you're going to apply it generically across
21 the industry, so let's not get into plant-specific
22 versus generic.

23 MR. DUDLEY: I would think that perhaps on
24 a plant-specific basis one could look at slowly
25 increasing the size of the earthquake. And then at

1 some point you would reach a threshold at which you
2 had major problems. And maybe at that point you would
3 identify -- that's perhaps a way you would identify an
4 event that you would then categorize, but this would
5 likely be under Option 4b.

6 MEMBER STETKAR: Okay, I understand how it
7 would be treated under 4b. I really do understand -- I
8 think I do, maybe I don't, but I think I do.

9 MR. CARUSO: My answer to --

10 MEMBER STETKAR: Let me be naive and assume
11 that for now.

12 MR. CARUSO: My answer is I would not put
13 it in the category.

14 MEMBER STETKAR: You would not --

15 MR. CARUSO: Because it's plant-specific,
16 I would --

17 MEMBER STETKAR: But, I'm sorry, station
18 blackout is plant-specific.

19 MR. CARUSO: Yes, but we're talking about
20 the seismic --

21 MEMBER STETKAR: ATWS is plant-specific.

22 MR. CARUSO: Well, not as much as seismic.

23 MEMBER STETKAR: ATWS is plant-specific.

24 Station blackout, any of these single issue focused
25 items is plant-specific, the frequency and the

1 consequences are plant-specific. But you're going to
2 apply them generically and, okay, I can understand
3 that.

4 I'm trying to understand how this whole
5 other category of hazards would be treated under what
6 is now being proposed as a regulatory framework.
7 Remember this 4a is an option for a regulatory
8 framework. It's how the NRC will do business, and the
9 NRC business should cover all hazards, and all sources
10 of risk. And if we can't explain how this -- how those
11 sets of hazards would be treated under this regulatory
12 framework, there seems to be a gap.

13 MR. CARUSO: This framework still includes
14 the ability to have plant-specific backfits. It's
15 still includes the ability to look at plant-specific
16 issues and deal with them on a plant-specific basis.
17 It doesn't take that away.

18 This is really not a large overarching new
19 framework for regulation. This is a major change in
20 how we do business, but it's -- there's still ways to
21 do things that we've always done. And if something is
22 plant-specific, this doesn't take away your ability to
23 deal with plant-specific issues.

24 MEMBER SHACK: No, this gives you a way to
25 turn things into adequate protection.

1 MR. CARUSO: And have criteria that makes
2 sense for that.

3 MEMBER SHACK: So, I mean, it's that first
4 bullet and that last bullet that, you know -- I
5 understand how you can -- you've worked out all those
6 problems in between, and I can understand how you do
7 that. It's Option 3, again. It's the first bullet and
8 the last bullet. How do you make the decision --

9 MR. CARUSO: Exactly.

10 MEMBER SHACK: -- for what you put into
11 these things. And, you know, Steve's idea that you
12 somehow have a residual risk that you're trying to
13 deal with is certainly one way to do it, but it just
14 seems to me back to Option 3 again here. We've just
15 hidden it under a couple of different bullets, but
16 putting these things into the bins is the tricky part.
17 But then there's this magic that it turns into
18 adequate protection at that point.

19 MR. CARUSO: That's the key distinction.

20 MEMBER STETKAR: Well, in some sense some
21 of the requirements then to provide assurance -- I've
22 forgotten what they're called, but things like seismic
23 qualification. You know if, for example, you populated
24 this with an event that's 1.5 times the current SSC,
25 in principle any equipment needed to provide

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1 mitigation capability for that event should be
2 qualified to operate under that event.

3 Now, you can argue well, you can do best
4 estimate calculations of its seismic capacity and so
5 forth but, indeed, there would need to be enhanced
6 seismic qualifications of the equipment, the
7 structures, and so forth, which could become quite
8 extensive.

9 MR. CARUSO: Or you could do -- like I say,
10 for the regulatory treatment in safety systems, it
11 says you -- it doesn't have to work during the
12 earthquake, but what it has to do is be available and
13 be ready to go after the earthquake. And I think
14 there's a difference there in terms of seismic
15 ruggedness. I think that we say that stuff that has to
16 be seismic category one, and make sure that -- and
17 work during LOCAs and stuff is working during the
18 earthquake; whereas, if you're talking about, you
19 know, acceptance criteria of maintaining and restoring
20 core cooling for the event, which is -- I mean, that
21 criteria in a boiler, I mean, you could have melted a
22 few of the bundles, and then you get the core cooling
23 back and things are okay.

24 MEMBER SHACK: Well, is your vision here
25 something like the mitigating order where you're

1 supposed to do beyond design basis accidents, but they
2 never tell you what the beyond design basis -- I mean,
3 it's unlimited.

4 MR. CARUSO: No, no, I'm just --

5 MEMBER SHACK: But you leave the definition
6 to the implementing guidance.

7 MR. CARUSO: I suppose that's a
8 possibility.

9 MEMBER SHACK: Okay. So, that's not the way
10 you're thinking at the moment, though, obviously.
11 You're thinking that somehow you're binning will have
12 defined what you mean by a beyond design basis
13 accident.

14 MR. CARUSO: Yes.

15 MEMBER SHACK: And you probably should. I
16 mean, we have this thing now that some things are
17 suddenly adequate protection, but the criteria for it
18 are not clear, so if you do the first bullet and the
19 last bullet, you'll have a new -- a set of criteria
20 for what becomes adequate protection, whatever that --
21 - you haven't done it for this many decades, but we're
22 going to get it done -- this time is different. Right?

23 MR. CARUSO: That would depend on whether
24 or not the Commission chooses to pursue this option.
25 I suppose they could say bring in implementation and

1 I'll see if I like it, you know. I mean, bring me 4a
2 and 4b and I'll choose. That's a possibility. And I'm
3 not particularly a proponent of 4a or 4b. Just trying
4 to explain as best as we can what they are, and I hope
5 we're making progress.

6 MEMBER ARMIJO: I am more confused than
7 when we started, you know. This hasn't clarified
8 anything for me, so just keep going because we're
9 bouncing around.

10 MEMBER STETKAR: Quite honestly, as I read
11 through it I under -- I think I understand quite well
12 how 4a would apply to those types of events like
13 hardware-driven station blackout, like hardware-driven
14 ATWS, like reactor vessel something or other, any --
15 what in PRA you normally consider as internal events
16 in the plant. I think I understand how you populate
17 it, that's sort of mechanics.

18 What I was missing is how it would apply
19 to all of those other external hazards that Harold
20 characterized that are kind of a continuum. And of
21 necessity would require some type of line to be drawn
22 and said that something on the lefthand side of the
23 line, mitigation of that is necessary for adequate
24 protection, and something on the right side of the
25 line is not.

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1 MR. CARUSO: Well, I haven't thought about
2 this issue at all. And I think that I will and that we
3 should as a working group, because you're talking
4 about an issue that we should address in our paper
5 about this particular option.

6 MEMBER STETKAR: Well, only in the context,
7 as I said before, that if 4a and 4b, the decision
8 makers say well, I don't like number 1, I don't like
9 number 2, number 3 I'm going to fold into 3 and 4a, or
10 3 and 4b. Now I need to make a decision between 4a and
11 4b as a way of thinking about agency's regulatory
12 framework. That framework needs to address internal
13 events and external hazards.

14 MR. CARUSO: Yes. If one option does it
15 better than the other, that should be brought out.

16 MEMBER STETKAR: That's fine, but at least
17 there should be some information presented to the
18 decision maker about the philosophy of 4a, how it
19 would treat those types of events.

20 MR. CARUSO: I think --

21 MEMBER STETKAR: Not in detail, but --

22 MR. SNODDERLY: Another analogy that might
23 help is it would be -- let's look at fire. So --
24 because I think we're doing a lot of this right now
25 in NFP 805.

1 MEMBER STETKAR: Absolutely.

2 MR. SNODDERLY: Right? So, we have certain
3 risk criteria from Reg Guide 1.174. And we say okay,
4 so for this set of -- these external events, fire, we
5 don't want it to contribute more than X, so you would
6 go in and you would look at fires, and you would
7 verify that yes, I have a sufficient set of
8 structures, systems, and components to take me to hot
9 standby and make sure I'm okay for major fires. And
10 then now that I've identified that subset of
11 equipment, I've got a reliability assurance program
12 requirement or something, and I'm going to make sure
13 that those things are being maintained and have the
14 reliability that I'm expecting.

15 So, I think -- and, again, it --
16 and that's how I'd picture it in 4b. And I think the
17 difference between 4a and 4b is how you're going to
18 set up that rule. Who's going to make the decisions?
19 But I think it's, again, going to get you to something
20 like that. So, to me, I think NFP 805 is a good
21 example of that idea of the Commission creating a
22 rule, setting criteria, and then licensees going off
23 using their plant-specific fire PRAs to identify that
24 they have a sufficient set of structures, systems, and
25 components to get them to hot standby.

1 And then I could also see that for -- so,
2 instead of a fire you'd have some seismic event. Let's
3 say related to 10 to the minus 6, so for your specific
4 site, for an earthquake of 10 to the minus 6, you need
5 to demonstrate that you have sufficient structures,
6 systems, and components to get you to safe shutdown
7 and maintain it.

8 MEMBER STETKAR: The only difference that
9 -- yes, I mean there's some analogy, except that even
10 in the fires, there's not that sense of continuum. You
11 already drew the line. You already said 10 to the
12 minus 6.

13 MR. SNODDERLY: Okay, and that's -- so then
14 I would say that's the difference between 4a and 4b.
15 4a, someone is going to have to set that line in the
16 sand; 4b would be more of the continuum.

17 MEMBER RAY: What you actually said was
18 maximum credible. You didn't say 10 to the minus 6th,
19 or 10 to the minus 5th, 10 to the minus 4th. You said
20 -- we can go look at right now in an updated FSAR for
21 many, many plants, it'll say maximum credible. All
22 right?

23 Now, I think we're talking about how to
24 deal with conditions which we now have to interpret
25 maximum credible, maybe apply a number to it. I don't

1 know. That's what I'm trying to understand. But even
2 say about flooding, or I think external events are the
3 most troublesome to us, not -- maybe station blackout.
4 I don't know. But, you know, we shouldn't assume just
5 because of IPEEE and Mary mentioned IPEEE experience.
6 I think she's the one who often points out how it's
7 not a change to the licensing basis because you did an
8 IEEE evaluation to identify ways to reduce risk. That
9 didn't change your licensing basis. It's still what it
10 was.

11 I don't mean to get -- I'm off on a
12 tangent now so let me just stop right there. I'm
13 trying to understand how somebody who's got a maximum
14 credible earthquake, and now we have had Fukushima and
15 other things, how we're going to apply this. And I get
16 the sense that we're going to create a new category.
17 We're not going to change the design basis. It still
18 is going to be what we thought 20 years ago was a
19 maximum credible event, but now we're going to imagine
20 other events more severe, and we're going to apply
21 some new set of criteria to it. We're going to call it
22 an extended design basis, I guess.

23 MR. CARUSO: Can we go to Slide 47. So, in
24 4a what would be the products that would be produced
25 as part 4a? Well, that would be the revision of 50.2

1 to put the definition in there. We would revise 50.34
2 and Part 52 to require the event evaluations to be in
3 the FSAR. We would need regulatory guidance for
4 applicants and licensees for how you evaluate the
5 methodologies for evaluating these events, and
6 criteria, and all that sort of stuff. And we would
7 need Standard Review Plan sections for our review of
8 it. And, also, our review of their, you know, how they
9 are addressing the treatment requirements. And for
10 that, too, we would probably also have inspection
11 procedures to go out and see -- it's more of an
12 inspection activity. Next slide, Dick.

13 MEMBER SIEBER: That's about seven years
14 worth of work. Right?

15 MR. CARUSO: It's a lot of work, yes.

16 MEMBER SIEBER: I mean, you've got to --

17 MR. CARUSO: I think we have --

18 MEMBER SIEBER: Take them one at a time.

19 MR. CARUSO: We have some cost estimates
20 that we're going to go through in a minute. So, as
21 we've talked about, the NRC would be selecting the
22 events that go in here, would have to develop these
23 criteria that we've been talking about. As I said, we
24 could include events that we've already addressed by
25 regulation. We could go back and look for other events

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1 like I mentioned, and we would also be considering
2 events in the future that we haven't seen yet.

3 The second bullet here is about this
4 potential retrospective activity. And that was one of
5 the things that the NTTF had recommended as part of
6 Recommendation 1. I think it's Item 1.4, was to go
7 back and look at IPes and IPEEEs, you know, other
8 issues like shutdown and, you know, bounce those off
9 whatever selection criteria we come up with, and see
10 if we want to change our perspective. So, that's
11 something that could be done as part of this option.
12 Next slide.

13 Applicants and licensees would be required
14 to evaluate the events and show that they meet
15 acceptance criteria, and identify the SSCs that they
16 are relying on, and to demonstrate that they're
17 treating them in accordance with whatever requirements
18 we would put in place. And we would evaluate the
19 results. So, yes, that's a lot of work. Next slide,
20 Dick.

21 The treatment requirements. As I said
22 before, you know, there's a desire here to look
23 broader than our traditional, what we do for safety-
24 related. And, basically, if we're not changing the
25 definition of safety-related equipment, anything

1 that's relied upon to mitigate these events that's
2 safety-related will not change. That treatment is
3 there and that's what it is. You know, unless there
4 was something specific about the event that wasn't
5 being captured by the existing treatment, that would
6 be a reason to do something in addition. The real
7 issue here is non-safety-related equipment, fire
8 pumps, that sort of thing. And, as I've said, we've
9 done a little bit of this in implementing the
10 regulatory treatment of non-safety systems for the
11 passive designs, so we might use some of those
12 concepts as a starting off point.

13 MEMBER STETKAR: Mark, even in the active
14 designs they populate a design reliability assurance
15 program --

16 MR. CARUSO: Yes.


17 MEMBER STETKAR: -- that's kind of
18 analogous, so it's -- there is for the new reactor
19 designs and analogy to this type of treatment for both
20 active and passive in my mind.


21 MR. CARUSO: Yes.

22 MEMBER SHACK: Well, you've got the
23 potential to do it for current plants. Nobody has
24 exercised it yet.

25 MEMBER STETKAR: Yes, there's that, also.

1 MR. CARUSO: Now, this slide is just
2 intended to provide a concrete description of what we
3 mean by treatment in some of the areas. It's not
4 intended to say these would be all the areas, or just
5 to provide some more meat on the bones as to what
6 we're talking about. And I don't intend to go through
7 each of these boards. The last slide, Dick. That's it.

8  MR. SNODDERLY: Okay. My name is Mike
9 Snodderly. I'm an ACRS Staff Engineer, but I'm
10 currently on detail to NRR. And one of the assignments
11 that I have in NRR is to participate on this working
12 group. So, yes, let's summarize Option 4b.

13  Option 4b would implement Alternative 2 of
14 Appendix H to NUREG-2150, a proposed risk management
15 regulatory framework. This is the NUREG that documents
16 the findings of the Risk Management Task Force that
17 was chaired by Commissioner Apostolakis.

18 And, you know, this would be a -- I think
19 it -- as Jack Sieber said, you know, this would be a
20 lot of work. I think it would be a lot of work. It
21 would be a major change in regulatory philosophy, but
22 as I said, I think we need to keep in mind the example
23 of NFP 805. And I think that that is a good example of
24 where this 4b kind of concept is in play right now,
25 and has been a great success in helping to resolve the

1 threat of fire to plants. Okay?

2 I'm sorry, go back to -- stay on 153 for
3 just a second. So, this -- under Option 4b we would
4 establish a design enhancement category, not
5 extension, enhancement. This enhancement category
6 would be for additional protection beyond adequate
7 protection, so that's one of the things I wanted to
8 emphasize today to the Committee. If I've made that
9 point, then that's -- then I think that's important,
10 because in our interactions thus far with our
11 stakeholders, that's been something that there's been
12 some confusion. So, we want to make sure that's clear.

13 Also, under this Option 4b --

14 MEMBER ARMIJO: Mike, when you say beyond
15 adequate protection, exactly what do you mean there?
16 That it's not an adequate protection --

17 MR. SNODDERLY: I would be an additional
18 protection beyond adequate protection, a safety
19 enhancement for beyond design -- beyond adequate
20 protection that usually it would --

21 MEMBER ARMIJO: Somebody would --

22 MR. SNODDERLY: You would consider cost,
23 you would consider other aspects beyond just adequate
24 protection, and you would have to do it.

25 MEMBER ARMIJO: Okay.

1 MR. SNODDERLY: This option would require
2 a plant-specific PRA, but that doesn't mean that you
3 couldn't do this option without requiring a plant-
4 specific PRA. But then the staff would identify the
5 threats, kind of some of the things that we were
6 talking about before, so that's a key difference
7 between 4a and 4b.

8 MEMBER SIEBER: Does that require a
9 rulemaking?

10 MR. SNODDERLY: Yes, sir.

11 MEMBER SIEBER: And what level PRA would
12 you want --

13 MR. SNODDERLY: We're going to talk about
14 that later. Right now the idea would be Level 1 and
15 Level 2, and when Level 3s are available, the
16 Commission could consider that. But at this time, the
17 working group is not recommending that, because --

18 MEMBER SIEBER: Then that leaves out the
19 Fukushima category of --

20 MR. SNODDERLY: No, no. I'm sorry. It would
21 be fires, external events. I don't know about low
22 power and shutdown. You'd have to make that decision,
23 but clearly it would be external events and internal
24 events, Level 1, Level 2. And you could even back it
25 off some more and make it Level 1 and LERF if you

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1 wanted to just maybe step into -- as your first step
2 with the idea that maybe at the next time you come in
3 for license renewal, or in 20 years, then you would
4 meet all PRA standards in effect at that time, which
5 is the way the current rule, 5071(h) is written for
6 new reactors.

7 MEMBER STETKAR: I was going to wait until
8 you got to your slide, but I might as well jump on the
9 bandwagon. As I understand it, though, suppose --

10 another thought experiment. Suppose I have two
11 identical plants, physically identical at sites that
12 have the same characteristics for the sites, same site
13 seismicity, same vulnerability to external flooding,
14 high winds, so two identical sites with the exception
15 that Site A is out in the middle of nowhere, and Site
16 B is relatively close to a population center.

17 As I understand it right now since you're
18 limiting the scope of the treatment to core damage and
19 let's call it LERF.

20 MR. SNODDERLY: Okay.

21 MEMBER STETKAR: Both of those sites would
22 identify the same precise set of events that populated
23 this category, and would need to implement mitigative
24 features and maintain those features for that set of
25 events, the same set, even though the actual risk from

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1 each plant is much different.

2 MR. SNODDERLY: Yes, and I think that that
3 would be the argument for why maybe eventually you
4 would want to go to the next --

5 MEMBER STETKAR: Okay.

6 MR. SNODDERLY: Then you require Level 3.

7 MEMBER STETKAR: But at the moment the
8 Staff isn't willing to go --

9 MR. SNODDERLY: At the moment, our position
10 is there's significant work that's ongoing at the
11 Office of Research as part of -- and I've got in these
12 slides, but SECY-95-123 for investigating the impacts
13 of levels. The NRC Staff does not recommend that the
14 Commission consider the societal risk measures at this
15 time. The Staff is currently investigating possible
16 impacts of Level 3 PRAs on the NRC framework as part
17 of efforts associated with SECY-12-0123.

18 MEMBER STETKAR: I'm just talking about
19 public health risk.

20 MR. SNODDERLY: Well, that could --

21 MEMBER STETKAR: I mean, forget the other
22 societal risk elements.

23 MR. SNODDERLY: Yes, either one. I think
24 Level 3s would help with that. So, until we have the
25 Level 3 --

1 MEMBER STETKAR: But explicitly 4b does
2 exactly what it is, stops it, some Level 2ish type
3 thing.

4 MR. SNODDERLY: That would be the -- yes,
5 that would be a limitation right now, but I think
6 we're also trying to acknowledge that what's really
7 feasible right now. And right now, most people have
8 Level 1 and LERF. If it's Level 1 and a full Level 2,
9 well that cost estimate, it's going to go way up. And
10 Fred will talk about the specific assumptions. And,
11 obviously, if you went all the way to Level 3 right
12 now, that estimate of 100 million is going to be a lot
13 more than that. So, I think we're trying to be
14 practical, what's really realistic if we want to do
15 something right now.

16 MEMBER SHACK: He's going to do cost
17 benefit analysis, he has to have at least a pseudo
18 Level 3.

19 MR. SNODDERLY: Right. And that's one of
20 the things also we acknowledge, that the current
21 regulatory analysis guidelines have estimates for
22 estimating all site consequences. And that needs to be
23 updated, because that's -- I mean, that's where you're
24 addressing a lot of that, is using that type of a tool
25 in the absence of a full Level 2 right now. And those

1 tools need to be updated. And that's not just from
2 this activity, others have also recommended that.

3 Okay, sorry. The other thing on the
4 summary is yes, we're also going to talk about
5 treatment requirements for these SSCs and the design
6 enhancement criteria. Next slide.

7 We've already talked about this one as
8 part of Mark's presentation, so next slide, please.
9 And here's a -- okay, relationship to the NTTF and the
10 RMTF. The big difference between Option 4b and 4a is
11 that the design enhancement category instead of a
12 design extension category would add additional
13 protection for beyond adequate protection, as we've
14 talked about already.

15 And also, as we mentioned, really what 4b
16 is, is we would implement the Alternative 2 as
17 described in NUREG-2150, and you would use plant-
18 specific PRAs as opposed to the Staff using SPAR
19 models in our generic PRAs and our knowledge to
20 identify what we think should be those accidents that
21 should be addressed as part of 4a.

22 So, now, yes, design enhancement category
23 description. Let's see. The NRC would specify the
24 selection criteria. And, again, we could do that -- if
25 we do Option 3, that would help inform us greatly, but

1 I think the feeling is, and my understanding of the
2 RMTF is that there is a lot of guidance out there
3 right now for how to do these things. So, we could use
4 that existing guidance and implement 4b without Option
5 3. But Option 3, obviously would help inform that a
6 great deal, so I think that's an important point for
7 the Committee to keep in mind.

8 MEMBER SHACK: Would these be different
9 selection criteria than you use for 4a?

10 MR. SNODDERLY: Don't know. I mean, I --

11 MEMBER SHACK: You have two levels of
12 selection criteria, one that tells you it's adequate
13 protection and the other says go off and consider it
14 as additional protection.

15 MR. SNODDERLY: I think it would be more,
16 Dr. Shack, that we would use -- we've got criteria
17 that we use now for SAMAs, for regulatory analysis,
18 for backfit analysis, license renewal, so we would use
19 all that existing criteria, and Reg Guide 1.174, those
20 -- and for reliability assurance program, so we'd use
21 that existing criteria for right now. And then as we
22 go forward and we learn more, we may adjust those
23 design criteria. But for right now, that's what I
24 believe the RMTF envisioned.

25 MEMBER SHACK: Where would you get the

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1 criteria in 4a for the adequate protection decision?

2 MR. SNODDERLY: You'd have to ask -- I'm
3 sorry, Dr. Shack. That's the \$64,000 question right
4 now, but that would have to be determined. That's the
5 next step. And that's why we need to do -- that's why
6 you need -- I believe would have to do Option 3 if you
7 wanted to go down the 4a path, because we'd have to
8 flush that out better, what exactly --

9 MEMBER SHACK: But wouldn't you want that
10 for 4b also, because some of these things that you
11 might identify might be adequate protection, some of
12 them might be --

13 MR. CARUSO: We might have -- you know, I
14 mean we do have criteria that we use for regulatory
15 analysis decisions. I mean, you wouldn't have the cost
16 stuff for adequate protection, but you might look at,
17 you know, the significant safety improvement. I forget
18 what we use, is it -- there's a core damage -- change
19 in core damage, change in -- so, you might take
20 something like that concept and just make the limits
21 different. We used to have generic approaches to
22 evaluating -- I mean, approaches to evaluating generic
23 issues when we would use our own risk insights and
24 even analysis to come up with these things. So, we
25 have done these things in the past, where we've made

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1 -- we've used -- come up with methods and criteria to
2 make decisions about generic issues, so --

3 MR. SNODDERLY: I think we put a harder
4 stop on the 10 to the minus 4th limit in Reg Guide
5 1.174, so whereas now as it says something instead of
6 considering plant changes to make -- to increase risk,
7 you should be thinking about things to decrease risk.
8 So, if we found events that were greater than 10 to
9 the minus 4th, that's something that I think would
10 rise to say hey, maybe this needs to be in a design
11 basis event. So, yes, under this option I clearly
12 could see if we found such an event with that high of
13 a frequency, that it could possibly move into adequate
14 protection design basis category, and even get the
15 full safety-related treatment. But I think from our
16 experience thus far, we think we're talking more about
17 events in the 10 to the minus 5th, 6th, 7th type of
18 area.

19 MEMBER STETKAR: I think the analogy with
20 NFP 805 is also a good one because I suspect that
21 there are folks out there who might be discovering
22 those events and are implementing sort of protective
23 features to take care of them before they submit them.
24 It's a suspicion --

25 MR. SNODDERLY: Right. We have gotten to

1 some people -- right, there has been some sequences
2 that have been identified, some instances where they
3 think they may be in that area, and that has caused
4 great concern. And they have done modifications to get
5 under that bar in the short term.

6 MEMBER STETKAR: Thanks.

7 MR. SNODDERLY: Next slide, please. Yes,
8 sorry, I should have gone to this slide. So, the NRC
9 selection criteria thresholds -- so, yes, help me out
10 -- keep me on line, Dick.

11 MR. DUDLEY: Okay, sorry.

12 MR. SNODDERLY: NRC selection criteria
13 thresholds would as much as possible build upon
14 existing practices, reg analyses, backfit analyses,
15 SAMAs, Reg Guide 1.174.

16 MEMBER SHACK: As much as possible, of
17 course, that's the thought.

18 MR. SNODDERLY: Yes, I mean we're not here
19 for the final, you know -- but yes, I'm going to give
20 us some flexibility, but the main point is we're not
21 going to reinvent the wheel. We're going to use the
22 existing risk metrics that we have. We're going to use
23 the existing criteria that we have. And I have it in
24 more detail in the Option Writeup if you care to look
25 at it. So, if you have some more questions, when we

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1 come back next time we'll -- we can talk about that in
2 more detail.

3 Plant-specific PRA requirement. As I said,
4 we would again build off of 50.71(h). Right now the
5 vision is that we would limit it to Level 1 and Level
6 2, but that doesn't mean that it couldn't be Level 1
7 and LERF. Again, that's something that I'm sure the
8 Committee can help the Commission in their
9 deliberation, but they'll have to decide how far they
10 want to go. And we don't think Level 3 is practical at
11 this time, as we talked about.

12 MEMBER BLEY: Well, if somebody had a Level
13 3 PRA, we wanted to use that.

14 MR. SNODDERLY: Yes.

15 (Simultaneous speech.)

16 MEMBER BLEY: Is that something they have
17 to come in separately?

18 MR. SNODDERLY: We would encourage that.

19 MEMBER STETKAR: Back to my two
20 hypothetical sites, if they both had Level 3 PRAs and
21 came in and said well, we -- given the fact that our
22 analyses have identified out through LERF if you want
23 to call it the same set of mitigating features, we --
24 Plant A out in the boonies feels that we don't need
25 that same set, or the same set of controls, perhaps,

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1 because we have th is Level 3 PRA.

2 MR. SNODDERLY: I think that's a great --
3 or a vision of a carrot and a stick. So, in other
4 words, if you were to go and -- if you had this Level
5 3 tool and you could make that argument, then you
6 could say I don't need to do that. So, that's another
7 idea of how to maybe take us to --

8 MEMBER STETKAR: But this doesn't preclude
9 somebody --

10 MR. SNODDERLY: Not only would preclude it,
11 I think we want to make sure that we would encourage
12 that.

13 MR. CARUSO: Well, there would still be
14 difficulties, if you don't have a standard for it. I
15 mean, theoretically, yes, they could do analysis and
16 stuff, but --

17 MR. SNODDERLY: We're pretty close to a
18 Level 3 standard.

19 MS. DROUIN: There is a draft Level 3
20 standard that is going through ballot right now.

21 MR. SNODDERLY: But one way -- you know,
22 I'll call it 4b light, and 4b alternative, would be if
23 we didn't require a PRA but maybe said here's types of
24 events and sequences that licensees would have to
25 address. And if you can't address them, you would have

1 to do certain actions, provide mitigative features, do
2 some things. But if you had an adequate quality PRA,
3 you could maybe demonstrate that that's not risk-
4 significant for you and, therefore, you could address
5 it that way. So, that's another vision -- another way
6 you could do that.

7 And that's one of the difficulties we've
8 had as a working group. There's a lot of ways you can
9 skin this cat. We pretty much -- but to try to --
10 instead of having a multitude, we wanted to try to
11 get more focused, so that's why we tried 4a and 4b,
12 what would it look like if you had adequate protection
13 line here, and did not require a PRA here, require
14 PRA, and --

15 MEMBER STETKAR: But at a very high level,
16 and maybe I'm naive, my understanding, I've sort of
17 thrown 4a into generic populating a set of things that
18 are necessary to assure adequate protection; b is
19 plant-specific and populating a bin that's called,
20 whatever it's called.

21 MR. SNODDERLY: Design enhancement.

22 MEMBER STETKAR: Design enhancement, or
23 additional assurance, or something like that. Is that-
24 - that's sort of --

25 MR. SNODDERLY: That's correct.

1 MEMBER STETKAR: -- a very basic --

2 MR. SNODDERLY: Yes, that's it.

3 MEMBER STETKAR: -- notion. Okay.

4 MEMBER SHACK: One thing -- you know, your
5 slides I don't think anywhere in them have said
6 anything about uncertainty. And yet it seems to me
7 that a large reason for having a category that goes
8 beyond here is, in fact, to address uncertainty and
9 defense-in-depth.

10 MR. SNODDERLY: And that's why Option 3 and
11 the defense-in-depth criteria, that's the idea.

12 MEMBER SHACK: Somehow I'm a little
13 disturbed that your criteria don't seem to --

14 MR. SNODDERLY: That would be one of the
15 challenges of doing this right now. I agree with you,
16 Dr. Shack. We'd have to do a better job -- we'd have
17 to provide specific guidance on how to address
18 uncertainties, and there is guidance out there right
19 now that Mary Drouin and her group have helped develop
20 on uncertainty, but --

21 MEMBER SHACK: But what do you do with it?

22 MR. SNODDERLY: Well, I mean, yes, the --

23 MEMBER SHACK: It just seems to me that
24 somehow there's a disconnect between the discussion we
25 heard on Option 3, I think, where there was a great

1 deal of consideration of defense-in-depth and
2 uncertainty, and yet this one doesn't seem to mention
3 it at all explicitly.

4 MR. SNODDERLY: Well, I think right now I
5 would speak to it as it would greatly -- I believe it
6 would great -- Option 4 we would greatly benefit from
7 Option 3, but I'm saying that you could theoretically
8 implement it now without that, and that would be a
9 disadvantage, but here's how you would do it.

10 I'm sorry, next slide, please. Treatment
11 requirements. As was mentioned before about materials,
12 licensees, and integrated reliability assessments, I
13 believe the way we would do -- the Staff has addressed
14 the adequate treatment of risk-significant non-safety
15 systems as part of new reactors. And they've developed
16 a lot of guidance. And, in fact, they have proposed
17 and the Commission has endorsed how to appropriately
18 treat that for new reactors. And, basically, they
19 endorsed the following reliability assurance program
20 for new reactors. And that is described in the
21 following documents. So, the guidance is out there.
22 That's what we would build upon.

23 It would also address structures, systems,
24 and components beyond safety-related to include risk-
25 significant components, as would be identified in an

1 IRA. So, I believe that this system would go beyond
2 for materials licensees. It's similar but go beyond,
3 because PRAs are more comprehensive than IRAs. But
4 it's the same idea, that you're identifying some
5 important equipment that are not necessarily part of
6 the safety-related programs, and how would you treat
7 them? And this is how we would do it.

8 MR. CARUSO: Can I note for the Committee's
9 benefit that SRP 19.3 is new. You haven't seen it.
10 It's out for comment, draft for comment, and we will
11 be coming to you probably, I don't know, in a month or
12 so, whenever we can get on the schedule to present
13 that to you. It's basically trying to gather together
14 all the policy of implementing passive designs and to
15 use lessons learned from the reviews, so we put it in
16 an SRP, and we'll be talking to you sometime --

17 MR. SNODDERLY: And one last thought on
18 this before we have my last slide. The -- for
19 treatment it would be a little tricky because what
20 they did for new reactors, it talked about what
21 sufficient quality requirements for non-safety risk-
22 significant components, on how to procure, design, and
23 the problem you would have with operating plants right
24 now, all that non-safety stuff has been already
25 designed, it is what it is. So, not a huge problem, I

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1 just want to make sure the Committee was aware of it.

2 MEMBER SHACK: No, but you just may have to
3 take different measures to insure reliability.

4 MR. SNODDERLY: Exactly. If I had to solve
5 it today it would be I'd use the existing maintenance
6 rule that says you either set certain reliability
7 goals for it, or you have a specific preventive
8 maintenance program for that structure, system, and
9 component. I just wanted to make sure you weren't
10 under the impression that we were going to backfit
11 some additional quality procurement and design
12 requirements.

13 MEMBER SHACK: You have programs?

14 MR. SNODDERLY: Yes, exactly. I would not
15 envision D-RIP being imposed on operating reactors if
16 we went forward with 4b now.

17 Last slide is key issues. We've talked
18 about those in depth, and I think Dr. Shack is
19 absolutely right. I'd add a bullet to that, would be
20 how to address uncertainty. And, again, I'd use the
21 current guidance as part of the graded QA program that
22 was developed by the Office of Research for addressing
23 uncertainty. Thank you.

24 MEMBER STETKAR: One last thing, Mike, and
25 I'm just going to mention this. I think someone -- I

1 kind of beat up Mary about the way that Option 3 was
2 presented in a very, very positive note. I'd recommend
3 you look at some of the pros that are listed for 4b,
4 because they're -- a lot of them are really, really
5 self-serving, and they kind of go off message into
6 other areas about gee, this is wonderful because, you
7 know, we can solve world peace, and all of that sort
8 of thing. So, before you package this for a decision,
9 I'd suggest you go look at some of those from a --

10 MR. SNODDERLY: Okay. Thank you --

11 MEMBER STETKAR: -- full dispassionate --

12 MR. SNODDERLY: Yes. Thank you, Mr.
13 Stetkar. Yes, and if you could provide some details --
14 you know, specific criticisms on those pros, yes,
15 we'll definitely consider that.

16 CHAIRMAN SCHULTZ: We think you'll see them
17 if you look.

18 MEMBER STETKAR: Yes.

19 MR. SNODDERLY: And we'll do that.

20 MEMBER STETKAR: One that really caught my
21 attention says implementation of this recommendation
22 would provide additional assurance that nuclear power
23 plants can cope with challenges that were not
24 considered in initial design and licensing. I agree
25 with that. This includes challenges that have not yet

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1 been thought of, for which analysis is problematic,
2 for example, terrorist activities. Well, if we haven't
3 thought of it, and it's not in the PRA, this option
4 isn't going to do anything about it. I mean, you know,
5 you might identify other things that you have thought
6 about that might help, but -- so it's just -- you
7 know, don't try to oversell it as something that it's
8 not.

9 MR. SNODDERLY: Okay.

10 MR. DUDLEY: We decided it was really
11 important that these pros and cons be balanced, and we
12 had an entire working group meeting on it. And we
13 didn't complete it, and that's why you don't see any
14 here. We knew that what we had in that initial
15 document needed work, and we were not -- we made a lot
16 of changes but we don't have it quite ready to present
17 yet.

18 MEMBER STETKAR: Yes, and in the same sense
19 one of the cons says that the current combination of
20 prescribed DBAs and selected beyond DBA rules -- it
21 goes on. It says risk assessments have been performed
22 for all U.S. nuclear power plants. This is -- there is
23 likely little safety benefit to be gained from -- in
24 creating this category. Well, meaning this design
25 enhancement category. Well, if there isn't going to be

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1 any safety benefit, maybe we ought not to be doing
2 anything.

3 MR. SNODDERLY: Well, I think the idea --

4 MEMBER STETKAR: You know, that's a valid
5 con.

6 MR. SNODDERLY: Well, I think what we were
7 trying to say, sir, is that this is really -- you're
8 going to benefit more from clarity and openness. In
9 other words, when we have a new event like Fukushima,
10 people could understand the process that the Staff is
11 going to go through to try to determine whether this
12 is an adequate protection problem, whether it's a
13 design enhancement problem, whether it's a residual
14 risk. And so, yes --

15 MEMBER STETKAR: I think Rich put it
16 correctly, just look at those in kind of a
17 dispassionate, both sides of the coin and see what
18 kind of message they're presenting.

19 MR. DUDLEY: Different people put them
20 together. We realize they're on different threshold,
21 and we're trying to normalize them.

22 MR. SNODDERLY: We have modified them, and
23 when we come back next time we'll let you guys have
24 another shot at it, or see --


25 MEMBER BLEY: When you can say what we


1 really mean is -- well, sure, that's what you ought to
2 say.

3 MR. CARUSO: Fred, are you ready?

4 MR. SCHOFER: I'm ready and I see I'm out
5 of time, but --

6 MR. CARUSO: Nice try.

7  MR. SCHOFER: My name is Fred Schofer. I'm
8 a Senior Cost Analyst in the Office of Nuclear Reactor
9 Regulation in the Division of Policy and Rulemaking.

10  And the first slide you'll see a summary of cost
11 expressed in 2013 dollars, which model either the
12 annual recurring cost basis or those items that are on
13 a one-time implementation bases.

14 I want to point out that the resource
15 estimates are preliminary. At this point, I have not
16 included any of the potential benefits which we're
17 still developing. And that the costs represent a
18 guidepost in that they're used to evaluate the
19 possible costs associated with each option, and as we
20 further refine and finalize those options, I imagine
21 these costs will change.

22 MEMBER SIEBER: A question. None of the
23 costs that you reported in the following slides
24 include any changes to the plant, physical changes.
25 Right?

1 MR. SCHOFER: That is correct.

2 MEMBER SIEBER: It's assumed that you will
3 make all these regulatory changes and everything will
4 be perfect.

5 MR. SCHOFER: That is correct.

6 MEMBER SIEBER: Thank you.

7 MR. SCHOFER: Okay. Voluntary initiatives,
8 you can see the cost estimate represent the
9 incremental resource requirements above maintaining
10 the existing framework, and you can see that for this
11 option it's primarily to NRC implementation costs
12 associated with developing the policy statement,
13 developing guidance documents, and industry costs to
14 prepare their procedure. And the way I've modeled that
15 is that an organization would get together and develop
16 a template which would then be rolled out to each of
17 the licensees.

18 I assume all implementation costs are
19 incurred in the first year which is conservative, and
20 as I indicated, the generic industry procedure would
21 be prepared. Roughly, you can see the implementation
22 costs for industry, those for NRC, and then the
23 average industry cost per unit is provided, so that's
24 my standard format. As we go through, you'll see it
25 again and again.

1 The second slide estimates costs in the
2 case that follows the publication of a policy
3 statement, and this is should the NRC perform a
4 retrospective review of existing industry initiatives?
5 That makes a finding that a regulatory action is
6 required.

7 In this case, there would be rulemaking
8 required, so some of the examples previously discussed
9 where it is believed, you know, it is required for
10 adequate protection, would go into rulemaking to make
11 those requirements. There's an assumption that the
12 industry's voluntary initiative programs were
13 successfully implemented, and that they don't need to
14 do modifications; however, they would do an inspection
15 and review of their design documentation to insure
16 that they conform with the rule.

17 MEMBER BLEY: I guess the -- you've had
18 comments about people saying the estimates are too
19 low, and this isn't my main focus here. But when I
20 look at the estimates I see tabulated I think, gee,
21 you're a utility and you're going to do this, you've
22 got to have a plan. Then you've got to implement it,
23 you've got to have people do it. Maybe these are kind
24 of okay there, then you review them, then you deliver
25 them to NRC, and there's an awful lot of overhead

1 costs that are involved in delivering something like
2 this to get it approved and finished that don't seem
3 to be picked up here at all. Is that true, or am I --
4 or do you think you've covered that kind of cost? I
5 mean, just when you guys are going to come here and
6 present to us, all of a sudden you add a heck of a lot
7 of hours to your total hours, just to talk to us, so
8 the other folks are doing that when they come talk to
9 you. Well, they have costs associated with the
10 rulemaking, as well, which aren't showing up, so it
11 resonates with me when I hear these might be off by
12 factors of 10 or more, when I think about things like
13 that.

14 MR. SCHOFER: Granted these are incremental
15 costs that will be above the -- our framework, you
16 know, maintaining the framework, so they have some of
17 those costs regardless. The question is whether to
18 package a submittal to the NRC is that totally
19 captured? Possibly not, but the issue is that it
20 depends upon what that rule requires with regard to
21 documentation submittals.

22 I assumed here that they would do a
23 verification for their own purposes that NRC would
24 possibly inspect to verify compliance, though not a
25 formal submittal. So, with regard to the Paper

1 Reduction Act, I'm kind of going that way, but if they
2 had to do a submittal, it's probably underestimated.
3 You're correct.

4 MR. DUDLEY: And we made all of these cost
5 estimates public the week before our public meeting
6 and we I won't say begged, but we certainly asked for
7 licensees to provide us input on the costs, and NEI
8 has stated they'll provide us PRA cost estimates. So,
9 we put out something and we seek comment on it, and we
10 hope to get that, and we'll make adjustments as
11 appropriate.

12 MR. SCHOFER: Yes, the biggest numbers are
13 the same as what was presented public.

14 MEMBER BLEY: Okay.

15 MEMBER ARMIJO: As far as the NRC costs,
16 you know your costs, and you know the workload, and
17 that shouldn't be out for public comment. Right?

18 MR. DUDLEY: Well, we --

19 MEMBER ARMIJO: If you don't know your
20 costs, nobody else -- better than anybody else. It's
21 the industry costs I think that really need --

22 MR. DUDLEY: Right.

23 MR. SCHOFER: Okay. Defense-in-depth, there
24 was quite a bit of discussion during Mary's
25 presentation about whether a PRA should be required.

1 On this slide, which is the base case, it shows the
2 industry costs associated with developing their
3 generic industry procedure again, and that gets rolled
4 out to each licensee for their specific unit. You can
5 see the costs that the NRC would have in developing
6 the policy statement, preparing a Management
7 Directive, preparing new guidance documents, and
8 revising existing documents.

9 There's quite a few existing documents
10 that do address defense-in-depth and margins, so we
11 have that as the last line item there. You can see the
12 total cost for industry implementation as well as NRC
13 implementation, but if you go to the next slide, I
14 also -- we have this as, again, a guide that if we do
15 require plant-specific PRAs, there is a significant
16 cost involved.

17 Within the working group, we've talked
18 about whether we're simply encouraging this to occur,
19 or whether it would be required. Currently, it's more
20 on the encouragement side, but we had -- we're
21 considering this as a possible cost that may need to
22 be included in that option. Currently, the summary
23 does not have a -- if you go to the next slide, Fred.

24 MEMBER STETKAR: In the public meeting, was
25 that element presented?

1 MR. SCHOFER: Yes, it was.

2 MEMBER STETKAR: It was? Okay.

3 MR. SCHOFER: Now, the real key to the PRA
4 is where you're starting from.

5 MEMBER STETKAR: Yes.

6 MR. SCHOFER: And how much do you have to
7 do to be sufficient to provide the needed confidence
8 in how it's going to be used. So, I think there was
9 some give and take during that public meeting with
10 regard to that. For my purposes, in my model what I
11 did was I looked at those plants that have already
12 done quite a bit of work either for seismic, either
13 have already done it or have a commitment, or have --
14 for fire, which have raised the quality of the PRA
15 substantially. It's for those plants that have not yet
16 done that, or have no commitment to do that that I
17 specifically costed out to kind of get to the same
18 standard. So, I think we'll have some discussion, or
19 I'll get some feedback from industry with regard to
20 that modeling, as well as the number of hours --

21 MEMBER STETKAR: And I noticed you used
22 essentially the same bar on the PRA for 4b and 3.
23 Right?

24 MR. SCHOFER: That is correct.

25 MEMBER STETKAR: Where indeed, in fact, you

1 might not necessarily need the same --

2 MR. SCHOFFER: Well, and as you probably
3 gained from the discussion we had, we haven't really
4 finalized the level of PRA. Recognizing a seismic PRA
5 may be like 600,000, I currently have a 300,000 type
6 number. So, granted, I mean, it may move and that --

7 MEMBER ARMIJO: Where are the NRC costs for
8 accepting the PRAs that would be developed by the
9 industry?

10 MR. SCHOFFER: The model that I used is the
11 same as what's currently used for like the fire PRA
12 program, using the NEI guidance where you do the peer
13 reviews. So, what I did was I modeled the industry
14 costs for performing those peer reviews, and don't
15 have an NRC acceptance cost.

16 MEMBER ARMIJO: But there would be
17 something, right, somehow you would have to do an
18 inspection or do something.

19 MR. SCHOFFER: Currently I have none.

20 MEMBER STETKAR: Have you talked to the
21 NFPA folks, 805 folks? They're either not being paid
22 for a lot of hours, or --

23 MR. SCHOFFER: Granted. I mean, currently,
24 I have none, other -- you know --

25 MEMBER ARMIJO: Okay. Maybe you want to

1 think about that.

2 MEMBER SHACK: What is the --

3 (Simultaneous speech.)

4 MS. DROUIN: That's a missing factor. We're
5 going to have to adjust the cost because we do do spot
6 check reviews, et cetera. There is some review costs
7 from the NRC side that needs to be reflected here.

8 MEMBER STETKAR: And even on NFP 805 you
9 went through a very extensive peer review, or a pilot
10 plant process that helped an awful lot to inform the
11 NRC Staff and also the industry that might or might
12 not be implemented in this type of activity. But it is
13 a substantial cost --

14 CHAIRMAN SCHULTZ: It would be a good
15 benchmark for the level of effort. Even if you didn't
16 move in that direction for this type of change, it
17 would be a good benchmark just to gather the
18 resources.

19 MR. SCHOFFER: And then Option 4b follows
20 along the same lines. You'll see the rulemaking --

21 MEMBER BROWN: Before you --

22 MR. SCHOFFER: Yes?

23 MEMBER BROWN: I guess the question -- to
24 me, there's a disconnect. You use the same labor rate
25 for very high-skilled PRA type people as opposed to if

1 you go back to the earlier ones, you use the same
2 labor rate, it's 105 bucks an hour for people who are
3 developing a template, or processing or doing -- but
4 yet people who do PRAs I presume -- everybody talks
5 about how that resource is not readily available.
6 There's not a lot of people around that really know
7 how to do those, and do them well. And, therefore,
8 they don't -- they're not cheap. Okay. And yet 105
9 bucks an hour does not sound like a very good cost for
10 high-quality, plus the consultants you will probably
11 have to bring in, they will have to bring in to
12 probably do that at the same circumstance.

13 MEMBER ARMIJO: Yes, I think the peer
14 reviewers are going --

15 MEMBER BROWN: That looks a little --

16 MEMBER ARMIJO: -- to be pricier.

17 MS. DROUIN: Fred, aren't these unburdened
18 rates?

19 MR. SCHOFFER: Well, in defense of that
20 rate, that rate was established in accordance with the
21 NUREG/CR-4627 which talks about labor rates. And what
22 it does is -- I relied upon Bureau of Labor statistics
23 to come up with the base rate, and then have a burden
24 on that which was benefit plus some management burden,
25 but it's not a fully burdened rate because it's an

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1 incremental cost versus a total rate. So, you're
2 right, if it was totally burdened it would probably be
3 200 bucks. But using that methodology, it's less.
4 Now, I'm looking at that model and that probably will
5 be adjusted upward, but the NRC rate will not.

6 MEMBER SKILLMAN: Fred, excuse me. Let me
7 ask this. Industry costs for 4a and 4b, in each case
8 the parameter of what equipment is necessary, the SSCs
9 that are necessary expands, and included in the
10 population of equipment is that equipment that is
11 presently Maintenance Rule Section 3, Class 1, Seismic
12 1, Section 3, Class 2, Seismic 1, and so on and so
13 forth in accordance with the existing NUREGs 126, 129
14 and the rest of the rulemaking.

15 4 Alpha and Bravo actually the perimeter
16 of equipment, and my thought is that equipment now
17 becomes ungradable or becomes vulnerable to the
18 identification of new requirements, such as inclusion
19 Maintenance Rule, EQ, and all of the other regulatory
20 required programs that encompass what is now semi-
21 safety grade or new safety grade equipment. Those
22 costs don't seem to be included here. How do those get
23 treated, because those are real costs to the plant and
24 to the owners?

25 MR. SCHOFFER: They are not here.

1 MEMBER STETKAR: That depends, if you have
2 the perfect plant in the world, your incremental costs
3 are zero.

4 MEMBER SKILLMAN: If your plant is perfect.

5 MEMBER STETKAR: If you have a really
6 terrible plant, your incremental costs are going to be
7 pretty doggoned high.

8 MEMBER SKILLMAN: Absolutely, that's
9 exactly my point. So, here's --

10 MR. SCHOFFER: But there's also the
11 possibility that you may downgrade things, as well as
12 -- some people have indicated that with the PRA, with
13 the -- they can justify reducing --

14 MEMBER SKILLMAN: I guess it's hard for me
15 to imagine that there would be a sufficient number of
16 downgrades to offset what are likely a very large
17 number of required upgrades.

18 MR. SCHOFFER: In response to John's prior
19 question, there is no plant modifications identified
20 in any of these estimates.

21 MR. DUDLEY: I mean, if commentators or the
22 industry wants to give us those figures, I mean,
23 perhaps we could include them, but it's really hard to
24 try to estimate what could happen on an average basis
25 at these facilities, so we haven't attempted to make

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1 those estimates yet.

2 MR. SCHOFFER: And it would be somewhat
3 speculative, I mean --

4 MR. DUDLEY: Quite a bit.

5 MEMBER SKILLMAN: Well, I can understand
6 why some from industry would say these are
7 underestimated by a factor of 10 because even a not
8 terribly complicated plant change, depending on how
9 many programs that affects the components or the
10 controls gets very expensive very quickly.

11 (Off the record comments.)

12 MR. SNODDERLY: If you're concerned say
13 about hardened vents and severe accident management
14 guidelines, those actions weren't considered. And even
15 though they may end up in the design enhancement
16 category, they're going to be required under other
17 programs independent of this action. In other words,
18 you're going to have to do that to meet the orders and
19 those other Fukushima requirements, so that's why we
20 didn't include them here because you're going to have
21 to do them --

22 MEMBER ARMIJO: You've assumed that those
23 hardware changes that have already been ordered or
24 will eventually develop, that are not included, that's
25 already part of the existing framework.

1 MR. SCHOFER: Yes. I'm looking at costs
2 above the --

3 MEMBER ARMIJO: Well, what about other
4 equipment that have not been covered by the order that
5 you determined there would be some upgrades required,
6 further inspection, further -- better maintenance.

7 MR. SNODDERLY: We haven't identified any
8 yet.

9 MEMBER ARMIJO: You have not identified --
10 you don't anticipate that that would be done.

11 MR. SNODDERLY: Yes, that's why I was --
12 when I was talking about the treatment requirements
13 for 4b, I think it's going to be the existing
14 Maintenance Rule, because we can't go back -- it would
15 be too difficult to go back and say you have to --

16 MEMBER ARMIJO: I understand.

17 MR. SNODDERLY: -- go reprocore this with
18 these additional quality requirements. We would just
19 take that as going forward, you would either -- you
20 would set reliability goals for those components, or
21 you would have specific preventative maintenance
22 program to address those SSCs.

23 MEMBER SKILLMAN: Actually, I was thinking
24 somewhat differently than that. 4 Alpha and Bravo
25 actually push the present design basis like Harold Ray

1 said an hour again. He said what you are contemplating
2 here is actually extending what is the present design
3 basis. A couple of examples, all of the river-based
4 plants may be facing new water levels. Pick Browns
5 Ferry, pick TMI, pick Peach Bottom, pick Susquehanna,
6 pick the ones out in the Midwest, if you say by golly,
7 your water level is now 5 feet higher, you can't raise
8 the plant. You know that from Fort Calhoun, but you
9 may have to build a moat, which is what they've done
10 at Oconee.

11 MR. SNODDERLY: Correct, and --

12 MEMBER SKILLMAN: So, in building the moat
13 you may also have to build water level alarm systems
14 30 miles upstream, 20 miles upstream, they might have
15 to be safety grade.

16 MEMBER STETKAR: But, Dick, that doesn't
17 apply to Palo Verde, so you can't do --

18 (Simultaneous speech.)

19 MEMBER STETKAR: -- do it on a generic
20 basis like this.

21 MEMBER SKILLMAN: But, John, you're making
22 a good argument, some plants will have that type of
23 issue. Palo Verde and the ones in the northwest may
24 have a different set.

25 MR. SCHOFFER: But for those issues --

1 MEMBER SKILLMAN: But those costs are not
2 included, and that's my point.

3 MR. SCHOFFER: But that's part of the
4 existing framework in that 2.1 and 2.3 is evaluating
5 seismic and flooding, and the requirements for that
6 will be coming explicitly from those recommendations.
7 Therefore, it is not as a result of revising the
8 framework that's causing those changes, it's because
9 of those particular activities. Therefore, they were
10 excluded because they're part of the existing
11 framework.

12 MR. CARUSO: Any particular issue here --
13 any particular item that would go in the category say
14 4b, has to go -- it's a cost justified safety
15 enhancement, may not be cost justified if you have to
16 build a moat, but that has to be addressed. So, I
17 think those costs are included in the sense that we're
18 just talking about the framework part here. That part
19 will happen automatically. Right? I mean, you've got
20 to deal with that.

21 MEMBER SKILLMAN: I think the diamond
22 that's coming out of this discussion is the
23 recognition that this 4 Alpha and Bravo are really
24 independent from 2.1 and 2.2 recommendations.

25 MR. SCHOFFER: This is to revise a framework

1 that is to evaluate a particular situation and resolve
2 it.

3 MR. SNODDERLY: But 4b would help you with
4 -- if you have 4b in place theoretically, you would be
5 evaluating okay, Browns Ferry, I'm now -- I
6 underestimated my risk from flooding. I may now have
7 to look at the cost of building that moat. How tall
8 would that moat have to be? You know, how far do I
9 have to reduce risk? And then that would be -- the
10 check and balance would be then we as the Staff would
11 go in, could look at those analyses and then could
12 challenge to say, you know -- and eventually come to
13 a conclusion that says either yes, we agree with the
14 cost beneficial fix that you're proposing, or no, we
15 think it needs to be greater. But it would provide
16 that vehicle for helping to determine whether you need
17 to do something or not; whereas, with 2.1 or 2.2, it's
18 a I want you to go address it and do it no matter
19 what. So, it's --

20 MEMBER ARMIJO: I'm still trying to see if
21 there are no hardware changes or no plant changes, or
22 no greater level of inspection or maintenance on
23 equipment, what's the incremental safety benefit of
24 all of this stuff on NTF Recommendation 1? Is it just
25 all administrative and documentation?

1 MR. SCHOFFER: Regulatory efficiency, along
2 those lines.

3 MR. DUDLEY: More openness so the public
4 can see the process of --

5 (Simultaneous speech.)

6 MR. DUDLEY: -- how decisions get made
7 and why the result of a decision --

8 MEMBER ARMIJO: There is a lot of work of
9 Staff and the industry, and the incremental safety
10 improvements are being done by the orders and the
11 things that the Commission has already initiated. And
12 I'm just trying to --

13 MEMBER STETKAR: Sam --

14 MEMBER ARMIJO: This seems like an awful
15 lot of effort to kind of improve the way the
16 regulations are set up and making consistent -- these
17 are all good things. I'm not criticizing, but I don't
18 see where they really --

19 MEMBER STETKAR: Sam, why do we have
20 specific treatment of ATWS events that might be a 10
21 to the minus 8 per year event in the regulations and
22 ignore the effects of perhaps 10 to the minus 5
23 seismic events that might be much more important than
24 an ATWS event? Why do we do that?

25 MEMBER ARMIJO: John, I don't know --

1 MEMBER STETKAR: Well, it's because the
2 regulatory framework that we have right now don't
3 treat those in a coherent manner. And that's sort of
4 the impetus for why doing this.

5 CHAIRMAN SCHULTZ: Yes, so therein lies
6 your benefit. Now, how to quantify that is perhaps
7 very difficult to do --

8 MEMBER ARMIJO: Yes, I missed that.

9 MEMBER STETKAR: Perhaps if you'd had this
10 30 years ago, we wouldn't have been so myopically
11 focused on ATWS, ATWS, ATWS, and spent all of the
12 money.

13 MEMBER SIEBER: Might have built the plants
14 differently.

15 MEMBER STETKAR: Or some strainer plugging
16 for that matter.

17 PARTICIPANT: Could have put the money on
18 cap credit, right?

19 MEMBER STETKAR: Yes, there you go. I was
20 going to say that.

21 (Laughter.)

22 MEMBER STETKAR: I mean, that I think is an
23 action of tangible benefit going forward.

24 MR. SCHOFER: Okay. For the cost that I
25 just was describing, the upgrade of the PRA, that was

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1 a one-time implementation cost which is a conservative
2 assumption because more than likely that would be done
3 over years, and may not occur in year one. There are
4 some costs associated that would be recurring, such as
5 PRA maintenance, which would be an annual cost as well
6 as PRA upgrades to incorporate new standards or
7 methodologies on a four-year basis.

8 MEMBER STETKAR: By the way, quick
9 somebody, where did the four years come from? I mean,
10 what's magic about four years?

11 MR. SNODDERLY: That's currently in the --

12 MR. SCHOFER: That's what we --

13 MS. DROUIN: This is in the regulation.


14 (Simultaneous speech.)

15 MR. SNODDERLY: That's what's in 50.71(h)
16 right now, but I can't give you a good answer for
17 where that came from.

18 MR. SCHOFER: Next slide. So, the total
19 estimated burden using the standard 3 percent, 7
20 percent discount rates and you have the total cost.
21 So, that's a best estimate for 3 percent and 7
22 percent, I believe is on the front page. Yes.

23 MR. DUDLEY: Any more questions?

24 CHAIRMAN SCHULTZ: Dick, your summary.

25  MR. DUDLEY: Okay, I'm going to briefly


1 summarize where we are. Just as a little recap, this
2 is a little matrix that shows how the individual
3 options stack up with respect to Recommendation 1 and
4 the sub-recommendations, just so you can see which of
5 the sub-recommendations are addressed by which of the
6 options.

7 Option 1, maintain the existing framework
8 does not address any of the recommendations. Option 2
9 for voluntary initiatives also does not address any of
10 the specific recommendations or sub-recommendations
11 called out in Recommendation 1, but Bill already --
12 Bill Reckley explained why we included it as an
13 option in the -- in our paper that we're preparing.

14 Option 3 identifies or would address three
15 of the recommendations or sub-recommendations. The
16 criteria for getting a check here was that you had to
17 address any part of the regulation so Option 3 would
18 address three of the sub-recommendations under
19 Recommendation 1.

20 Option 4a would address four of the five
21 sub-recommendations and recommendations. It would not
22 do anything to modify the regulatory analysis
23 guidelines. And Option 4b would address in one way or
24 another portions of all the recommendations and sub-
25 recommendations associated with Recommendation 1. And

1 under 1.4 in the bottom right-hand corner, I gave it
2 a check+ because it would not -- although it would not
3 evaluate the insights from the IPE and the IPEEE if
4 you had the plant-specific PRAs, you would do that
5 same review in a better way in a plant-specific
6 manner.

7  So, we're preparing a SECY paper, and in
8 the paper we'll describe the proposed options that
9 we'll have to address the key NTTF and the Risk
10 Management Task Force recommendations. We'll describe
11 the key technical policy and regulatory issues
12 associated with the options, and to the best of our
13 ability we'll provide possible resolutions of some of
14 those issues. We'll describe the actions and products
15 that we need to implement each option. This would be
16 policy statements, rulemakings, regulatory guides,
17 management directives, other internal guidance, other
18 housekeeping activities we'd have to do.

19 We'll estimate both NRC and licensee
20 resources, we'll refine the estimates that we've shown
21 you today, and we'll discuss the pros and cons that we
22 hope to have on a better more consistent, normalized
23 basis than in the initial draft document that you saw.
24 And we'll provide a recommendation to the Commission
25 in our SECY paper.

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1 So, what are we doing now? Well, we're
2 completing the description and the assessment of the
3 proposed options. We will review feedback. We are
4 reviewing feedback from the November 8th public
5 meeting, and we'll review additional comments that we
6 expect to receive on December 14th.

7 MEMBER SHACK: Are those comments on the
8 regulation.gov site?

9 MR. DUDLEY: Yes.

10 MEMBER SHACK: Can we go look at them
11 there?

12 MR. DUDLEY: Yes, there's just one comment
13 available, but yes, there's a -- I had the docket
14 number. One of the earlier slides has the docket
15 number, and so you just go to regulations.gov and you
16 type in that docket number and hit search, and it pops
17 it right up.

18 We're also working to modify the option
19 descriptions and cost estimates as appropriate. We'll
20 probably consider external events in Option 4a, and we
21 have multiple interactions scheduled with the JLD
22 Steering Committee. We're scheduled to meet with them
23 three times in the near future. We will meet again
24 with the ACRS Subcommittee and full Committee with a
25 goal of obtaining the ACRS letter with their views on

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1 Recommendation 1. And we'll finalize our
2 recommendation and provide it in a notation vote paper
3 to the Commission.

4 And the last slide is just -- yes?

5 MEMBER STETKAR: Before you run down the
6 dates there, you mentioned earlier that NEI had
7 indicated they were going to provide their estimates
8 of PRA costs. Are they doing it according to the
9 schedule that we're going to see here? For example,
10 will we see those by mid-December time frame?

11 MR. DUDLEY: Yes, it was understood at the
12 meeting that that was the case.

13 MEMBER STETKAR: Okay.

14 MR. DUDLEY: But I am going to contact --

15 MEMBER STETKAR: I just want to make sure
16 that they don't -- coming in so late that they say
17 see, we told you that you were wrong --

18 MR. DUDLEY: Yes.

19 MEMBER STETKAR: -- after February.

20 MR. DUDLEY: Right. I am going to contact
21 them directly to make sure I know the schedule for
22 that. And this last slide is just -- shows the precise
23 schedule dates for some of the milestones that I've
24 discussed earlier, with a paper due to the Commission
25 on February 19th of next year. So, that completes our

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1 presentation of where we stand on Recommendation 1.

2 MEMBER ARMIJO: Dick, would you go back to,
3 I guess it's Chart 74, the one that's a table.

4 MR. DUDLEY: Yes.

5 MEMBER ARMIJO: Yes. In each of the
6 categories where you have a checkmark, let's say just
7 Option 3, 4a and 4b, how many years would it take to
8 complete the work that's defined by a checkmark? In
9 other words, I'm just trying to get an idea of when
10 would this be finished? Is this --

11 MR. DUDLEY: Anything that requires a
12 rulemaking is probably at least three years from now.

13 MEMBER ARMIJO: So, even Option 3?

14 MR. DUDLEY: Option 3 --

15 MEMBER ARMIJO: A couple of years?

16 MR. DUDLEY: The policy statement is almost
17 as complicated as one of your most complicated rules.

18 MEMBER ARMIJO: So, it's three years
19 minimum. What about 4b, which has got much more work?

20 MR. DUDLEY: Well, 4b is described in the
21 Risk Management Task Force report as what, a 5 to 15-
22 years implementation effort.

23 MR. SNODDERLY: Right. It was looking out
24 15 years, where do we want to be. And that -- now,
25 where do we want to be in 15 years would be all modes,

1 all of the internal events, external events, and I
2 think I'm going to say 5 years, though, for what I
3 kind of described today, which is meaning to take the
4 first step, CDF, LERF, and somewhere, 4 to 5 five
5 years to do --

6 MEMBER SIEBER: At least.

7 MR. SNODDERLY: Yes.

8 MR. DUDLEY: But they're not short-term.

9 MR. SNODDERLY: Yes.

10 MEMBER ARMIJO: Yes, and 4a would be
11 somewhere of similar --

12 MR. SNODDERLY: More than three, less than
13 five.


14 MEMBER ARMIJO: 4a would be something
15 similar?

16 MR. SCHOFER: Yes, I would say about that
17 time.

18 MEMBER ARMIJO: Okay. And then you could
19 actually put cost for each of these things when you
20 have everything.

21 MR. SNODDERLY: Correct.

22 MEMBER ARMIJO: Okay, thank you.

23  CHAIRMAN SCHULTZ: Dick, because we're
24 coming close to the noontime, I would like to take the
25 prerogative to ask for public comments at this time.

1 As we understand, there are no participants on the
2 telephone line, so if there are any public comments
3 from members of the public in the room or any
4 additional comments that anyone would like to make at
5 this time for the proceedings. Thank you. So, hearing
6 none, we can go back to comments of the Committee.

7 Could you go back to the schedule slide,
8 Dick. I would just like to start with a couple of
9 questions related to that.

10 MR. DUDLEY: This one?

11 CHAIRMAN SCHULTZ: Yes. So, we talked about
12 the public comments and how we could gain access to
13 it, and understand what has been provided. And we'll
14 get some summary of that in the January 18th meeting,
15 as well.

16 With regard to the JLD Steering Committee
17 meetings, you mentioned that you expect several during
18 the month of January. Will there be one or two before
19 the time we meet again, January 18th?

20 MR. DUDLEY: Well, we're going to meet on
21 December 18th, is the first one.

22 CHAIRMAN SCHULTZ: Okay.

23 MR. DUDLEY: We'll meet again on January
24 15th, I believe, with the JLD.

25 CHAIRMAN SCHULTZ: Okay.

1 MR. DUDLEY: So, that will be two meetings.
2 And our meeting with you is the 18th of January.

3 CHAIRMAN SCHULTZ: That's right.

4 MR. DUDLEY: Yes, so we will meet with them
5 twice, so we will have gotten feedback from the JLD
6 Steering Committee.

7 CHAIRMAN SCHULTZ: And, optimistically, in
8 the introductory statement that I made, I indicated
9 that perhaps there would be some written materials
10 associated with the SECY paper that we might be able
11 to see before the 18th. Is that possible?


12 MR. DUDLEY: Yes, we will have an initial
13 draft of our SECY paper in mid to late December. We'll
14 need to get a certain amount of management review but
15 we'll be able to provide you a draft sometime in
16 January. I'm not sure when. Certainly we'll try to get
17 it to -- we'll get it to you before the January 18th
18 meeting, as soon as possible.

19 (Off the record comments.)

20 CHAIRMAN SCHULTZ: Unfortunately, that's
21 the type of schedule we've been working toward with
22 many, many projects over the last 12 to 18 months, but
23 we appreciate that. We'd really like to have that
24 opportunity.


25 (Simultaneous speech.)

1 MR. DUDLEY: -- have it at least a week
2 ahead of time, at least. I know that's still not
3 sufficient, but it's -- we're all working -- it's
4 pretty hard to meet these deadlines.

5  CHAIRMAN SCHULTZ: Well, I mentioned the
6 context, those two elements because I know it is
7 important for you to meet with the Steering Committee,
8 as well, and incorporate whatever you can from that
9 interaction within the paper that we see in its draft
10 form prior to the 18th of January. I appreciate that.
11 Thank you.

12 Members of the Committee, comments related
13 to today's presentation, or other questions? Jack?

14 MEMBER SIEBER: No comments.

15  MEMBER RAY: I guess, Steve, I just want to
16 say I sit here and it's really going to have at some
17 point for us to decide whether it's better to avoid an
18 accident versus mitigate its consequences. I don't see
19 that as emerging very clearly in all of this mass of
20 philosophical discussion. And if there is a way to do
21 that, I would be pleased to understand what it is.

22 CHAIRMAN SCHULTZ: Thank you.

23 MEMBER BLEY: Yes, several things. First,
24 last time we met we were looking at 12 potential areas
25 that were all mashed together, and congratulations,

1 you've come a very long way, and this has much more
2 clarity for me. I guess I'd reiterate some of the
3 things that were said on 4a, especially making it
4 clearer. As you write the paper, one thing that
5 strikes me, most SECY papers I can recall right now
6 have options that are kind of mutually exclusive. This
7 paper is quite different, and I think a fair
8 discussion of that will be real important to make it
9 clear.

10 Early today someone mentioned that gee,
11 you kind of thought if you go to 4a or 4b there's, at
12 least 4b there's -- well, both, an implication that
13 you've really kind of incorporated 3 into that. Well,
14 it isn't in the text. Right? So, we had questions
15 about that later. To me, that makes sense that it's
16 there and that would pick up some of the uncertainty
17 in the other things. Instead of embedding all of that
18 in 4a and b, if the text itself of the document lays
19 out how these pieces fit together, and that if you're
20 doing those, some others apply. I think it would be
21 kind of helpful.

22 MR. DUDLEY: We'll try to clarify that.

23 MEMBER BLEY: Yes. I mean, there's a lot
24 more to do, but it's starting to have pretty good
25 substance, and just those philosophical things I think

1 are pretty important on how you arrange this. It also
2 strikes me, it might be to advantage to tie even a
3 little more closely than you have in the current
4 document to some of the details that are in the Risk
5 Management Task Force report. It might help support
6 some of the things that you have in 4a and 4b. That's
7 all.

8 CHAIRMAN SCHULTZ: John?

9 MEMBER STETKAR: I don't have anything.

10 MEMBER RYAN: Nothing additional, but I do
11 appreciate Dennis' comments on some of the details of
12 how it would better fit together down the line with
13 some of the other documents we've seen. So, I second
14 that. Thank you.

15 CHAIRMAN SCHULTZ: Charlie.

16 MEMBER BROWN: I would only second Harold's
17 comments because I'm a big believer in accident
18 prevention by mitigation of consequences. Clarity is
19 not forthcoming on that. That's it.

20 CHAIRMAN SCHULTZ: Joy?

21 MEMBER REMPE: No comments.

22 CHAIRMAN SCHULTZ: Okay. I've got one
23 comment, and then would like to wrap up. And that
24 comment would be there are some elements associated
25 with new plants, passive designs and so forth, that

1 were mentioned in the presentation, some of those
2 elements are being drawn upon into defining a new
3 process. But providing clarity associated with how
4 this would apply, could apply to operating plants and
5 separately how it would need to apply, and what impact
6 it would have on already made decisions associated
7 with new plant design, construction, and
8 implementation would be necessary for me to draw that
9 forward, because the time frame that we're talking
10 about here in terms of application would be much more
11 important for new plants than for operating plants, or
12 could be more important depending on that time frame,
13 and the time remaining for operations --

14 MR. DUDLEY: We explicitly discuss that.

15 CHAIRMAN SCHULTZ: And also just to second
16 the comments that have been made by the Committee
17 about the quality of the work that you've presented
18 today, and the level of effort that we know it
19 represents that you've applied between August and this
20 meeting, we really appreciate, and we also appreciate
21 that quality of the presentations that have been
22 developed and presented today, so thank you very much.

23 With that, I'll adjourn the meeting.

24 (Whereupon, the proceedings went off the
25 record at 12:06 p.m.)



Developing the Staff's Response to Fukushima Task Force Recommendation 1

Advisory Committee on Reactor Safeguards
Subcommittee Meeting

December 4, 2012

NRC Interoffice Working Group



Overview of Fukushima Task Force Recommendation 1

ACRS Subcommittee Meeting

December 4, 2012

Richard Dudley – NRR Rulemaking Branch

Outline of Presentations

- Overview of Recommendation 1
 - Review actions taken and planned
- Discuss options being considered
- Discuss cost estimates
- Summary – Path Forward

Acronyms

ACRS – Advisory Committee on Reactor Safeguards
ADAMS – Agencywide Documents Access and Management System
AIA – Aircraft Impact Assessment
ATWS – Anticipated Transients Without Scram
BWR – Boiling water reactor
BWRVIP – Boiling Water Reactor Vessel and Internals Project
CDF – Core Damage Frequency
CFR – Code of Federal Regulations
CRGR – Committee to Review Generic Requirements (NRC)
DBA – Design-basis accident
DBT – Design-basis threat
DID – Defense-in-depth
DPR – Division of Policy and Rulemaking
DRA – Division of Risk Assessment
DSRA – Division of Safety Systems and Risk Assessment
FSAR – Final Safety Analysis report
GSI – Generic Safety Issue
IAEA – International Atomic Energy Agency

Acronyms (cont.)

INL – Idaho National Laboratory

IPE – Independent Plant Evaluation

IPEEE – Independent Plant Evaluation – External Events

JLD – Japan Lessons-Learned Directorate (NRC/NRR)

LWR – Light Water Reactor

MK-1 – Mark 1

NRC – Nuclear Regulatory Commission

NRO – Office of New Reactors

NRR – Office of Nuclear Reactor Regulation

NTTF – (Fukushima) Near-Term Task Force

NUREG – NRC report series

OGC – Office of the General Counsel

PRA – Probabilistic Risk Assessment

PWRMRP – Pressurized Water Reactor Materials Reliability Program

RES – Office of Nuclear Regulatory Research

RG – Regulatory Guide

RMTF - Risk Management Task Force

Acronyms (cont.)

RTNSS – Regulatory treatment of non-safety systems

SAMGs – Severe Accident Management Guidelines

SBO – Station Blackout

SDP – Significance Determination Process

SECY – Office of the Secretary (or Commission paper)

SER – Safety evaluation report

SRM – Staff Requirements Memorandum

SRP – Standard Review Plan

SSCs – Systems, Structures, and Components

Basis for Recommendation 1

- **Near-Term Task Force findings:**
 - NRC now relies on combination of design-basis requirements and “patchwork” of beyond design-basis requirements and voluntary initiatives to maintain safety
 - NRC’s safety approach is incomplete without strong program for dealing with the unexpected, including severe accidents
 - Continued reliance on industry voluntary initiatives for a fundamental level of defense-in-depth would leave gaps in NRC’s regulatory approach

Task Force Recommendation 1

- ***The Task Force recommends establishing a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations.***
- *Initiate action through the following steps:*
 - *1.1 Draft a Commission policy statement that articulates a risk-informed defense-in-depth framework that includes extended design-basis requirements in the NRC's regulations as essential elements for ensuring adequate protection.*
 - *1.2 Initiate rulemaking to implement a risk-informed, defense-in-depth framework consistent with the above recommended Commission policy statement.*

Task Force Recommendation 1 (cont.)

- *1.3 Modify the Regulatory Analysis Guidelines to more effectively implement the defense-in-depth philosophy in balance with the current emphasis on risk-based guidelines.*
 - *The Task Force believes that the Regulatory Analysis Guidelines could be modified by implementing some of the concepts presented in the technology-neutral framework (NUREG-1860) to better integrate safety goals and defense-in-depth.*
- *1.4 Evaluate the insights from the IPE and IPEEE efforts as summarized in NUREG-1560, “Individual Plant Examination Program: Perspectives on Reactor Safety and Plant Performance,” issued December 1997, and NUREG-1742, “Perspectives Gained from the Individual Plant Examination of External Events (IPEEE) Program,” issued April 2002, to identify potential generic regulations or plant-specific regulatory requirements.*

Commission SRM Direction

SRM-11-0093:

“Recommendation 1 should be pursued independent of any activities associated with the review of the other Task Force recommendations. Therefore, the staff should provide the Commission with a separate notation vote paper within 18 months of the issuance of this SRM. This notation vote paper should provide options and a staff recommendation to disposition this Task Force recommendation.” (Due in February 2013)

What is the Issue?

- The NTTF noted that the NRC's existing power reactor regulatory framework for does not logically and systematically address the need for new requirements to reduce the risks of beyond design-basis events and severe accidents.
- The existing regulatory framework for power reactors effectively addresses design-basis events. But for beyond design-basis events, the staff working group believes the existing framework could be improved to facilitate more consistent, efficient, timely, and transparent Commission decisions to address new issues and information.
- These improvements would allow the existing framework to provide:
 - An improved structure and set of criteria for identifying and categorizing unanticipated events or accidents that may require regulatory action (e.g., extended station blackout)
 - A structure and criteria for consistently and predictably evaluating how risk and defense-in-depth should be addressed for an effective NRC regulatory response to new information or unforeseen events or accidents (e.g., filtered vents)
 - A regulatory process that ensures licensee implementation and consistent long-term maintenance of voluntary industry initiatives (e.g., SAMGs)

Risk Management Task Force (RMTF)

Regulatory Framework

- Proposed risk management framework documented in NUREG-2150 (April 2012)
 - Preserve the design basis accident, but supplement with an enhanced design basis category by rulemaking
- Chairman's Tasking memorandum (June 14, 2012):
 - Consider regulatory framework recommendations for power reactors in RMTF report (NUREG-2150; April 2012) in developing options for Recommendation 1

Evolution of NRC Approach

- June 2012 public meeting – Three options: (1) Continue with existing framework, (2) Improve existing framework, and (3) Implement new framework (w/four new framework sub-options)
- August 2012 ACRS meeting – Described 12 framework improvement activities (framework building blocks)
- Today – Four options
 - Option 1 – Maintain existing framework
 - Option 2 – Clarify role of voluntary initiatives (2 sub-options)
 - Option 3 – Establish process and criteria for balancing risk, defense-in-depth and safety margins
 - Option 4 – Establish an additional regulatory category for requirements on beyond design-basis events and severe accidents (2 sub-options)
- Applicability of framework – light water power reactors
 - Operating reactors, evolutionary LWRs, and small modular LWRs

Draft Option Summary Document

- Released on Nov. 2 (ADAMS ML12296A096) and www.regulations.gov under docket NRC-2012-0173
 - Detailed descriptions of each option, key issues, expected products, preliminary cost estimates, and pros and cons
- November 8 public meeting
 - Discussed each option
 - Answered questions to clarify
 - Solicited feedback/comments on options
 - Industry implementation costs
 - Views on the pros and cons
- Through December 14, 2012 – Accepting public comments via www.regulations.gov, docket NRC-2012-0173
- NRC will review and consider all comments but will not provide written responses or formal comment evaluations

Feedback from Nov. 8, 2012 Public Meeting

- If you select Option 1 (status quo), you are just relying on luck. (i.e., if Fukushima hadn't happened, would we be improving hardened vents?)
- Industry is spending millions on FLEX. Will FLEX be revisited under Option 4a? [Option 3? Option 4b?]
- Please explain to the Commission that Option 4b will take a long time to implement. [PRA improvement]
- Under Option 4a – it seems that the tools are already available for the NRC to take action without rulemaking.
- Estimated costs for PRAs are too low (factor of 10)
 - NEI committed to submit improved PRA cost estimates

Next Steps

- Evaluate stakeholder feedback
- Working on details/integration of options
- Refining cost estimates/pros and cons
- Meet with ACRS subcommittee (December and January)
- Finalize SECY paper
- Meet with ACRS full committee in February
- Commission paper due in mid-February 2013
- Receive ACRS letter



Fukushima Task Force Recommendation 1

Option 1 – Maintain Existing Regulatory Framework

Stephen Dinsmore, NRR/DRA

Summary of Option 1

- Retain the current regulatory framework and design basis event structure.
- Current framework can add rules and requirements to address issues as they arise
 - NRC uses the fundamental concepts of design-basis events and defense-in-depth
 - Backfit rule provides a structured means to judge whether a proposed rule or other mandated change is consistent with the principles of good regulation
 - When significant safety issues arise, NRC has processes in place to issue immediately effective orders
- Existing framework includes risk-informed, performance based changes to the regulations (i.e., regulation that considers risk insights)
 - mandatory 50.65 maintenance rule implementation
 - Regulatory Analysis Guidelines
 - Reactor Oversight Process (ROP) and its significance determination process
 - Voluntary alternative rules
 - 50.69 special treatment
 - 50.48(c) fire protection
 - 50.46a – (draft final) risk-informed redefinition of large-break LOCA
 - Voluntary license amendment applications (e.g., 4b risk-informed completion times)

Option 1 – Relationship to NTTF and RMTF Reports

- Fukushima Near Term Task Force Report:
 - “...recommends establishing a logical, systematic, and coherent regulatory framework ... that appropriately balances defense-in-depth and risk considerations.”
 - No new framework
 - “...articulate[s] a risk-informed defense-in-depth framework [and initiate rulemaking] that includes extended design-basis requirements...”
 - No introduction of new extended design-basis and associated requirements
 - “..modify regulatory analysis guidelines...evaluate insights for IPEs and IPEEs..”
 - May be implemented if determined necessary/desirable
- Risk Management Task Force Report:
 - Option A Chapter 4, “...efforts related to ongoing risk-informed and performance-based initiatives and activities related to the followup to the Fukushima accident would continue on their current courses...”
 - Consistent with this description but the RMFT does not recommend this option



Fukushima Task Force Recommendation 1

Option 2 – Clarify Role of Voluntary Industry Initiatives

Bill Reckley, NRR/JLD

Summary of Option 2

- As described in NUREG/BR-0058, industry initiatives can generally be put into one of the following categories:
 1. those put in place in lieu of, or to complement, a regulatory action to ensure that existing requirements are met (e.g., BWRVIP, PWRMRP)
 2. those used in lieu of, or to complement, a regulatory action in which a substantial increase in overall protection could be achieved with costs of implementation justifying the increased protection (e.g., SAMGs, BWR MK-I hardened vent, Backup power for H₂ igniters)
 3. those that were initiated to address an issue of concern to the industry but that may or may not be significant regulatory concern (e.g., groundwater monitoring)
- Option 2 would clarify the role of voluntary industry initiatives in NRC's regulatory processes by defining when or under what circumstances the NRC would incorporate such initiatives into regulatory requirements

Option 2 – Background

- Direction-Setting Initiative 13 (SECY-97-303) resulted in decision to develop guidelines for using industry initiatives
- SRM-SECY-99-063 stated that regulatory framework allows voluntary initiatives **except in issues involving adequate protection**
- SRM-SECY-00-0116 – directed staff to publish guidelines for using voluntary initiatives (65 FR 53050; Aug. 31, 2000)
- SECY-01-0121- Responding to overwhelmingly negative public comments, the NRC abandons voluntary initiative program
- Fukushima Near Term Task Force Report
- Risk Management Task Force Report (NUREG-2150)

Option 2 – Relationship to NTTF and RMTF Reports

- Fukushima Near Term Task Force Report
 - Notes that "... voluntary industry initiatives should not serve as a substitute for regulatory requirements but as a mechanism for facilitating and standardizing implementation of such requirements." The NTTF further notes that "... NRC inspection and licensing programs give ... little attention to industry voluntary initiatives since there are no requirements to inspect against."
 - Examples include SAMGs and BWR hardened vents
- Risk Management Task Force Report (NUREG-2150)
 - "The extent to which licensee activities undertaken as part of voluntary industry initiatives can be credited has been a source of contention in the Reactor Oversight Process and has reduced the efficiency of that process."

Option 2 - Description

- Clarify the role of voluntary industry initiatives in NRC's regulatory processes by defining when or under what circumstances the NRC would incorporate such initiatives into regulatory requirements
- Could be implemented on stand-alone basis or with one of the design extension/enhancement category options

Option 2 - Stand-alone improvement

- Implement with Commission Policy Statement and revised internal guidance documents
- Adequate protection requires binding NRC requirements
- Factors to consider for safety improvements
 - Importance in reducing or maintaining plants' risk profiles
 - Importance in maintaining plants' levels of defense-in-depth
 - Relationship of initiative to other regulatory requirements
 - Duration of initiative (e.g., one time or for remaining life of plants)
 - Degree of safety improvement achieved
- Revise regulatory analysis guidance (base case treatment)
- Revise oversight processes (inspections, audits)
- Key issue – Should NRC re-evaluate existing initiatives?

Option 2 - Integrated improvement

- Relies upon the outcomes of Options 3 & 4 to address voluntary initiatives
- Importance of “voluntary initiative” addressed using same guidance as developed for Options 3 and 4
- Incorporation of actions (hardware, procedures, etc.) into appropriate licensing basis document addressed through guidance for Options 2 and 4
- Example:
 - Importance of SAMGs in mitigating some beyond design basis accidents captured through the design extension/enhancement categories (Option 4). Associated requirements include provisions for recordkeeping (e.g., FSAR Chapter 19) and change control (e.g., 50.59-like process)



Fukushima Task Force Recommendation 1

Option 3 – Decision Process for Balancing Risk, Defense-in-depth, and Safety Margins

Mary Drouin, RES/DRA

Summary of Option 3

- Establishes the Commission's expectations with regard to risk-informed regulatory decision process for balancing risk, defense-in-depth, and safety margins.
- Defines the objective of and the principle elements of defense-in-depth and safety margins.
- Establishes a risk-informed, regulatory decision process for balancing risk, DID and safety margins.
 - Includes the NRC developing criteria for determining whether adequate defense-in-depth and safety margins have been addressed in the design and operation of a nuclear power plant.

Background – Defense-in-Depth

- Since the beginning of licensing nuclear facilities, starting with WASH-740 in March 1957, the concept of multiple lines of defenses, has been consistently viewed for describing defense-in-depth and as an approach to address accident prevention and mitigation.
- There has also been a consensus in that defense-in-depth is needed to compensate for the recognized lack of knowledge (i.e., uncertainties
- A probabilistic approach to defense-in-depth came into the history in the 2000 to 2012 time period
- It recognized that although PRA cannot compensate for the unknown and identify all unexpected events, it could use risk assessment to:
 - identify some originally unforeseen scenarios,
 - identify where some of the uncertainties lie in the plant design and operation, and, for some uncertainties,
 - quantify the extent of the uncertainty.
- While the PRA may not be helpful in reducing uncertainties associated with the PRA itself, it can point out areas where “deterministic defense-in-depth” needs enhancement

Background – Safety Margins

- The concept of safety factor or safety margin is a key principle in balancing risk and defense-in-depth.
- By including margin in the design, it allows the SSC to perform past its operating limiting to a certain level without negative consequences.
- The Commission's regulations require that SSCs have adequate margins of safety.
 - The concept of margin is built in to the various engineering codes and standards in virtually all engineering disciplines.
 - The General Design Criteria 2, 10, 15, 26, 27, 31, 50 and 51 explicitly require that sufficient margin be provided in the design of specific SSCs.
 - Other regulations implicitly or explicitly call for safety margins in the designs of nuclear power reactors.

Relationship to NTTF Recommendation 1

- NTTF Recommendation 1 states: “The Task Force recommends establishing a logical, systematic, and coherent regulatory framework for adequate protection that appropriately balances defense-in-depth and risk considerations.”
 - Option 3 directly supports this recommendation
- NTTF also recommended four sub-options
 1. Commission policy statement that articulates a risk-informed defense-in-depth framework that includes extended design-basis requirements
 - Option 3 directly support this sub-option
 2. Initiate rulemaking to implement a risk-informed, defense-in-depth framework
 - To be evaluated to determine if rulemaking is necessary
 3. Modify Regulatory Analysis Guidelines
 - Option 3 directly supports this sub-option
 4. Evaluate insights from IPEs and IPEEEs
 - Option 3 does not directly consider this sup-option

Relationship To RMTF

- The RMTF notes in NUREG-2150 that
 - “After decades of use, there is no clear definition or criteria on how to define adequate defense-in-depth protections.”
 - “the concept of defense-in-depth has served the NRC and the regulated industries well and continues to be valuable today.”
 - “However, it is not used consistently, and there is no guidance on how much defense-in-depth is sufficient.”
- The RMTF concluded that “clarifying what the U.S. Nuclear Regulatory Commission (NRC) means by defense-in-depth is a necessary part of the development of a holistic strategic vision.”

Detailed Description of Option

- The Commission would issue a policy statement that would articulate the Commission's views on the need to balance risk, defense-in-depth, and safety margins.
- It would clearly describe the need for defense-in-depth, specify the actual levels of defense, their objectives and criteria for being met.
- The policy statement would also clearly describe the need for safety margins, and explicitly define its objectives, and the elements and principles related to safety margins.
- Along with the policy statement, the NRC would establish a decision process that would provide guidance for balancing risk, defense-in-depth and safety margins. This would include the NRC developing criteria for determining whether adequate defense-in-depth and safety margins have been addressed in the design and operation of a nuclear power plant while using risk insights.

Potential Policy Statement

- Specifying, for example, three specific levels of defense to ensure the risk would be acceptably low:
 - Level of Defense 1: Accident Prevention to ensure that there is (1) stable operation to limit the frequency of events that can upset plant stability and challenge safety functions and (2) protective systems to ensure that the systems are adequately designed, and perform adequately, in terms of reliability and capability, to satisfy the design assumptions on accident prevention during all states of reactor operation.
 - Level of Defense 2: Barrier Integrity to ensure that there are adequate barriers to protect the public from accidental radionuclide releases from all sources. Adequate barriers could include physical barriers as well as the physical and chemical form of the material that can inhibit its transport if physical barriers are breached.
 - Level of Defense 3: Accident Mitigation to ensure that adequate protection of the public health and safety in a radiological emergency can be achieved should radionuclides penetrate the barriers designed to contain them.
- Requiring that the levels of defense be maintained; that is, independent of risk, in balancing risk and defense-in-depth and safety margins, each of the levels of defense need to be met.

Potential Policy Statement (cont'd)

- Probabilistic elements would be included which could consist of using the PRA,
 - to the extent possible, to search for and identify unexpected scenarios, including their associated uncertainties,
 - to subsequently establish adequate defense-in-depth measures to compensate for those scenarios and their uncertainties which are quantified in the PRA model.
- The ability to quantify risk and estimate uncertainty using PRA techniques, where possible, and taking credit for defense-in-depth measures in risk analyses, allows one to provide a better estimate of how much defense-in-depth is enough.

Implementing Guidance

- The guidance would likely include a Management Directive, other documents (e.g., regulatory guides, NUREGs, SRP chapters) for a process that would involve decision-based criteria for implementing the defense-in-depth strategy and for determining adequate defense-in-depth has been achieved.
 - Potential rulemaking will be evaluated
- The implementing criteria would involve examining each level of defense to identify key design and operational features for consideration (e.g., redundancy and diversity).
- The adequacy criteria would also involve each level of defense and would include both deterministic and probabilistic acceptance guidelines.
 - That is, for determining if adequate defense-in-depth has been achieved, there would be a blended deterministic and probabilistic process that defines both deterministic and risk criteria.

Implementing Guidance (cont'd)

- In determining whether adequate defense-in-depth has been achieved, the use of risk is an integral part; however, the extent of defense-in-depth that is needed can be impacted by safety margins. For example,
 - a tactic in achieving one of the levels of defense is a particular design feature. Whether this feature has safety margin and the extent of the margin can influence the degree to which the feature plays in defense-in-depth. Consequently, determining the adequacy of defense-in-depth can be dependent on safety margins and the associated risk. Therefore, the process for determining adequacy should balance risk, defense-in-depth and safety margins.
- Example process for balancing:
 - For a given level of defense, develop quantitative criteria.
 - Consider the Accident Mitigation level of defense, proposed quantitative criteria could be in the form of a frequency-consequence curve.
 - The risk would be evaluated considering the mitigation measures put in place against the curve.
 - The evaluation would consider any safety margins in the assessment, whether the uncertainties have been addressed.
 - If in the decision process, it has been determined that one of the criteria have not been adequately addressed, then plant defense-in-depth capabilities and the programmatic assurance could each be enhanced and the entire decision criteria would then be re-evaluated.

Key Issues

- Should the regulatory analysis guidelines and backfit analysis guidelines include defense-in-depth and safety margins as fundamental decision criteria?
- The requirement for plant-specific PRAs is still to be determined



Fukushima Task Force Recommendation 1

Option 4 – Establish New Event Category

Mark Caruso, NRO/DSRA

Option 4 – New Event Category

- New event category can be established on a generic or plant-specific basis
 - Generic approach (Option 4a): Generic criteria established by NRC to identify generic events/sequences as design extension events (adequate protection)
 - Plant-specific approach (Option 4b): Generic criteria specified by the NRC which are applied by licensees (as opposed to the NRC) to identify plant-specific events/sequences from PRA as design enhancement events (safety enhancement)



Fukushima Task Force Recommendation 1

Option 4a – Establish Generic Design Extension Category

Mark Caruso, NRO/DSRA

Summary of Option 4a

- Extend design-basis with events historically outside the design-basis (design-extension events)
- Establish requirements for the category of design-extension events
 - Inclusion in the design-basis
 - Acceptance criteria for mitigation
 - Event evaluation
 - Treatment of SSCs credited for mitigation

Option 4a - Background

- Commission has relied upon design-basis events/accidents to demonstrate plant design is robust
- Generic safety concerns related to events outside design-basis have been identified through operating experience and PRA and addressed with event-specific regulations or licensee “voluntary” actions
- NTTF and the RMTF have recommended design-basis be extended to address events historically outside the design-basis; current framework for design-basis events OK
- European regulators and IAEA taking actions to address events outside traditional design-basis
 - IAEA Safety Standard No. SSR-2/1, February 20, 2012

Relationship to NTTF and RMTF

- Option 4a would establish regulatory requirements for addressing the new design-extension events, as recommended by NTTF sub-recommendation 1.1
- Option 4a would establish “design-extension” events as requirements for adequate protection, as recommended in NTTF sub-recommendation 1.1
- Option 4a would include rulemaking, consistent with NTTF sub-recommendation 1.2
- Option 4a would specify generic requirements informed by a review of information already collected by the NRC, as recommended in NTTF sub-recommendation 1.4
- Option 4a would implement the recommendations of the RMTF report for operating and new power reactors as described in NUREG-2150, Appendix H.2.1.

Description of Option 4a

- Category of requirements for addressing specific events created by rule to extend the design-basis
 - Category definition included in 10 CFR 50.2
- NRC populates category with regulations that address specific events and apply generically
 - Selection criteria specified in 10 CFR 50.2
 - Regulations in category would be for adequate protection
- Applicants and licensees required by rule to:
 - Design, construct and operate facility in accordance with design-basis-extension categorization and special treatment designation requirements.
 - Evaluate events and show event-based acceptance criteria are met
- Special treatment requirements for SSCs credited in the evaluation will be established in the regulations

Key Issues

- On what basis must design-extension events be identified, and how should that basis differ, if at all, from the basis for identifying DBAs and beyond DBAs?
- What acceptance criteria must be met to show that the plant's licensing basis adequately addresses design extension events? For example, must design-extension events meet acceptance criteria with specified conservative assumptions (e.g., single failure, loss of offsite power); and, should the criteria be general or event specific?
- How will non-safety related SSCs that are relied upon to mitigate design-extension events be treated?
- Is it feasible to specify a common (or minimum baseline) set of design or operating requirements for design-extension events, or must different requirements be specified for each design-extension event?
- What methods will be used to evaluate design-extension events?
- How will the NRC review and approve each plant's licensing basis demonstrating that the design extension events (however they are specified or determined) are adequately addressed? What review guidance is needed?
- Are the criteria for balancing risk, DID and SM the same for design-extension events as for DBAs?

Option 4a – Expected Regulatory Products

- Revision to 10 CFR 50.2
 - Define DBA and design-extension events
- Revision to 10 CFR 50.34 and Part 52
 - Put design-extension event evaluations in FSAR
- Regulatory Guides
 - Implementation of design-extension requirements
 - Treatment of design features credited in evaluation of design-extension events
- Standard Review Plans
 - Implementation of design-extension requirements
 - Treatment of design features credited in evaluation of design-extension events
- Inspection Procedures
 - Implementation of special treatment requirements

Designation of Generic Design-Extension Category of Events

- NRC would determine the set of design-extension events
 - Selection criteria included in the regulations
 - Could include events already addressed by regulation (e.g., SBO, AIA)
 - Could include events not currently addressed by regulation
- NRC may review the following to identify new candidate events covered in the design-extension category
 - Individual Plant Evaluations and the Individual Plant External Event Evaluations
 - Analyses performed with NRC SPAR models
 - Accident Sequence Precursor Analyses performed by the NRC
 - PRAs: power plant licenses and design certification applicants
 - State-of-the-Art Reactor Consequence Analysis
 - NRC Level 3 PRA project (in progress)
 - Generic Safety Issues Program

Evaluation of Design-Extension Events

- Applicants and current licensees evaluate events
 - Show how acceptance criteria met
 - Identify SSCs relied upon to mitigate events successfully
- Evaluation methods may relax some or all conservatisms and prescribed boundary conditions required in design-basis event evaluation
- NRC reviews evaluation results

Treatment Requirements for SSCs

- Treatment requirements for design-extension category SSCs established by rule
- Goal: Strive for uniform treatment across category rather than event specific
- Graded approach to treatment based on safety significance could be considered
- Utilize applicable concepts from Regulatory Treatment of Non-Safety Systems (RTNSS) for passive designs

Potential Elements of Treatment

- Design requirements for independence, redundancy, and diversity
- Codes and Standards for design, material procurement, fabrication, construction, and operation
- Seismic design-basis
- Seismic qualification testing
- Equipment qualification testing
- Quality assurance and quality control
- Maintenance Requirements
- Availability Controls
- Materials surveillance testing
- Pre-service and in-service inspection
- Pre-service and in-service testing



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Option 4b – Establish Design Enhancement Category Using Plant-Specific PRA

Mike Snodderly, NRR/DRA

Summary of Option 4b

- Establish design-enhancement category
- Plant-specific PRA required
- Licensee designates plant-specific design-enhancement category events and accidents
- Includes treatment requirements for SSCs used to meet design-enhancement acceptance criteria

Option 4b – Background (same as Option 4a)

- Commission has relied upon design-basis events/accidents to demonstrate plant design is robust
- Generic safety concerns related to events outside design-basis have been identified through operating experience and PRA and addressed with event-specific regulations or licensee “voluntary” actions
- NTTF and the RMTF have recommended design-basis be extended to address events historically outside the design-basis; current framework for design-basis events OK
- European regulators and IAEA taking actions to address events outside traditional design-basis
 - IAEA Safety Standard No. SSR-2/1, February 20, 2012

Relationship to NTTF and RMTF

- The NTTF envisioned a framework in which a new category of events would be established for adequate protection (i.e., Option 4a).
 - Differs in that the design-enhancement category would add additional protection beyond adequate protection
- Option 4b would implement the recommendations of the RMTF report for operating and new power reactors as described in NUREG-2150, Appendix H.2.2. (Alternative 2)
- Option 4b would implement the NTTF and RMTF recommendations for use of plant-specific PRAs

Design-Enhancement Category Description

- NRC would specify selection criteria for events/accident sequences
- Licensees would apply NRC criteria to determine which events should be included in the design-enhancement category
- This option “enhances” the design basis events/accidents to add “additional protection” that improves safety beyond the level required for reasonable assurance of adequate protection

Designation of Plant-Specific Design-Enhancement Category Events

- Licensee selects design-enhancement events/sequences using its plant-specific PRA, deterministic information, and criteria set forth in NRC regulations.
- NRC selection criteria thresholds would, as much as possible, build upon existing practices, such as:
 - regulatory analyses
 - backfit analyses
 - severe accident mitigation alternatives
 - Regulatory Guide 1.174

Plant-Specific PRA Requirement

- Each operating and new nuclear power plant would develop and maintain a plant-specific PRA
- Similar to the requirement for new reactors in 10 CFR 50.71(h)
 - Limited to Level 1 core damage Level 2 containment performance
- New regulation would require licensees to perform periodic PRA updates and analyses to identify relevant scenarios and determine appropriate actions to address identified design-enhancement events

Option 4b Treatment Requirements

- Treatment requirements for design-enhancement events would be developed similar to RAP for new reactors:
 - SECY 95-132, “RTNSS for Passive Plants,”
 - SRP 17.4, “RAP,”
 - SRP 17.5, “QA Program Description,”
 - SRP 19.3, “RTNSS for Passive Plants”

Option 4b – Key Issues

- Needed as part of adequate protection or additional protection?
 - Should existing requirements, such as SBO, ATWS and AIA, be designated as design-enhancement events?
- What selection criteria should NRC specify for identifying events/sequences?
- Determine how backfit rule would be integrated with this option.

Option 4b – Expected Products

- A requirement for licensees to periodically identify, assess, and address design-enhancement events meeting thresholds specified by NRC.
- A requirement for power reactor licensees to prepare, maintain, and upgrade a PRA meeting NRC-specified quality requirements.
- A rule specifying treatment requirements for design-enhancement events.
- Conforming rule changes to 10 CFR 50.34 and analogous provisions in Part 52 requiring various nuclear power plant applications to include information on compliance with the various design enhancement requirements.
- Guidance documents consistent with the new rules.



Fukushima Task Force Recommendation 1

Cost Estimates

Fred Schofer, NRR/DPR

Estimated Costs

Option 1 (existing framework) – no cost

Option 2 (voluntary initiatives) – \$1.6 million

Option 3 (defense-in-depth) – \$2.3 million

Option 4a (design extension) – \$7.6 million

Option 4b (design enhancement) – \$83 to \$105 million

These resource estimates are preliminary, do not include any potential benefits, and are subject to change.

Option 2 – Voluntary Initiatives

Option 2 – Estimated Burden – One-Time Implementation Costs				
	Hours per action	No. of actions	Labor rate	Implementation Cost
Industry Costs				
Prepare generic industry procedure template to conform with policy statement	3120	1	\$105	\$327,600
Licensees adopt template for facility use	80	104	\$105	\$873,600
Subtotal				\$1,201,000
NRC Costs				
Prepare a Policy statement regarding voluntary initiatives for public comment	1000	1	\$119	\$199,000
Resolve public comments and publish the final Policy statement	674	1	\$119	\$80,206
Revise existing NRC guidance documents to conform with policy statement	80	19	\$119	\$180,880
Subtotal				\$460,000
Total				\$1,661,000
Average industry cost per unit				\$12,000
Assumptions:				
1. All implementation costs are incurred in first year				
2. A generic industry procedure is prepared and then implemented at each nuclear generating station.				
3. No impact to existing industry initiatives				

Option 2 – Voluntary Initiatives (cont.)

Option 2 – Estimated Burden – Additional One-Time Implementation Costs				
	Hours per action	No. of actions	Labor rate	Implementation Cost
Industry Costs				
Facility inspection and review of design documentation	160	104	\$105	\$1,747,200
Document verification results	80	104	\$105	\$873,600
Subtotal				\$2,621,000
NRC Costs (if required)				
Rulemaking establishing requirements for previously voluntary initiative(s)	3348	1	\$119	\$398,000
Subtotal				\$398,000
Total				\$3,019,000
Assumptions:				
1. All implementation costs are incurred in first year				
2. Retrospective review of existing industry initiatives results in a finding that regulatory action is required				

Option 3 – Defense-in-Depth

Option 3 – Estimated Burden – One-Time Implementation Costs				
	Hours per action	No. of actions	Labor rate	Implementation Cost
<u>Industry Costs</u>				
Prepare generic industry procedure template to conform with NRC guidance document	3120	1	\$105	\$327,600
Licensees adopt template for facility use	80	108	\$105	\$907,200
Subtotal				\$1,235,000
<u>NRC Costs</u>				
Prepare a Policy statement regarding risk-informed regulatory decision making for public comment	1000	1	\$119	\$119,000
Resolve public comments and publish final policy statement	674	1	\$119	\$80,200
Prepare a new MD for risk-informed decision making				
NRC guidance documents to conform with policy statement	500	1	\$119	\$59,500
Prepare and issue new guidance that provides criteria and methodology for using a blend of deterministic and probabilistic processes on a plant-specific basis.	3600	1	\$119	\$428,400
Revise existing NRC guidance documents to conform with policy statement	160	20	\$119	\$380,800
Subtotal				\$1,068,000
Total				\$2,303,000
Average industry cost per unit				\$11,000

Option 3 – Defense-in-Depth (cont.)

The policy statement would provide the criteria for how defense-in-depth should be implemented. However, determining if an individual licensee has adequate defense-in-depth is determined on a plant-specific basis. The most efficient approach may be to use a plant-specific PRA. Below is the estimated burden for those plants which do not have a plant-specific PRA.

Option 3 – Estimated Burden – Additional One-Time Implementation Costs				
	Hours per action	No. of actions	Labor rate	Implementation Cost
<u>Industry Costs (if required)</u>				
Upgrade plant-specific PRA	3120	68	\$105	\$22,276,800
Peer review plant specific PRAs	624	68	\$105	\$4,455,360
<u>NRC Costs</u>				
Rulemaking establishing requirements for having and maintaining plant-specific PRA models	3348	1	\$119	\$398,000
Total				\$27,130,000
Average industry cost per unit				\$393,000
Assumptions:				
1. New plants and existing plants with plant-specific PRAs have negligible work to upgrade their PRAs to meet these new requirements				
2. All implementation costs are incurred the first year				

Option 4a – Establish design-basis extension on a generic basis

Option 4a Estimated Burden – One-time Implementation Costs				
	Hours per action	No. of actions	Labor rate	Implementation Cost
<u>Industry Costs</u>	-	-	-	-
Prepare generic industry procedure template to conform with NRC guidance document	3120	1	\$105	\$327,600
Licensees adopt template for facility use	80	108	\$105	\$907,200
Licensees prepare submittal and resolve NRC comments	320	108	\$105	\$3,628,800
Subtotal				\$4,864,000*
<u>NRC Costs</u>				
Rulemaking establishing design basis enhancement requirements on a generic basis	3348	1	\$119	\$398,412
Prepare new guidance document	2200	1	\$119	\$261,800
Review submittals and prepare and issue SERs	160	108	\$119	\$2,056,320
Subtotal				\$2,717,000
Total				\$7,580,000
Average Industry cost per unit				\$45,000
Assumptions:				
1. All implementation costs are incurred the first year				
2. New categorization requirements would be imposed on existing nuclear power plants (including already-approved design certifications and combined licenses, as well as future plants (including applications currently in process))				
3. Implementation details would be contained in a new guidance document that accompanies the rulemaking.				
4. Licensee submittals and safety evaluation reports (SERs) are required				

Option 4b – Establish design-basis enhancement on a plant-specific basis

Option 4b Estimated Burden – One-time Implementation Costs				
	Hours per action	No. of actions	Labor rate	Implementation Cost
<u>Industry Costs</u>	-	-	-	-
Prepare generic industry procedure template to conform with NRC guidance document to classify events and accidents	3120	1	\$105	\$327,600
Licensees adopt template for facility use	80	108	\$105	\$907,200
Licensees perform plant-specific assessments	500	108	\$105	\$5,670,000
Licensees prepare submittal and resolve NRC comments	240	108	\$105	\$2,721,600
Subtotal				\$9,626,000
<u>NRC Costs</u>				
Rulemaking establishing design basis enhancement requirements on a plant-specific basis	3348	1	\$119	\$398,412
Prepare new guidance document	1465	1	\$119	\$174,335
Review submittal and prepare and issue SER	740	108	\$119	\$4,498,200
Subtotal				\$5,071,000
Total				\$14,697,000
Average Industry cost per unit				\$89,000
Assumptions:				
<ol style="list-style-type: none"> 1. The requirement for a plant specific PRA does not impose additional burden on COLs holders or COL applicants [10 CFR 50.71(h)] 2. All implementation costs are incurred the first year 3. One-time upgrading of PRAs is required for those nuclear power plants that don't have a plant specific PRA 4. New categorization requirements would be imposed on all existing and future nuclear power plants license and design certification holders. 5. Implementation details would be contained in a new guidance document that accompanies the rulemaking. 6. Licensee submittals and safety evaluation reports (SERs) are required 				

Option 4b – Establish design-basis enhancement on a plant-specific basis (cont.)

PRA Upgrade to All Mode, All Initiating Events PRA

One-time cost to upgrade PRA to cover all modes and all initiating events.

Option 4b Estimated Burden – One-time Implementation Costs (cont.)				
	Hours per action	No. of actions	Labor rate	Implementation Cost
<u>Industry Costs</u>				
Upgrade plant-specific PRA	3120	68	\$105	\$22,276,800
Peer review plant specific PRAs	624	68	\$105	\$4,455,360
Total				\$26,732,000
Average industry cost per unit				\$393,000*

Option 4b – Establish design-basis enhancement on a plant-specific basis (cont.)

PRA Maintenance

Industry annual PRA maintenance per unit to incorporate new information could be fairly straight-forward, and has been modeled over a range to represent a low estimate, best estimate, and high estimate per year for existing operating reactors PRAs as shown below:

Estimate Type	Hours per year	Labor rate	Annual PRA Maintenance Cost	No. of PRAs	Annual Industry PRA Maintenance Cost
Low	40	\$105	\$4,200	104	\$436,800
Best	200	\$105	\$21,000	104	\$2,184,000
High	600	\$105	\$63,000	104	\$6,552,000

PRA Upgrades Every 4 Years

Industry periodic PRA upgrades per unit to incorporate new standards or methodologies could be fairly straight-forward to complex. To model this variation, estimates were developed for a low estimate, best estimate, and high estimate as shown below:

Estimate Type	Hours per update	Labor rate	Maintenance cost per PRA update	No. of PRAs	Industry Periodic PRA Update Cost
Low	200	\$105	\$21,000	104	\$2,184,000
Best	480	\$105	\$50,400	104	\$5,241,000
High	1000	\$105	\$105,000	104	\$10,920,000

Option 4b – Establish design-basis enhancement on a plant-specific basis (cont.)

Total Estimated Burden

To provide meaningful summations, the estimated burden is expressed on a present-worth basis using both 3 percent and 7 percent real discount rates.

The 3 percent rate approximates the real rate of return on long-term government debt which serves as a proxy for the real rate of return on savings. Alternatively, the 7 percent rate approximates the marginal pretax real rate of return on an average investment in the private sector.

	Option 4b Estimated Burden (2012 dollars)					
	3% Discount Rate			7% Discount Rate		
	Low Est.	Best Est.	High Est.	Low Est.	Best Est.	High Est.
Total Industry	\$53,858,000	\$100,358,000	\$202,358,000	\$48,058,000	\$78,358,000	\$151,358,000
Total NRC	\$5,071,000	\$5,071,000	\$5,071,000	\$5,071,000	\$5,071,000	\$5,071,000
Total	\$58,900,000	\$105,000,000	\$207,000,000	\$53,100,000	\$83,400,000	\$156,000,000



Fukushima Task Force Recommendation 1

Summary – Path Forward

Richard Dudley, NRR/DPR

Comparison to NTTF Recommendation 1

NTTF Recommendation	Option				
	1	2	3	4a	4b
1. Regulatory framework for adequate protection; appropriately balance defense-in-depth and risk	–	–	✓	✓	✓
1.1 Policy Statement: Risk-informed defense-in-depth framework; include extended design-basis requirements	–	–	✓	✓	✓
1.2 Rulemaking to implement 1.1	–	–	–	✓	✓
1.3 Modify Reg. Analysis Guidelines: more effectively implement defense-in-depth in balance emphasis on risk	–	–	✓	–	✓
1.4 Evaluate the insights from the IPE and IPEEE	–	–	–	✓	✓ +

Contents of SECY Paper

- Describe proposed options to address key NTTF and RMTF recommendations for power reactors
- Describe the key policy, technical, and regulatory issues and possible resolutions
- Describe the actions/products needed to implement each option
 - Policy statements, rulemakings, regulatory guides
- Estimate NRC/licensee resources
- Discuss Pros and Cons
- Provide staff recommendation

Path Forward

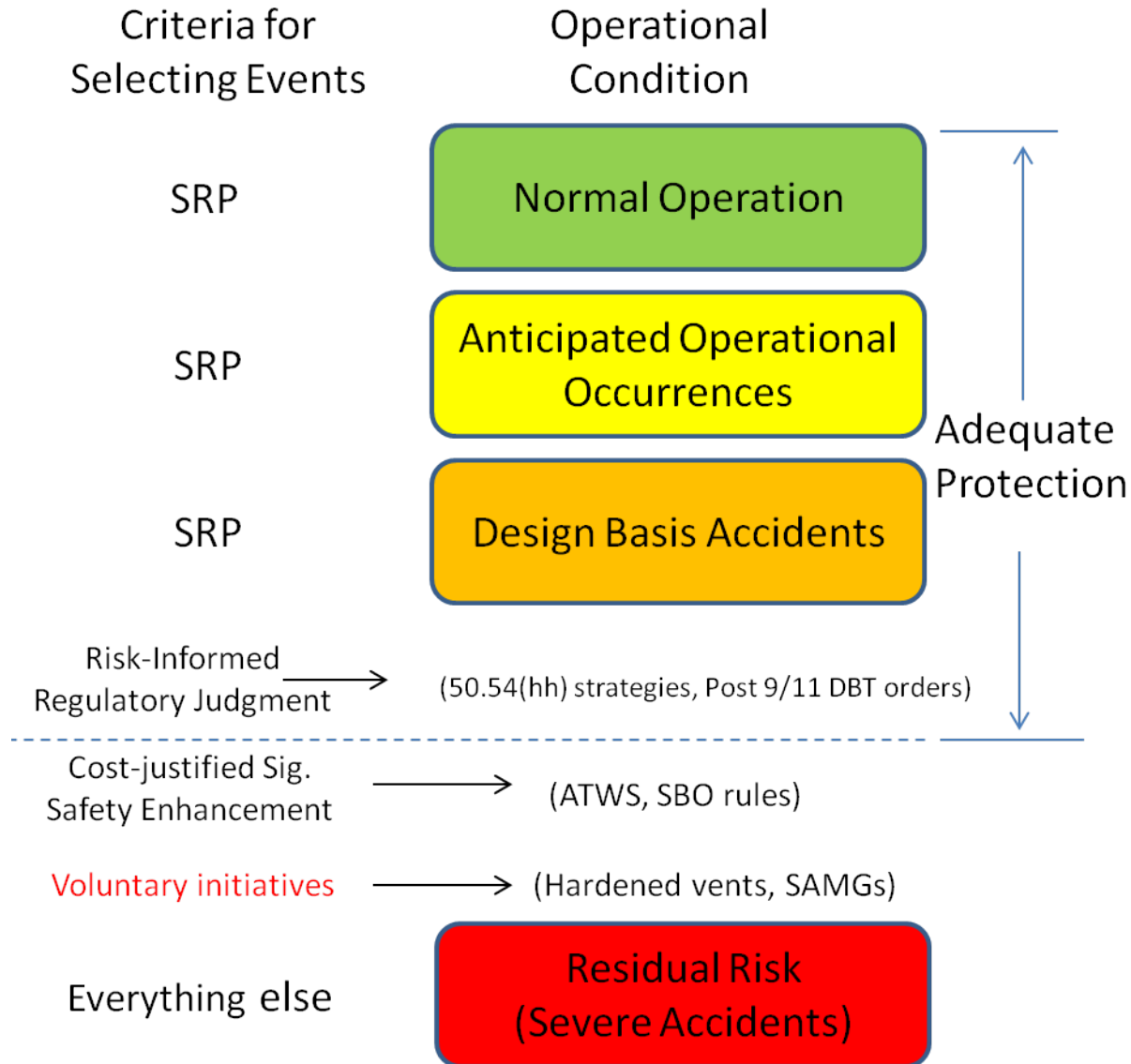
- Complete description and assessment of proposed options
- Review feedback from Nov. 8 public meeting (comments due Dec. 14)
- Modify options/cost estimates as appropriate
- Multiple interactions with JLD Steering Committee
- ACRS sub- and full committee briefings - letter
- Finalize staff recommendation and provide notation vote paper to Commission

Schedule

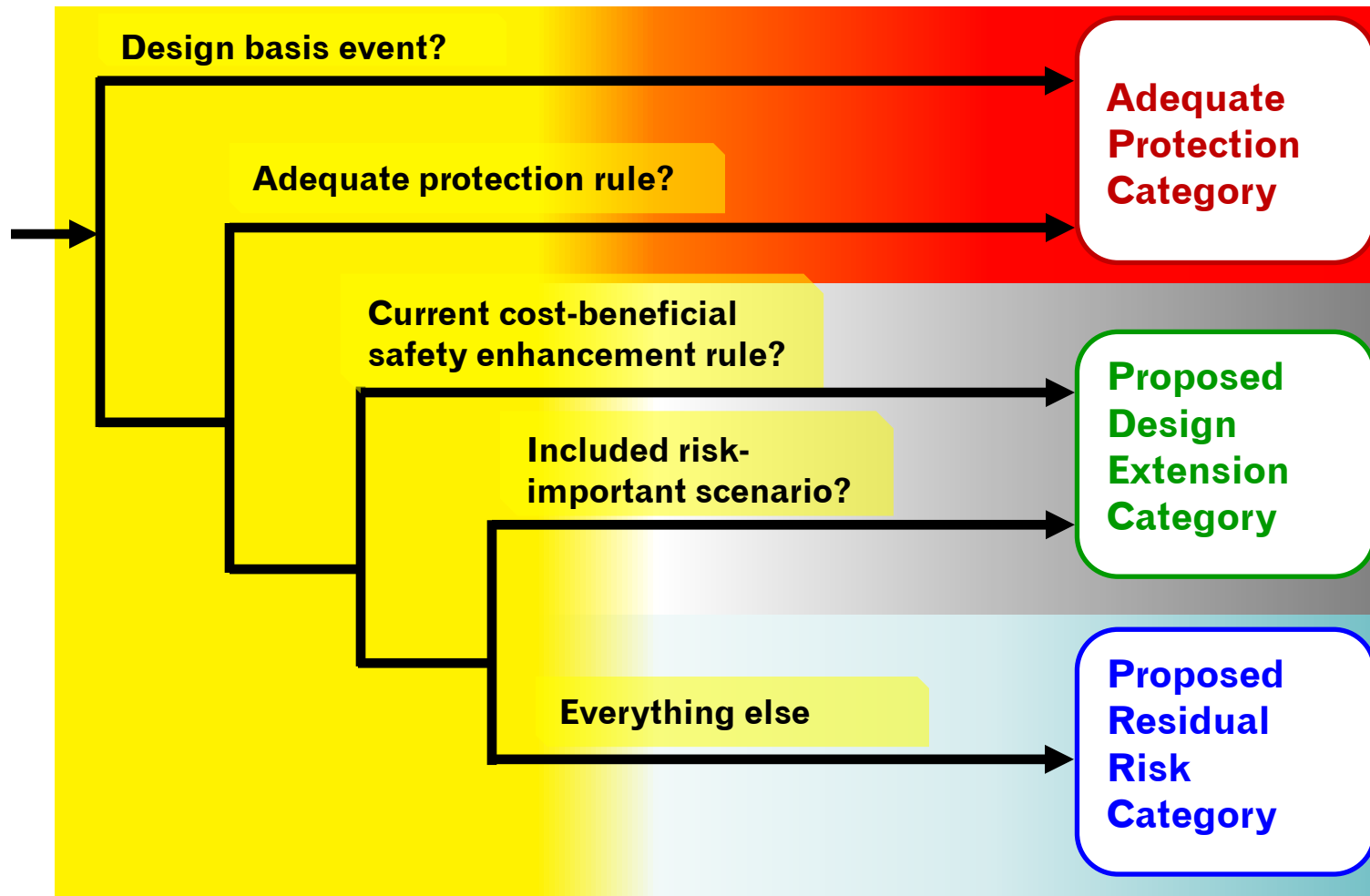
- November 8, 2012 – Second public meeting
- December 4, 2012 – Second ACRS subcommittee meeting
- December 14, 2012 – Public comments due (www.reg.gov)
- December 2012 – January 2013 – 3 JLD Steering Committee meetings
- January 18, 2013 – Third ACRS subcommittee meeting
- February 7 – 8, 2013 – ACRS full committee meeting
- February 12, 2013 – SECY paper due to EDO
- February 19, 2013 – SECY paper due to Commission

Backup Slides

Current Regulatory Approach for Events



Risk Management Task Force - Proposed Regulatory Framework: Power Reactors



The Current Framework for Events Compared to Options 4a and 4b

Adequate
Protection

Additional
Protection

No Req'ts

Option 1

- Design basis events
- Other Req'ts (50.54(hh))

- Cost-beneficial rules (50.63 SBO, ATWS)
- Voluntary initiatives

Option 4a

- Design basis events
- Design extension events (50.54(hh))

- Cost-beneficial rules (50.63 SBO, ATWS)
- Voluntary initiatives

Option 4b

- Design basis events
- Other Req'ts (50.54(hh))

- Design enhancement events
- Cost-beneficial rules?
- Voluntary initiatives