

Official Transcript of Proceedings
NUCLEAR REGULATORY COMMISSION

Title: ACRS PRA Subcommittee

Docket Number: N/A

Location: Rockville, MD

Date: November 17, 2010

Work Order No.: NRC-557

Pages 1-181

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

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24

DISCLAIMER

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

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

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

1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

3 + + + + +

4 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

5 RELIABILITY AND PRA SUBCOMMITTEE

6 + + + + +

7 WEDNESDAY

8 NOVEMBER 17, 2010

9 + + + + +

10 ROCKVILLE, MARYLAND

11 + + + + +

12 The Subcommittee met at the Nuclear
13 Regulatory Commission, Two White Flint North, Room
14 T2B1, 11545 Rockville Pike, at 1:00 p.m., John W.
15 Stetkar, Chairman, presiding.

16
17 SUBCOMMITTEE MEMBERS:

18 JOHN W. STETKAR, Chairman

19 DENNIS C. BLEY, Member

20 JOY L. REMPE, Member

21 WILLIAM J. SHACK, Member

22
23 ACRS CONSULTANT PRESENT:

24 THOMAS S. KRESS

25
NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1
2
3
4
5
6
7
8

ACRS STAFF PRESENT:

HOSSEIN NOURBAKSH, Designated Federal Official

KEVIN COYNE

DON HELTON

DAN HUDSON

CHRISTIANA LUI

MARTY STUTZKE

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

C-O-N-T-E-N-T-S

1
2
3
4
5
6
7
8
9

Opening Remarks.....4

Introduction.....5

Project Planning.....7

Technical Approach.....25

Level 2 PRA and Interface to Level 3 PRA.....126

Developing Options for Proceeding.....155

Adjourn.....182

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

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

12:58 p.m.

1
2
3 CHAIRMAN STETKAR: The meeting will now
4 come to order. This is a meeting of the reliability
5 and PRA Subcommittee. I'm John Stetkar, Chairman of
6 the Subcommittee meeting. ACRS members in attendance
7 are Dennis Bley, William Shack, and Joy Rempe.

8 Our consultant, Tom Kress, will be
9 joining us sometime soon, I hope. Hossein Nourbakhsh
10 is the, of the ACRS staff, is the designated Federal
11 official for this meeting. Purpose of this meeting
12 is for the staff to brief the Subcommittee on the
13 plan that's scheduled for developing a level three
14 PRA.

15 We will hear presentations from the
16 staff. We have received no written comments or
17 requests for time to make oral statements from
18 members of the public regarding today's meeting. The
19 entire meeting will be open to public attendance.

20 Subcommittee will gather information,
21 analyze relevant issues and facts and formulate
22 proposed positions and actions as appropriate for
23 deliberation by the full Committee. The rules for
24 participation in today's meetings have been

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

www.nealrgross.com

1 announced as part of the notice of this meeting
2 previously published in the Federal Register.

3 A transcript of the meeting is being
4 kept and will be made available as stated in the
5 Federal Register notice. Therefore, we request that
6 participants in this meeting use the microphones
7 located throughout the meeting room when addressing
8 the Subcommittee.

9 The participants should first identify
10 themselves and speak with sufficient clarity and
11 volume so they may be readily heard. We will now
12 proceed with the meeting and I guess I'll ask
13 Christiana Lui to make some comments.

14 MS. LUI: Thank you. Christy Lui, NRC
15 staff. Today we are coming to really discuss with
16 the, with the Committee work in progress in terms of
17 where we stand regarding planning for a new level
18 three PRA.

19 And, we want to report out where we
20 stand, and we would like to be able to give you
21 insights and so that we will have the benefit of the
22 reliability Committee's wisdom to also help us
23 moving forward. Okay.

24 And, want to point out that there has

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 been lots of development and use, and use over the
2 past two decade in terms of risk information and
3 risk analysis tools and models, especially after
4 NUREG number fifty and post IPE and IPEEE.

5 There are a lot, there have been lots of
6 applications in a very specific regulatory issues
7 and also subject area. So, part of the objective
8 here is to really, is really to culminate what we
9 have learned and what we have developed and what we
10 have used in the past two decades and integrate all
11 these different pieces together.

12 ACRS has expressed support in, I mean,
13 for a level three PRA over, over the, over the past
14 couple of years, and the latest support comes out at
15 your NUREG 13--I mean, 1635, the latest iteration of
16 your review of research program.

17 And, as we have been going through these
18 planning work, we found that it's, we believe that a
19 new level three PRA is not just good to have, it's
20 also driven by our increasing needs to have an
21 integrated and comprehensive PRA.

22 So, today We're going to have the team
23 presentation approach. We're going to have Dan
24 Hudson, who is the project manager for the PRA for

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 these level three PRA project, to do a short
2 presentation to lay out the project considerations,
3 status, and the near term time lines so that you
4 have the context about where and how we go to where
5 we are today and where We're going from this
6 particular point on.

7 And want to focus the rest of the
8 discussion on the overall technical approach, which
9 will be led by Marty Stutzke, our senior level
10 advisor for PRA technology and also a very focused
11 discussion on the level three--I mean, sorry, on the
12 level two piece, which interfaces with level one and
13 level three.

14 And, at the end of today's meeting, we'd
15 like to come back and to plan for our next set of
16 interaction with you, based on the, based on what we
17 have heard discussed today. So, with that, we turn
18 to you for, to Dan.

19 MR. HUDSON: Okay. Moving on to slide two
20 of the presentation, I guess already briefly
21 introduced me. I'm serving both as the project
22 manager for the new site level three PRA effort, I'm
23 also the technical assistant for the Division of
24 risk analysis.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Slide three provides an overview of the
2 time length for this afternoon's activities, which
3 Chris already touched upon. So we'll move onto slide
4 four. So, we begin our discussion about planning for
5 a new site level three PRA activity by briefly
6 reviewing some relevant background information.

7 As you may know, the last NRC sponsored
8 level three PRAS were conducted over twenty years
9 ago in the late 1980's. These level three PRAS were
10 documented in a collection of NUREG CR ports and a
11 single corresponding summary document, NUREG 1150.

12 Now, in thinking about the possibility
13 of proceeding with new level three PRAS, and how the
14 results of these PRAS might be used, it's important
15 to consider the objectives of this NUREG 1150 effort
16 and how those results were subsequently used.

17 There were three main objectives
18 associated with NUREG 1150. The first was to provide
19 a snapshot in time assessment of the severe accident
20 risks of five nuclear power plants of differing
21 major reactor and containment designs. The second
22 was to summarize the perspectives gained in
23 performing these risk analyses, and the third was to
24 provide a set of PRA models and results that can

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 support the ongoing prioritization of time safety
2 issues and related research.

3 In addition to considering the
4 objectives and subsequent uses of the NUREG 1150
5 PRAs it's important to consider their scope and
6 limitations. Now this slide shows reactor risk cube
7 that was developed by Marty to illustrate the
8 dimensions of level three PRA for a power reactor.

9 The scope of the NUREG 1150 PRAs is
10 indicated by the green and yellow boxes. As you can
11 see, these PRAs were incomplete in scope as they
12 involved a limited assessment of risk from reactor
13 accidents initiated primarily by internal events
14 Occurring during full power operations with a
15 limited treatment of some external events for two of
16 the five power plants that were analyzed.

17 On the next slide, it's also important
18 to consider the many changes that have taken place
19 in the two decades since NUREG 1150 was published.
20 In conjunction with acquiring over twenty years of
21 operating experience, there have been many advances
22 in PRA methods, models, tools and data which we
23 collectively refer to here as PRA technology.

24 There have also been many substantial

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 plant changes effecting risk. In addition to changes
2 in technical specifications, there have been power
3 uprates as well as the implementation of risk
4 informed regulations to improve safety.

5 It's as important to note that the NUREG
6 1150 PRAs only evaluated risk from reactor
7 accidents. Since then, there's been a growing
8 interest in integrating and quantifying the relative
9 contribution to public health risk from all
10 radiological hazards, both reactor and non reactor.

11
12 Now with this background information in
13 mind, we identify three potential high level
14 objectives for a new site level three PRA. First is
15 to update and improve our understanding of nuclear
16 power plant site accident risk by incorporating
17 these advances in PRA technology and plant safety
18 improvements that have taken place over the past two
19 decades, and by integrating the risk from all
20 radiological hazards using consistent assumptions,
21 methods, and tools to enable a meaningful comparison
22 and ranking of risk contributors that will focus our
23 safety mission.

24 The second is to develop a risk analysis

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 toolbox using 21st century technology. Now this will
2 serve as a repository of PRA information of sorts,
3 that will enhance our ability to risk inform current
4 and future regulatory decisions.

5 And, the third is to develop critical
6 internal PRA expertise by training a new generation
7 of risk analysts who will gain state of the art
8 knowledge and experience by participating in this
9 activity.

10 MEMBER BLEY: Before you go on--

11 MR. HUDSON: Yes?

12 MEMBER BLEY: I don't know if I should
13 ask you or Marty, but what's the status and, and
14 general usage of the current risk analysis toolbox
15 that you put out? I think that was the title of the
16 old one, yes?

17 MR. HUDSON: The toolbox that you're
18 referring to, is that the, the risk standardization
19 one?

20 MEMBER BLEY: What was it, you had a
21 website--the toolkit or toolbox?

22 MR. STUTZKE: Yes, the risk toolkit.

23 MEMBER BLEY: Yes, that's the one. Are
24 people broadly using that now?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: Yes, it's, SRAs use it
2 routinely.

3 MEMBER BLEY: Okay. And that's the idea
4 here, is, add to that?

5 MR. STUTZKE: Yes, but if you look at the
6 risk toolbox, it's oriented towards event
7 assessments and things that SRAs, We're talking
8 about much older--

9 MEMBER BLEY: Okay. Thanks.

10 MR. STUTZKE: So, I'll try to make it
11 clear as we get into--

12 MEMBER REMPE: Does that toolbox include
13 then like the SPAR models?

14 MR. STUTZKE: Yes.

15 MEMBER REMPE: Okay.

16 MR. STUTZKE: SPAR models, the SAPHIRE
17 software, the drives, the models. There are
18 handbooks that talk about how the assumptions one
19 makes during event assessment so that everybody does
20 it consistently.

21 MR. HUDSON: Moving onto slide eight.
22 Now, with these objectives in mind, we envision that
23 the new site level three PRA would have the
24 following attributes. First, it would be

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 comprehensive in that all radiological hazards
2 including the reactor, spent fuel, and other sources
3 all plant operating modes, including full power
4 operations and low power shutdown operations, all
5 causes of initiating events, both external and
6 internal, and multiunit effects would be considered.

7
8 Second, it would be integrated with
9 common assumptions, methods, and data used in the
10 analyses to allow for a meaningful relative ranking
11 of risk contributors. And these integrate analyses
12 would also conform to staff endorsed PRA standards.

13
14 Finally, it would be state of the art in
15 that current best practice and more recent
16 information experimental results and methodology
17 developments would be used as appropriate, including
18 the use of 21st century technology to document the
19 project results, methods, models, tools, and data to
20 support a wide variety of regulatory applications.

21 CHAIRMAN STETKAR: Can you talk a little
22 bit later, I hope, about what the definition of
23 state of the, current state of the art means in the
24 context of this project?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: We'll certainly try.

2 CHAIRMAN STETKAR: Okay. Good. Okay.

3 MR. HUDSON: Okay. On slide nine, now,
4 with this stage set, on February 18th of this year,
5 during the annual Commission briefing on RES
6 programs, performance and future plans, our research
7 management proposed to initiate planning for this
8 new site level three PRA.

9 On March 19th of this year, the
10 Commission issued a staff requirements memorandum
11 that expressed conditional support and directed the
12 staff to first continue internal coordination
13 efforts and engage external stakeholders in
14 formulating a plan and scope for future level three
15 PRA activities.

16 And second, to provide the Commission
17 with options for proceeding which include custom
18 perspectives on future uses. In response to this
19 Commission tasking, we initiated a scoping study to,
20 to develop the options for Commission consideration
21 and perspectives on future uses of level three PRAS.

22
23 And also, identify and screen candidate
24 sites for participation in a potential pilot study.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And, consistent with our objectives, we also want to
2 investigate and develop different approaches for PRA
3 documentation and staff training.

4 The figure at the bottom of this slide
5 shows our progressively staged approach where,
6 continued upon Commission support, the scoping study
7 would be followed y a pilot site level three PRA
8 with subsequent follow on studies as necessary and
9 appropriate.

10 MEMBER BLEY: I noticed that in the, I
11 guess it was a brainstorming session, you had to get
12 this thing off, you had folks from as well as our
13 NRO, you had both NRR and OSS at that meeting.

14 MR. HUDSON: That's correct.

15 MEMBER BLEY: Are they going to continue
16 the involvement so have all those houses together?

17 MR. HUDSON: They have certainly been
18 assigned to the working groups that we'll talk about
19 in a little bit, and the level of participation at
20 this point has varied based on their availability
21 but they have been engaged in the process and we
22 intend to keep them engaged as we move forward.

23 MEMBER BLEY: Okay, are, are the
24 representatives from those organizations here with

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you today, or?

2 MR. HUDSON: They're not here today.

3 MEMBER BLEY: Okay. That's a little
4 disappointing, but go ahead.

5 CHAIRMAN STETKAR: Also an indication.

6 MEMBER BLEY: Perhaps. Perhaps.

7 MR. HUDSON: Okay. On slide eleven, as,
8 as we just talked about, for the scoping study, we
9 developed six different technical working groups to
10 address specific technical elements associated with
11 a level three PRA. And you see some of those
12 technical elements listed here.

13 It's important to note that these
14 technical elements were identified at this workshop
15 that you mentioned by the staff as being
16 particularly challenging and of the highest priority
17 for getting the project started.

18 We also created a seventh working group
19 to provide oversight to the different technical
20 working groups and to integrate the information
21 provided by those working groups in a way that the,
22 you know, Commission could consider at all in a SECY
23 paper.

24 CHAIRMAN STETKAR: Those, those working

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 groups, again, I don't want to nitpick things, but
2 it, it might again be an indication. You have one
3 working group that is, is addressing level one,
4 level two interface. You have another working group
5 that's addressing level two, level three interface.

6
7 I think some of our comments in the past
8 is that we need to be thinking about an integrated
9 level three PRA. Are, are the separate working
10 groups implicitly maintaining that artificial
11 disconnect between at least level two, you know,
12 across some sort of level two boundary?

13 In other words, this seems to--lost my
14 train of thought. The structure seems to foster that
15 notion of, well, we need to link level one with
16 level two across some sort of arbitrary interface,
17 and we need to think about level two versus level
18 three across some arbitrary interface. But, but it's
19 not clear how all of those people talk to one
20 another.

21 MR. HUDSON: Right.

22 CHAIRMAN STETKAR: And, and you're also
23 talk about cutting down the amount of binning--

24 MR. HUDSON: Yes--

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: --which really would
2 apply across the whole thing.

3 MR. HUDSON: Which means, you know, if
4 I'm binning at something the end of what I'm going
5 to arbitrarily draw the dotted line and call a level
6 one PRA. In many cases, my decisions, if I'm doing a
7 level three PRA, are based on where I need to get to
8 pass that level two model, I need to understand
9 that.

10 So, you can't just talk to people who
11 have had experience going from level one to level
12 two, never thinking about level three, because
13 that's somebody else's problem. You can't think,
14 talk to people who have only done the two three,
15 because the level one stuff has always been somebody
16 else's problem.

17 MR. HUDSON: Right.

18 CHAIRMAN STETKAR: So, I'm, I'm hoping
19 that some place there's that sense of you really
20 need to pull those three elements together and it's
21 not just a, a, insights from people who have always
22 been doing business in a certain way.

23 MR. HUDSON: Right. And your point is
24 well taken that it, I think the structure here was

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 something that we developed to allow us to make the
2 problem more manageable and one aspect of the
3 integration working group was to, to try to provide
4 that insight, that integrated overall perspective.

5 CHAIRMAN STETKAR: I hope it--yes. I hope
6 it does that. The only reason I brought it up here
7 is because the bullets here. But in many places, as
8 I was reading through the information that we
9 received, there were holes, you know, well, this
10 working group hasn't reported back to us yet so
11 We're not quite sure what their recommendations are
12 going to be, which kind of fosters that sort of
13 compartmentalized--

14 MR. HUDSON: Right.

15 MR. STUTZKE: The other thing I point out
16 is that some people belong to multiple working
17 groups.

18 MR. HUDSON: Exactly.

19 CHAIRMAN STETKAR: That's good. Yes.
20 That's good.

21 MR. HUDSON: So, yes, we did have some
22 overlap in terms of the individuals that were making
23 up the different working groups. But the point that
24 you bring up is one that we identified as we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 progressed through the scoping study. We had another
2 workshop in July where this particular aspect was,
3 was highlighted as a challenge. And, and we tried to
4 identify ways to improve as we move forward there.

5 CHAIRMAN STETKAR: Good. And, you're not
6 relying on that at all, though, that SECY paper
7 integration? You're relying on that last group to
8 glue the things together somehow?

9 MR. HUDSON: Right.

10 CHAIRMAN STETKAR: Okay.

11 MR. HUDSON: Right.

12 MR. HELTON: I just was going to
13 interject there, going to--sorry, my name is Don
14 Helton. I work in research, as well. There's going
15 to be a point later this afternoon when I talk about
16 the work that the level 2 working group has been
17 doing where you're going to have a particular
18 opportunity to, to re-engage on that point and we'll
19 talk about the level one level two interfacing and
20 the level two level three interface.

21 CHAIRMAN STETKAR: Good. Thanks.

22 MR. HUDSON: Okay. So the SECY paper
23 integration and oversight working group developed a
24 charter that provided expectations, guidance, and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 deliverables to the technical working groups. The
2 specific objectives of the working groups are
3 highlighted on the slide.

4 They were to identify the activities
5 needed to complete the new site level three PRA,
6 candidate methodologies, and relevant, completed,
7 and ongoing research. They're also tasked with
8 assessing data and information needs and identifying
9 technology and information gaps.

10 Finally, of course, we would like them
11 to provide a recommendation regarding the optimal
12 approach for completing some of these specific
13 technical elements for the level three PRA. We also
14 ask that they estimate schedule and resources, since
15 the Commission asked that we provide the
16 perspectives on cost and future uses.

17 And, finally, we wanted them to capture
18 the basis for decisions so that taking a look back
19 we can understand why and how we arrived at the
20 recommended approach.

21 Slide thirteen highlights some of the
22 key scoping study activities that we've accomplished
23 to date, as we move towards accomplishing the
24 Commission tasking. In March we had our first

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 engagement with external stakeholders by presenting
2 a poster and having a panel discussion at the
3 regulatory information conference.

4 In April, as we already discussed, we
5 had the, the scoping study kickoff workshop. We had
6 some brainstorming sessions and this was an
7 opportunity to have an early engagement with some of
8 the other internal stakeholders from NRO, NRR, and
9 MSS and answer.

10 April through September consisted of
11 internal working group meetings and coordination
12 activities. And in October after realizing that the
13 Commission decision regarding whether and how to
14 proceed with SOARCA and level three PRA activities
15 would be best informed if they were to receive the
16 staff's recommendations at the same time.

17 We began further coordination with the
18 SOARCA team and accomplished some activities to
19 align the schedules of the two projects. Slide
20 fourteen highlights some of the remaining activities
21 that we have in this clean setting. Obviously today
22 We're meeting with this group, our first interaction
23 with the ACRS.

24 From fall to winter, We're going to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 draft the Commission paper. Late winter to early
2 spring time frame, we'll arrange for a public
3 meeting to engage external stakeholders. In March,
4 we'll continue our external stakeholder outreach
5 with a reactor poster presentation.

6 And in the spring, We're hoping for
7 further interactions with the ACRS. Right now, We're
8 scheduled to meet with the full Committee on March
9 10th, but I think We're going to continue engaging
10 you and the ACRS staff to consider the possibility
11 of having a follow on Subcommittee meeting and then
12 a later full Committee meeting that would ideally
13 take place after the public meeting so that we could
14 have considered and address public comments.

15 And then, finally, in the June July time
16 frame our Commission paper is due. So that concludes
17 my discussion about the project planning aspects,
18 unless you have any further questions for me we'll
19 proceed with Marty's discussion.

20 MEMBER BLEY: So you're--I'm, I'm just
21 trying to get the schedule here. Sometime this, very
22 soon, you'll have a draft of your Commission paper,
23 but it's not due for six months or so?

24 MR. HUDSON: Correct.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Okay. So there will be
2 plenty of time to--

3 MR. HUDSON: We anticipate, you know,
4 after we've drafted the Commission paper, we've,
5 we've circulated it within our internal Office, and
6 then we start engaging external stakeholders, there
7 will be further revisions. Ultimately, after we've
8 engaged with the public and completed our follow-up
9 ACRS activities, we'll go through the concurrence
10 process.

11 And because of the complexity of this
12 paper we anticipate that may take a little bit
13 longer than normal. So, we want to get that started
14 probably around the very beginning of June, since
15 the paper is due to the EDO's Office at the end of
16 June.

17 CHAIRMAN STETKAR: We are though as you
18 mentioned, I think we are on the schedule at least
19 tentatively for March, full Committee presentation.

20
21 MR. HUDSON: Yes.

22 CHAIRMAN STETKAR: And we, we may decided
23 to write a letter, you know, at that meeting. I
24 guess we should wait until the end of this meeting

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 to see what the most appropriate time might be. You
2 don't want to come in too late if we have a, a
3 letter with, that might have redirection in it.

4 But, given our meeting schedule, March,
5 March full Committee meeting may be the first time
6 to actually get together. But that, that still, if
7 you're looking at a, at a June July time frame
8 period for the paper that still gives you a little,
9 a little time for that. `=

10 MEMBER BLEY: One other thing, I don't
11 know if it got retained in the slides. Normally,
12 before we make up the full Committee you guys like
13 to hear that we've made some public outreach?

14 CHAIRMAN STETKAR: Yes.

15 MEMBER BLEY: And we have a workshop
16 planned, and you begin to say that the time gets
17 tight for us to have a public workshop and, you
18 know, early next year or so and to factor that
19 results in. May to March Committee deadline.

20 MR. STUTZKE: Let's talk a little bit
21 about the schedule at the end of the Subcommittee
22 hearing and see what we can work out.

23 MEMBER BLEY: Yes, I'd appreciate it
24 greatly, because it's getting a little tight.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: It, it is. Let's talk, make
2 sure we talk about that at the end.

3 MR. HUDSON: Okay. Thank you.

4 MR. STUTZKE: Let's do the next slide.
5 So, I'm Marty Stutzke, the senior level advisor for
6 PRA technology and the Division of risk analysis. I
7 work for Christiana. What you see here is a
8 breakdown of the project as we had originally
9 envisioned it based on that slide that Dan had
10 showed you earlier.

11 So, We're going to look at reactor
12 accidents and spent fuel accidents and accidents
13 that involve other sources. At the time I threw that
14 block down, the other sources I had in mind were
15 tritium spills. We, we just had some up in, I think
16 up in Illinois and, you know, they always are high
17 visibility.

18 And, my thought was, yes, and we dismiss
19 them as very low risk, but what definitive study can
20 you point to that says the risk is small? So, I
21 added that onto the slide. The spent fuel activities
22 or accidents that we have in mind would cover
23 everything from getting fuel out of the reactor
24 until it's storage in dry cask.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 So, all of the fuel handling operations
2 to get it out of there, storage in the spent fuel
3 pool itself, transfer activities into the cask, so
4 forth and so on. Like that. For reactor accidents,
5 one of the key things is the multiunit aspect. It's
6 come up in a variety of contexts for us.

7 As a result of some work on the SOARCA
8 project, a proposed generic issue was written that
9 says what about multiunit risk. And, in fact, I was
10 in a meeting this morning and the conclusion of that
11 panel is, well, we will, we will transfer that issue
12 over to long term research that would be covered by
13 this project We're discussing now.

14 But it remains a viable concern, that
15 the other issue about multiunit risk, at least in my
16 experience, came about with, work a number of years
17 ago on the technology neutral framework, and there
18 were some policy issues written there about, what
19 about integrated or site level risk.

20 And I can remember well at the time Dr.
21 Kress opined that large early release is really a
22 site risk metric, not a per reactor risk metric like
23 that. So, I haven't forgotten the ideas, I don't
24 know the answer yet--

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 DR. KRESS: It still applies.

2 MR. STUTZKE: So, we, we want to do that.

3 Like that, then, of course, full power versus
4 shutdown and low power stages, internal events, a
5 suite of external events. The shade box you see is
6 roughly the scope of NUREG 1150. Some of the
7 externals, the internals and things. So, you get an
8 idea of the magnitude of the project that We're
9 looking here.

10 MEMBER BLEY: Have you restrained the
11 reactor types that this work will be considering as
12 it moves forward?

13 MR. STUTZKE: I'll talk about that in a
14 minute when we get into site selection, but yes,
15 we've done some work in that area about which plants
16 or plants we would go after like that.

17 DR. KRESS: Would you--could you, for
18 example, include the breeder reactors, that are
19 sodium cooled, for example? That gives some
20 challenges to the--

21 MR. STUTZKE: Right. Yes. What we have,
22 that the, the focus of, so far has been to focus on
23 currently operating reactors, okay, so We're talking
24 large, large LWRs and things like that. There was,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 we had interfaced with NRO and they indicated,
2 probably, they didn't want us over there quite yet.

3
4 And there are some technical reasons,
5 you know, I mean it's hard to get the level of
6 information you need to do a good PRA for a nuke
7 plant. That being said, with the Commissioner
8 Apostolakis' calm on small modular reactors, we are
9 now thinking about well, maybe that's the
10 appropriate thing we ought to be doing.

11 CHAIRMAN STETKAR: Yes, it's--there,
12 there, there's several bridges to be crossed and,
13 you know, extending too many bridges means you'll
14 never, you'll never get to the other shore, wherever
15 that is. I think it's an important consideration
16 that, that--I think there's a lot to be learned from
17 doing, you know, a, a second decade of the 21st
18 century integrated level three PRA for the stuff
19 that we currently have in hand.

20 I think we can learn a lot about that.
21 If you try to bite off too much, you might, in that
22 project, in terms of new reactor designs or areas
23 where you don't have as much information, you tend
24 to turn it into a much longer term research project-

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 -

2 MR. STUTZKE: It's not going to be an
3 easy step from there, from the modular reactors.
4 Which I think is going to get a, become a hot item
5 pretty soon.

6 CHAIRMAN STETKAR: And you might learn a
7 lot from this act, this activity to help you focus,
8 you know, that, that sort of second stage
9 application of this process, if you will.

10 MR. STUTZKE: Yes, my, my hope is that we
11 would, as Dan indicated before, we'll do a pilot
12 study on a current plant that we understand how it
13 behaves pretty well.

14 CHAIRMAN STETKAR: That is a multiunit--

15 MR. STUTZKE: That would be a multiunit
16 and we, we would smoke test the multiunit risk
17 approach, which, you know, I, I thought about it in
18 terms of, of two Unit risk. And when you extrapolate
19 it to six or eight reactors, I blew up, I got a cow
20 manure of a nightmare and I don't know whether it's
21 real or not.

22 Okay, I may just be overly rigorous this
23 way, but I can't tell right now. So, you know, we,
24 we'd be better to pick maybe two reactors or three

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 reactor site--

2 CHAIRMAN STETKAR: See what issues come
3 up--

4 MR. STUTZKE: See what, yes.

5 CHAIRMAN STETKAR: See how difficult it
6 really is to do.

7 MR. STUTZKE: You know, there are,
8 there's some other issues we'll talk about later,
9 but the favorite one on my list is human reliability
10 because we need to get into level two space with the
11 EDMGs, we need to get into the level three space,
12 and the concern has been raised, well, that might
13 necessitate redrawing the level one event trees and
14 logic structures to make their job more amendable.

15 Well, you know, if We're, if We're doing
16 that type of work, I don't want to have to also
17 worry about how the reactor physically behaves
18 during, during an accident progression--

19 CHAIRMAN STETKAR: On some of the new
20 designs, what you might have to assume about what
21 some of their systems might look like at--

22 MR. STUTZKE: Right.

23 CHAIRMAN STETKAR: --any given time.

24 MEMBER REMPE: There's also the potential

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that some of the designs could disappear and you'd
2 be starting on a path that, that--

3 MR. STUTZKE: That's absolutely true,
4 that there's a longevity and you'll see in the site
5 selection where I've tried to account for that.
6 Okay, but the, to finish with this one. Of course,
7 We're looking at accident risk. We would set aside
8 terrorism and sabotage for the interim like this.

9 And spent fuel and transportation risks
10 that are off the site are out of the scope of this
11 project. Like that. So far, everything's--

12 CHAIRMAN STETKAR: Yes. The bullet that
13 you cleverly skipped over that I was going to ask
14 you a question about is, what do you mean it's not
15 going to address risk from routine operations?

16 MR. STUTZKE: Routine--

17 CHAIRMAN STETKAR: I think I probably
18 understand that, but--

19 MR. STUTZKE: Routine releases.

20 CHAIRMAN STETKAR: Oh. I didn't
21 understand that. Okay. Thanks. Okay.

22 MR. STUTZKE: Yes. Strictly accident
23 risk.

24 CHAIRMAN STETKAR: But, accidents that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 could be initiated from routine operations.

2 MR. STUTZKE: Absolutely.

3 CHAIRMAN STETKAR: Okay.

4 MEMBER BLEY: Elsewhere, you talk about
5 nonreactor accident but you've moved those off the
6 table for now, it sounds like.

7 MR. STUTZKE: No, they're still there.

8 MEMBER BLEY: But not spent fuel.

9 MR. STUTZKE: Spent fuel is still there,
10 too.

11 MEMBER BLEY: Oh. I misunderstood what
12 you just said. It's the opposite--

13 MR. STUTZKE: Right, right now, it's all
14 on the table.

15 MEMBER BLEY: Okay. Fair enough. Good. I
16 misunderstood.

17 CHAIRMAN STETKAR: But, you are including
18 onsite, dry cask storage right now--

19 MR. STUTZKE: Yes.

20 CHAIRMAN STETKAR: --and, and in, in pool
21 storage, but not shipments.

22 MR. STUTZKE: You know, the example
23 scenario I give is, let's, let's think of a
24 multiunit site that has dry cask. One of the plants

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 is running at full power, the other one's in
2 refueling, and a big earthquake hits.

3 MEMBER BLEY: There you go.

4 MR. STUTZKE: So now We're, do something
5 to the fully operating reactor. We drop spent fuel,
6 while it's being transported. We bust open the dry
7 cask. That's the sort of scenario I want to be able
8 to analyze.

9 CHAIRMAN STETKAR: That's a good one.

10 MS. LUI: I just want to make sure that
11 we understand that, we, we started off the point of
12 view trying to be as comfy as possible and then as
13 the project goes on, depending on what, what, what
14 are we trying to, trying to solve.

15 Then we'll be able to pick and choose
16 and then provide a rationale for why certain things
17 were included or excluded, so that you be
18 transparent from the get go, rather than just go in
19 and say We're going to address this and not address
20 that without proper documentation.

21 MR. STUTZKE: That's absolutely right,
22 Chris, and it's one of the things that you'll see as
23 we talk about documentation is we don't only want to
24 record what we did, we want to record why we did it,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 how we got there.

2 CHAIRMAN STETKAR: The, the only, I
3 think, possible disconnect there is you're
4 excluding, you know, releases from routine
5 operations. So, for example, you know, pumping a
6 bunch of spent resin out in the yard, I guess, is
7 excluded but, but you've highlighted tritium because
8 it's apparently a newsworthy thing. So you want to
9 be a little bit careful about, about consistency,
10 even at the stage, across that sort of fuzzy line.

11 MR. STUTZKE: What, what I have in mind
12 is, you might remember this, there's a diagram, I
13 think it's in chapter two of the old Wash 1400 that
14 says, these are all the radioactive sources onsite.
15 And they went systematically, source by source, and
16 decided what they, that's the process, I want to
17 start from there.

18 CHAIRMAN STETKAR: The reason I bring up
19 things like, you know, there are plants, certainly a
20 lot of the newer designs, and I don't know how
21 extensively the currently operating plants use
22 things. But they use a lot of, the newer plants use
23 a lot of portable waste processing equipment.

24 So, indeed, your, you're handling pretty

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 hot, you know, containers of spent resin, for
2 example, pretty routinely. And, there, you know,
3 there could be a measurable frequency of releases
4 from that type of activity.

5 As I said, if you're restricting, you're
6 restricting it to currently operating plants, I just
7 don't know how people are doing their, their rad
8 waste processing these days, whether it's primarily--
9 --I think it's still primarily, you know, hard pipe
10 systems.

11 But, that's, that's the kind of question
12 you get across that grey area about, you know, why
13 are you looking at tritium and not some of these
14 other, you know, in the sense of what are all the
15 sources within the plant.

16 MR. STUTZKE: Yes. But, but you point out
17 something that's, that's, I think is also important
18 in this site selection, and that is we don't want to
19 presuppose the answer now.

20 CHAIRMAN STETKAR: That's right.

21 MR. STUTZKE: Like this. So, you know,
22 for example, if we picked Surrey or Peach Bottom
23 because we did them in Wash 1400 and did them in
24 1150 it creates the impression you already know the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 answer, and now you're trying to force your
2 methodology to confirm your wisdom of twenty years
3 ago and I tried very hard to resist that, even
4 though there are economics involved.

5 CHAIRMAN STETKAR: That, that's a good
6 point.

7 MR. STUTZKE: The next slide shows some
8 previous projects. This was an effort to try to, to
9 understand what information was out there. So, of
10 course, we have NUREG 1150, the five plants for the
11 internal events, the Surrey and Peach Bottom fire
12 studies out to level three.

13 The seismic out to level two for Peach
14 Bottom and Surrey. We have the set of IPEs and
15 IPEEEs. By the way, I guess you all know, everything
16 on the IPE and the IPEEE we have stored in ADAMS,
17 all the original submittals, the staff's request for
18 additional information, the licensees responses.

19 It's all there. And so it's going out to
20 us. We have the SPAR models. I want to explain the
21 notation here, it's, it's rather terse. So, FP for
22 full power, slash I.E. for internal events. 77
23 models like that. Full power external event models,
24 fifteen shutdown and low power, internal events,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 seven models.

2 Then, we have some level two feasibility
3 studies at three plants like that. As far as
4 shutdown of the power risk, of course, we have NUREG
5 CR--

6 CHAIRMAN STETKAR: Marty, before you go
7 vertically down on the table, just out of curiosity
8 since I'm not familiar with the SPAR models, are
9 there any SPAR models that indeed cross all four of
10 those attributes, in other words, that have full
11 power, internal, and external shutdown and low power
12 internal and level two? Is there, you know, at least
13 one that does all of that?

14 MR. STUTZKE: No.

15 CHAIRMAN STETKAR: Okay.

16 MR. STUTZKE: A couple of slides later,
17 I'll show you the diagram of how it all worked out.

18
19 CHAIRMAN STETKAR: I was just curious.

20 MR. STUTZKE: Yes. Like that. Okay, so
21 the shutdown studies at Grand Gulf and Surrey and
22 NUREG CR 6143 and 6144, all the way out to, to level
23 three. NUREG 1738, which was a spent fuel risk
24 study. And, NUREG 1864, which was a pretty recent

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 study for dry cask storage like that.

2 And, that one's interesting because the
3 actual site is not specified deliberately, and the
4 assumptions behind it, like the--now, you'll notice
5 that there's one shaded box up there, SOARCA. And, I
6 took some grief over including--

7 CHAIRMAN STETKAR: I, I was going to say,
8 it's kind of interesting that you just call it, sort
9 of, level two, level three, sort of.

10 MR. STUTZKE: Well, because it is a
11 consequence type of study. It has information that's
12 useful to us, like that, but I add at the risk of
13 offending Dr. Tinkler, sitting on the back, my
14 comment is there's no P in SOARCA. It's not a
15 probabilistic study. Rather, it used the most likely
16 sequences and went off into the, pretty robust
17 detail. Accident progression analysis.

18 So, to the extent that that is useful to
19 use, methodology or whatever, fine, like that. But
20 this is sort of the suite of information we have to
21 work with here. Next slide.

22 We tried to spend some time to
23 understand what sorts of risk metrics should be--

24 MEMBER BLEY: Can I back you up?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: Yes.

2 MEMBER BLEY: I'm just trying to figure
3 out the shading and what this means. Some of the
4 1150 studies you show level three, is that what I'm
5 reading on here?

6 MR. STUTZKE: That's right.

7 MEMBER BLEY: What did they do for level
8 three? They didn't do a full level three--

9 MR. NOURBAKSH: They did level three
10 except for the seismic--

11 MEMBER BLEY: Oh, that's right. Yes.
12 They--there was a follow--that was his second set
13 of, yes. Okay.

14 MR. STUTZKE: And in fact--

15 MEMBER BLEY: Weak memory, that's all.

16 MR. STUTZKE: Fifty one actually has the
17 level three seismic, but it's, it's kind of set
18 aside on the baseline report.

19 MEMBER BLEY: Okay.

20 MR. STUTZKE: Okay. Risk metrics. We have
21 tried to identify various risk metrics that we might
22 want to compute. You know, the first ones are
23 related to the cyclical, so individual early
24 fatality risk, individual latent cancer fatality

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 risk, these are pretty standard.

2 We could go to simply total early
3 fatality risk, total latent cancer fatality risk.
4 These are readily computer. We need person rem risk
5 out to zero to fifty miles. That's one of the key
6 metrics we use for backward analysis.

7 Like this. Others that have been
8 suggested that are interesting are land
9 contamination and offsite economic cost risk. And,
10 that one--

11 DR. KRESS: I can't hear--stand up and
12 say yea on this. Second set on the possibilities.

13 CHAIRMAN STETKAR: I told you you'd be
14 happy soon, didn't he?

15 DR. KRESS: I've been preaching that for
16 years.

17 MR. STUTZKE: See, Tom, I have paid
18 attention to what you said all this time.

19 MR. STUTZKE: That one, that one, that
20 was actually suggested by our late colleague, Dr.
21 Jocelyn Mitchell, and it was her observation from
22 looking at SOARCA results that the latent cancer
23 fatality risk was being, being controlled not by
24 people getting dosed while the release was

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 happening, it was from repopulation of a previously
2 evacuated area.

3 Okay, and so that speaks directly to
4 economic cost. How long to you want to interdict the
5 land. So, our study would hopefully provide
6 information that would inform Commission policy like
7 that. And of course, it doesn't take much
8 imagination. If the land that you need to interdict
9 is a major metropolitan city, you're talking
10 trillions of dollars, potentially.

11 So, that, that's why--now, whether it's
12 only this list that are some more, you know, or
13 there's some surrogates of these, that's all
14 predecided, I try to show you the, you know, it's
15 going to be more beyond early fatality risk in these
16 sorts of things.

17 The other one on the list is worker
18 risk, and that was coming out of our working group
19 on the non reactor that says, you know, it's hard to
20 get offsite fatalities from some of these accidents,
21 spent fuel, but the risk to the worker can be very
22 high, in criticality accidents and things like that.

23
24 So, perhaps that's where we need to be.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 So, it got added to the list. Of course, the notion
2 of risk surrogates, core damage frequency, large
3 early release frequency, and large release
4 frequency, of course, that's Commission paper that
5 you guys viewed up in front of the Commission now
6 and the definition of large release frequency and
7 those metrics like that, and unfortunately, our
8 study won't get done to help inform that.

9 Well, what I would like to do is to say,
10 given that the early individual early fatality risk
11 is X, how do you calibrate a large release
12 frequency? We have done that in NUREG, or, in reg
13 guide 1.174. We used the results from NUREG 1150 to
14 decide what the surrogate acceptance guideline was
15 for core damage frequency, and large early release
16 frequency and the question arises, is there a
17 suitable surrogate for large release frequency.

18 CHAIRMAN STETKAR: Or, or what is large
19 release--

20 MR. STUTZKE: What's, sort of, what's it
21 for. Is more. Yes. Things like that. So I would hope
22 at some--

23 DR. KRESS: You might consider just
24 calling it release frequency, including all

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 releases.

2 MR. STUTZKE: I remember the sketch you
3 drew for me once, and personally, I like release
4 frequency. Total release frequency.

5 MEMBER REMPE: What do you use for a
6 lower cutoff of event frequencies when you do all
7 these different types of analyses? I mean, what's
8 the basis? I mean, how far down do you go, to ten to
9 the minus seven, ten to the minus eight?

10 MR. STUTZKE: Routinely, they quantify
11 SPAR to the ten to the minus twelfth.

12 MEMBER REMPE: And that's what you're
13 planning to do on this upcoming new study, also?

14 MR. STUTZKE: Most likely. I mean, I'll
15 run it until the computer dies, basically.

16 CHAIRMAN STETKAR: That essentially gets
17 into some, I'm assuming I'd be talking about issues
18 of binning and stuff like that.

19 MR. STUTZKE: Yes.

20 MEMBER REMPE: I'm also thinking about if
21 there really should be a lower cutoff frequency
22 that's what I'm kind of thinking about.

23 DR. KRESS: Your outputs, are they going
24 to be cumulative complimentary most recent

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 functions, likely--

2 MR. STUTZKE: Yes. And average risk.

3 DR. KRESS: Average risk. How would you
4 deal with that for how those other possibility
5 consequences? You would--

6 MR. STUTZKE: I don't know yet. But--

7 DR. KRESS: My, my suggestion has been
8 convert all those to economic risk, and use that as
9 your--

10 MR. STUTZKE: Kind of a common baseline?

11

12 DR. KRESS: Yes, that's the only common,
13 that's the only thing those have in common. And that
14 way I can come up with a, with a regulatory
15 acceptance criteria. Otherwise you're going to have
16 a bunch of criteria.

17 MR. STUTZKE: Okay. I got it now. Okay.
18 Next slide. One of the things that the SRM tasked us
19 to do was to provide some perspectives on the future
20 uses of level three PRA. And, we've made some
21 attempts with varying degrees of success about that.

22

23 Clearly, the, the, the need to better
24 understand the significance of various contributors,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 so, the reactor risk versus non reactor risk, these
2 sorts of things like that, from a variety of metrics
3 like that.

4 Again, the notion of developing and
5 calibrating surrogate risk metrics, one of the, the
6 outcomes of this project could well be that we
7 redraw the risk acceptance guidelines in reg guide
8 1.174.

9 So, instead of ten to the minus four
10 being the CDF, maybe it's some other number. Same
11 thing for large early release frequency as well. And
12 then, of course, the assessment of multiunit risk,
13 you know, the large seismic event comes up.

14 Although there are other ways to get in
15 trouble with multiple units like that. I, I would
16 point out, we did some work, looking at how NUREG
17 1150 was used beyond it's original, stated purposes.
18 It has been used in a number of rulemakings.

19 Direct to site of this, is the technical
20 basis of the justification, it's cited in the
21 Commission's PRA policy statement. Like this, and so
22 when I look at the future uses of this project, you
23 know, my first reaction is, well, we'll use it as we
24 see fit, and probably for all kinds of things.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: I, I wanted to ask
2 you, Marty, just trying to look ahead in the
3 presentation here. And in the, some of the
4 background material that we received in preparation
5 for this meeting, there, there were some tables that
6 elaborated priorities, I guess, set by different
7 working groups on--one of the tables that I happen
8 to making some notes on were potential end uses.

9 Did you want to discuss much of that in
10 detail today? And, I recognize that was, it was
11 characterized, you know, as only the input from only
12 the level two working groups so it's an incomplete
13 set of priorities. And if it's, if it's, if it's
14 very, very early, it's prior pointless to discuss
15 anything--

16 MR. STUTZKE: Yes, We're, where we are,
17 quite frankly, is that we have the individual
18 working group inputs and We're still sifting through
19 them and trying to identify--

20 CHAIRMAN STETKAR: I, I made several
21 notes, you know, to myself on that table, you know,
22 sort of questioning bases for the assigned
23 priorities, but recognizing that it's only part of
24 the input.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 It's probably not useful, but again, in
2 terms of the preceding question, this sense of, I
3 hope that integrated group is, is looking at all of
4 those inputs, and perhaps, you know, thinking across
5 some of these backgrounds--you know, different,
6 different line items might receive different
7 priorities depending on which group is evaluating
8 it, so.

9 MR. STUTZKE: The, the line of attack I
10 was taking on the perspective of future uses was
11 that there may be a perception that level three is
12 really hard and the idea is can we do something less
13 than a level three. You know, in other words, the
14 goal is to compare seismic risk to fire risk to
15 internal events. We can get--you can get a picture
16 of that by stopping a core damage. We routinely do
17 that.

18 CHAIRMAN STETKAR: I know you routinely
19 do that, that's one of our criticisms of what is
20 routinely done--

21 MR. STUTZKE: Exactly. Exactly. So, you
22 know, it wants to push you to level three to revisit
23 all of these things to see--

24 CHAIRMAN STETKAR: Include, including

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 emergency planning and the things that really effect
2 how easy it is to shelter or evacuate people under--

3 MR. STUTZKE: Exactly.

4 CHAIRMAN STETKAR: I think that, you
5 know, we've had this discussion before. But it's
6 particularly important, although I know you're
7 talking about applying this, initially, certainly at
8 the pilot stage, to currently operating plant.

9 The new plants, if We're demonstrating
10 methodology, you know, are showing indications that
11 their, their accident frequency--I'm trying to avoid
12 the term risk--may be strongly driven by events that
13 could directly effect off site emergency planning
14 considerations--

15 MR. STUTZKE: Exactly.

16 CHAIRMAN STETKAR: --so that although the
17 absolute frequency may be low, the correlation
18 between the cause of a release and things that might
19 impair emergency planning may be relatively high, if
20 it ever happens, it's going to happen under
21 conditions that may not be all that conducive to
22 your, your nominal emergency planning functions. So,
23 that's, let's stop there.

24 MR. STUTZKE: I'm interested, you don't

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 need to--

2 CHAIRMAN STETKAR: That's part of that
3 integrated thing, that if only the level three
4 people look at it, they say, well, this is really
5 hard to do, and we've always learned everything we
6 need to know from level one plus type models,
7 whatever those are.

8 And the level two, one and two people
9 say, well, that level three stuff is really
10 difficult to do and the emergency planning people
11 have all thought about that already anyway. You
12 know, so why spend the extra dollars.

13 MR. STUTZKE: I had previously mentioned
14 human reliability, and this is the area where human
15 factors, human performance, whatever you want to
16 call it, out into the level three space, because I
17 think it could be important.

18 MEMBER BLEY: Yes, I do too, and I think
19 it's a good one to pick up. It also links to do the
20 conclusions were in my head from SOARCA when we get
21 it in front of us one day, and some of the thing
22 that hitting everything are linked together by
23 picking up the operator and, and, and the emergency
24 activities into one integrated look might give us

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 some real understanding.

2 I just wanted to ask you a question on
3 your previous slide, you don't have to go back to
4 it. It said that NMSS was developing some things on
5 non reactors and is that part of this work, or is
6 that something separate they're doing?

7 MR. STUTZKE: Separate.

8 MEMBER BLEY: Okay.

9 MR. STUTZKE: I've been asked to review
10 some white papers and we've had some presentations
11 at risk management team meetings about--

12 MEMBER BLEY: They're active right now?

13 MR. STUTZKE: Yes, they're interested in
14 an STP like process.

15 MEMBER BLEY: Okay. Because I, at least I
16 haven't seen anything from them yet on that. Okay.
17 Thanks.

18 MR. STUTZKE: Yes. It's, it's still
19 cooking. The other thing I would say on the
20 prospective future uses, when you get out into, to
21 level three space, you know, it's more than the
22 control room staff. It's more than the utility with
23 it's emergency response.

24 I wanted to go after our own op-center.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Right, I mean, We're all part of the team, and
2 that's a human performance issue, and--

3 CHAIRMAN STETKAR: Well, and other
4 issues, you know, there are people who are
5 proposing, you know, emergency operations
6 facilities--a couple of states away, in some
7 gleaming silver tower that--might, might be okay,
8 but if you really did an assessment of
9 communications and responsiveness, you might learn
10 things.

11 MR. STUTZKE: What, what made me realize
12 it was about a month ago I had to take my, my annual
13 training on our continuity of operations and they're
14 talking about, if headquarters gets knocked out,
15 then it gets transferred to Region one, and I
16 thought, gee, if there were an accident at that
17 time, that, that could be pretty interesting.

18 It works well on paper, but you wonder
19 how it would actually work. And so I would view what
20 We're doing here is to build a platform that would
21 let us go after this, not necessarily answer the
22 question. But have an adequately built in documented
23 so that some follow on project we could try to
24 attack these things.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Okay. So, that's all I want to say on
2 prospectives. All right, now, one of the things that
3 this integration coordination group did was look at
4 options for selecting the right site, or a site like
5 that. And, I had indicated earlier when we had our
6 initial discussions with NRO, they indicated they
7 would prefer it we didn't pick one of their plants
8 for a variety of reasons.

9 You know, lack of information, concerns
10 about interrupting their licensing process, and, and
11 things like that. We may reconsider it, under SMRs,
12 some things like that. So, this slide is showing
13 you, well, of the current operating plants, we could
14 either pick one that we've already studied, like
15 Surrey and Peach Bottom, or we could pick something
16 new.

17 I'm trying not to let my own personal
18 biases creep into this, which are, gee, I'm awfully
19 tired of looking at Surrey and Peach Bottom.

20 CHAIRMAN STETKAR: Well, and--yes.

21 MR. STUTZKE: But there are, there are
22 some advantages. You know, the, it allows you to
23 compare something. You've got the fifty estimate of
24 risk and now you want to compare it to what We're

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 doing. So obviously you want to study some site that
2 you already have some baseline.

3 The rebuttal to that is, if you've ever
4 looked at a delta, a change in risk, and tried to
5 decompose it, why did it changed, well, is it the
6 method? Is it some plant, and it's almost impossible
7 to sort your way through that, like that. It's--so,
8 whether we want to do that or not.

9 The other thing is that if you pick a
10 site that's been previously studied, there is some
11 benefit for reducing the amount of effort it takes
12 to get information and data out of that plant, you
13 economize somewhat. I had mentioned before that,
14 potential public perception issues.

15 You already know what the answer is and
16 you're studying, you know, even a new study may tend
17 to reinforce that, give the impression that you're
18 just confirming. I've been very careful not to use
19 the words confirmatory in anything We're doing. I
20 really want to start with a new team of analysts, a
21 blank piece of paper, and see where we go.

22 Selecting the new sites has of course
23 it's own pro's and con's. Certainly, we would learn
24 something more, diversifying our suite. I had talked

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 about this project at last year's RIC conference,
2 and the comment I got from Dr. Lyman at the Union of
3 Concerned Scientists was, you guys got to do an ice
4 condenser. You just got to do an ice condenser.

5 So, I thanked him for the comment, and
6 of course, it's part of it. I think there's an
7 advantage in doing a new site in that it gets a
8 better understanding of PRA methods. Remember, in
9 one of our key goals here is to train new people,
10 new staff.

11 We need a new generation of risk
12 analysts. If I pick a plant that we already know the
13 answer, the tendency is I'll copy it. I won't think
14 hard about it's appropriateness, whereas if I start
15 with an empty sheet, it forces people to think
16 harder, it asks the questions, like this.

17 Of course, the downside to this is it's
18 going to be potentially more work to get the
19 information that we need, and we have to convince
20 somebody to participate, you know, I mean, I don't
21 want to say it's a done deal, but if we go to one of
22 our previous plants, they've already, they're used
23 to working with us, they're cooperative, and things.

24

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Now, we got to go solicit some new
2 utility to go do this, and I think there's going to
3 be a natural hesitancy or reluctance to want to
4 engage, until industry understands what We're going
5 to do with this thing.

6 CHAIRMAN STETKAR: Marty, on, on the, you
7 certainly know this better than I do. One thing that
8 kind of popped into my mind on, the, you know, the
9 previously studied sites is, you, you call them.

10 Are you aware of anything--because,
11 because those sites have been studied publically for
12 many years, are you aware of anything that has been
13 done at those sites that may not have been applied
14 pervasively throughout the industry that would
15 indeed effect how the core damage frequency or
16 release frequency?

17 In other words, enhancements that have
18 been made there because they've been in the public
19 eye and studied so carefully that, that perhaps
20 other sites might not have.

21 In, in other words, that might bias in
22 the sense--

23 MR. STUTZKE: I understand what you're
24 saying--

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: --either the level of
2 detail you put into a model in particular area or,
3 or perhaps the results that might not necessarily be
4 representative--

5 MR. STUTZKE: Yes. I'm, I'm not aware of
6 anything--

7 CHAIRMAN STETKAR: Okay. Okay.

8 MR. STUTZKE: I couldn't point my finger-
9 -

10 CHAIRMAN STETKAR: I'm not, you know,
11 I'm, as I said, I'm not familiar enough with the
12 plants or the studies, but--

13 MR. STUTZKE: I mean, what, what I would
14 say is, you know, those licensees have their own
15 PRAs, and they heavily participate in industry
16 groups. They hire the same consultants who spread
17 the benefit of the--

18 CHAIRMAN STETKAR: You know, I was just
19 curious, only because of the, you know, the public
20 visibility of those sites. Okay.

21 MR. STUTZKE: Okay. So, we constructed a
22 massive spreadsheet where we looked at each site
23 according to, to most of these attributes. Every
24 time we, we think We're done somebody suggests a new

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 attribute. The last two on the list are examples
2 here, and I don't even know how to quantify them.

3 But, so the idea is the objectives and
4 scope, if we're going to do multiunit risk then we
5 ought to be using, looking at a multiunit site. So
6 the breakdown is there are 65 sites right now, 29 of
7 which are single Unit, so you would set those aside
8 for now, and say, sorry.

9 And SSS design and containment design to
10 some extent might influence our selection. The
11 availability of SPAR models of different types, to
12 some extent participation in NFPA 805. Because of
13 the fire PRA, we know they will already have a lot
14 of location information, cable location that is very
15 tedious and expensive to get.

16 So, if we could have it done for us,
17 that would be helpful. License renewal status. This
18 is a question that Dr. Rempe had asked earlier. You
19 don't want to do the study and two years later have
20 the plant shut down. You know, to some extent, that
21 happened in the NUREG 1150, Zion was one of the
22 plants and it didn't--

23 CHAIRMAN STETKAR: In some cases plants
24 that, that have their licenses renewed have made

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 commitments to--not necessarily hardware
2 modifications, but soft issues in terms of
3 maintenance programs, or monitoring programs that,
4 that in principle could effect things. So, might be
5 useful to capture that also.

6 MR. STUTZKE: I've also, have personal
7 experience with doing some PRAs and--not in this
8 country, but as a result of that PRA, the plant was
9 shut down.

10 DR. KRESS: One attribute I wonder about
11 is, why the plants are, are going to increase their
12 burnout, to well below--and even put in MOX fuel,
13 some of them.

14 MR. STUTZKE: Yes.

15 DR. KRESS: What of those things could
16 effect your source term and could effect your
17 consequence models, because you, maybe getting more
18 actinides and things of that nature.

19 MR. STUTZKE: Absolutely.

20 DR. KRESS: Just wondered about this.

21 MR. STUTZKE: It's, it's on my list,
22 about what do we want to do about MOX fuel, and the
23 question on my mind is not what to do about it, the
24 question is could you craft the PRAS so that when

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you went to MOX fuel, are you--is it a small change,
2 or am I fundamentally having to redo large portions
3 of the PRA, success criteria change, or would the
4 sequence logic remain the same. If it's a matter of
5 just re-computing source terms, that's a more
6 manageable--

7 DR. KRESS: I suspect it's mostly source
8 terms.

9 MR. STUTZKE: And I think so too, but it
10 bears some thought. The other thing I wanted to
11 point out about license renewal status is it's part
12 of the license renewal process they have to do the
13 evaluation of several accident mitigation
14 alternatives.

15 The SAMAs. And in order to do the SAMAs,
16 you have to have a level three, so we already have
17 some body of information there that we can see some.
18 Nothing else that we have up there, the maximum put
19 deck available.

20 Plan on site, that was looking to the
21 future, that while we may not analyze it now, we
22 might want to go after a new plant, you know, so a
23 site such as Vogel, that would have AP1000, maybe we
24 want to pick one where we think they're actually

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 going to build, like the--

2 MEMBER BLEY: You might start with two
3 and by the time you're done you might have four.

4 MEMBER REMPE: What happened to--I hear
5 you mention--

6 CHAIRMAN STETKAR: Palo Verde has three.
7 Brown's Ferry has three. Coney has three. In terms
8 of equipment, they got about two. But that's okay.
9 The other consideration here, getting out of the,
10 the reactor arena, the spent fuel pool design. I'll
11 show you a graphic in just a little bit, but there
12 are sites where all the pools the multiple units,
13 it's one happy large swimming pool, and that's it.

14 So, you got a lot of fuel in there, and
15 if you spring a leak in that thing, I mean, the
16 source term is big. As compared to plants that have
17 separate pools for each reactor, and you think,
18 well, maybe that's better, well the source term's
19 smaller, but you sure are moving a lot of casks on
20 top of those things.

21 You know, so. It's kind of hard to say,
22 well, do you want to pick the worst one, or maybe
23 you just accept what you have, something like that.
24 In addition, you know, not all the sites have dry

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 casks on them.

2 The last two that we've added on here is
3 quality of the licensee's PRA and their, their
4 willingness to participate with us. Like that.
5 That's, that's a reflection of the fact that we know
6 some plants and utilities are active players, and
7 risk informed regulation.

8 And, some of them have never submitted a
9 risk informed license Amendment request--

10 DR. KRESS: South Texas. Think of it.

11 MR. STUTZKE: Just saying that, what's
12 interesting about South Texas, with deference to
13 both Dennis and John here, is that they're one of
14 the few RISKMAN plants left. And it's a different
15 approach than SPAR. So--

16 MEMBER BLEY: You must have a SPAR model
17 too, no?

18 MR. STUTZKE: Yes. They have a SPAR
19 model. So, you know, and of course, no licensee uses
20 SAPHIRE. That's our tool. They're all using either
21 CAFTA or RISKMAN or NEWPRO or things like this. But
22 it's, it's these sorts of things we want to try to
23 consider a little bit before we go approach
24 somebody.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Threw up the next slide--this is my
2 effort at a Venn diagram to sort out what I know
3 right now. Let me try to lead you through it--

4 CHAIRMAN STETKAR: This is almost--I have
5 to interject this, because I can be a clown--this is
6 almost like, you saw the movie The Jerk, you know,
7 you throw the thing, you can win anything on this
8 shelf here, all options are equal, you can win
9 anything between these two points. You can win this
10 little thing right here. So, I want to see how the
11 decision process works.

12 MR. STUTZKE: I'm kind of curious myself.
13 Okay, so the, the idea is this. The basic framework
14 of the, of the colored squares is to show the
15 overlaps among the SPAR models.

16 MEMBER BLEY: These are all at least two
17 Unit plants?

18 MR. STUTZKE: These are all--first of
19 all, they're only the multiunit plants, like this.
20 Setting aside the single. So, the squares show you
21 the overlaps of the SPAR models, so we have the
22 square at the top, is the external event models, the
23 SPAR shutdown models, and then the level two
24 feasibility studies like that.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And when you look at that, what you see
2 is you get an overlap between external event and
3 level two that Surrey and Peach Bottom, but they
4 don't have a shutdown model. The overlap there is at
5 Turkey Point, which has an external event and a
6 shutdown model, but no level two.

7 There are no SPAR models that are shut
8 down on level two, and none have all three, like
9 this. So, expanding that, I decided to look at the
10 overlap between the external events and NFP 805,
11 which is another major sink, so you'll see over on
12 the left hand side, that's a list of the NFP 805
13 plants, which includes, for example, Turkey Point,
14 so now We're getting somewhere.

15 Right, so we have an NFP 805 cable
16 database and an external event SPAR model and a
17 shutdown model to work with--

18 MEMBER BLEY: You have at least one
19 former operative from there on your staff, here.

20 MR. STUTZKE: The, well, coincidentally,
21 I did the original PRA at Turkey Point.

22 MEMBER BLEY: Oh, did you?

23 MR. STUTZKE: And for that, the guy I
24 used to work with at Florida Power Corporation now

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 works at FPNL, so it's, I don't know whether that's
2 good or bad. That's normally called common cause
3 failure.

4 But, okay, so then the other thing
5 that's going on here is a color coding that shows
6 you the plants that have license renewals or
7 combined license applications. Either announced or
8 in front of the staff right now like that.

9 And you begin to remove a few more
10 plants like that, for, you can distinguish the
11 bright pink ones--they don't show out so well on the
12 graphic, they show up better when you project them,
13 the bright pink ones, no license renewal or COLA,
14 would include Indian Point and Limerick and San
15 Onofre.

16 MEMBER REMPE: Have you done any
17 discussions or started any discussions with industry
18 to see which ones you might even begin to be--

19 MR. STUTZKE: No, not yet. We wanted to
20 try to--

21 MEMBER REMPE: That would be more
22 difficult than a lack of a model being already in
23 place.

24 MR. STUTZKE: Right. It could well be.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 What I wanted to use the list for was to try to
2 target it a little bit, if I had to go after some
3 plant, which one would it be.

4 So, when you look at this graphic--oh,
5 by the way, the asterisks indicate whether or not
6 there's spent fuel, or a dry cask storage.

7 CHAIRMAN STETKAR: Asterisks--oh, okay.

8 MR. STUTZKE: That's what the asterisk
9 means. So, you know, on one crisis, Turkey Point
10 looks pretty good, but they don't currently have dry
11 cask storage at this, at this site. You could
12 hypothesize, well, that you know they will. Even the
13 apparent demise of Yucca Mountain, you know they're
14 going to have to do something with it.

15 So, you could create some spent, you
16 know, some dry cask, you know, just hypothesize
17 they're going to have X amount, and--

18 CHAIRMAN STETKAR: Do you know if they're
19 close? Do they need to go soon?

20 MR. STUTZKE: I don't know. This is just
21 the list. Okay. So, that's, that's kind of the idea.
22 You know, one of the things, begin to see the
23 attributes play against each other. You had earlier
24 mentioned South Texas.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 But, notice where they are. There's no,
2 we haven't touched them, you have inside of SPAR--

3 CHAIRMAN STETKAR: You're going to limit
4 yourself, because of resources, do you feel that
5 it's not appropriate or not feasible to actually get
6 the licensee's PRA models through and industry
7 cooperative--

8 MR. STUTZKE: We'll, we'll talk about
9 that. But, yes, I mean, one of the options--

10 CHAIRMAN STETKAR: Because, for example,
11 in it, you know, South Texas, riskman
12 notwithstanding, has done, has done some external
13 events modeling, and that sort of stuff that, you
14 know, doesn't appear on this radar.

15 MR. STUTZKE: That's, yes, that's
16 correct. No, I mean, one of the options we'll talk
17 about later is, do you want to start from SPAR, or
18 do you want to start from the licensee's PRA, if
19 they would actually give it to us, and there's
20 present cons to each one. Or do you want to start
21 from your own? You know, to try to craft it that
22 way.

23 Okay. The other thing that I will throw
24 up, it's on the next slide, is, this is a breakdown

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 of the multiunit sites of the spent fuel design.
2 Seven sites have separate pools that are connected
3 via transfer teams.

4 Nineteen sites where there are separate
5 pools for each reactor, and if they want to shuffle
6 fuel units, then they load it into a cask and move
7 it over, like that. There are some special sites
8 where units one and two share a common pool and Unit
9 three has it's own. By the way, that's Brown's Ferry
10 and Oconee.

11 And, there are eight sites where there's
12 just a common pool for all the reactors, like that.
13 As you can imagine, I was beginning to go a little
14 crazy. I couldn't figure out how to put this on the
15 Venn diagram, or I would have.

16 It tends to overload, the information
17 contents, just--it's, it's pretty bad. Like that.
18 But anyway, that's, that's what We're looking toward
19 site selection. So, that the perspective that I
20 have, I mean, it's not at all clear to me that you
21 can pick the definitive site, you know, the one that
22 meets all of it.

23 If you look at the, at the Venn diagram,
24 you would be attracted towards Turkey Point, and I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 could go, well, I could deal with the dry cask
2 storage by inventing some on there. I could pick up
3 hurricane risk, that might be interesting.

4 Like that. There's no seismic risk.
5 There's no seismic hazard down there, but I could
6 still do a seismic PRA. I would just get numbers
7 that would be small. You know, presumably smaller
8 than at some other sites like that.

9 Of course, not having any idea whether
10 FPL wants to participate in such a project like
11 this, or not, we don't know. The other thing I would
12 point out is that I made, pointed out the virtue of
13 plants that have combined licenses in place.

14 If and when they actually get one
15 issued, they might be too busy to want to play with
16 us, because they have a fuel load PRA to get done.
17 And that would black ball them, from, at the same
18 time, that fuel load PRA could be very beneficial as
19 we struggle through the effort together about common
20 methodologies and assumptions.

21 You know, it cuts both ways, so I can
22 see--

23 DR. KRESS: I wonder if site
24 characteristics is on your list. Some things make

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 some sites more difficult to deal with, like routes
2 of escape, traffic during different times, cities
3 closer by than you might want. Things of that
4 nature. I wonder if that's on your list, something
5 to challenge you.

6 MR. STUTZKE: I haven't--no. No, I, I,
7 appreciate all the comments like that because, it's
8 like I say, every time I thought I was done, I kept
9 adding a few more attributes, and, and--the, the
10 other comment I'll throw out on the site selection,
11 I mean, it's, it's become even more obvious to me
12 over time, is it's very hard to draw a demerit of
13 coalitions from a single PRA.

14 Okay? You know, because some of these
15 PRAs, you know, like, if we picked a site inland,
16 they're not going to have a hurricane risk study.
17 Things like this. And so you'll just get a total
18 site sort of number like that. And, of course,
19 there's always different reasons why you're going to
20 get different results.

21 The reason why I, I point that out is,
22 in fact, the risk acceptance guidelines in reg guide
23 1.174 were calibrated to Surrey. There was no effort
24 to use Peach Bottom, or the other level three

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 information. It was calibrated only to Surrey. And
2 that's a little--so, you know, this is my pitch.

3 Call it empire building or whatever but,
4 you know, originally, when I started the project, I
5 thought we'd just go after all the sites, come up
6 with a method and we'd just march down the path. But
7 economics made, tape that's not feasible. But then
8 it leads the question of, if you have to pick a
9 handful, which one should it be.

10 You know, it's a PWR large dry
11 containment, an ice condenser, three categories of
12 BWRs, which ones. Are there some sites, or plant's
13 designs that are interesting because they have
14 interesting questions, like the impact of extended
15 power uprate? Well, we ought to pick an uprate
16 plant.

17 Or, the impact of containment accident
18 pressure credits on risk. Finally, on half the
19 toolkits, to answer your questions--

20 MEMBER BLEY: Just, just let me throw
21 something in. Diablo Canyon, while you didn't have a
22 SPAR external events, had a very thorough external
23 event and really big issues on part of the staff
24 here reviewed in, in great detail. So there are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 people here very familiar with it.

2 It's also coming in for license renewal
3 now, it's in progress. I don't know about updates,
4 if they're on the list yet or not.

5 MR. STUTZKE: That, and--I know they're
6 getting their histories, they're getting a general
7 license now, I think. They already have some--
8 there's distinct categories of licenses, site
9 license and a general license.

10 If you're well outside my regulatory
11 expertise, so. What's the difference. I don't
12 remember. I made the mistake of reading the
13 regulation and then trying to ask some questions and
14 I got really confused. But, yes, I mean, that's a
15 possibility as well.

16 MEMBER BLEY: So, there are some on here
17 that have things going on that haven't quite been
18 reflected--

19 MR. STUTZKE: Right.

20 MEMBER BLEY: --in that.

21 MR. STUTZKE: But you see my point. I
22 mean, you can pick them kind of globally like this,
23 or is it the regulatory issues of the moment that
24 you would like to go after and try to solve.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: Is it a little early
2 to break? Is it a good time--

3 MR. STUTZKE: This would be a good time
4 because I'm going to start in with the, with the
5 discussion of each one of the working groups and--

6 CHAIRMAN STETKAR: Oh, I'm, I'm never shy
7 to call a time for a break, so given that
8 suggestion, let's recess until 2:40. Twenty minutes
9 until three.

10 MEMBER BLEY: We're almost halfway
11 through.

12 CHAIRMAN STETKAR: Almost halfway
13 through, yes. I thought we were further ahead than
14 we were, but--I was going to give you twenty
15 minutes, but no.

16 MEMBER BLEY: What did you call?

17 CHAIRMAN STETKAR: Fifteen minutes. You
18 have fourteen minutes now. Keep talking, and you'll
19 have thirteen minutes.

20 (Whereupon, the above-entitled matter
21 went off the record at 2:26 p.m. and resumed at 2:41
22 p.m.)

23 CHAIRMAN STETKAR: We're back in session.
24 Marty, you're still up.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MS. LUI: Actually, just, very quickly,
2 that, want to make sure that we introduce Don
3 Helton. He's the senior liability analyst. He's
4 going to be talking to you more about the level two
5 aspect which has interface with level one and level
6 three.

7 And, John, you mentioned that you had
8 some questions regarding the level two report and
9 that will be the right person--

10 CHAIRMAN STETKAR: Okay.

11 MS. LUI: --to try to address some of
12 those questions that you have.

13 CHAIRMAN STETKAR: I, I, yes. I think I
14 got some of that addressed already, the, the, I'm
15 confident that the bullet number seven on that one
16 slide, the integration team is aware of pulling all
17 of that stuff together.

18 MS. LUI: I think I remember, you have a
19 question about priority of the--

20 CHAIRMAN STETKAR: I, I did, but, but my
21 question is probably not particularly relevant
22 because the only information that I had in front of
23 me was one of the working groups. And, and, and I'm,
24 I'm more interested in priorities on the whole

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 project, not necessarily individual working group
2 input.

3 So that, I'd be a lot more interested in
4 priorities if I saw the coalesced, you know, results
5 from that integration group looking at all of the
6 working group inputs.

7 MR. HELTON: I, I didn't speak up
8 earlier, but the one thing I'd offer on that regard
9 is, the table you had referenced out of the level
10 two input, the leftmost column out of that which
11 lists the fifteen potential end uses--

12 CHAIRMAN STETKAR: Yes.

13 MR. HELTON: That's something that came
14 out of a brainstorming session we had at a higher
15 level, so project wide, so those, those are project
16 wide, and--

17 CHAIRMAN STETKAR: I had no question
18 about the scope of those things. They seemed to be
19 pretty dog-gone reasonable scope. It was, it was
20 question about, you know, why particular priorities
21 were assigned--you know--

22 MR. HELTON: Right, yes. Everything ,
23 everything to the right of that first column was
24 trying to put those, you know, in the situation

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 where you're trying to develop options in the
2 absence of a prioritized list of end uses. Once
3 somebody gets around that, prioritizing those end
4 uses, how would that prioritization affect what the
5 level two working group cares about.

6 CHAIRMAN STETKAR: Oh. Okay. Maybe we'll-
7 -but again, it, it, it, probably, at that level, for
8 this meeting, at that level of detail it might not
9 necessarily be relevant for taking time because, as
10 you said, it's only kind of a snapshot of one
11 working group's perspective on that whole problem,
12 puzzle, anyway.

13 MR. HELTON: Yes.

14 MR. STUTZKE: Okay. So now, I want to
15 talk about the, the results of the work that was
16 done by each one of the working groups. And, I guess
17 to preface that, there, there's a number of, of
18 thoughts this way, you'd asked earlier about what do
19 we mean by state of the art.

20 And, one answer is, I don't know yet. I,
21 I have different opinions depending on the time of
22 the day. Like that. That being said, our working
23 premise for any number of reasons was that we wanted
24 to use best current practice but supplement it as we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 needed to in, in certain areas to, to achieve a good
2 final product like that.

3 So, it's not simply a matter that over
4 the twenty years since NUREG 1150, we've built a lot
5 of, of models, we've got more operational data and
6 so we got a box of Tinker Toys and We're just going
7 to stick them together. It's not that simple, and
8 that's become apparent to us.

9 What we challenged the working groups to
10 do and framing options, one of the things we
11 suggested to them was they could divide options, or
12 identify options according to the capability
13 categories in the ASME ANS PRA standard.

14 Say, okay, if we want a category three
15 PRA it implies this scope of work, if we want a
16 category two, it implies a smaller scope, and
17 something like that. So, its an effort to use the
18 capability categories as almost surrogates for cost
19 and resources and things like that.

20 But to some extent that was successful.
21 In other cases, it probably led us astray. When you
22 look at the standard itself, there are not that many
23 requirements that really distinguish between
24 category one versus two versus three.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Like that. A lot of the categories are
2 written either meet the requirement or you don't,
3 it's, it's black and white sort of thing like that.
4 Then, I remember from Gareth Parry's time here, he
5 said, well, you know, category between one
6 supporting requirement to get from category two to
7 three could be major amounts of effort.

8 So, you can't just raw count the number
9 of requirements and get, get, I mean, it gives you
10 some feel but it could be very misleading like that.
11 So, anyway, I will show you the, the, some of the
12 highlights of each one of the working groups as they
13 exist right now. This is the whole pile of
14 information that I got. It's not necessarily our
15 consensus opinion at this point in time.

16 CHAIRMAN STETKAR: Before you go into the
17 individual working groups, one of the reasons that I
18 kind of asked that question about, what is this
19 state of the art, or state of the practice, however
20 you want to characterize it.

21 And I, and I suspect we'll talk about
22 this as we get into the, the details, but I wanted
23 to get a sense from the team, if you will, is the,
24 is there a strong incentive to push the state of the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 art in this project, or is, is the scope and intent
2 of this project to be a snapshot of what we
3 understand about the integrated level three PRA
4 modeling process, whatever you want to call it, in,
5 you know, two thousand and, pick a number, twelve,
6 thirteen, time frame.

7 MR. STUTZKE: Yes, it's--

8 CHAIRMAN STETKAR: You know, because,
9 because looking at some of the, some of the
10 discussions of some of the options, you have, some
11 of them are, are what I would consider kind of
12 pushing the state of the art, which, which is more
13 of a looking forward research type activity rather
14 than a sort of a NUREG 1150 revisited but, but with
15 what we know now type of activity.

16 MR. STUTZKE: Right.

17 CHAIRMAN STETKAR: So I, I wanted to get
18 a sense--that, that's the reason for sort of asking
19 that question. Perhaps some of that will come out of
20 the individual working groups--

21 MR. STUTZKE: Well, and we actually, when
22 we had our other meeting before, that question came
23 up and was debated. Do we really want to push the
24 state of the art, versus you know, use what we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 already know how to do and put it together and, you
2 know, I, I think it falls somewhere down in the
3 middle.

4 There's some technical elements that we
5 have to push, we have to advance the state of the
6 art, human reliability, because as I'll show you,
7 there are things that have not been addressed
8 before, simply unknown, like that. At the same time,
9 you know, we, we are, I'm sensitive to the fact that
10 we conducted twenty years of research for millions
11 of dollars, and to come to the Commission and say
12 well, I can't do a PRA right now, but if you give me
13 some money and in ten years I'll have all the
14 technology--

15 CHAIRMAN STETKAR: I have some good ideas
16 about the way it should be, but that's right,
17 that's, that's a good--

18 MR. STUTZKE: That's, that's a, that's a
19 nonstarter.

20 CHAIRMAN STETKAR: Yes, that's right.
21 That's right.

22 MR. STUTZKE: Like that. The other thing
23 that I'll point out is that when you work with a
24 such a diverse and talented group of people that I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 have now on each working group, I'm reminding of, of
2 the first thing I was ever taught about managing
3 PRAS, and that is, it's like herding grasshoppers.
4 Get them all together, and everybody goes off in
5 their own direction, you're pulling back in.

6 Like this. So We're still in that sort
7 of filtering, herding sort of process about where to
8 go. Like--so let's, let's dive in and, I guess the
9 last prefacing comment is, these, in retrospect,
10 these are not necessarily the working groups I would
11 define today.

12 It's a starting point, you know, I mean
13 it came out of our workshop and it seemed reasonable
14 at the time, but in retrospect, there were other
15 areas we probably should, could have dug into more.
16 Like that.

17 So, the level one working group and,
18 that's interfacing to level two, grappled with the
19 issue, should we start with an existing SPAR model
20 or start with a licensee's PRA model. And, the
21 conclusion was the resources, there's no great time
22 saving, just, you know, per se, by picking one model
23 over the other.

24 It's rather, we realize everybody's PRA

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 is going to have to be improved, you know, expanded,
2 in order to meet the project scope. And so that's
3 going to be driven by what site we pick and how
4 cooperative they want to be with us, like this.

5 You know, there's some good things about
6 SPAR models and good things about licensee's PRA
7 models. You know, our SPAR models have been peer
8 reviewed, at least two representative models. And,
9 you know, it's, that came out pretty well in that
10 process. That being said, I mean, we do have a
11 laundry list of peer review findings and We're
12 diligently trying to work those things off like
13 that.

14 Got it in here and realize about SPAR
15 models is that they are deliberately simplified in
16 some cases, like you model one frame and you assume
17 it's always, the operating frame on this one's in
18 standby and you want something more flexible.

19 So we'll have to overcome things like
20 that. We've done a lot of work under an MOU with
21 EPRI on support system initiator modeling that we
22 would want to incorporate like that. That one's
23 particularly important in my mind, to get into the
24 multiunit PRA aspect, because what it seems to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 involve is that I can take a, an accident sequence
2 from a single Unit, and I need to ask, did the other
3 Unit trip.

4 And then, go from there. As a result of
5 all of those failures, there were some other ones
6 like that, so--using support system initiator models
7 to try to get at that, try to scratch that itch. I
8 mean, it's simple enough to say. I mean, I can
9 always undo some trip and the other Unit with a
10 consequential loop.

11 All I need to, positive, got brittle
12 grid condition and the other Unit just goes down.
13 The more interesting questions are plants that have
14 shared or joint service water systems or interleaved
15 electrical power systems, things like that. So,
16 We're going to have to, need to do something there
17 to pick up the multiunit risk.

18 There's been a great effort in the last
19 couple years about loop and loss of offsite power
20 and station blackout recovery modeling in the SPAR
21 models. This notion of convolution, adding in the
22 right recovery events and things like that.

23 I've, I've seen that in action, and it's
24 implementation is impressive. Okay. Where there are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 large numbers of recovery rules added to the models
2 to incorporate them, and I've had a concern for a
3 number of years, how do you know that it's right.

4 I mean, it's--it's almost impenetrable
5 to read, because it's really computer-like input.
6 It's not, you don't have the benefit of a logic
7 model or graphical picture to like this, well, this
8 thing can really get out of control when you have
9 multiple units involved.

10 Like that. Things like that. I had
11 mentioned before the idea that when we start working
12 on enhancing the level two, or the external events
13 or the HRA we might have to go back and revisit the
14 existing SPAR model logic structure. We might want
15 to add more events into our trees, we might want to
16 have different fault trees and things like this. And
17 so--

18 CHAIRMAN STETKAR: Marty, you, you've
19 done, you've done enough of this, you know, that
20 may, I would be surprised if you wouldn't need to do
21 that. I mean, it's, it's--

22 MR. STUTZKE: But now, now you see my
23 project management issue is that I think I'm one,
24 suddenly I'm starting over again.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: Well, not necessarily
2 starting over from zero, but backing up maybe, 20,
3 20, 30% into the models, and unrattling some things.

4
5 MR. STUTZKE: It's awfully hard to
6 explain to your boss. Sometimes, it's, it's, it's
7 tough, I'm sensitive to the management sort of issue
8 that that one brings up.

9 CHAIRMAN STETKAR: But, didn't, didn't
10 1150 need to do that? I mean, you know, there's
11 experience--

12 MR. STUTZKE: Right. I mean, if I
13 remember right, the, the first version of 1150 came
14 out in about 1987 or so, and then there was a
15 basically a two year, almost a two year--

16 CHAIRMAN STETKAR: Yes, when they figured
17 out that they needed to go back and undo a bunch of
18 stuff, to stitch things together--

19 MEMBER BLEY: And that sprung out of the
20 IREP program that was trying to generalize PRA into
21 some repeatable boxes that went on for about five or
22 six years before they said, can't do this. Got to do
23 a PRA, and--

24 CHAIRMAN STETKAR: But from a management

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 perspective there's at least some, you know,
2 historical, twenty year old--

3 MR. STUTZKE: Yes, or--

4 CHAIRMAN STETKAR: Things you can point
5 to--

6 MR. STUTZKE: I mean, every PRA plan I've
7 ever seen always has this feedback arrows, like,
8 yes, you get done with this task, and you go back
9 and revisit this, and. That's not only counting the
10 mistakes that we might make, you know, some peer
11 review would uncover a, you guys, it's like, oh,
12 yes, you're right, we need to go fix this thing,
13 and.

14 Like that. So, I expect it will be a
15 discovery process as we go along. Last and not
16 least, the, the concern from the level one working
17 group was availability of support contractors. We'll
18 talk in a little bit about our plans or at least
19 some of our questions about staff participation in
20 this project.

21 But, the truth of the matter is that
22 our, our laboratory support contractors are pretty
23 well saturated with work that we, you know, SPAR
24 models, STP support, these sorts of things like

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that. If we were to go out and, and say, you guys,
2 here's, we got this big project, it's not clear
3 anybody could submit a good bid for us.

4 They'd have to staff up. Things like
5 that. So, some time lag like that. External events.
6 You know, we clearly, we want to get all of the
7 external events that are applicable to the site that
8 we actually pick. I, I break them into two groups,
9 what I call the big three that apply to all sites,
10 internal floods, internal fires, and seismic.

11 I'm deliberating whether the big three
12 to go to the big four and pick up aircraft crash.
13 It's a trendy sort of thing, but it would seem to
14 affect all sites like this. That's a, that's as
15 opposed to other sorts of external events. High
16 winds, you know, hurricanes can effect certain
17 flight sites, external floods, surges only at
18 certain sites.

19 More or less like that. Implementation
20 concerns, again, you see that the concern about the
21 availability of plan information and the willingness
22 of the licensee to share it--

23 CHAIRMAN STETKAR: You, you know, Marty,
24 I'll interrupt you--just thinking, that, the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 aircraft crash stuff might, might be, I mean, you
2 don't have it listed on this slide here but it might
3 be worthy--forget, you know, other issues on
4 aircraft crashes. Aircraft crash events do present
5 interesting dependencies, certainly for level two
6 analysis.

7 I hearken back to a level two study that
8 once was done that concluded that aircraft crashes
9 had the same functional impact on the level one PRA
10 as a LOCA, with some power failures, so bend the
11 things together and forgot that some of the aircraft
12 crashes went through the containment.

13 You know, for example, that, oh, by the
14 way, there, there, there is a hole there So,
15 although they might be, you know, in general, for,
16 for most sites, are rather infrequent event. The
17 potential coupling between containment response and
18 core damage might be, you know, in particular, with
19 a case of this, this scope--

20 MR. STUTZKE: Well, and, and the other
21 thought I had was, even if you get outside of the
22 reactor, what about the spent fuel pools. They're
23 not nearly as hard as--

24 CHAIRMAN STETKAR: Yes, that's, that's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 true.

2 MR. STUTZKE: Thanks. You know, that may
3 be something that we want to pick up, and--

4 CHAIRMAN STETKAR: And it's shared sites
5 that have shared switch yards and cooling water
6 systems or something, aircraft--again, they're where
7 events, but the damage can be, you know, large.

8 MR. STUTZKE: Well, and the other thing
9 is that they are a starter, a surrogate, on security
10 related things, certainly the frequency is not known
11 but the conditional risk, given the event, would be
12 insightful. Like that. Okay. Again, availability and
13 willingness to share information like this.

14 Goes back to not presupposing the
15 answer, but we also don't want to frighten the
16 licensee that we're looking for something, you know,
17 like that. I, I suppose we could in principle pick
18 any site we wanted to and through our inspectors get
19 the information we need for the SRAs.

20 That's not going to be cost effective at
21 all. Again, the notice, or the concept we have
22 limited availability of expertise needed for each
23 one of the hazard groups, there's darn few seismic
24 PRA analysts left in the world, and they're all

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 working on new plants right now, basically.

2 To a, to a large extent of them. And,
3 when you couple that with our own contracting
4 limitations, organizational conflicts of interest,
5 you begin to really narrow the field down and things
6 like that.

7 Well, there's good people, it, you know,
8 it, that expert, this situation alone leads me to
9 think we ought to explore cooperative agreements
10 with industry because they don't have restrictions,
11 you know, like this, and maybe that's the right way
12 to get the group of experts in the room, rather than
13 trying to be independent and go it ourselves like
14 that.

15 We had identified in the external event
16 group the concern you raised earlier, and that is
17 the integration. You can't just set off and say fire
18 people, do your thing, seismic people, do your
19 thing, and, and expect it to gel together.

20 I coined the phrase early in the
21 project, I will insist on a level playing field.
22 Everything being done equally to the same level of
23 degree, either equally well or equally bad,
24 depending on your point of view. But at least it

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 will be level, so that you can really rank risk
2 contributors--

3 CHAIRMAN STETKAR: Well, and, and some of
4 the things, Marty, it depends on your starting
5 point, kind of experience, you, you can build, if
6 you know that you're going to do fire and flooding
7 and seismic events, the, the amount of effort, for
8 example, to identify equipment and equipment
9 vulnerabilities within a particular plant location.

10

11 You don't have to do that three times,
12 you don't send--

13 MR. STUTZKE: That's right.

14 CHAIRMAN STETKAR: You know, you don't,
15 you do it once, and if you're missing some
16 information about flooding vulnerability, you go add
17 that in. If you're missing some information about
18 seismic fragility, you go add that in. But, but if
19 you have those three parallel efforts, you know, the
20 fire people collect fire information, the flooding
21 people collect flooding information, the seismic
22 people collect seismic information, and, so, so
23 there are economies of scale in addition to sort of
24 technical adequacy.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 It's one of the things that, keep that--
2 MR. STUTZKE: --working in Europe, they
3 always prefaced external events with what they
4 called area events analysis and so you try to get
5 all the information at one time, knowing that you're
6 going to do all, potentially anything that could
7 effect that area.

8 So, only to do that, but I, I think this
9 one's a little bit deeper, this last bullet about
10 the need to coordinate and get people making common
11 assumptions and things like this. Okay. So, next
12 slide that, the conclusion out of the working group
13 was that in general, the, we have methods and models
14 and softwares to model the external hazards.

15 I think that's true from a high level,
16 but I keep reminding people the Devil's in the
17 details here about how you actually do it. For
18 example, one could, could extend seismic PRA into
19 level two with our existing techniques. We know how
20 to do fragility evaluations and floor response.

21 And, you know, all of the, the
22 analytical, the computational machineries there, we
23 just haven't applied it. That being said, there are
24 some complicated things when you think about the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 impact of earthquakes and containment. What happened
2 in NUREG 1150 was the assumption that I think it was
3 at Surrey when you've got a large seismic event, the
4 steam generators would actually collapse.

5 And, when they failed, they would rip
6 the penetrations from the steam lines open, and so
7 now you have core damage and a large release pathway
8 directly there. The question arose, is, do you
9 really think that's what's going to happen, like
10 this.

11 In recent years with my work on cap
12 credit, I begin to realize, well, gee, maybe you
13 don't need a big earthquake, all you need to do is
14 to shake a large number of penetrations a little bit
15 and each one begins to leak a little bit, and you
16 create the equivalent of a large flow path out of
17 the containment.

18 It's like, okay, so that, that sounds
19 like that's pretty hard to analyze. One of the
20 things, I was talking to Susan Cooper this morning
21 in HRA and the issue comes up is to site
22 accessibility. And we don't normally do fragilities
23 in doors, stairwells. Well, maybe we ought to.

24 CHAIRMAN STETKAR: That's a good point.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Fire analyses very seldom look at fire impacts on
2 security systems that, for example, can make areas
3 inaccessible. That's right.

4 MR. STUTZKE: I mean, half of the time,
5 this thing doesn't work well anyway, after it gets
6 shook up in an earthquake, you know, it's going to
7 get worse. But, you know, other things, you know,
8 crediting the B5B mitigated strategies where they
9 want to hook up a portable pump, well, when you find
10 out how it works, is, the pump is sitting over in
11 some buffer building in the corner of the site and
12 they're going to put it on a truck and drive it, and
13 you go, well, can you really do that after a large
14 seismic event?

15 So, it's become apparent to me we're
16 going to look at fragilities of thins that we
17 haven't normally looked at and try to make an
18 estimate here. It ought to be interesting, I think.

19
20 MEMBER BLEY: That's been done only once
21 before, where I remember and it wasn't actually
22 published. But you'll find, maybe not surprises, but
23 if, if the plant's been damaged, that's pretty
24 unlikely. But other things aren't pretty damaged.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: Yes. Well, and that goes
2 not my comments on level three PRA and the impact of
3 the external event on things like evacuation and
4 emergency planning. You know, if, if there's a
5 large, for example, seismic event, or something like
6 this, police officers are going to be busy doing
7 other things rather than, at our beck and call about
8 you need to evacuate here, and by the way, tell them
9 this bridge is collapsed.

10 You know, we really need to think hard
11 about how to go to attack that sort of problem, like
12 this. I think there are issues in shutdown and low
13 power, operating states, when you get the reactor
14 vessel head off, maybe you're in mid loop operation
15 and then the earthquake happens.

16 Well, fragilities of stop logs and
17 things like that need to be thought about, spent
18 fuel pool risk, you know, again, when you get some
19 of these, of these external events, I'll pick again
20 on seismic. If it's more than nine, the weakest
21 patient of the pool and where the yield stress is,
22 you want to know things like, well, how big is the
23 hole.

24 It's draining the fuel down, and the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 fuel reassemble itself into some critical geometry,
2 things like that. So, I, I would agree in principle,
3 we know how to do the structural analysis but we
4 haven't done it, and so we might learn things that
5 might help but it's harder to do them when--

6 DR. KRESS: Yes, and in calculating the
7 risks, all we want to do is use the bin rows and the
8 probability it will go in a given direction. But if
9 you really wanted your emergency operation crew,
10 they'd like to know where things are actually going
11 at that time. So you'd have to put a different model
12 in there with what's the wind direction and shifts
13 at random, and, you know, so, so you have two
14 different kinds of PRAS, looks to me like.

15 MR. STUTZKE: Right. Well, to follow up
16 on that, when you think about it in the context of
17 multiunit accidents where the releases could occur
18 at different times with different source terms, now
19 it gets pretty complex to account for it.

20 CHAIRMAN STETKAR: Marty, you're talking
21 about the seismic a bit here and I, I, you know,
22 well aware of the, the problems on seismic. I, just
23 looking back at, at your, your Venn diagram, if you
24 will. The Venn diagram says that an external event

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and shutdown analysis has been performed within the
2 SPAR models for Turkey Point. Is that--

3 MR. STUTZKE: That's correct.

4 CHAIRMAN STETKAR: Is, is, did that
5 analysis include internal fires during all shutdown
6 plant operating states, or was it strictly focused
7 on midloop operation or something like that?

8 MR. STUTZKE: Not certain.

9 CHAIRMAN STETKAR: You have to identify--
10 this is--sorry about this, but, has to work this
11 way.

12 MR. COYNE: Kevin Coyne, Office of
13 Research. I'm the Branch chief of the PRA Branch.
14 The shutdown models did not include fire.

15 CHAIRMAN STETKAR: Did not include fire.
16 One of the things I was thinking about for, don't,
17 don't underestimate the level of effort to do fire
18 analysis during shutdown. The, the book keeping will
19 drive you nuts as you probably know. If nothing
20 else.

21 And, fires during, if you, if you're in
22 a plant that offloads, does a full core offload, and
23 I don't know if any or how many does, it might not
24 necessarily be insignificant contributor to risk in

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 early state, early plant operating states.

2 So, don't, you know, be, be a bit
3 careful. Certainly, the tools that we have in the
4 context of this, this slide, can handle that. But if
5 you're talking about comprehensive internal fire
6 analysis during shutdown, a couple of the things you
7 mentioned were seismic events, which indeed do have
8 perhaps interesting combinations of failures during
9 shutdown, but internal fires can be, can be pretty
10 daunting.

11 It, it, I characterize it as a book
12 keeping exercise, but, but it's, if you're thinking
13 about dividing the plant into something like a dozen
14 plant operating states to capture the, the, the time
15 during shutdown, each of those characterized by
16 different sets of equipment that may be operating
17 or, or out of service for maintenance, or, you know,
18 things like that, the, the, the effects of fires on
19 a given compartment can become, it can become a
20 pretty daunting book keeping exercise. I mean, it's,
21 it's, it's like doing twelve little mini fire PRAs,
22 if you will, each with different sets of boundary
23 conditions on them. So, just don't underestimate
24 that when you're thinking about this stuff--

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: I appreciate that.

2 CHAIRMAN STETKAR: --and, and focus
3 mostly on seismic thing because it was reading
4 through some of the, some of these tabulations and
5 some of the assumptions, I said, gee, wait a minute,
6 this sounds like maybe they haven't thought about--
7 that's why I asked the question about the SPAR
8 model, whether, whether anybody in the agency had
9 actually grappled with that, with that problem
10 before.

11 MR. STUTZKE: Well, I'll, I'll confess
12 I'm a little biased to seismic because I've been
13 working on generic issue 199 for the last couple of
14 years, and--

15 CHAIRMAN STETKAR: Seismic is all, you
16 know, if you have that area events and information
17 again, what is fail depends on the impacts of what's
18 failed depends on the plant operating states. But,
19 the, the, the fire stuff, the fire stuff is fire
20 stuff.

21 DR. KRESS: The probability of a fire is
22 much bigger during shutdown.

23 CHAIRMAN STETKAR: Yes. Depends on the
24 location, you know, only because of the human

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 induced fires, the exposure fires. Which,
2 unfortunately, a lot of the stuff that's been done
3 so far are the NUREG CR 6850 has not looked at
4 fires--A, it hasn't looked at fires during shutdown,
5 it, systematically, and B, there's not data
6 available for, yet, for those shutdown exposure fire
7 categories.

8 There are for, you know, a pump is a
9 pump is a pump, so a pump fire doesn't, the pump
10 doesn't care. But, the human induced exposure fires
11 which do show a higher, much higher frequency than
12 shutdown, are explicitly excluded from any
13 information in NUREG CR 6850.

14 So, you, you need to have that
15 information source to go and say, what is the fire,
16 due to, you know, maintenance activity inside the
17 containment in this area during shutdown. There's,
18 to answer that question, somebody, there needs to be
19 some data analysis done that, that hasn't been done
20 yet.

21 MR. STUTZKE: And it would be fair to say
22 it may be more than data analysis that, there might
23 be some HRA implications there.

24 CHAIRMAN STETKAR: I, well, HRA, not for

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the initial--well, I don't want to get into the
2 detail, this is just to, you know, warning is, don't
3 underestimate the, the amount of effort that may be
4 necessary to do--

5 MR. STUTZKE: I hear you.

6 CHAIRMAN STETKAR: --what, what's
7 characterized as a comprehensive level two fire
8 analysis during shutdown.

9 MR. STUTZKE: I hear you. And speaking of
10 HRA, this, this working group is still working and
11 what they did was they went down and looked at the
12 available HRA techniques for this, notice three for
13 full power internal events, level one, there's a lot
14 of techniques out there like this.

15 MEMBER BLEY: How big is this working
16 group? I'm just, can you tell us who's on it?

17 MR. STUTZKE: It's basically everybody in
18 the human factors and reliability Branch. So--

19 MEMBER BLEY: Okay.

20 MR. STUTZKE: --Susan Erasmia, James--

21 MEMBER BLEY: All of them.

22 MR. STUTZKE: Yes. Valerie Burns.

23 MEMBER BLEY: Oh, Val, too. Okay.

24 MR. STUTZKE: Yes. We tried to get

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 everybody. Again, our analogy of herding
2 grasshoppers is appropriate. You know, the
3 conclusion is, gee, you know, this, this NUREG 1921
4 for HRAs and fires, the belief is that could be
5 extended into other types of external events.

6 At least, the framework seems to be
7 sound. Like that. That being said, there's been some
8 work done in shutdown on low power HRA, you know,
9 the older studies of grand gulf and I think surrey
10 for the shutdown low power work. So we're aware of
11 some work being done by W.G. Russ, the hunter, I
12 guess that's CSNI.

13 Some work in SPAR model, some things
14 like this. Some work has been done in spent fuel
15 handling, but then you come down to this list where
16 the, the work--

17 MEMBER BLEY: Actually, those two
18 studies, that do ATHENA, but go ahead.

19 MR. STUTZKE: Well, I mean, you mentioned
20 it when I first came here. I said, great, we'll just
21 run ATHENA on everything, no problem, right? We have
22 a good, comprehensive method, and that, it's not
23 that easy. It's obviously not that easy.

24 So, you know, what they're telling me

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 is, gee, when you try to push me, there's no good,
2 or identified studies or comprehensive satisfying
3 studies for level two or level three. But the level
4 two gets a little surprising to me because we've
5 been doing level two the same models for some time
6 now.

7 And to hear that message, in my mind,
8 this is the, the heart and soul of the EDMG's and
9 the SAMG's like this, but it's clear at this stage
10 of the accident you're talking about more than
11 control room response, you're talking about the
12 utilities response and then ultimately our response
13 like this.

14 Most, none of the other external events,
15 whether it's floods, high winds, hurricanes and
16 things, people particularly willing to, to stand by.
17 You know, Dan, I recently had opportunity to review
18 a pilot seismic PRA that EPRI did and they attempted
19 to credit the impact of the seismic event on
20 operators by simply scaling up the internal event
21 HEPs according to the acceleration level of the
22 earthquake.

23 MEMBER BLEY: Is this something recent,
24 or?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: Really?

2 MR. STUTZKE: It's this year. And, they
3 cited Diablo Canyon as the basis of that. And, when
4 I ran that by the team, you know, they're going,
5 well, there's no technical basis behind it. I mean,
6 it's a plausible approach, but it's, you know, it's
7 maybe not the simplest performing shaping factor
8 multiplier you could throw out there right now.

9 So, so be it. It's about all I can say
10 on the HRA working group--

11 MEMBER BLEY: Now, before you leave that
12 one--

13 MR. STUTZKE: Didn't think I'd get away
14 that easy.

15 MEMBER BLEY: You know, something like
16 twenty years ago we tried to hire some people and I,
17 I think there are some people out there now who
18 might know better, who, psychologists who thought
19 they understood people under unusual conditions like
20 seismic.

21 We got a little ten page report out on
22 them trying to identify what happens to people in
23 seismic. They, the one little thing I, it ended up
24 not being extraordinarily useful, but the one thing

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 they did point out pretty clearly with lots of
2 anecdotal evidence is, under really severe ground
3 shaking, people very often, if we drop back to that
4 old frugal knowledge base, behavior stuff, and,
5 they, not the Rule, what's the one before that, the
6 skill.

7 One of the things you can do, skill
8 things, people end up doing very well and maybe an
9 hour or two later they don't know they did it, but
10 they did it pretty well, but anything that takes any
11 cognitive processing doesn't work too well.

12 MR. STUTZKE: Right.

13 MEMBER BLEY: And they have lots of
14 theories about why that's so, about the one anchor
15 we have in the whole world has disappeared for us,
16 and I kind of start--but there seems to be a lot of
17 evidence of that.

18 MR. STUTZKE: Right, when I discuss--
19 right, when I discuss this with Val Burns, our human
20 factors SL, she said there was a lot of information
21 on the, and, that shows that people do recover
22 rapidly. I mean, there's almost like a decay curve
23 where they, normal functioning--

24 MEMBER BLEY: But they do tend, probably

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 has a lot more on this than I have, they do tend to
2 have some substantial gap in memory and don't know
3 what they did but they've done stuff. And often,
4 they've done it very well. Like, they drove all the
5 way home and didn't know they did it. That sort of
6 thing.

7 MR. STUTZKE: Sounds like most of my
8 children. They don't remember--

9 MEMBER BLEY: There might be something
10 good to pursue there out in that community that Val
11 knows, there--

12 CHAIRMAN STETKAR: It's about twenty
13 years ago. Do you remember--

14 MEMBER BLEY: I probably even got a, got
15 it, if I can look for it. It was about twenty years
16 ago and it was, it was done to support some seismic
17 PRA work and, like I said, it ended up not being
18 real helpful but at least it gave us some, some
19 basis for thinking about it. I must have it
20 somewhere. If I can find it, I'll send it on to you.

21 MR. STUTZKE: I would certainly
22 appreciate, at least, the link to it.

23 MEMBER BLEY: It wasn't proprietary in
24 any way, so. Not sure the bunch that did it are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 still around, but they might be.

2 CHAIRMAN STETKAR: They weren't here in--

3 MR. STUTZKE: Yes, it's a thread. That's
4 what I need right now. Okay. Non reactor risk. The
5 considerations, what has been made clear by the
6 working group is that different pools have different
7 quantities of materials in them, you know,
8 configuration of the pool, lifetime of the plants,
9 how much fuel has been stacking up over time,
10 various decay process, you know, radioactive decay
11 so they're all going off in different lifetimes.

12 To make it even worse, is this variety
13 of cask designs in use, different vendors like that.
14 And of course, the inherent fuel design, you know,
15 pressurized water reactor versus boiler reactor and
16 things like that. They didn't identify it on the
17 report, I added it in here, what about MOX fuel.

18 What do they want to try to do in that
19 area, since this is more a placeholder, I don't know
20 the answer yet. I didn't want to forget the thought
21 like this. I have questions from talking to the HRA
22 folks that we have about methods for cask loading
23 and transfer and storage.

24 The actual manipulation of the fuels,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 what I was told was human behaviors are controlled
2 by different things in those reviews like that. So,
3 that, that seems to be an open question to me. The
4 other thing is, the need to include non spent fuel
5 risks into the, into the project at all.

6 MEMBER BLEY: Just, just an aside. Susan,
7 and you probably already have this, put together
8 something some years ago on human reliability for
9 nonreactor, for NMSS, that started out, it was aimed
10 at Yucca, and I think it got derailed from that
11 because, you know, it could have had to be done in a
12 certain other way.

13 But it was, you know, a to of what it
14 aimed at was thinking about Yucca. So, somewhere she
15 has something. I don't know if it's available, or,
16 or not.

17 MR. STUTZKE: Well, well now that I think
18 about it, this is an example of what John was
19 warning me earlier. I've got two working groups
20 charging off in different directions and one doesn't
21 know what the other one does. There were no HRA
22 folks in this working group. This is NMSS.

23 MEMBER BLEY: Well, it was done for them
24 in NMSS. But, but nevertheless.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: As you can see, it's, you
2 know, the right hand doesn't know what the left hand
3 is up to. Sort of thing like that.

4 DR. KRESS: The timing of the event, I've
5 often thought one could start from a given refueling
6 for you have a given status of the pool if new, new
7 fuel in it, and calculate an instantaneous like
8 risk, and integrate it over time until the next
9 refueling and that would give you the change in risk
10 with time, as well as overall average risk over a
11 refueling period. I don't know if that's a good
12 suggestion or not, but I tried that once and it
13 seems to work.

14 MEMBER BLEY: I got another for you on
15 the new one. The Army's chemical weapons
16 demilitarization program did pretty thorough PRAS on
17 all of their facilities. Some of them were public
18 for a year or two, and then after 9/11, they tried
19 to unpublic them but they had been in libraries all
20 over the country for, for two or three years.

21 But maybe by now they'd be willing to
22 share what they had done, and some of your
23 contractors were actually involved in something. But
24 that's processing the same kind of stuff as this.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And they looked at a lot of different pieces of the
2 process, and actually have data on things that have
3 gone wrong that was pretty helpful.

4 MR. STUTZKE: I'm, I'm glad you mentioned
5 that. I should have done, I was involved in the
6 project for a couple of years.

7 MEMBER BLEY: Oh, okay.

8 MR. STUTZKE: And the overall--yes, I did
9 land mines--

10 MEMBER BLEY: Ah. I didn't know that. I
11 didn't remember that.

12 MR. STUTZKE: The overall framework of
13 how they approached the, the, the risk
14 quantification I think is relevant to spent fuel
15 handling operations, because you have so many things
16 you need to move from point A to point B--

17 MEMBER BLEY: And their data, some of
18 that is relevant, for, one of the things, one of the
19 worst things would happen is they'd have some
20 problem, they'd go in, they'd remove what was in
21 process, fix the problem, and they'd come back and
22 once in a while they wouldn't put it back where it
23 came from, they'd put it back the next step down the
24 line and here it didn't get the preprocessing so it

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 blew up at the next step, or did something
2 unfortunate.

3 So they have a lot of data, and it seems
4 to me they actually did a little bit later on for
5 the ones that--

6 MR. STUTZKE: Right.

7 MEMBER BLEY: --possible things but
8 actually most of the work was gone after the, Gary
9 Boyd and the folks working for him. Yes. That's
10 where you worked?

11 MR. STUTZKE: Right.

12 MEMBER BLEY: Yes. Okay. So, yes, I mean,
13 I might be willing to certainly share that with you
14 now--

15 MR. STUTZKE: It hasn't all been purged
16 from the internet, because I--

17 MEMBER BLEY: Oh, it can't be.

18 MR. STUTZKE: --I crossed it a couple of
19 weeks ago.

20 MEMBER BLEY: Yes, it can't be. And there
21 are still copies of at least the first one that were
22 public for so long, they are public. No matter what
23 they want.

24 MS. LUI: Just coming back to address the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 issue that Dr. Bley raised about the HRA for, for
2 the, for the cask loading. We are finishing up a
3 study for NMSS on the cask load and cask mislead
4 from, from the HRA perspective. But it's most
5 visibility in scoping and we are actually in
6 communication with NMSS at this point in time
7 regarding the next phase.

8 So, this can be a really great segue
9 into that, in terms of expanding that which is of
10 particular issue especially if this project is going
11 to be a go from the Commission's decision.

12 MEMBER BLEY: Excellent.

13 MR. STUTZKE: Next, next slide. Now,
14 realizing, you know, there are very few studies of
15 nonreactor risk out there, and so the working group
16 tried to, to come up with the technical elements
17 that they thought needed to be addressed in any sort
18 of study, and they came up with the list you see on
19 the left hand side.

20 It, it's not surprising, I mean, it
21 looks like a reactor PRA when you think about it,
22 and, what is necessary here is, well, the details,
23 you know, which step do you do when in order to get
24 the project done the most efficiently, like, like

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 this.

2 But I think it's a good starting point
3 for us to begin to consider and try to lay this
4 thing out. I haven't yet taken this thing, for the
5 reactor PRA, by the way, I have a massive critical
6 path network diagram of on the wall next to my
7 Office. You know, it's huge. I haven't done that yet
8 for the nonreactor risk study, yet.

9 MEMBER BLEY: I got--yes, I got this, you
10 know, reading a little bit through the material that
11 we got, the, the, it is pretty clear there was still
12 a lot of uncertainty about what the scope of this
13 might be, and--

14 MR. STUTZKE: Right.

15 MEMBER BLEY: Maybe we ought to come up
16 and look at your flow chart one of these days.

17 CHAIRMAN STETKAR: It's, it's, it's kind
18 of interesting that, I think it's good to consider
19 it, you know, as part of the whole scope that this--
20 it may require some, you know, difficult decisions
21 about scoping, if, if this shows up as 30% of your
22 total budget, for example, presuming the other part
23 of the budget is, is, is, is estimated
24 realistically, then the question, you know.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: Right.

2 CHAIRMAN STETKAR: Feasibility of
3 actually doing this is, might be questionably.

4 MR. STUTZKE: Yes, I would say, of all of
5 the aspects of the study we've talked on, the, the
6 spent fuel issue is one that's near and dear to my
7 Office director's heart.

8 MS. LUI: I, I, I guess, you know, I
9 mean, the Committee might be aware that the NMSS now
10 is leading up an effort within the agency to, to
11 actually assess the longer term spent fuel storage
12 strategy and risk, so part of that is, as we have
13 stated, that at the beginning, we're trying to be as
14 comfy as possible.

15 And all we want to do is to look at
16 potential end use, so, that, I mean, depending on
17 how that particular project's going, then this may
18 be a very logical piece to be developing in order to
19 support that particular effort. So that's the reason
20 why we have engaged NMSS.

21 CHAIRMAN STETKAR: If there's resources
22 available--

23 MS. LUI: Absolutely.

24 CHAIRMAN STETKAR: --to support that,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that's fine. It's just, you know, you've already
2 mentioned the limitations on bodies, basically, if
3 not money.

4 DR. KRESS: Spent fuel pool is definitely
5 an important risk contributor. But, I don't think
6 the dry cask storage is. Probably put that low on my
7 priority list.

8 MR. STUTZKE: Well, one of the things
9 that, that became clear from the working group, of
10 course, we have no standards, although, bits and
11 pieces of our existing standards apply like this
12 that the studies are old, and so I'm deliberating
13 the need for some sort of review Committee, a
14 standing review Committee or peer review, different
15 than what I would do for the reactors.

16 The reactor risk, I'm relatively
17 confident I can get it done with a couple of peer
18 reviews, you know, midway, or at the end. And we're
19 not going to miss anything. For this, we're kind of
20 feeling our way forward, and it would be good to
21 have advice, you know, you guys are going the wrong
22 direction and you need to worry about this before we
23 spend a lot of money.

24 So I think it will have to be managed

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and reviewed differently than the other task. That--

2 CHAIRMAN STETKAR: And this is, and this
3 is in the sense of state of the art, you know, this
4 is, you're now, in principle we have all the tools,
5 in principle we know how to do it, it's just that
6 nobody has really, has really done this--

7 MR. STUTZKE: Precisely.

8 CHAIRMAN STETKAR: --at all.

9 MEMBER BLEY: And factor the steam mount
10 studies, the Army did that. They had both oversight
11 from Nassau County but they had a higher review team
12 that came in about, might have been as much as once
13 a quarter, certainly twice a year, that had major
14 impact on where they, where they went. I mean, got
15 involved at every step of the way, and--

16 MR. STUTZKE: It's a good model for us.
17 To think of. Okay. Okay. Last but not least is what
18 I call 21st century documentation.

19 DR. KRESS: I've been waiting for this
20 one.

21 CHAIRMAN STETKAR: This means there's,
22 this means there's no complete words, no sentences,
23 it's just all, you know, tweets. But for some reason
24 everybody understands it.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. STUTZKE: Well, the mantra is, you
2 know, I told you, we have all of the IPEs and IPEEEs
3 and we have all of the NUREG 1150 studies store in
4 ADAMS in our system, you know, and the goal here is
5 something more than this filing cabinet of paper and
6 this 100 megabyte pdf file that I can't find things
7 in.

8 So--although I admit, I'm getting pretty
9 good at quoting verbatim out of sessions of NUREG
10 1150 right now. But, you know, we need something
11 better, and, than what we have. So we had a whole
12 dedicated working group to this and I think it's
13 some of the more interesting this that were done.

14
15 So, we have some minimum requirements
16 here. Whatever we do, we have to meet our own
17 management Directive requirements like this. The
18 necessity, retain all the information and make it
19 available in an electronic forms, meet the standard,
20 security of information so it can't be corrupted or
21 fall into wrong hands, that's the distribution
22 things. And again, the version controls, how do you
23 know what you're doing.

24 MEMBER BLEY: Are--by the way, are you

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 looking at maybe using website technology? Not that
2 you'd put it on a public website, but a website can
3 run on your computer, and you have the advantage of
4 the, links could--

5 MR. STUTZKE: This could easily end up as
6 a web based thing, on the internet.

7 MEMBER BLEY: I think it might--might
8 make it a lot easier to find things, and move
9 around, yes.

10 CHAIRMAN STETKAR: Marty, you mentioned
11 security, and I know, you know, in terms of access.
12 Have you thought at all about, I've run into this
13 with a couple of my clients in terms, as soon as you
14 start to talk about area that's in vulnerabilities
15 in particular, parts of the plant.

16 Clients have been quite reluctant to
17 make, make that information public, and--

18 MR. STUTZKE: Yes, and I, I, thought--

19 CHAIRMAN STETKAR: --and if you're
20 talking about, you know, now, a detailed assessment
21 of a real cooperative plant, right, you might need
22 to think about that.

23 MR. STUTZKE: Yes, we do, because it, it
24 links into that last bullet under goals, the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 openess and transparency, President, so, from the
2 Government Initiative and we need to try to do more
3 better and things like that. At the same time, we
4 were trying to learn a lesson from SOARCA when you
5 do things, you know, under the wrap, so to speak,
6 people become suspicious--

7 CHAIRMAN STETKAR: Well, that, that,
8 that's my, that's the concern, if, for example, some
9 area events were, were a large contributors to risk,
10 you know, what lessons do you learn from that? Well,
11 you can only learn to a certain point, because you
12 can't make the, the fundamental information publicly
13 available, right, because of safeguards, you know,
14 security concerns.

15 MR. STUTZKE: Yes, it's a dilemma and we
16 haven't--

17 CHAIRMAN STETKAR: Okay. You're, you're,
18 you're certainly thinking about that?

19 MR. STUTZKE: Definitely. These other
20 goals up here, I mean, the number one in my mind is
21 this need to record deliberations. Why things were
22 done the way they were. Even if it's as simple as I
23 didn't have any money, so, I made it, you know, I
24 made my best back of the envelope calculation and I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 went about my business, versus, you know, some
2 management direction to go down this path, or the
3 ACRS advice is to do this.

4 You know, and try to link all of that
5 stuff together, because one of the problems you see
6 when you read almost any PRA is it's real good on
7 describing what happened what the model was, but not
8 so good on how it, why it involved in the fashion
9 that it did like that.

10 That's, I think that's necessary to make
11 it usable for future uses, because you're always
12 suspicious about, what were the ground rules, what
13 were the assumptions.

14 CHAIRMAN STETKAR: We were just at the
15 break having a conversation that's exactly that,
16 that, the idea that as soon as some neurons fire,
17 you write down I, insert your name here, did this
18 today, insert today's date, because. You know, only
19 because you ten years from now won't remember that
20 even you did it, much less why you did it.

21 MR. STUTZKE: Yes, exactly.

22 CHAIRMAN STETKAR: That is very, very
23 important to keep that, that legacy information--

24 MR. STUTZKE: Yes, I think that's what

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 will make this ultimately into the risk toolbox that
2 we have in mind, is at least you'll know what's in
3 there, which is basis to--

4 CHAIRMAN STETKAR: Yes--what's in there,
5 what's not in there, and, and if something's not in
6 there, why it isn't.

7 MR. STUTZKE: Right. So, yes, all of
8 these, what could be considered as project
9 management sorts of document, minute, minutes of
10 meetings, you know, links to transcripts with, with
11 the Committee here, or, whatever. All of that, we
12 want to try to preserve and put pointers back into
13 things like that.

14 This longevity refers to storage medium
15 sorts of things, you know, one would presume that if
16 it was preserved inside ADAMS, you know, and if
17 ADAMS migrated to the latest IT technology that it
18 would be picked up, things like that.

19 Thoroughness, you know, how much
20 documentation do you need, under what level of
21 detail. We're looking at collaboration environments,
22 so things could be done through things like share
23 points, websites, or other sorts of electronic
24 collaboration environments like that.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Next slide. I guess the other thing I
2 would say is that this perhaps would be a model for
3 how all research will be done in the future, so
4 we're interested in that from a, if it's Office wide
5 implications like this. But, you know, again, the
6 idea of reporting, work for meetings, we do a lot of
7 things with, you know, web and video
8 teleconferencing, things like this.

9 And that stuff ought to be easily
10 captured now, the latest technology, like that. You
11 know, just some simple things like name files in
12 some way that you can figure out what's actually in
13 the file, and--

14 MEMBER BLEY: That always sounds good
15 when you do it, but.

16 MR. STUTZKE: Well, and it, and it points
17 down here to the documentation coordination
18 Committee, you know, about, to enforce the standard,
19 like this, somebody that's disinterested, you know,
20 beyond the project manager, and, you know, they can
21 be almost autonomous and beat us into submission or
22 something like that.

23 But, standard storage locations and
24 things like this, we could store stuff in the NRC's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 intranet, you know, our network drive, things like
2 this. Again, the emphasis on the basis for decisions
3 and plans and why things got done, want to focus
4 extra attention on this thing, just because it's
5 relatively new.

6 By the way, in, we have bounced all of
7 these balls against the NRC's IT infrastructure plan
8 to make certain we're in alignment, or at least,
9 we're trying to be compliant with where the agency
10 wants to go, so we're not just striking out on our
11 own, but we are trying to be coordinated with things
12 like that.

13 MEMBER BLEY: The, the, the counter to
14 the having it really well organized, which is
15 wonderful, but always seems to break down at some
16 point, I guess, is having the ability to use a, you
17 know, Google--like search engine to go through these
18 things, and, and find it for you.

19 MR. STUTZKE: Absolutely. Absolutely. And
20 that's the virtue of making it kind of web based,
21 and, you can Google.

22 MEMBER BLEY: Right. Right. Within your
23 own little web--yes.

24 MR. STUTZKE: But that's like, going

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 after, you know, about twenty years ago, may have
2 been longer than that, we actually tried to do this
3 in, in the context where we had, like, PNID's, we'd
4 put up on windows, and then you could click on the
5 component and it would pull up the list of PRA basic
6 events and things, because we had this need,
7 contractual requirement to show that we had a living
8 PRA.

9 But, at the time, computer technology
10 was so bad, I mean, there was no way, it simply,
11 didn't, it failed miserably in implementation. But I
12 think the idea was there.

13 MEMBER BLEY: The folks--have you been up
14 to see any of the new control rooms? I was just,
15 that, the people who designed those could probably
16 be of use to you or somebody like them, because
17 they're pretty impressive, and they work.

18 MR. STUTZKE: So, I think that's all I
19 want to say on documentation. One more slide, and,
20 read it here, but, staff training opportunities. We
21 have, I guess, some questions, like this. What We're
22 trying to think of, is, do we want to do a business
23 as usual, where we would hire some signatory to be
24 our contractor and say you guys go forth and, we do

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 this project and we'll be happy to review your
2 deliverables and stuff.

3 Or, do we want to actually do the work
4 in house, so we'll have us a little dedicated team,
5 you know, call it the skunk works or something, and
6 we'll go off and go do this. And, how that would
7 actually work in house, you know, we would expect
8 participation from large numbers of offices, people
9 are very interested to train their staff in how to
10 do a PRA.

11 Like this, and how one actually does
12 that, you know, from a, a personnel and management
13 sort of thing is different, difficult because you'd
14 have to put people on rotational assignment here to
15 get them over here. While they're busy working on
16 the PRA they're regarding not doing the core
17 mission, you know, and it's not so easy to justify
18 an increase in our FTE's or things like that.

19 At the same time, we might park somebody
20 in a laboratory for an extended time period to go
21 learn, you know, like that. We could certainly host
22 a variety of seminars and workshops to convey
23 information methods and stuff as it comes along.

24 The problem there is, we spend more time

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 writing view graphs for the workshops than we do
2 doing the project, and it will die under it's own
3 weight, like that. Then there's this issue of, well,
4 who should participate, you know, compromising the
5 safety mission.

6 And then, how do you measure success? I
7 mean, the success will be, we'll have a, it's easy
8 enough to count the number of people that go through
9 but how many are real PRA analysts when they get
10 done with this remains to be seen. And, the other
11 thing is, once they get qualified, we're liable to
12 lose them. They'll get promoted, and, things like
13 this.

14 So, we haven't, we haven't explore this
15 and it's why we have more questions than we have
16 answers. But clearly, the intent, and I think, if
17 you go back and look at the transcript when RES
18 briefed the Commission that led to that SRM,
19 Commission Svinicki and Chairman Jaczko were very
20 interested in the staff training.

21 CHAIRMAN STETKAR: That's, that's, I'm
22 sure you've, you're struggling with this. It's, it's
23 an issue because if you want to maximize the
24 efficiency of actually producing a product, you need

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the lean, mean team. You might, you know, but, on
2 the other hand, if training is an objective, you're
3 going to sacrifice efficiency and, and have much
4 higher overall technical project management burden
5 in terms of forcing consistency.

6 Because, you know, regardless of how you
7 write, write guidelines of how to do things, analyst
8 A is going to do it slightly different than analyst
9 B, especially if they're both new.

10 MEMBER BLEY: Yes, but the other side is,
11 the only way to really get trained, that's why, is
12 to come into the crew--you've probably done this in
13 the past, but we just have clients and people that
14 live with for six months or a year, and when they
15 left, they really knew what they were doing.

16 CHAIRMAN STETKAR: That's right. But
17 there too, it's a problem of, of, you know, one of
18 his clients, it was typically two or three bodies,
19 basically--

20 MEMBER BLEY: That's right, and we're
21 talking--

22 CHAIRMAN STETKAR: They were really well
23 trained bodies for their PRA, it wasn't a massive--
24 we weren't trying to train the industry, you know?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: But at the same time, you
2 have new people coming into the organization that
3 were going through the same thing. But it does
4 increase management load and supervision but it's
5 the only way you're going to get new people unless
6 you go out and steal them from somebody else.

7 MEMBER REMPE: In addition to training
8 your staff earlier you mentioned you had trouble
9 finding contractors with expertise. I was wondering
10 if you'd consider a different type of model too that
11 perhaps contractors or even foreign research
12 organizations might want to send someone here and
13 they could fund you guys--or, fund their person--to
14 learn, this.

15 Because, NRC is not the only one
16 suffering with staff not having enough expertise,
17 and have you explored that option, or is that not a
18 good idea because of what you're trying to
19 accomplish?

20 MR. STUTZKE: I think it's a good idea.
21 But we hadn't, hadn't heard from you before. I'd
22 like it if they paid their own way.

23 MEMBER REMPE: I--again, I'm sure my own
24 experience in my other job, that there, that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 something like that is an opportunity that other
2 organizations might consider, everyone's struggling
3 for funding now. But, you know.

4 MS. LUI: Yes, actually it's not just in
5 this area, lot of different areas that we do
6 nowadays that everybody's seen these bimodal curve,
7 that we are trying to bring the new hires up to
8 speed and with that we have already initiated a
9 conversation with some of our major contractors
10 indicating that we'll be having to, to actually host
11 the contractor staff coming over to NRC to learn
12 about the regulatory environment that we're in, so
13 in fact they were in the state of wanting to ask
14 certain questions, why our statement of work is
15 written in particular ways so we are exploring
16 things such as, I mean, vehicles such as,
17 intergovernment personnel actions, okay, so these
18 are the practical tools that we do have that we can
19 work with. What it comes down to is everybody make
20 allowance for that to happen.

21 MEMBER REMPE: I think other work other
22 organizations have that capability. In my own area,
23 we send people overseas to learn certain things and
24 you pay for their salary while they're over there.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: But, but you've had
2 experience with this in the past, bringing people in
3 from the regions who worked with the PRA group for a
4 year or so then went back and now finally have some,
5 some expertise on the regions. It's a slow process
6 but I don't think there's any other.

7 You can't do it through, through lesson
8 plans and seminars. I mean--

9 CHAIRMAN STETKAR: No.

10 MEMBER BLEY: --and classes, you don't
11 get the same level of expertise that you're going
12 to--

13 MS. LUI: And the other thing we do is
14 that at the get go we really need to think through
15 and very thoughtful about what can be a good
16 project, so we can carve that out, because certain
17 organizations that they may not be able to afford,
18 you know, one, any people for one or two years, but
19 six months is something that's reasonable.

20 So, whether, whether it's to be a six
21 month that they will be a well defined piece that
22 the person can really benefit from, getting into
23 the, the text of the analysis. So there are a lot of
24 different degrees of freedom that we can play with

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and I think time that we do have to, I mean, these
2 degrees of freedom will allow us to take the
3 practical constrains into consideration and we
4 absolutely have to do that, too.

5 MEMBER BLEY: One other, one other place
6 we had experience that you might want to borrow from
7 at least for arguments for getting this kind of
8 support was the Kalinin PRA, which was done by all
9 Russians of five different organizations.

10 But, we managed to get them over here to
11 work together as a team, and when that was first
12 proposed, I think it was, Mark was asking, well, how
13 long, two or three weeks? And I said, a year, but at
14 least three months, several times in a row, and they
15 did that, and that really did work.

16 Those people were able to do some pretty
17 decent work by the time they were done and, and,
18 and, and it, and it also broke down the
19 organizational difficulties they had coming in from
20 all these different competing pieces of
21 organization, not that you have that here, in any
22 sense. But it can be helpful.

23 CHAIRMAN STETKAR: That's--I've got to be
24 aware of time here a little bit, I want to make

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 sure, Don's got a bunch of stuff to, to talk about,
2 apparently.

3 MEMBER BLEY: And we're right there.

4 CHAIRMAN STETKAR: And we're right there.

5
6 MR. HELTON: All right. My mic doesn't
7 have one of those pretty green lights like Marty's
8 and Dan's, but I assume somebody will let me know if
9 they can't hear me. My name is Don Helton. I work in
10 the same Division as Dan and Marty, working for
11 Christiana. It's been actually about three years now
12 since I've had the opportunity to brief the ACRS,
13 so.

14 It's been a long, cold winter but I'm
15 glad it's finally--

16 MEMBER BLEY: Well, welcome back.

17 MR. HELTON: --spring has finally
18 arrived.

19 CHAIRMAN STETKAR: We'll try to make you
20 appreciate that hiatus, so.

21 MR. HELTON: So, let's go ahead and jump
22 to the next slide there. Just by way of background,
23 I want to point out a few random things. We have
24 developed three SPAR, what we term feasibility

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 models that we have, and those have a number of
2 strengths and weaknesses associated with them.

3 But, it's, it's something that we want
4 to at least consider as a launching point for, for
5 working on this project, and so I'll come back to
6 those in a minute when I talk about the options that
7 we developed. In addition to that, there was some
8 work done to enhance the level two capabilities of
9 SAPHIRE that was associated with the development of
10 the SAPHIRE 8 version of the code.

11 That included things like being able to
12 handle decomposition of entries and those will
13 certainly help this project, and whether they will
14 cover everything we need will, will of course depend
15 on the approach that we select. For those of you who
16 are, who associate doing level three PRAS with
17 running the source term code package, I just wanted
18 to remind you that we do have the MELCOR code.

19 It is a wonderful thing, and that is the
20 deterministic tool that we would use for the level
21 two portion of the PRA, as well as likely for the
22 success criteria portion for the level one part of
23 the PRA.

24 And then finally we have a project

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that's been ongoing for a year now, in the area of
2 advanced level two PRA modeling, and this is looking
3 at dynamic of entry PRA, level two PRAS. It's not
4 suitable for a full scope PRA but we do think it has
5 some utility here in areas where We're willing to
6 sacrifice cost at the gain of realism.

7 MEMBER BLEY: I don't think you brought
8 that ACRS. Are there any reports that are out yet on
9 the work that's been done here?

10 MR. HELTON: Yes. There--we have not had
11 the opportunity to brief ACRS on that. There are,
12 there's a report from a May 2009 that documented the
13 internal scoping study that was done, and that's, we
14 can provide that to you. In addition, there have
15 been a couple of conference papers--

16 MEMBER BLEY: No, no NUREGs or anything?
17

18 MR. HELTON: There have been no NUREGs,
19 no. So. Most recently there was an Israel paper that
20 documented where we're at with that project.

21 MEMBER BLEY: Yes, that one, yes, we
22 just--

23 CHAIRMAN STETKAR: --is, is, primarily,
24 the, that's the most comprehensive documentation?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Well, it doesn't have much
2 detail on the dynamic--

3 MR. HELTON: Well, it--I think we're
4 talking about two different things. There's the
5 input to this project for level two, which is the,
6 which includes that table that you referenced
7 earlier--

8 CHAIRMAN STETKAR: There, there, there,
9 there, there, there is a, there is a, I notice that
10 the primary author is someone named Don Helton--

11 MR. HELTON: Yes, he's a--

12 CHAIRMAN STETKAR: The title is called
13 scoping study on advanced modeling techniques--

14 MR. HELTON: Yes.

15 CHAIRMAN STETKAR: --for level two three
16 PRA May 2009.

17 MR. HELTON: Yes. Good guy. I like him a
18 lot.

19 CHAIRMAN STETKAR: There you go. I was
20 pretty impressed--

21 MEMBER BLEY: Is that the one with the
22 details--

23 CHAIRMAN STETKAR: Is, is that--

24 MR. HELTON: That provides, that's very

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 detailed as of May 2009.

2 MEMBER BLEY: Okay.

3 MR. HELTON: Now, the--trying to think.

4 There were, there's an intermediate conference
5 paper, and then the Israel paper, which tried to
6 then take that and talk about what's been done since
7 then.

8 MEMBER BLEY: Maybe you could get those
9 to Jose and he could give them a look.

10 MR. HELTON: Yes. Absolutely.

11 MEMBER BLEY: Like to--and, and, and,
12 maybe some thoughts to him about how up to date that
13 is.

14 CHAIRMAN STETKAR: Don, send it to John
15 Lai, john.lai--

16 MR. HELTON: Yes, yes. Yes. I know John.

17
18 CHAIRMAN STETKAR: Jose is just filling
19 in for John today.

20 MEMBER BLEY: I'm sorry, Jose, didn't
21 mean to grudge you.

22 CHAIRMAN STETKAR: He doesn't, he has no
23 other problems.

24 DR. KRESS: Could you have John put me on

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the distribution list?

2 CHAIRMAN STETKAR: I will.

3 MR. HELTON: And we, you know, would
4 welcome the opportunity to engage with you guys on
5 that topic. Unless there are any other questions,
6 I'll jump tot the next slide. This slide's pretty
7 self explanatory. There's, you know, three options,
8 and there you go. Can't understand them in four
9 words, then, you know, how could you not.

10 We actually used to have a lot more
11 words on the slide but we felt like it would be
12 better to talk about the different options than,
13 rather than trying to explain them in a hundred
14 words or less. These are sort of the high level
15 options that we developed in the absence of focused
16 end uses for the project.

17 So, understand that these things are
18 going to need to be further developed once we get a
19 better understanding of what site we're looking at,
20 what the targeted end uses are, those sorts of
21 things. And as well as when, as we go along and get
22 further input from you all and from external
23 stakeholders and others.

24 Basically, option one is what I termed a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 contemporary decoupled level two. This is the throw
2 it over the fence sort of mentality that was alluded
3 to earlier, where the level one information is
4 transitioned into the level two model via plant
5 damage eights.

6 Those feed into containment event trees,
7 which are mostly informed by point estimate split
8 fractions that have been developed by expert
9 judgment or offline deterministic analysis. And the,
10 those are then fed into ten or twenty release
11 categories that get thrown over the fence to the
12 level three folks.

13 MEMBER BLEY: Before you leave that one,
14 earlier, there were words about uncertainty
15 somewhere. Those option one stay with point
16 estimates in the level two, or does it try to
17 address uncertainty? It just makes--

18 MR. HELTON: It, at, I think at the
19 moment, the way it's written is, is that it, I'd
20 have to go back and look exactly, you can address
21 uncertainty in that, in that type of methodology,
22 by, you, you, putting distributions on the split
23 fractions, and then handling epistemic uncertainty
24 or model uncertainty via sensitivity analyses or via

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 also providing distribution.

2 So it doesn't, option one doesn't
3 preclude the treatment of uncertainty. It's
4 debatably not as well suited for capturing it
5 consistently.

6 MEMBER BLEY: So you just have like,
7 delta function on--well, you could have uncertainty
8 there, and--

9 MR. HELTON: Yes, you could still, I
10 mean, you could still propagate--I mean, through
11 this, through the containment of entry you could
12 propagate uncertainty, distribution based
13 uncertainty the way that you would in the level one.
14 You're just missing a piece of the uncertainty.

15 MEMBER BLEY: Okay.

16 MR. HELTON: Option two, I termed an
17 enhanced contemporary level two. What I mean by that
18 is, is, the notion here is a link to level one,
19 level two model, which some licensee models already
20 are. The SPAR model, the three feasibility SPAR
21 models are not designed this way.

22 But, but, talking about a linked level
23 one, level two model where you've separated out the
24 systems and operator actions from the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 phenomenological events to the extent that you can
2 do that. You, your systems of entry in level two
3 space can directly access the information from the
4 level one, from the level one fault trees to the
5 extent it needs it.

6 And, so, some of that information can
7 get sort of directly passed across--

8 MEMBER BLEY: So, there's any systems
9 over there that failed that would effect what you're
10 doing over here.

11 MR. HELTON: Right.

12 MEMBER BLEY: Another two.

13 MR. HELTON: Right. The construction of
14 the containment phenomenological event for you, we
15 would try to base pretty explicitly on MELCOR
16 calculations so we would place a lot of faith in the
17 ability of the code to predict those things.
18 Obviously practitioner judgment is going to be
19 resident, but we would place a lot of focus on, on
20 the, on bringing those offline deterministic
21 analyses into a more online fashion.

22 And the last thing we would do is for
23 the sake of trying to increase precision across the
24 level two and level three interface, we would carry

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 a lot, a much larger number of release categories. I
2 have 100 to 200 in the writeup. That's obviously
3 negotiable.

4 But, the notion is, is that when we talk
5 to people we had a brainstorming session as part of
6 that, the other effort that we talked about earlier,
7 and one of the few things that everybody agreed on
8 is that the level three people could stand to get
9 more release categories, and so that's another area
10 that we think there's some benefit in.

11 Finally, option three is a, what I've
12 termed a quasi-dynamic event tree approach. It is
13 philosophically I think based on some of the work
14 that we're doing in the dynamic event tree, the, the
15 advanced level two modeling techniques project. But,
16 recognizing that that project and those efforts
17 aren't going to be far, aren't going to be mature
18 enough to just directly implement them in here.

19 So, in that regards, what we're looking
20 on--what we're looking at is, first of all, you
21 would have to do something like an option two. You
22 would have to, you would have to start with an
23 existing level two PRA. You would then pick out the
24 most significant sequences from that, say, ten or

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 twenty most significant sequences.

2 That's what you're bringing into option
3 three. So, this is not a completeness, option three
4 is not trying to cover the spectrum. It's trying to
5 take the significant part of the risk profile and
6 now really drill down on that.

7 Key events would I, be identified much
8 the same way that they're done now, the way the top
9 events are identified. But, in this case, what you
10 would be doing is constructing cumulative
11 distribution functions that predict the probability
12 of events happening, and coding those directly into
13 your simulation tool, in our case, MELCOR.

14 And, so you still, still branching, you
15 still have these key events but those branches, the
16 timing of those branches, and the probabilities are
17 being determined by a decomposition of the
18 constituent inputs, as opposed to by sort of higher
19 level practitioner judgment.

20 CHAIRMAN STETKAR: Is, is that done--I
21 don't want to spent too much time on, on this,
22 because I was trying to understand it in the
23 material that I read. Is, is that done only in the
24 context of the phenomenological issues, or do you go

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 back and, and effectively simulate from the
2 initiating event through the release category?

3 So, when you talk about sampling from
4 cumulative distribution functions, one of those
5 might be the time, the time at which a pump fails,
6 during the progression of event, which might have
7 effected both your level one-ish kind of, you know,
8 issues, or if it's a pump that, you know, serves
9 dual functions like RHR pump that might be an
10 injection pump for LOCA, and, and a containment,
11 heat removal sort of thing.

12 And, and the failure mode is fail during
13 operation, you know, the timing at which it fails
14 might effect things, is, is that part of this notion
15 of, of sampling from, you know, uncertainty
16 distributions, if you will, on both phenomenon and
17 timing, or, or--

18 MR. HELTON: Yes--yes, yes, it is. The--

19 CHAIRMAN STETKAR: It is? Okay.

20 MR. HELTON: --the idea would be when
21 you're selecting those top events, you're
22 considering systems, operator actions, and phenomena
23 and you are considering both level one and level two
24 space. If you think there's something that's going

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 on in level one space, be it a relief valve that's
2 cycling, or RCP seal failure, if you think that
3 that's driving your results, then you're, in this
4 situation, you're, you're better suited to worry
5 about that in your simulation than you are to only
6 worry about the level two stuff, if that, if that,
7 if particular things in level two are not having
8 that big of an effect.

9 CHAIRMAN STETKAR: Okay. Thanks.

10 MEMBER REMPE: On the MELCOR uncertainty
11 analysis, there's got to be some sort of expert
12 opinion determine what parameters have distributions
13 associated with them, right?

14 MR. HELTON: Yes.

15 MEMBER REMPE: And, how much effect do
16 you think that that's going to have? Plus, they've
17 got to determine what those uncertainty
18 distributions are, and are you concerned that that
19 could be a significant, I mean, that's a, that's a
20 reality you have to live with, but has there been
21 much thought put into how much impact that has on
22 some of the things?

23 MR. HELTON: Let me answer that two ways.
24 I think in terms of whether there's been thought on

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that, yes, there definitely has been, through, you
2 know, things that come to mind are, are, a study
3 that was done about six or seven years ago by Randy
4 Gann at Sandia on hydrogen production--hydrogen
5 generation uncertainty.

6 They're under the SOARCA project, they
7 are looking at uncertainties in the context of, of
8 MELCOR simulation. So there's that. I guess the
9 other thing that pops into my mind is the fact that
10 one advantage that we see here is, is that rather
11 than an expert sitting back and trying to predict
12 the uncertainty and the output of a phenomenon,
13 We're now trying to put them in a mode where they
14 can predict the uncertainty in the inputs that
15 effect whether or not that our, that phenomenon
16 occurs.

17 MEMBER REMPE: Actually I think I've seen
18 some work done by Randy where he actually does do it
19 on the input, to some of the phenomenon, for the
20 MELCOR mode.

21 MR. HELTON: Right, yes. The hydrogen
22 uncertainty study that I'm thinking of, if it was
23 done six years ago or so, was definitely that way.
24 But yes, that's the other notion here, is, is that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you're sort of putting your, you're not removing
2 the, the practitioner from the process, but you're,
3 you're hopefully putting him in a position where
4 they can inform things that experts are better
5 positioned to inform.

6 MEMBER REMPE: But there is a limit to
7 how many parameters they've selected to do that for,
8 because it's just, and so there are some deferring
9 to expert opinion influences on it?

10 MR. HELTON: Yes, yes, I mean, yes. We're
11 not, and we're not going to claim that we can remove
12 those and, and certainly, depending on sort of that
13 tradeoff of how many resources you have, how many
14 sequences you're looking at, you know, you're going
15 to be, at some point you're going to constrain
16 yourself as to how many things that you can
17 consider.

18 And in the context of a PRA, we're
19 thinking more along the lines of, of sampling across
20 eight or ten what I would still think of as sort of
21 top events as opposed to a situation where you're
22 trying to take a hundred different inputs and create
23 correlations for those inputs and then, you know, do
24 a brute force Monte Carlo on them.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Okay.

2 MR. HELTON: The next slide, just real
3 quickly, I just wanted to point out one of the sort
4 of the points of, of confusion for me early on in
5 this was, we were asked to create three options. We
6 have PRA standards that have three capability
7 categories, you know.

8 One option would be, or one approach
9 would be to say, okay, you know, there you go,
10 there's the mapping and we're done. At least in my
11 view and I think in some others given the definition
12 of what these options should look like off the
13 shelf, enhanced, advanced, I sort of view the
14 standards to get at those first two options,
15 recognizing that standards talk about the what you
16 should have, they talk about the characteristics
17 that your PRA should have and what we're out to do
18 to define the actually approach that you're going to
19 take.

20 But, that distinction aside, you've also
21 got the fact that at least in my mind option three
22 that we're trying to define here is sort of by
23 definition beyond the scope of the standards. You
24 know, for instance, the level two standard, the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 writing group that I'm on, we're sort of taking the
2 Rule of thumb that if nobody's ever done it, then
3 it's not state of the practice.

4 You know, no matter how much we would
5 have liked somebody to have done it and no matter
6 how much we, you know, wish that we could make
7 somebody do it, if nobody's ever done it than it's
8 not state of the practice. Jump ahead. Next slide.

9 So, I'm going to wrap up here with two
10 slides. They're just trying to point out some of the
11 challenges that we have and some just random
12 thoughts that go along with that. We are developing
13 the level two PRA standard, we being the community,
14 not we at NRC.

15 NRC is participating in that activity
16 but that is in draft form and it's still got work to
17 do. Some other challenges that we have are the
18 characterizations that have been touched upon
19 before--

20 MEMBER BLEY: What's--what's the status
21 of that? I haven't heard about it in a long time,
22 so.

23 MR. HELTON: Okay. The status of the
24 level two, it's the American nuclear society level

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 two standard. It was, there is a draft that's been
2 circulated to the standards Committees which covers
3 the internal events portion--

4 MEMBER BLEY: Never gone to a vote?

5 MR. HELTON: --of the scope. It's never
6 gone to ballot.

7 MEMBER BLEY: Sorry, go ahead, though.
8 It's, it's in circulation--

9 MR. HELTON: Absolutely. It's in
10 circulation--well, it was in circulation, it was, it
11 covered the internal events portion of the scope, of
12 a full level two. That went around for standard
13 Committee's comments. Those comments have come back,
14 we're addressing those comments and in addition to
15 that we have other remainder--remaining portions of
16 the scope to cover, which is external hazards and
17 low power shutdown.

18 MEMBER BLEY: They're all going to be in
19 one?

20 MR. HELTON: Yes, the notion is to have
21 on standard that covers all three.

22 MEMBER BLEY: Okay. What's, what's your
23 view on the comments, the significance of the
24 comments? Is it likely to delay things years, or are

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you pretty close to resolution, would you think?

2 MR. HELTON: We've gone through and at
3 least acknowledged, or developed how we plan on
4 addressing the comments. And actually in a lot of
5 sections, we've actually gone ahead and addressed
6 them.

7 My take was, you know, we had several
8 hundred comments. They were good, reasonable
9 comments, But they were addressable, they were not,
10 you know, you guys have completely missed the boat
11 and we need to go back and start over.

12 MEMBER BLEY: Not, we shouldn't have this
13 standard, we should--

14 MR. HELTON: Right. You know, they were,
15 you know, there, you know, uncertainty is an example
16 of where there's some fundamental, you know,
17 differences of opinion but I think they're all
18 manageable.

19 MEMBER BLEY: But the missing scope, that
20 sounds like it could be quite a long time until that
21 gets incorporated, or am I overreacting?

22 MR. HELTON: Well, when you started
23 saying the word years, you might be overreacting. I,
24 I, I think by, the goal is that by next summer we

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 would have a complete scope draft for standards
2 Committee review.

3 MEMBER BLEY: Oh, okay.

4 CHAIRMAN STETKAR: Even with low power
5 shutdown?

6 MR. HELTON: That is the goal.

7 MEMBER BLEY: So then, less than a year
8 for a draft, maybe.

9 MR. HELTON: Yes. But that's the goal.

10 MEMBER BLEY: Okay, that's good. That's
11 an, that puts it in perspective for me.

12 MR. HELTON: It's a matter of degree, you
13 know, since a lot of level two low power shutdown
14 models haven't been built, we're obviously not going
15 to address low power shutdown to the level of rigor
16 that the level one standard's going to address it.

17 MEMBER BLEY: Okay.

18 MR. HELTON: Characterization of SSE's
19 following an external hazard. It's an issue that
20 Marty had already alluded to. Level two HRA, another
21 issue that's already been alluded to. Mechanistic
22 models for lower probability phenomena, is another
23 thing that might take a little bit of effort.

24 Consistent treatment of uncertainty,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 both between, within the level two but then of
2 course making sure that what, the way that we're
3 treating uncertainty in level two comports with the
4 way that it's been treated in, in the level one and
5 the way that it's going to get carried forward into
6 the level three.

7 And then, finally, in terms of if
8 realism is really a focus of this, then equipment
9 survivability and treating that in a more realistic
10 fashion is another challenge.

11 And then finally I just wanted to point
12 out a few random thoughts. There are a lot of LERF
13 models around. They are driven by the risk informed
14 licensing process, and so they have constraints
15 placed upon them in that they focus on completeness
16 as opposed to realism, in a lot of instances.

17 And so, a lot of what we need or do not
18 need to do to move the ball forward in this area
19 depends on how much realism is dictated by the
20 targeted end uses of this project.

21 PDS binning, be it happening at the
22 beginning of the level two or happening later in the
23 level two, as it would an option, in the option two
24 that I went over earlier, depends on good level one

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 success criteria and good level one HRA, and so this
2 goes back to the what we were talking about earlier,
3 about the fact that we may start getting into the
4 level two and, and saying, well, you know, we need
5 to go back and revisit a few aspects of the level
6 one.

7 Just wanted to point out that since the
8 time of NUREG 1150, we've implemented domestically
9 the severe accident management guidelines, so that
10 is new between now and NUREG 1150, certainly not new
11 between now and the existing LERF models.

12 But even so, the way that the severe
13 accident management programs are implemented in
14 those models and the extent to which HRA is
15 considered is, I would term, ad hoc.

16 Wanted to point out what you've already
17 yourself alluded to, which is the fact that there
18 needs to be tight coupling between these groups to
19 make sure that we're not doing, making assumptions
20 that are inconsistent with what other parts of the
21 group are doing. I think we're probably all in
22 violent agreement with that.

23 CHAIRMAN STETKAR: Yes, and, and again,
24 also, not, you know, not stopping at your scope, you

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 know, look forward to, this is a level three PRA.
2 Make sure that simply because we sort of know how to
3 do level two PRA perhaps, that you're not
4 foreclosing things by not looking forward.

5 MR. HELTON: Right. Yes. Turn things--

6 CHAIRMAN STETKAR: What information is
7 needed to, to capture, you know, things that might
8 effect, you know, the measures of merit that we want
9 to look at, you know, the things that Marty had
10 earlier from a level three perspective.

11 MR. HELTON: Yes.

12 CHAIRMAN STETKAR: Might, might not have
13 thought about before, you know, is, isn't sort of
14 standard.

15 MEMBER BLEY: And that begs the question,
16 I have to ask, I hope to have in the slides, but
17 this level three PRA has presentations in the level
18 one part and level two part, but none are mentioned
19 at a level three part. Is that to come later, is it
20 in progress but you weren't ready to talk about it?

21 MR. STUTZKE: It, it'll come later. I
22 mean, originally there was no working group specific
23 to level three.

24 MEMBER BLEY: Is there now? I mean, you

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 are kind of getting kind of migration John's talking
2 about, everything's even a group. Just sort of on.

3 CHAIRMAN STETKAR: You people out there
4 who are saying hey, wait a minute, wait a minute. We
5 need these things.

6 MS. LUI: Part of the reason why we
7 didn't set up the level three group separately
8 because at the beginning, you know, as Dan had
9 mentioned, when we had the first kickoff meeting
10 back in April, that, at that particular point in
11 time, just as a mutual pretty much a statement that
12 she thought MACCS code was ready to be used, which
13 is the way we decided to go.

14 Therefore, the emphasis of the, of the
15 scoping and coordination over the summertime has not
16 been putting special resources out which address the
17 level three aspect. But, the, but then the
18 integration team is going to bring all these
19 different pieces together and using the existing
20 tools that we already have in a consequence
21 analysis--

22 MEMBER BLEY: I'd really urge you at the
23 very, very minimum that the level two there
24 integration team, which you do have, is heavily

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 loaded with level three people to make sure that the
2 concerns that the level three area are, are getting
3 worked in now, or you'll have the same trouble
4 everybody else had later when the damn pieces don't
5 fit together.

6 CHAIRMAN STETKAR: Yes, that's right,
7 yes. Not only have to unravel parts of level two but
8 you'll, you'll have to re-unravel parts of level
9 one, perhaps.

10 MEMBER BLEY: Perhaps. Yes.

11 MR. HELTON: Yes, I think--

12 MEMBER BLEY: And, as you begin to talk
13 about uncertainty, that's an area that level two and
14 level three need a little real thought on addressing
15 uncertainty. Most of the uncertainty you see in the
16 level three stuff I've seen is just the, the
17 uncertainty in the simulation over data that was
18 collected over X number of years, and that's not the
19 whole story.

20 MS. LUI: Yes, I mean, the level three,
21 the level three portions focusing on John's weather
22 variations that has been--

23 MEMBER BLEY: Yes, but when you take
24 weather over twenty years and assume that's weather

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 forever, and run that simulation, you're missing
2 some of the places where the things are, we talked
3 about earlier come up where you're going to get
4 coupling between the initiating event, maybe
5 failures locally, emergency team response and all of
6 this stuff, so I think more, you need to think about
7 the uncertainty altogether and, and plan it out from
8 very beginning.

9 MS. LUI: Yes, I mean, yes, well,
10 obviously simple if the initiating event is seismic
11 event then clearly it's going to be, I mean,
12 depending on language and when you could really
13 impact the evacuation model that's going to be done
14 in the consequence analysis. So, yes, we are, we are
15 aware of that, it's just that we have not explicitly
16 been out there addressing those issues. We are going
17 to be coming back and then when we do the
18 integration phase we will--I mean, our--

19 MEMBER BLEY: I guess, what I guess I'm
20 urging is you don't wait until you get there and--

21 CHAIRMAN STETKAR: Start thing about it
22 now--

23 MEMBER BLEY: --I mean that you plan it
24 all. You might not do the work until later but that

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you get people in who know what they're going to get
2 saddled with and, and can bring things up to
3 everybody else's attention.

4 CHAIRMAN STETKAR: Just as an example, a,
5 a, a, you know, we had a meeting a couple of weeks
6 ago, Dennis? I guess it was--

7 MEMBER BLEY: Which one, the EP?

8 CHAIRMAN STETKAR: Yes, the EP.

9 MEMBER BLEY: Or, a week ago.

10 CHAIRMAN STETKAR: I don't know. And,
11 there was put, you know, you ask people who are
12 developing emergency plans, the guidance that they
13 use for developing those plans explicitly excludes
14 consideration of several of the types of severe
15 external events. They don't have to consider
16 emergency plans or estimates of evacuation times for
17 external hazards that have recurrence periods of
18 more than 100 years.

19 Which, to us is a no never mind thing,
20 We're talking about recurrence periods of perhaps
21 10,000 years or 100,000 years or a million years.
22 They don't even have that. So, that knowledge base
23 isn't even available in term so information that you
24 might then want to just simply sample from, to tack

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 onto the back end.

2 That's, that's why, you know,
3 consideration of upfront to say, well, we think that
4 we have the information that we need for that level
5 three stuff, isn't at all clear when you're talking
6 about a comprehensive assessment. That's just,
7 that's just one example.

8 MEMBER REMPE: Could I ask the question?
9 I think I've been hearing from you guys in another
10 way, why isn't there like, an uncertainty working
11 group that looks at uncertainty from the various
12 level one, level two, and level three, and is it
13 possible to have something like that. Is it
14 worthwhile?

15 MEMBER BLEY: It's certainly one of them.

16
17 CHAIRMAN STETKAR: It's certainly
18 treated--as a separate section on uncertainty but
19 it's not--

20 MEMBER BLEY: Back--back in, when the PTS
21 stuff was done, Nathan and some others tried to put
22 together a consistent way to examine uncertainty in
23 the hope that that would end up being something we
24 would use everywhere.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 It was never really broadened but it
2 laid out a pretty thorough foundation for, for how
3 to explore the issues, and, and catalog them and
4 plan attacking them. I think it would be a really
5 good idea to resurrect that and maybe Paul Simms, he
6 would, he remembers of what was done back then.
7 Because it was, it was an attempt to unify the
8 approach and was general enough that it would be a
9 good starting point.

10 MR. HELTON: My last point was just the
11 fact that the point that's already been made before
12 in other contexts, which is that we need to find a
13 way to, to, one of our challenges is utilizing the
14 expertise in a level two community that's become
15 quite fragmented since the times of NUREG 1150.

16 CHAIRMAN STETKAR: Have you seen, Don,
17 when you say U.S. expertise has become fragmented,
18 people overseas have been doing more level two type
19 PRA work. Do you envision trying to develop any kind
20 of cooperative efforts with folks overseas?

21 MR. HELTON: Yes, I'm--I'm glad you, I'm
22 glad you took the bait. Didn't have room in my
23 slide, but, yes, I mean, two thoughts there.

24 CHAIRMAN STETKAR: I could even name

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 names, but--

2 MR. HELTON: Two thoughts there. First of
3 all, this is the point where I like to point out to
4 people who don't realize that you, you probably do,
5 but there are people who don't realize it, that
6 three of the most active level two PRA groups in the
7 world doing European level to PRAS actually reside
8 in the U.S., in places like New Mexico and
9 California and Rockville, Maryland.

10 And then, separate from that, we do, we
11 do try to stay engaged in the international
12 community. An example of that is the, under the
13 auspices of the European union, a large group on the
14 order of about sixty organizations including
15 regulators, TSOs, other organizations in Europe are
16 putting together a level two best practices
17 guidelines and we've been invited to observe and
18 have participated in the one end user workshop that
19 they've had, we'll be participating in the second
20 one here in a few months.

21 So, we, we are trying to at least
22 maintain those links so that when the time comes we
23 can, you know, see what makes sense.

24 MEMBER BLEY: Just--yes. Good. Good.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. HUDSON: Okay. Again, I'm Dan Hudson,
2 and I'm going to be wrapping up our presentation
3 this afternoon with a discussion about our approach
4 to developing options for proceeding with level
5 three PRA activities. Next slide.

6 As you may recall from our earlier
7 discussion, part of our Commission tasking was to
8 provide them with various options for proceeding.
9 We've spent the last almost three and a half hours
10 having a discussion about this project and I think
11 by now everyone's developed a sense for how complex
12 this is, how multidimensional in nature it is and
13 one of the challenges for those of us that are on
14 the SECY paper, integration and oversight working
15 group is how best to integrate this information
16 we're receiving from the different working groups
17 and package it so that we can effectively present it
18 to the Commission for their consideration.

19 Some of the approaches that, that we're
20 considering using are, are outlined here. And there
21 are some additional slides provided in the backup
22 viewgraph section. These are slides 49 through 52,
23 again, wasn't sure exactly how much time we have or
24 maybe in the afternoon when we got the section so

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 they're, they're in the backup section for you to
2 take a closer look at.

3 But the schedule oriented approach
4 really relates to the treatment of some of the
5 existing gaps that we've, that we've talked about
6 this afternoon. We address those gaps in a series
7 or parallel fashion. Again, I'm going to direct you
8 to, to slide 49 right now, and as you can see there
9 we have a few options outlined with pros and cons
10 associated with each of them.

11 Obviously, one option is to, to not
12 proceed with a, a new site level three PRA at this
13 time. One advantage of that is that it's consistent
14 with the, the current budget climate and the
15 limitations that we are experiencing. But obviously
16 we, we have discussed a number of advantages and
17 benefits associated with moving forward with a new
18 site level three PRA and the con obviously would be
19 that we would be, we would not be benefitting from
20 that effort.

21 The next option you see there is before
22 proceeding with the, the level three PRA we might
23 want to dedicate some, some time and energy to
24 filling in the existing gaps. Obviously this, the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 benefit there is that we're going to address those
2 gaps and we'll, by the time we would finish up with
3 that effort we'd have a better understanding of the,
4 the budget and schedule requirements proceeding with
5 the level three PRA.

6 The, the problem with that is that, you
7 know, we start, we start going down that path of
8 trying to fill in the gaps before we get started, we
9 may never get our feet off the ground and actually
10 proceed with the level three PRA.

11 MEMBER BLEY: May be too soft.

12 MR. HUDSON: Right. And then a final
13 option is using a concurrent approach, a parallel
14 approach, where we, we start the level three PRA and
15 simultaneously fill in the gaps. You know, the
16 advantage to this is that we actually, it ensures
17 that we get the project started, the, the
18 disadvantage is that there's a very high potential
19 for rework as we gain new insights, we'd have to go
20 back and address some issues that might be
21 identified.

22 CHAIRMAN STETKAR: Dan, I, you know, I
23 recognize the potential for rework. It strikes me
24 that if you have the, the right expertise and

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 experience, in this sort of feeding into this
2 project, there's always that potential. I mean, you
3 can always say that that potential is there, but
4 the, the risk can be controlled, I think, you know,
5 in terms of knowing, knowing what the gaps are,
6 where they are, and how, how you can muster, you
7 know, your project management to do that.

8 So, I know you have to put some con down
9 there, but, but, but I wouldn't necessarily, you
10 know, if, if you were naively starting off with a
11 group of people who had never thought about this
12 problem before, absolutely definitely there's a high
13 risk of substantial rework needed. But we're not.

14 MEMBER BLEY: Lest we sound like we're
15 perfectly aligned. No matter how you do it, there's
16 going to be a fair amount of rework because you're
17 going to learn things on the way. So, even if in the
18 second on you didn't run into the problem you have
19 there, whenever you decide to go ahead and apply
20 them you're going to find they don't quite work and
21 you're going to rework, so there will be rework.
22 There's no question.

23 CHAIRMAN STETKAR: There, there will,
24 but. Is it prohibitive? Probably not. There's

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 always--yes, yes. If you have the right people, you
2 know, organizing the project, you can control that.
3 Or, you should be able to control that.

4 MR. HUDSON: Okay. So the point is,
5 expect rework, and do your best in the beginning to,
6 to mitigate the risk of--

7 MEMBER BLEY: And see where it's coming,
8 you know, that's always it. Have places to have
9 flags when you see it and have alternatives to move
10 forward. Just like you'd manage any other project.

11 CHAIRMAN STETKAR: It's, sometime, you
12 know, the cost of doing rework to make something
13 perfect might not necessarily be essential to
14 understanding the final dole, which is not
15 necessarily a perfect depiction of level three risk,
16 but, but an integrated, you know, filling out all of
17 the blocks in that cube that Marty had there.

18 MR. HUDSON: Exactly. That's actually a
19 nice segue into the next approach, and, and keep in
20 mind that these approaches that I'm talking about
21 are not mutually exclusive. Rather, we're just
22 taking a look at some of the different issues that,
23 that need to be addressed and considered when we,
24 when we package this information for considered, for

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Commission consideration.

2 So, the scope oriented approach relates
3 to developing different options for proceeding
4 through this reactor risk cube that, that Marty
5 developed. Okay, moving onto, to slide 51. A couple
6 of options that we came up with are, were first, you
7 develop the level one PRA for, for all hazards, both
8 internal and external and then you add on the level
9 two and level three analyses.

10 And the, a benefit to this is obviously,
11 you know, in level one space, there are, there are
12 near term benefits for NRR and NRO in terms of their
13 regulatory work. A disadvantage to this is that it
14 delays the quantity to comparison reactor non
15 reactor risk that we talked about from the
16 beginning, which can only occur in level three
17 space.

18 CHAIRMAN STETKAR: And, and you didn't
19 put down maximizes the likelihood of rework required
20 in the level one PRA. I'm not being facetious, I, I,
21 it--

22 MEMBER BLEY: You get some near term
23 products. The other way you'll get some near term
24 confidence in the integrated approach, hanging

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 together.

2 MR. HUDSON: Right, and as you can see
3 there, the second option is to go out to level three
4 space for the internal events and then add on the
5 external events, and as we talked about, that's the
6 fastest way to get out there and, and quantitatively
7 compare the reactor non reactor risk.

8 We've already, again, for the cons,
9 we've, we've, we've talked about the fact that the
10 potential for rework exists and, as you just
11 addressed, the, maybe the first option maximizes the
12 likelihood of--

13 CHAIRMAN STETKAR: I, you know, you, you,
14 you're emphasizing rework, and, and at least in my
15 opinion, that first option on this slide, you,
16 inserts a lot of danger for rework.

17 MR. HUDSON: Okay.

18 CHAIRMAN STETKAR: Back through the level
19 one models. I think, I, you know, I think we, I'd be
20 very confident that that would happen. That, there,
21 as Dennis said, there's always going, there's always
22 a potential and probably always going to be some
23 amount of rework no matter how you approach a
24 project like this.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 With, with again, expertise and
2 experience, down on the second option, I think you
3 can minimize that--doing things, like you said
4 earlier, that if you're going to do an area analysis
5 you don't do it three times, once for fires, once
6 for floods, once for seismic, you know, maybe again
7 for some sort of bizarre high wind impact. And that,
8 you know, have to reiterate on your models, you
9 know, anyway.

10 MR. HUDSON: Okay. And the last slide,
11 slide 52, outlines our recent resource oriented
12 approach. This deal with, you know, whether or not
13 we want to do the project completely in house,
14 whether or not we want to utilize contractors.

15 And then, a third option, which has been
16 talked about at various points throughout our
17 discussion today, is a collaborative effort with
18 industry. Obviously the internal development
19 approach is, it provides convenient staff training
20 opportunities, which supports one of the, the, the
21 three high level objectives that we outlined in the
22 beginning.

23 It also, in some sense, make project
24 management easier, because you can redefine the

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 project scope and focus more easily. But at the same
2 time, we talked about the complicated nature of, of
3 the, you know, rotational assignments, potentially
4 having to provide some more oversight to ensure
5 consistency.

6 MEMBER BLEY: Yes, that makes me, when I
7 look at it, I'm surprised you say convenient staff
8 training opportunities. They might not be
9 convenient, but they might be the only way to really
10 gear up the staff. Might do something more with
11 that.

12 CHAIRMAN STETKAR: Effective staff
13 training opportunities.

14 MEMBER BLEY: Since I started babbling,
15 jumping the gun on you for contractors, you've
16 mentioned several times that the expertise isn't out
17 where it used to be, in the same amounts it used to
18 be, and that's a downside of trying to go with the
19 contractor.

20 MR. HUDSON: Some additional
21 disadvantages for the internal development approach
22 is that obviously we need to have dedicated internal
23 staff associated to, with the project. And that,
24 that can impact our capabilities to support some of

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 our core missions, you know, that the staff are
2 already engaged in a number of activities.

3 So we need to ensure that participation
4 in this project doesn't effect our ability to
5 accomplish our core mission. Talked some already--

6 MEMBER BLEY: But--just bouncing
7 something around. If, I know you've talked about it,
8 I expect you have. But you're going to need a
9 couple, at least, or three, certainly one but I
10 think you'll need more than one person, essentially
11 run it full time on this to keep, keep it all under
12 control and know everything that's going on. And, I
13 don't, you know, the people who would do that are
14 also people who are in great demand to do everything
15 else, so that's going to be tough one for you.

16 CHAIRMAN STETKAR: Anybody, the,
17 equivalent of that principal investigator--

18 MEMBER BLEY: Exactly. That's what he is,
19 that's what that person will be, is a principle
20 investigator.

21 CHAIRMAN STETKAR: It's, it's, it's the
22 conductor of the orchestra, and they--

23 MEMBER BLEY: That person will need, they
24 don't--

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: They don't need to
2 manage everything, but they need to know something
3 about everything.

4 MEMBER BLEY: And, and, and where all the
5 glitches are who's doing them and who's handling it.
6 And I, that's a really full time effort.

7 CHAIRMAN STETKAR: And some management,
8 you know, responsibility, because they make the
9 decision about, no, we're not going to go back and
10 change this model yet again because--we need to get
11 done with the project, so, that's--that is, that is
12 a full time job on a project like this. Marty, you
13 know, Marty, you know that.

14 MR. STUTZKE: Oh yes.

15 CHAIRMAN STETKAR: And if that's, that's,
16 that's the only--

17 MEMBER BLEY: In a sense, good manager to
18 help.

19 CHAIRMAN STETKAR: It's the only full
20 time job.

21 MEMBER BLEY: That's a good
22 Administrator, to help.

23 CHAIRMAN STETKAR: Because all of the
24 other ones, all of the other tasks, you know, don't,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 don't necessarily have to have that level of
2 involvement throughout the end to end project.

3 MR. STUTZKE: The advantage in my
4 position is I'm not allowed to touch money, I'm not
5 a qualified project manager under the NRC.

6 MEMBER BLEY: That's too bad. So you need
7 an Administrator, yes.

8 MR. STUTZKE: Yes, and we need a project
9 manager, with the contractual, you know, somebody's
10 got to sign the invoice and--

11 MEMBER BLEY: But the, the technical
12 decisions need to reside with a principal
13 investigator.

14 MR. STUTZKE: Yes, I was thinking about a
15 structure of a PM and a project engineer, it's what
16 we used to call them. But the technical--

17 MEMBER BLEY: Anybody that sounds like a
18 PI and a PM--

19 CHAIRMAN STETKAR: Industry does that, a
20 PI and a PM, the PM, that sort of thing, does the PM
21 stuff. Subdivides the excel spreadsheets so that you
22 can keep track of time line--

23 MEMBER BLEY: That was only in our little
24 organization.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: --twenty minute basis
2 rather than a forty minute basis.

3 MEMBER BLEY: Anyway, back to you. We're
4 sorry.

5 MR. HUDSON: Okay. That's quite all
6 right. The contractor development approach, we've
7 talked a lot about already. It's, it's our business
8 as usual, but we have some concerns about the
9 availability of, of the expertise, the necessary
10 expertise at the labs. And we've talked about the
11 project management aspect.

12 The third one, the collaborative effort
13 with industry is, these pros and cons I think are
14 relatively intuitive. It provides wide access to the
15 expertise, shared resource burden as, as we talked
16 about earlier. And it also promotes buying into the
17 project.

18 In a sense, some of the disadvantages
19 are that the project management becomes perhaps even
20 more complex. There may be some compatibility issues
21 with, with the software that's being used out in
22 industry versus what we have in use here at the NRC.

23
24 And finally, as more of a, the potential

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 for public perceiving that there's a lack of
2 independence if we're, we're working closely with
3 industry in this project.

4 MEMBER REMPE: I'd like to reiterate
5 another option, that is, the collaborative approach,
6 that internal, where you have individuals from
7 outside coming in with industry as well as the
8 laboratories or contractors.

9 MEMBER BLEY: Essentially augmenting the
10 staff here?

11 MEMBER REMPE: It's a training
12 opportunity for other organizations, and, at least
13 in the U.S., you know, maybe internationally.

14 MEMBER BLEY: Well, as you said, we did
15 that with international people who were actually
16 funded, essentially, on sabbatical to do something
17 and they were able to come and do useful work as
18 well as getting trained.

19 MEMBER REMPE: And the contractors I
20 think would--

21 MEMBER BLEY: Do the same.

22 MEMBER REMPE: --look at that
23 opportunity. That makes project management look--

24 MEMBER BLEY: Certainly from things we've

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 heard, some of the labs might be willing to do that,
2 too.

3 CHAIRMAN STETKAR: Have you had any
4 exploratory discussions with industry yet?

5 MR. HUDSON: You know, we, we have had
6 some informal conversations with some of the people
7 from EPRI. We introduced them to the project, you
8 know, provided some of the overview that we provided
9 earlier today in terms of, you know, the background,
10 our objectives, the vision.

11 But, so far we haven't really gone down
12 a detailed path of, of highlighting where the
13 opportunities for collaboration exist. We've
14 mentioned to them some of our thoughts on site
15 selection attributes and we expect that they're
16 going to be involved in, in further conversations on
17 that topic. But, at this point it's all been very
18 introductory.

19 CHAIRMAN STETKAR: I was just curious, in
20 the sense of, of any feedback you have about whether
21 there was an interest or an active disinterest in--

22 MS. LUI: Actually, actually, there is a
23 letter that, that was sent to us by NEI earlier this
24 calendar year. It was more in the context of looking

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 at standards development. In that letter, they
2 indicate that they are interest in supporting level
3 three PRA as a potential place where they can do a
4 lot of the pilots to test all the standards.

5 So, there, so there are looking at, they
6 are looking at the option and the possibility of the
7 level three PRA as saying, as a practical tool for
8 the industry. But from that point on, we have not
9 engaged any further discussion, but there is some
10 initial interest that has already been demonstrated,
11 or, additional uses that have been identified by the
12 industry.

13 CHAIRMAN STETKAR: But there hasn't been
14 any, any blatant negative feedback--

15 MS. LUI: Not point in time--

16 CHAIRMAN STETKAR: --you know, there's no
17 vested interest in participating because they don't
18 see the net, you know, the possible net benefit or
19 anything like that. Okay.

20 MR. HUDSON: Okay. That actually
21 concludes my discussion on this. I, you know, wanted
22 to talk about the specific challenge that we're
23 facing, and we appreciate the comments that you
24 provided just now that, we really thought that given

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 your, your experience and expertise, that you might
2 be able to share some insights in terms of these,
3 you know, these project management aspects that
4 we've been talking about here.

5 And, perhaps--

6 CHAIRMAN STETKAR: In, in terms, when,
7 when you, I mean you're obviously, you know, in the
8 planning phases here, but well along. You've talked
9 about at least what we heard in the level one, level
10 two sort of technical area that Don was talking
11 about, and to some extent Marty.

12 The, the elaboration of three sort of
13 options in terms of approach to doing it, you know,
14 in terms of status quo linking level one two three
15 models, for example, to the extent of, of fully
16 integrated dynamic models if I want to characterize
17 it that way.

18 You've, you've just talked about, from
19 project management perspective, you know, another
20 matrix of approaches, what do you plan to deliver to
21 the Commission? I mean, is this going to be one
22 huge, what is the scope that We're going to do and
23 how are we going to do it with just a large number
24 of different options?

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Or are you finally going to--

2 MR. HUDSON: Yes, that's exactly--

3 CHAIRMAN STETKAR: --coalesce things?

4 MR. HUDSON: That's exactly the challenge
5 that we're facing. We're trying to figure out
6 exactly how we're going to do that. And, the other,
7 the other element that we haven't really talked too
8 much at length about is, is the coordination with
9 the SOARCA. We're working with that team, moving
10 forward and there will likely have to be some
11 discussion about the relationship between the two
12 projects and how we're going to proceed with either
13 both the studies moving forward.

14 So, that's exactly the challenge that
15 we're facing right now, how, how do we best package
16 this information and present it to the Commission.

17 MEMBER BLEY: The, the SOARCA team
18 members must be on your working groups, yes? Or not.

19
20 MR. HUDSON: Well--

21 MEMBER BLEY: Some of them?

22 MR. HUDSON: --there, there's a separate
23 working group--there is a separate working group now
24 that consists of whole SOARCA team members and level

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 three PRA team members.

2 MEMBER BLEY: Oh, okay.

3 MR. HUDSON: That, that has, had some
4 initial discussions and then we're going to have
5 ongoing discussions about the relationship between
6 the two projects.

7 MEMBER BLEY: Okay. Good.

8 MR. STUTZKE: I mean, part of the
9 problem, what we originally had in mind was that
10 each working group would write some sort of an
11 attachment to the paper, with the options. And the
12 difficulty is, the options are so detailed
13 technical, you know, they aren't the policy sorts
14 of options that the Commission can act on.

15 And so, we thought they would not
16 resonate with four of five Commissions and the fifth
17 one probably has his own opinions about how things
18 ought to be done anyway. So, you know, we need to
19 back off from the more detailed sort of things, and
20 perhaps provide that with some backup or
21 supplementary--though we are kind of stumbling
22 around, but some of these options like this that Dan
23 had showed you earlier were attempts to, to
24 anticipate Commission, you know, it's like, why do

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you have to do everything at once? Why don't you
2 just go off into the level one.

3 Doesn't work, and there's technical
4 reasons why that doesn't work, or--you know, the
5 alternative is to internally select an option that
6 you all agree is, seems to make the most sense, and
7 just go, you know, fight that tooth and nail--

8 MR. STUTZKE: Yes, well--

9 CHAIRMAN STETKAR: And, and, and tell us,
10 you know, tell, tell you why that doesn't make
11 sense.

12 MR. STUTZKE: Right. No, ultimately, we
13 have to pick up, you know--

14 CHAIRMAN STETKAR: Yes.

15 MR. STUTZKE: --recommended option.

16 CHAIRMAN STETKAR: But not necessarily
17 one out of 27 permutations that--

18 MR. STUTZKE: Right.

19 CHAIRMAN STETKAR: --are presented.

20 MR. STUTZKE: Okay.

21 CHAIRMAN STETKAR: Do you have anything
22 more?

23 MR. HUDSON: That's all of the material
24 we had to present to you today.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: Any questions from any
2 of the members, on any of the material?

3 MEMBER BLEY: Appreciated the material
4 very much, and I'm glad to see--

5 CHAIRMAN STETKAR: I--I, I, I, I want to
6 go around the table, I have to ask for the input
7 from any of the members of the public who might be
8 here. Seeing none. Okay. And again, you know, thanks
9 a lot for the presentation. I think it was really,
10 really good. I learned a lot. And what I'd like to
11 do is go around the table and see if each of the
12 members have any kind of closing remarks or
13 observations or if you just thought of additional
14 questions. Since--

15 MEMBER REMPE: Since I'm the least
16 experienced you're going to start with me.

17 CHAIRMAN STETKAR: Since you're the
18 first, I'll start with--well, I looked over here,
19 and he's not a member, he--

20 MEMBER REMPE: I guess I'd like to, I
21 couldn't, but I think I heard you just say that just
22 knowing how, what I know of the system and how it
23 works, I would recommend that you strongly start
24 narrowing down on your preferred options, with some

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 vetting of exploring the feasibility of those
2 options, so you've got a good strong case when you
3 go forward with whatever you write up for the
4 Commission paper.

5 The other question I had was, the
6 process that, how, ACRS interacts with something
7 like this, when you go to the Commission does ACRS,
8 or do we, is the Subcommittee for ACRS report that
9 this meeting occurred?

10 CHAIRMAN STETKAR: We'll, we'll talk a
11 little bit more about that once we get around with,
12 because we want to talk a little bit more on where
13 we go forward, schedule, and other Subcommittee
14 meetings or full Committee meetings. So, we'll flesh
15 that out a little bit here. Dr. Bley?

16 MEMBER BLEY: Thank you. Yes, I'm
17 delighted to see all the work you guys have done,
18 and it's really exciting to see this moving ahead.
19 I've, just, reiterate the, I, I'd really like to see
20 more level three and things about uncertainty
21 integrated in the, from the beginning, where it can
22 have the most impact. But, good luck. Look forward
23 to seeing how this really turns into a Commission
24 paper, because you got to work these up a little

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 clearer and better and, that'll be interesting.

2 Thank you.

3 CHAIRMAN STETKAR: Dr. Kress?

4 DR. KRESS: I am also delighted to see
5 this. I would fully support it if I had any way to
6 do that. I think there's one Commissioner that might
7 fully support that, I hope he's on Board. George.
8 And, I'm really tickled to see you're planning on
9 capturing societal risks with this, because that's
10 been a miss, a missing part.

11 And I also would think about
12 uncertainties from the start. And, you know, there
13 are lots of details that I think I would input on,
14 like how you deal with a Gaussian approach and how
15 far out in distance do you calculate consequences.

16 There are details like that that, you
17 use the linear non threshold model, and there's all
18 sorts of questions like that I have. But, this is
19 not the time. Ray knows that. I think if it were me,
20 I'd pick an option that I like. And, you know, my
21 choice would be more like the scope option.

22 But, you know, it's up to you guys,
23 having a, you know how to deal with the Commission a
24 lot better than I do. I, like I said before, I

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 don't, I don't think I give much priority to the dry
2 cask issue, probably, hold, I would put that off for
3 last.

4 Well, I like what you're doing. I hope,
5 I hope it gets support. I don't even think it's a
6 needed, a needed--

7 CHAIRMAN STETKAR: Thank you. Thank you.
8 I don't particularly have anything to add
9 personally. I'd reiterate, what you've heard, that,
10 I think it is important to identify and enable a
11 level three working group because I think there may
12 be value, almost certainly will be value added in
13 doing that, just hoping that you can tack that on
14 the end, won't be, and the integrated, real
15 attention to integrated treatment of uncertainty
16 and, is important.

17 I think presentations were great. I
18 think they were really appreciate the time and
19 effort you put into this, because it's clear that,
20 it's clear you've done an awful lot of thinking,
21 that seems like there's a lot left to do, but to see
22 where you are, is, is actually quite encouraging.

23 With that, while we're still on the
24 record, it's, it's probably useful to discuss a

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 little bit about where do we go from here in terms
2 of our interactions. I think, I don't have the
3 schedule in front of me but I, I believe that we
4 sort of pigeonhole the date for the March full
5 Committee meeting, is that right, Christiana?

6 MS. LUI: I think that when we talk to
7 John Lai, he, he had, at that point in time, just
8 for a placeholder of was, understanding that even
9 the scheduling change that our preference is to
10 actually come to a full Committee and give a letter
11 with any, either at the same time or before the SECY
12 paper goes out to the Commission.

13 CHAIRMAN STETKAR: I was going to say,
14 when, when do you think that, the two questions I
15 have is, is, is there a need for another
16 Subcommittee meeting before a full Committee
17 meeting, and, and when do you think it's most
18 opportune to have a letter from the Committee to
19 support your efforts, or at least to understand
20 where, where the Committee--

21 MS. LUI: I, I think that--

22 CHAIRMAN STETKAR: --so, you know, it,
23 kind of back up, from your proposed schedule to see--
24 -

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MS. LUI: Right. I believe that we should
2 have another Subcommittee interaction.

3 CHAIRMAN STETKAR: Okay.

4 MS. LUI: Because during these
5 Subcommittee meeting, we share with you where we
6 stand right now. We have heard from your feedback
7 there are couple of actions that we need to take,
8 and in the next Subcommittee interaction we like to
9 come back to you regarding the particular option
10 that we're going to be potentially advocating. Put
11 that on the table and explain our rationale.

12 CHAIRMAN STETKAR: That sounds like a
13 good plan.

14 MS. LUI: Right. And then, and then, and
15 then we can go forward to the full Committee and you
16 can write a letter, the, on the position that we
17 going to be taking. I think that if we can maybe
18 meet, Subcommittee rather than, I mean, rather than
19 March full Committee, March full Subcommittee and I
20 don't know whether April, there will be a full
21 Committee meeting.

22 CHAIRMAN STETKAR: Okay.

23 MS. LUI: That may, that may actually be
24 a little bit better for everybody.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: That's, that's, that's
2 probably, if, if that's, if that's amendable to you,
3 we should probably work on that, talk to John and
4 see what we can work in the schedule. I, I had a bit
5 of a fear that you might say, well, you really
6 needed a letter form the March full Committee and we
7 wanted to have a Subcommittee meeting before then,
8 and, and that, that could create problems. We're--

9 MS. LUI: Yes, I, I understand that--

10 CHAIRMAN STETKAR: Our, we're here, our
11 scheduling is, is already well out into February,
12 so--

13 MS. LUI: Yes, absolutely. And--

14 CHAIRMAN STETKAR: That might, that might
15 make sense.

16 MS. LUI: Right. Because if our SECY
17 paper is not due to a Commission until the end of,
18 end of, end of June, beginning of July, then that
19 will give you the opportunity to finalize your
20 letter, your main meeting.

21 CHAIRMAN STETKAR: Right. Right. Right.
22 Right. Right.

23 MS. LUI: Assuming that we go forward
24 with the March April and May time frame.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN STETKAR: Yes. Yes. That sounds,
2 that sounds like it's a good plan, so.

3 MS. LUI: And clearly, that will be, I
4 mean, we'll definitely want to share our draft SECY
5 paper and write full and with you so that you get a
6 heads up regarding where we're going so that we can
7 continue to work in a coordinated fashion, that way
8 there will be no surprises and hopefully that, the
9 full Committee is not going to come out with a
10 letter saying, staff, we're totally on the wrong
11 path.

12 CHAIRMAN STETKAR: We are only a
13 Subcommittee. We don't speak for the full Committee.
14 So, we can't predict what the full Committee will
15 say.

16 MS. LUI: I, I understand that. And at
17 same time, we want to have at least some level of
18 confidence that we are indeed on the right path.

19 CHAIRMAN STETKAR: Right. Well, good.
20 Let's, as I said, talk, you know, get in touch with
21 John, see if we can carve out those dates for both
22 Subcommittee and at least get us into the
23 preliminary planning stages for the full Committee
24 and we'll work sort of on that time schedule.

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Anything else from anyone? Well, again,
2 I'd like to thank everybody for the presentation. It
3 was very informative, really good. And with that, we
4 are adjourned.

5 (Whereupon, the above-entitled matter
6 went off the record at 4:53 p.m.)

7
8
9
10
11

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701



Planning for a New Site Level 3 PRA

Office of Nuclear Regulatory Research (RES)
Division of Risk Analysis (DRA)

November 17, 2010



Project Planning

Dan Hudson

Project Manager

Technical Assistant, RES/DRA

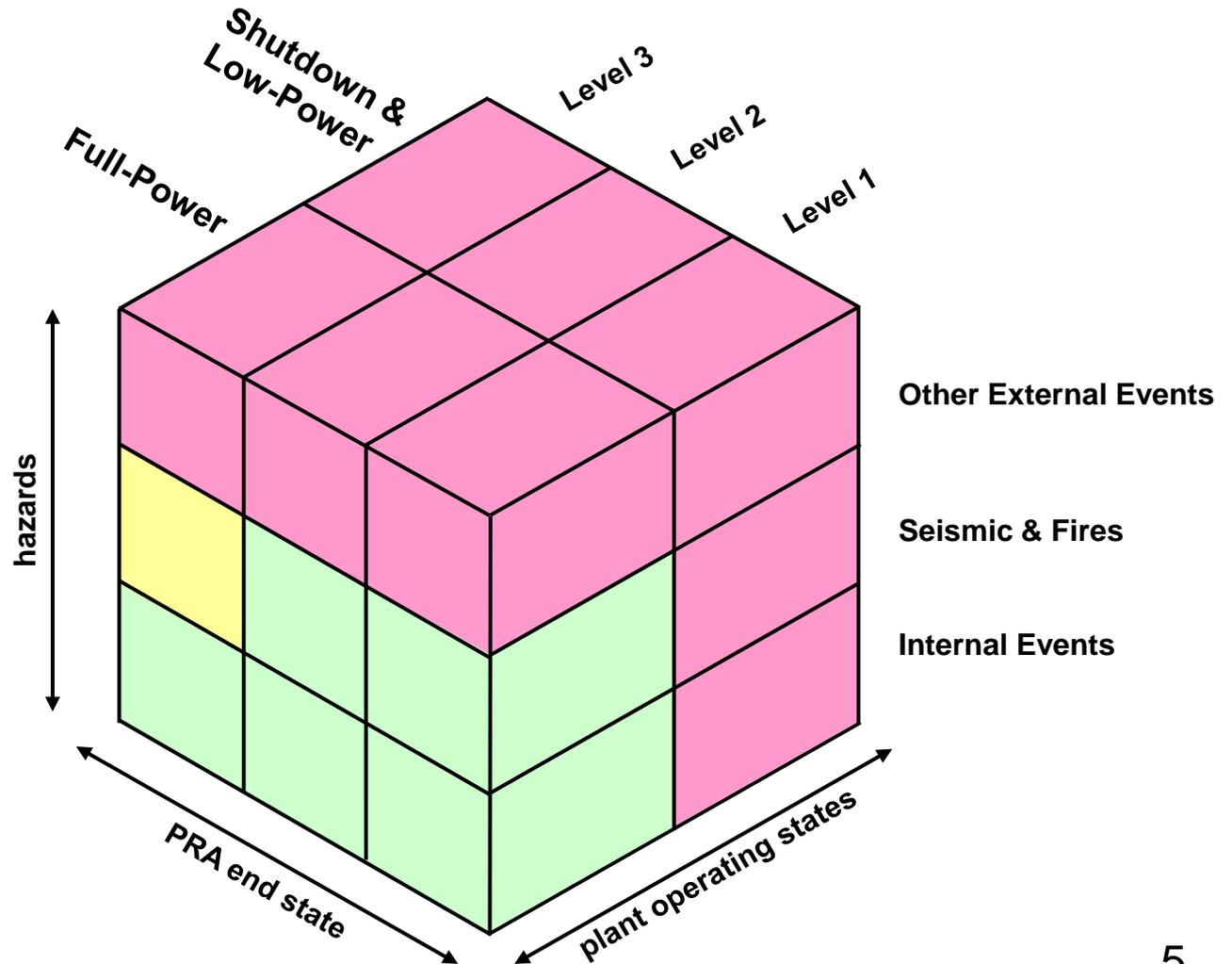
Agenda

- Project Planning
 - Background
 - New site level 3 PRA objectives and vision
 - Commission tasking
 - Scoping study
- Technical Approach
 - Considerations
 - Scope
 - Risk metrics
 - Perspectives on future uses of level 3 PRAs
 - Site selection options
 - Insights from technical working groups
 - Documentation
 - Staff Training Opportunities
- Level 2 PRA and Interface to Level 3 PRA
- Developing Options for Proceeding

Background

- The last NRC-sponsored level 3 PRAs were conducted over 20 years ago
- NUREG-1150, “Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants.”
- NUREG-1150 Objectives:
 - To provide a snapshot in time (circa 1988) assessment of the severe accident risks of five nuclear power plants of different design
 - To summarize the perspectives gained in performing these risk analyses, and
 - To provide a set of PRA models and results that can support the ongoing prioritization of potential safety issues and related research.

NUREG-1150 Scope



The scope of NUREG-1150 is indicated by the green and yellow boxes.

Background

- Changes since NUREG-1150:
 - Advances in PRA Technology
 - Plant changes affecting risk:
 - Technical specifications
 - Allowed outage times
 - Surveillance test intervals
 - Power uprates
 - Risk-informed regulations, such as:
 - Station Blackout Rule, 10 CFR 50.63
 - Maintenance Rule, 10 CFR 50.65
 - Accident management strategies
- Integration of reactor and non-reactor risk

New Site Level 3 PRA: Objectives

- Update and improve our understanding of nuclear power plant site accident risk
- Develop a “risk analysis toolbox”
- Provide staff training opportunities

New Site Level 3 PRA: Vision

- Comprehensive
 - All radiological hazards
 - All plant operating modes
 - All causes of initiating events
 - Multi-unit effects
- State-of-the-Art
 - Current best practice, as appropriate
 - Use of more recent information, experimental results, and methodology developments
- Integrated
 - Common assumptions, methods, and data
 - Meaningful relative ranking of risk contributors
 - Conformance with staff endorsed PRA standards
- 21st century documentation
 - Project results, methods, models, tools, and data
 - Support for a wide variety of regulatory applications

Commission Tasking

- February 2010: Commission briefing
 - RES proposed to initiate planning for a new Level 3 PRA
- March 2010: Commission issued SRM to express conditional support and to direct the staff to:
 - Continue internal coordination efforts
 - Engage external stakeholders
 - Provide options for proceeding which include costs and perspectives on future uses

Scoping Study: Purposes

- Develop options for Commission consideration
- Develop perspectives on futures uses
- Identify and screen candidate sites
- Investigate documentation approaches
- Develop staff training approaches

Progressively Staged Approach



Scoping Study: Working Groups

- Level 1 PRA and interface to Level 2 PRA
- Level 2 PRA and interface to Level 3 PRA
- Other (than internal events) hazard groups PRA
- Spent fuel and other non-reactor PRA
- Human reliability analysis
- 21st century documentation
- SECY paper integration and oversight

Scoping Study: Working Groups

- Identify activities needed to complete a new site level 3 PRA
- Identify candidate methodologies
- Identify relevant completed and ongoing research
- Assess data and information needs
- Identify technology and information gaps
- Recommend an optimal approach
- Estimate schedule and resources
- Capture the basis for decisions

Scoping Study: Key Activities to Date

- March 2010: Regulatory Information Conference (RIC) presentation and panel discussion
- April 2010: Scoping study kickoff workshop
- May-September 2010: Internal working group meetings and coordination
- October 2010: Coordination with SOARCA and alignment of schedules

Scoping Study: The Path Forward

- November 2010: ACRS Subcommittee meeting
- Fall-Winter: Draft Commission paper
- Late Winter-Early Spring: Public meeting
- March 2011: RIC poster presentation
- Spring: Further ACRS interactions
- June-July 2011: Commission paper due



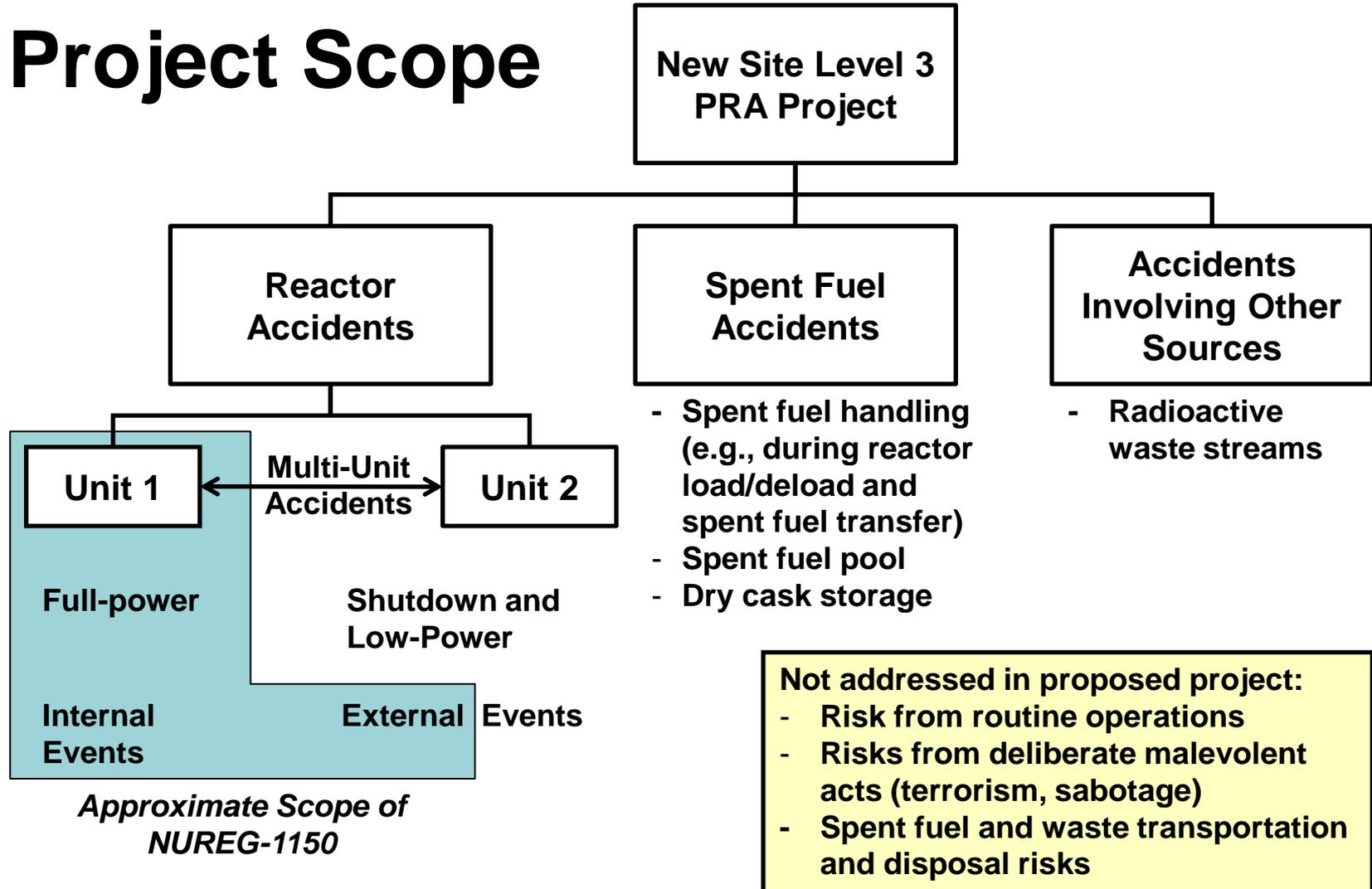
Technical Approach

Marty Stutzke

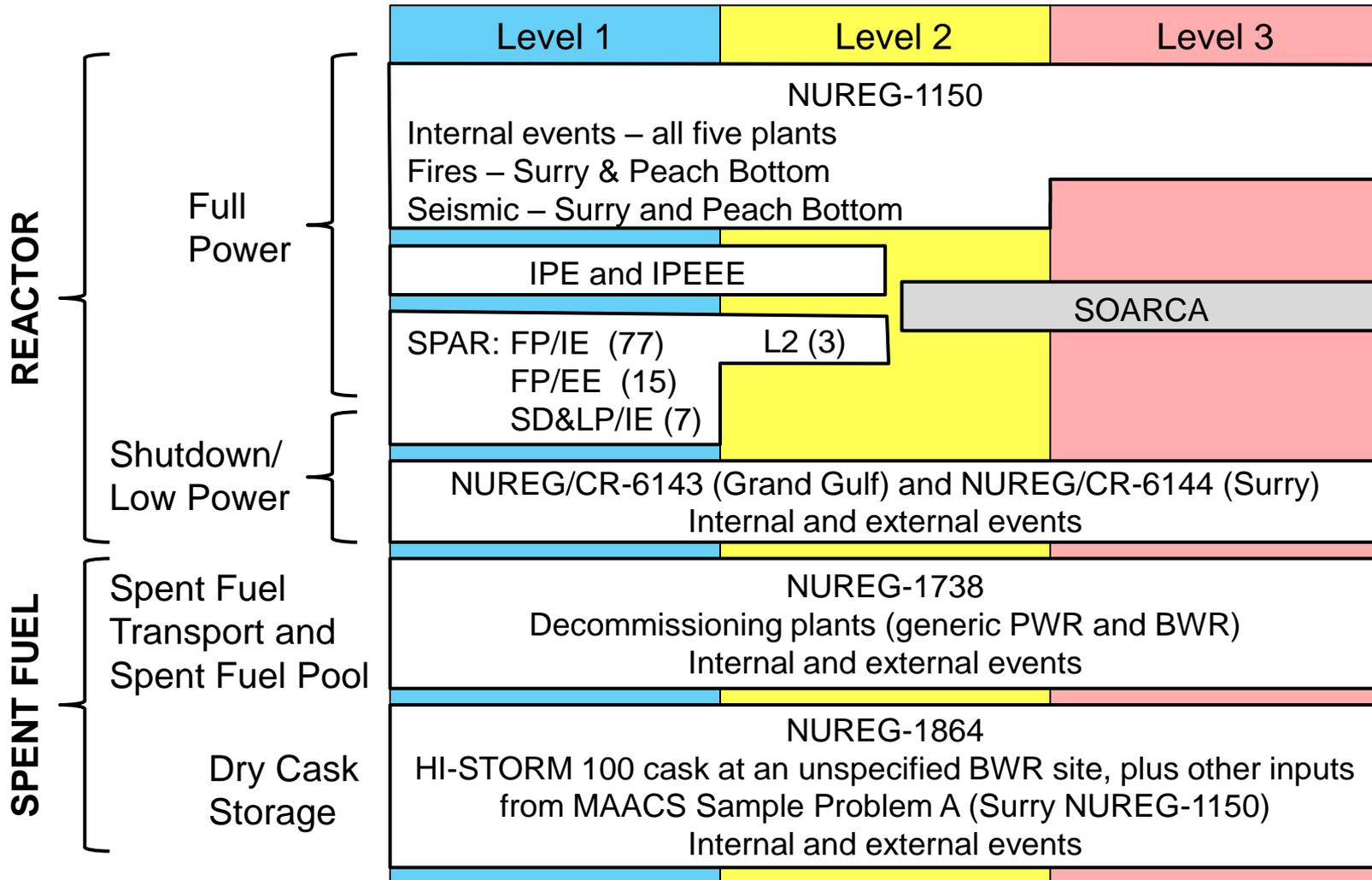
Technical Monitor

Senior Technical Advisor for PRA Technology, RES/DRA

Project Scope



Previous PRA Projects



Risk Metrics Under Consideration

- Related to the Commission's Safety Goals
 - Individual early fatality risk (0-1 mile)
 - Individual latent cancer fatality risk (0-10 miles)
- Other Possibilities
 - Early fatality risk
 - Latent cancer fatality risk
 - Person-rem risk (0-50 miles)
 - Land contamination risk
 - Offsite economic cost risk
 - Worker risk (may be important for non-reactor risks)
- Risk Surrogates
 - Reactor
 - Core-damage frequency
 - Large early release frequency
 - Large release frequency
 - Non-Reactor
 - Being developed by NMSS

Perspectives on Future Uses of Level 3 PRA

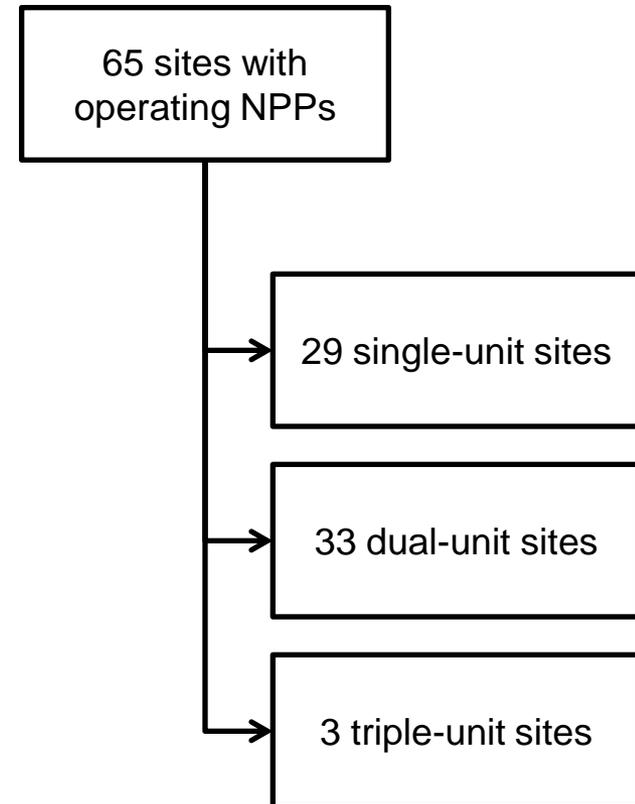
- Better understand the risk significance from the various contributors in an integrated fashion
- Development and calibration of surrogate risk metrics.
- Assessment of multi-unit risks (e.g., a large seismic event)

Site Selection Options

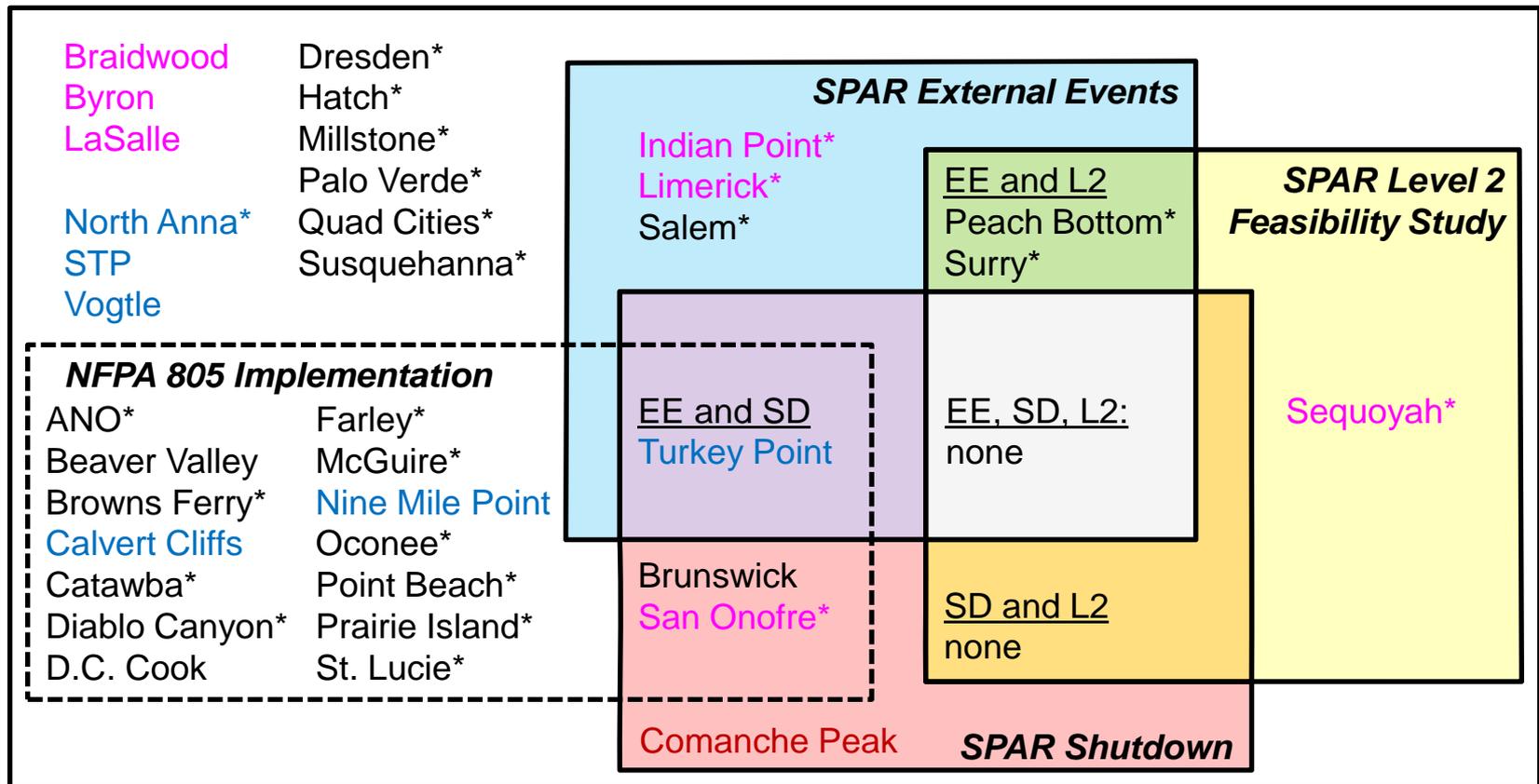
Options	Pros	Cons
Select a site that has previously been studied	<ul style="list-style-type: none"> • Allows comparison to previous studies • Somewhat reduces information and data gathering effort 	<ul style="list-style-type: none"> • Difficult to understand why PRA results change (methods vs. plant changes) • Potential public perception issue
Select a new site	<ul style="list-style-type: none"> • Diversifies NRC's suite of PRA models and results • Promotes in-depth understanding of PRA methods, uncertainties, and limitations 	<ul style="list-style-type: none"> • Must start information and data collection from scratch • May be difficult to solicit licensee participation

Some Site Selection Attributes

- PRA objectives and scope
- Number of units
- NSSS design
- Containment design
- SPAR models for external events, shutdown risk, and Level 2
- NFPA 805 plant
- License renewal status
- Proposed new plant on site
- Spent fuel pool design
- ISFSI
- Quality of the licensee's PRA
- Industry volunteers



Multi-Unit Sites: Existing Information



Legend: No LR or COL LR only COL only LR and COL *ISFSI

Multi-Unit Sites: Spent Fuel Pools

- **Connected: 7 sites**
 - Separate pools for each reactor that are connected via transfer tubes
- **Individual: 19 sites**
 - Separate pools for each reactor
- **Special: 2 sites**
 - Units 1 and 2 are share a single pool; Unit 3 has a separate pool
- **Shared: 8 sites**
 - Single pool that is common to all reactors

Perspectives on Site Selection

- There is no ideal site from the perspective of existing information.
- It is difficult to draw generic conclusions from a single site PRA study:
 - Variations in the site's location
 - Selection of external events
 - Factors that affect the consequence analysis
 - Variations in plant design and operation

Level 1 PRA Working Group

- Start with existing SPAR model vs. start with licensee's PRA model?
 - The resources needed to complete the project appear to be more driven by:
 - The specific site that is selected
 - Level of NRC and licensee cooperation
- Need to address SPAR peer review findings.
- Incorporate latest support system initiator modeling.
- Incorporate LOOP and SBO recovery modeling.
- Interface with Level 2, external events, and HRA may necessitate changes/enhancements to the existing Level 1 SPAR model.
- Concerns about availability of support contractors.

External Event Considerations

- The risk from all external hazard groups applicable to the specific site should be quantified.
 - The “Big Three:” Internal floods, internal fires, seismic events
 - Other: High winds, tornados, external floods, etc.
- Implementation concerns:
 - Availability of plant-specific information.
 - Willingness of licensee to share information.
 - Limited availability of specialized expertise needed for each hazard group.
 - Need to effectively coordinate the individual external event analyses among themselves, and also with the internal events analysis.

External Event Methodology

- In general, PRA techniques, models, and software exist to adequately model all external hazards in a consistent manner.
- Development work needed to extend methods to:
 - Level 2 PRA (e.g., containment structure and systems)
 - Level 3 PRA (e.g., evacuation)
 - Shutdown and low power plant operating states
 - Non-reactor risks (e.g., spent fuel pool)

HRA Working Group

- Many approaches, detailed and simplified, for full-power, internal events Level 1 HRA.
- NUREG-1921 addresses post-initiator HFES for fires (includes a screening approach, a simplified HRA approach, and two detailed HRA approaches).
- Some previous work for:
 - Shutdown and low power HRA (e.g., NUREG/CR-6144, international work being done by WGRisk, preliminary SPAR model development, and qualitative approaches such as NUREG/CR-6093 and NUREG/CR-6265).
 - Spent fuel handling (NRC and EPRI studies, SNL qualitative work to be published in 2010, Yucca Mountain application).
- No studies identified for the following hazards:
 - Level 2
 - Level 3
 - Seismic events
 - Internal floods
 - High winds
 - Other external events

Non-Reactor Risk: Considerations

- Spent fuel pools have variable quantities of radioactive materials:
 - Spent fuel pool configuration (individual vs. shared vs. connected)
 - Life of the plant (amount of fuel in the pool)
 - Timing of the event (radioactive decay)
- There are a variety of cask designs in use
- Risk is affected by fuel design (PWR vs. BWR)
 - Should we consider MOX fuel?
- HRA methods for cask loading, transfer, and storage operations?
- Feasibility study for the need to include non-spent-fuel risks into the NSL3 PRA?

Non-Reactor Risk Methodology

Technical Elements

- Initiating events
- Data analysis
- HRA
- Structural analysis
- Accident sequence analysis and accident progression
- Success criteria and T/H analysis
- Source terms
- Consequence analysis

Notes

- No PRA standards:
 - Some portions of reactor PRA standards may apply
 - IAEA-TECDOC-1267
- Existing PRAs for spent fuel pool storage are at least 10 years old.
- Need for ACRS and/or peer review on interim work products?

21st Century Documentation

Minimum Requirements

- Meet agency recordkeeping requirements in MD 3.53
- Retain all information need to reproduce results
- Create an electronic version of all information
- Adhere to documentation requirements in RG 1.200 and NRC-endorse PRA standards
- Security
- Distribution
- Version controls

Goals

- Record deliberations
- Usability (easy to enter and retrieve information)
- Longevity
- Thoroughness
 - What type of documentation are required?
 - What level of detail is required?
- Collaboration
- Openness and transparency

Documentation Practices

- General practices
 - Electronic versions of all information
 - Deliberations should be captured when possible
 - Record virtual meetings; keep minutes of real meetings
 - Utilize naming conventions
 - Utilize storage locations
 - Utilize version control and editing practices
- Planning and Decisionmaking
 - The bases for plans and decisions must be captured
 - Since this is a new aspect of project documentation, specific expectations will be established for the project team to consider the factors and planning and decisionmaking and record them.

We are considering the need for a Documentation Coordination Committee.

Staff Training Opportunities

- Options for maximize staff training during the project?
 - Do some work in-house
 - RES, NRR, NRO, NSIR, NMSS, Region participation
 - Rotational assignments
 - Detail staff to contractors
 - Seminars and workshops
- Which staff should participate?
- How do we ensure that our safety mission is not compromised during the project?
- How do we measure success?



Level 2 PRA and Interface to Level 3 PRA

Don Helton

Senior Reliability & Risk Engineer, RES/DRA

Modeling Techniques for Level 2 PRA

Background

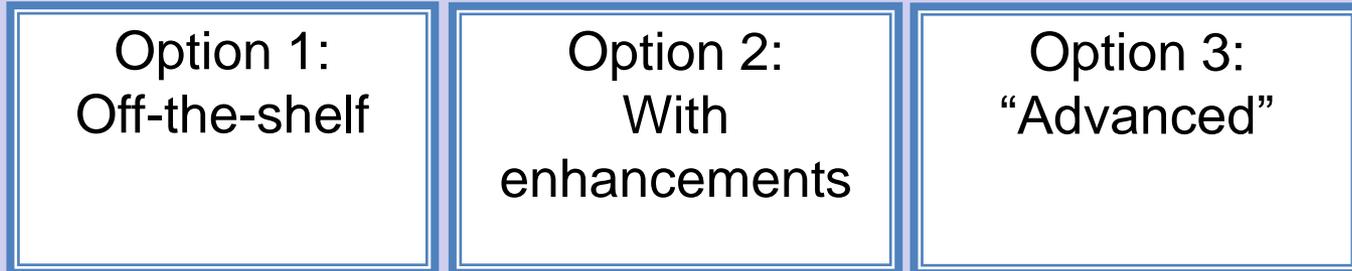
- 3 SPAR feasibility models assembled by INL/BNL in 2002 to 2008
 - Have a number of strengths and weaknesses (e.g., lack of independent validation)
- SAPHIRE 8 has enhanced Level 2 PRA capabilities
 - E.g., handling of decomposition event trees
 - Whether these capabilities are sufficient depends on the targeted end uses
- MELCOR is the appropriate deterministic accident progression tool
- “Advanced” dynamic method under development is promising, but not suitable for a full-scope PRA
 - Intended for greater realism for limited-scope applications
 - Too labor / computationally intensive

Modeling Techniques for Level 2 PRA

The three proposed high-level options

- Option 1: Contemporary Level 2 akin to Level 2 SPAR feasibility models
- Option 2: Enhanced contemporary Level 2 model
- Option 3: Quasi-dynamic event tree model

Scope comparison: this project vs. a PRA standard



- Increased level-of-effort
- Increased complexity
- Increased specificity
- Increased use of state-of-the-art tools
- Increased realism

Modeling Techniques for Level 2 PRA

Technology gaps and weaknesses

- Consensus standard under development
- Characterization of SSCs following external hazard initiating events
- Level 2 HRA - no consistent model for treating SAMGs
- Incomplete mechanistic models for some lower probability phenomena (e.g., hydrogen detonation)
- Consistent treatment of uncertainty
- Equipment survivability under severe conditions (for realism)

Modeling Techniques for Level 2 PRA

Integration and Other Thoughts

- Most existing models/methods are focused on being comprehensive (in terms of sequences) and are partial Level 2 PRAs (LERF-only)
 - Driven by risk-informed licensing process
 - Realism versus completeness
- Realistic plant damage state binning hinges on good Level 1 success criteria / HRA treatment
- Circa NUREG-1150, there were no accident management programs
 - Even now, SAMG incorporation in to Level 2s is ad hoc
- Tighter coupling between Level 2 PRA phenomenological analysis, system/structure environmental response, event tree construction, and operator actions
- US expertise has become fragmented
 - Effectively accessing and utilizing this expertise could be a challenge



Developing Options for Proceeding

Dan Hudson

Project Manager

Technical Assistant, RES/DRA

Developing Options for Proceeding

- Still considering how best to present the Commission with high level options for proceeding.
- Approaches under consideration:
 - Schedule-oriented approach
 - Scope-oriented approach
 - Resource-oriented approach



Questions?

BACKUP VIEWGRAPHS

Uses of NUREG-1150 Beyond Its Stated Purpose

- Risk-informed rulemaking:

New Siting Criteria

10 CFR 100.20

61 FR 65157

December 11, 1996

Alternative Source Terms

10 CFR 50.67

64 FR 72001

December 23, 1999

Combustible Gas Control

10 CFR 50.44

68 FR 54141

September 16, 2003

- Cited in the Commission's PRA Policy Statement [60 FR 42622], August 16, 1995
- Used to establish acceptance guidelines for risk surrogates (CDF, LERF) based on the QHOs:
 - RG 1.174
 - SDP thresholds
 - Regulatory analysis (NUREG/BR-0058)
 - MD 6.4 (Generic Issues Program)

Alignment With IT Roadmap

Function	Requirement/Goal	Direct	Indirect	Example
Store and secure documents	<ul style="list-style-type: none"> • Meet agency requirements • Longevity • Security 	X		<ul style="list-style-type: none"> • ADAMS • SUNSI reviews
Store software-related information from raw data to model output	<ul style="list-style-type: none"> • Retain all information needed to reproduce results • Longevity 		X	<ul style="list-style-type: none"> • NRC LAN • Obtain all data and codes from contractors
Foster open collaborative environment	<ul style="list-style-type: none"> • Collaboration • Openness and transparency 	X		<ul style="list-style-type: none"> • Sharepoint
Capture the deliberation process	<ul style="list-style-type: none"> • Record deliberations 		X	<ul style="list-style-type: none"> • Sharepoint discussion • Email into ADAMS • Wiki

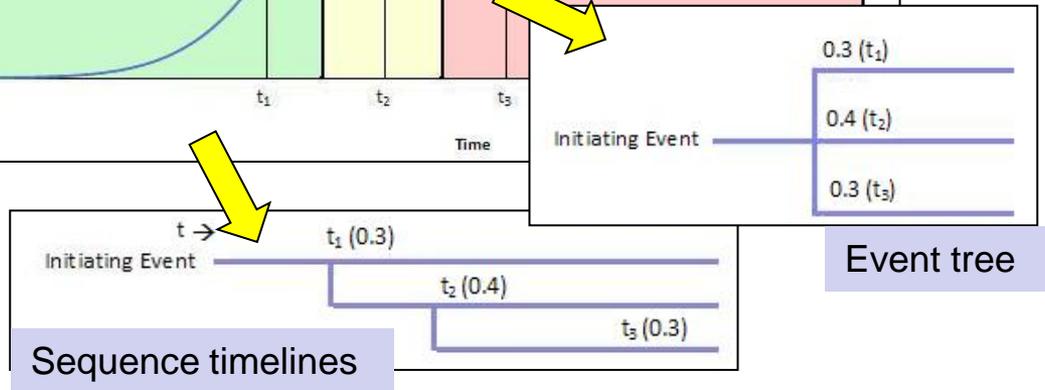
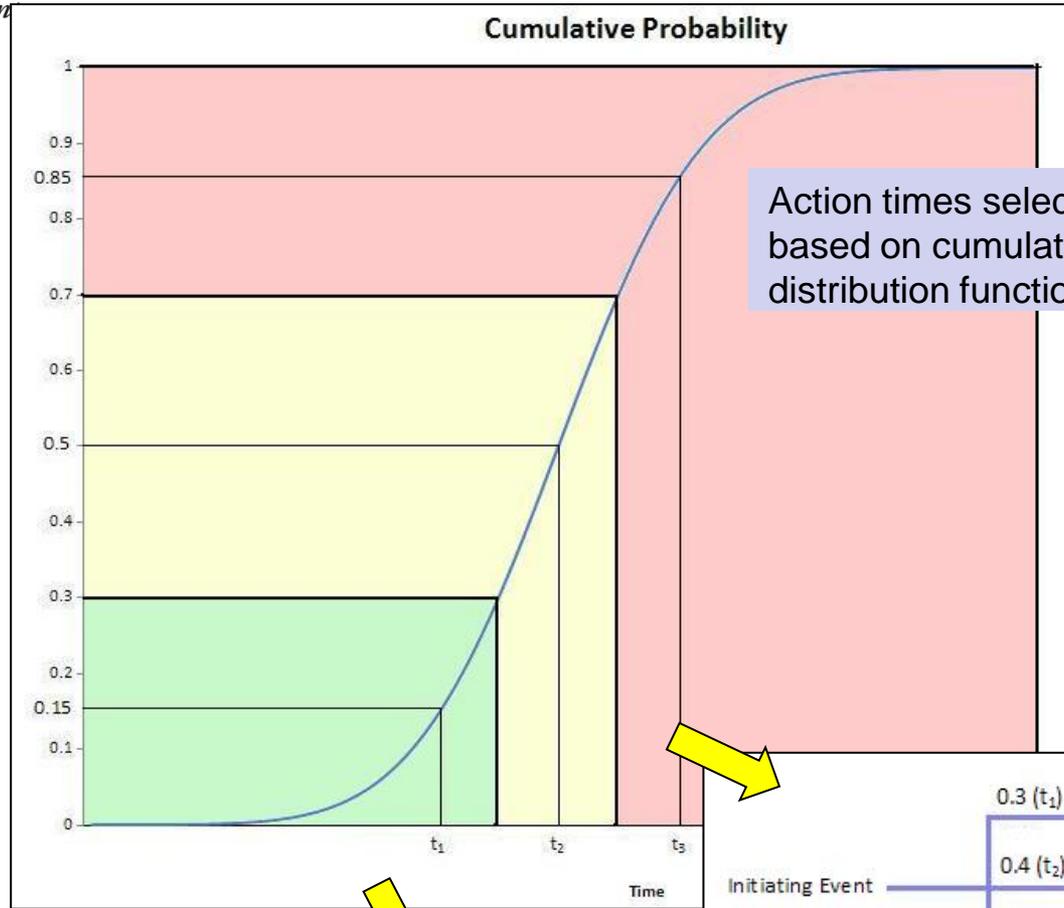
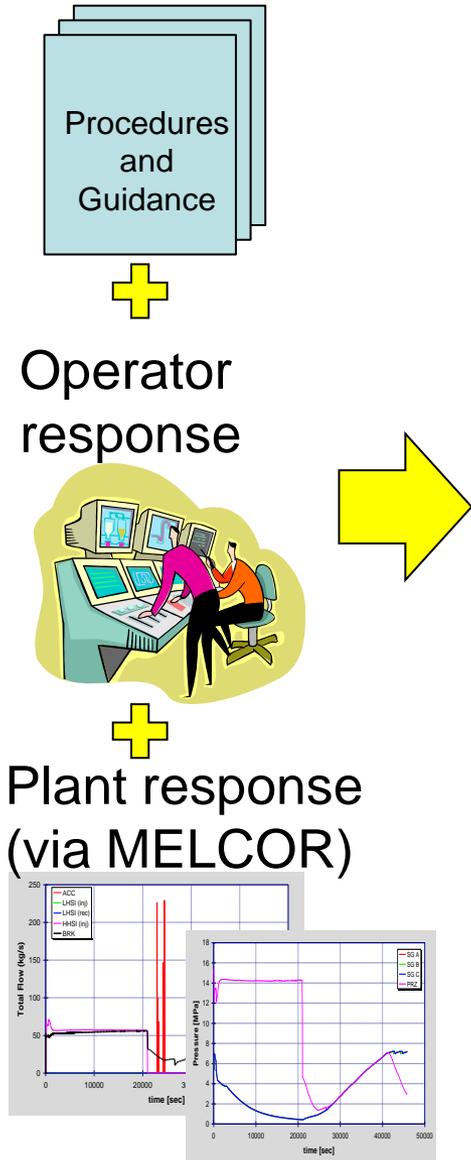
Alignment With IT Roadmap (Con't.)

Function	Requirement/Goal	Direct	Indirect	Example
Collaborative document preparation and review	<ul style="list-style-type: none"> • Version control • Collaboration • Usability 	X		<ul style="list-style-type: none"> • ADAMS • Sharepoint
Provide interface to easily retrieve and review information	<ul style="list-style-type: none"> • Usability • Thoroughness • Version control 		X	<ul style="list-style-type: none"> • Web-based retrieval system • Wiki
Produce documentation in formats that can be easily shared	<ul style="list-style-type: none"> • Longevity • Distribution • Openness and transparency 	X		<ul style="list-style-type: none"> • MS Office • OpenDocument Format • XML
Organize information in standard taxonomy	<ul style="list-style-type: none"> • Usability • Thoroughness 	X		<ul style="list-style-type: none"> • Single repository organized by standard taxonomy that relates to the type of data being stored

High-level comparison of the 3 options

Sub-element	Option 1	Option 2	Option 3
Starting point	Existing licensee PRA LERF or Level 2 mode		Product developed under Option 2
Completeness	All Level 1 cutsets		All L1 cutsets (treated under Option 2) + further analysis of significant sequences
Iteration on Level 1 model	None	Limited	Explicit re-visiting for significant sequences
Approx. # of PDS bins	10 – 20	40 – 60	No (or minimal) binning for significant sequences
Structural	Rules of thumb / existing sources	Generic or simplified finite element model	Plant-specific, detailed finite element model
Operator Actions	Scoping approach	Context-informed for important HEPs	Context-derived for significant sequences
Event tree / deterministic simulation interplay	MELCOR-informed	MELCOR-derived	Coupled, for significant sequences
Approx. # of release categories	10 – 20	100 – 200	TBD based on results

Option 3 branching cartoon

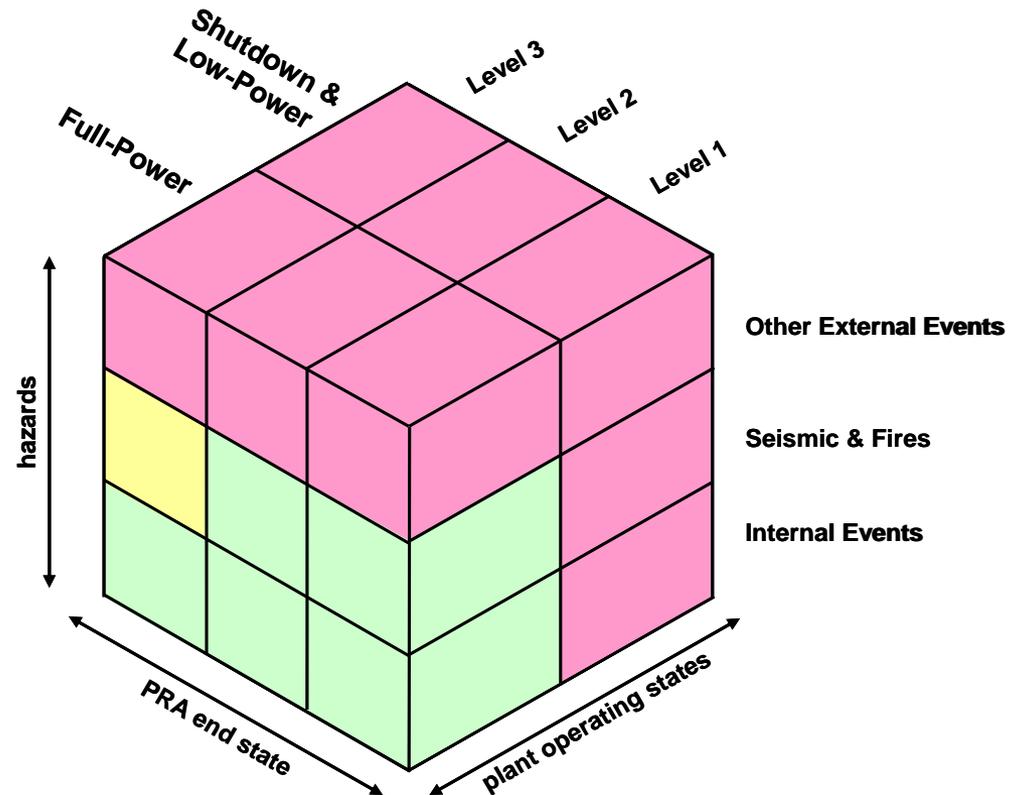


Schedule-Oriented Approach

Options	Pros	Cons
Do not develop new site Level 3 PRA	<ul style="list-style-type: none"> • Supports current budget climate 	<ul style="list-style-type: none"> • No input for policy decisions • No further PRA capabilities
First develop/improve methods; then develop new site Level 3 PRA	<ul style="list-style-type: none"> • Addresses existing gaps • Achieve better understanding of budget and schedule requirements 	<ul style="list-style-type: none"> • May never complete the full scope Level 3 PRA
Concurrent approach – start new site Level 3 PRA and simultaneously address existing gaps	<ul style="list-style-type: none"> • Ensures project gets started 	<ul style="list-style-type: none"> • Potential for rework as new insights are gained

Scope-Oriented Approach

- Relates to options for proceeding through the “reactor risk cube” to complete a full-scope Level 3 PRA.
- **NOTE**: Similar cubes would exist for other radiological hazards.



Scope-Oriented Approach (cont.)

Options	Pros	Cons
<p>First develop Level 1 PRA for internal and external events; then add Level 2 and Level 3 analyses</p>	<ul style="list-style-type: none"> • Fastest near-term benefits for NRR and NRO 	<ul style="list-style-type: none"> • Delays quantitative comparison of reactor and non-reactor risks
<p>First develop Level 1, Level 2, and Level 3 PRAs for internal events; then develop external events</p>	<ul style="list-style-type: none"> • Fastest way to quantitatively compare reactor and non-reactor risks and to consider multi-unit effects 	<ul style="list-style-type: none"> • Sequencing causes potential for rework when external events are considered

Resource-Oriented Approach

Options	Pros	Cons
Internal Development	<ul style="list-style-type: none"> • Convenient staff training opportunities • Can easily redefine project scope and focus 	<ul style="list-style-type: none"> • Needs dedicated project staff • May impact capability to support core mission
Contractor Development	<ul style="list-style-type: none"> • Business as usual 	<ul style="list-style-type: none"> • Lacks convenient training opportunities • Complex project management • Lab availability
Collaborative Effort with Industry	<ul style="list-style-type: none"> • Wide access to expertise • Shared resource burden • Promotes buy-in 	<ul style="list-style-type: none"> • Complex project management • Software compatability • Lack of independence