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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

REACTOR DECOMMISSIONING RISK WORKSHOP

Holiday Inn Hotel
2 Montgomery Village Avenue
Gaithersburg, MD

Thursday, July 15, 1999

The above-entitled workshop commenced, pursuant to notice,
at 8:08 a.m.

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P R O C E E D I N G S

[8:08 a.m.]

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3 MR. CAMERON: Good morning everybody. My name is Chip
4 Cameron. I'm the special counsel at the Nuclear Regulatory Commission
5 for Public Liaison. And I'd like to welcome you to our public workshop
6 on risk issues related to the spent fuel pool at the decommissioning
7 plants. And the staff has -- the NRC staff has asked me to serve as the
8 facilitator for today's session. And in that role, I'm going to try to
9 assist all of you in having a more effective meeting. And some of my
10 goals, in that regard, are:

11 One, to help you keep the discussion relevant and focused,
12 and there's a number of aspects to this goal. We want to try to keep
13 the discussion focused on the agenda topic that we're on at the
14 particular time. There may be other items that surface that are more
15 appropriate for discussion in another part of the agenda or perhaps even
16 in another process that we might use. I'm going to keep track of those
17 items on that flip chart, which I'm going to call the "paddock." You may
18 have heard that referred to as the "parking lot." But, we'll circle
19 back, from time to time, to make sure that we pick up those issues at
20 the appropriate time.

21 Another aspect to the focused and relevant goal is to try to
22 develop what I call discussion threads on a particular topic, rather
23 than an unrelated monologue, where we just jump from one issue to
24 another. So, we'll do that to the extent practical. That may be --
25 that may be a challenge.

Now, my second goal would be to make sure that our
discussions are as clear as possible. So, I will be asking you, from
time to time, to explain your statements and also to provide a rational
for your conclusions, so that everybody can understand the basis for
what you're saying.

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1 A third goal is to develop solutions to the issues that
2 we're going to be talking about. So, I would urge you to listen to each
3 other and try to develop constructive comments on the issues today. And
4 there are going to be several places on the agenda that we're going to
5 summarize any actions that should be taken by the NRC, by the industry,
6 possibly by others. And I will be keeping track of those on these flip
7 charts up here. And I'm hoping that we'll have these charts -- we'll
8 have something on these charts by the end of the two days.

9 And a final goal is I want to make sure that all of you have
10 an opportunity to speak, including the audience. And we will be going
11 out to those of you in the audience, who may have a comment on the
12 discussion topics at the end of each topic. The focus of the discussion
13 is going to be up here at the table. And I think it's particularly
14 important to note that we do have NRC presentations on issues; we do
15 have some folks from the industry that are going to be making
16 presentations on the issues and, of course, they're going to be in the
17 discussion. But, we do have representatives of the public, citizen
18 groups here with us today, and we want to make sure that their thoughts,
19 their perspectives are reflected in our discussions today. In a minute,
20 we'll be going around and doing some introductions and you'll be able to
21 get to meet everybody.

22 Ground rules are fairly simple. You have name tents. These
23 are, you know, name tents. That's something that is sort of an obscure
24 fact. But, you have those in front of you. Hopefully, it has your name
25 on it. But, even if it doesn't, if you want to say something, okay, put
your name tent up like that. That relieves you of the burden of having
your hand up all the time and it lets me know who wants to speak. And
what I'll do is I'll call on you and at the beginning, if you could just
& give your name, until John, our stenographer, gets to know you and where
you're seated around the table. This will help us get a clean

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1 transcript of this meeting. We are keeping a transcript. That
2 transcript will be available to the Commission for their deliberations.
3 And in a minute, we'll be talking about how information from this
4 meeting is going to go to the Commission.

5 And when I go to the audience, if you have something to say,
6 you can either go to one of these standing mikes or I'll bring you this
7 talking stick and just state your name and affiliation, if appropriate;
8 let us know where you're from.

9 We have a little bit of a challenge that I'm sure we can
10 work with at the front table. The black mikes are the mikes for the PA
11 system here and the other microphones you see only go into the
12 stenographers recording. So, you need to speak into the black
13 microphones. You'll see that there aren't really that many mikes around
14 the table, then. So, we're going to have to be doing some mike passing.
15 And John suggested that we pass the hat for contributions in the
16 audience to get some more money to get some more microphones. So, if
17 you see a hat in front of you, just throw, you know, five or ten dollars
18 in, whatever you want.

19 But, at any rate, just to give you an agenda overview,
20 before we get to introductions, we're going to start off with some
21 opening remarks from Stu Richards and from Mike Meisner. Gary Holahan,
22 who is up in the front here, is going to give us a few minutes on how we
23 get to this -- to this meeting. And then, we're going to get into the
24 first substantive discussion area, which is called sequences for long --
25 sequences for long term and intermediate events. Glenn Kelly from the
NRC staff is going to do a presentation for us and we're going to have
an industry perspective on this from Ed Burns. Then, we're going to go
to open discussion after a break.

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And this beginning session is to talk about the NRC study
and methodology, assumptions, over arching issues. And when we get

1 there, Rich Barrett from the NRC is going to, what I call, tee the issue
2 up for us and just describe what that session is supposed to encompass,
3 in terms of discussion points.

4 At 1:00, we start a session called mitigation of events. In
5 other words, once you've -- once we've talked about sequences, then what
6 types of mitigation activities could be applied to these particular
7 events. And we're going to start with an industry presentation on that.
8 And we're going to have open discussion for most of the afternoon and
9 then get to a summary about 3:30. And then we'll have some closing
10 remarks at 4:00 by Stu Richards and also maybe a preview of the next day
11 for you.

12 And as you can see, day two, we're going into some specific
13 areas: seismic. We're going to do two breakout sessions tomorrow
14 afternoon, one on heavy loads, one on thermal hydraulics. And we do
15 have a summary and follow-up session at the end of the day, and this is
16 where we might discuss how the NRC is going to be using the information
17 from this workshop; how people who comment will be able to see how their
18 comments have been evaluated and dispositioned by the NRC; what are the
19 regulatory applications of this information; and how is this going to be
20 integrated into a larger decommissioning regulatory context.

21 With that, let me go out to you and -- for some
22 introductions. And if you could just tell us your name and where you're
23 from and one -- what your concern or interest in this particular issue
24 is. And let's start with Gary -- well, let's start with Vonna, I'm
25 sorry.

MS. ORDAZ: I'm Vonna Ordaz with the NRC and the leader of
the technical working group.

MR. HOLAHAN: I'm Gary Holahan, the director of the Division
of System Safety and Analysis in NRC, and most of the technical people
working on the working group work for me.

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1 MR. ZWOLINSKI: I'm John Zwolinski. I'm the director of the
2 Division of Licensee Project Management. We're responsible for actions
3 and activities moving forward in the decommissioning area, including
4 possible rulemaking and integrating decommissioning activities.

5 MR. RICHARDS: I'm Stu Richards. I'm with the NRR projects
6 and I'm primarily interested in getting a lot of feedback in the session
7 here, because we're working on rulemaking in the future and trying to
8 consolidate rules that apply to decommissioning and establish a
9 framework that ought to make it easier to go through the decommissioning
10 phase.

11 MR. MASNIK: I'm Mike Masnik. I'm the chief of the
12 Decommissioning Section in Projects and I'm responsible for the
13 day-to-day oversight of those reactors assigned to NRR that are in the
14 decommissioning process.

15 MR. HANNON: I'm John Hannon, Plant Systems branch chief. I
16 work with Gary Holahan, NRR.

17 MR. GUNTER: My name is Paul Gunter. I'm director of the
18 Reactor Watchdog Project for Nuclear Information and Resource Service
19 here in Washington. I would just take a moment just to submit a request
20 from two citizen's groups that have been principle in litigating the
21 decommissioning issue, that's the New England Coalition on Nuclear
22 Pollution and the Citizens Awareness Network. Their request is that
23 future public meetings on the decommissioning subject, they would
24 certainly appreciate timely invitations to participate in these -- in
25 this dialogue.

MR. LOCHBAUM: Dave Lochbaum, nuclear safety engineer for
the Union of Concerned Scientists.

MR. NELSON: Thanks, pass the baton. Alan Nelson, NEI,
looking forward to working and resolving many of the solution -- finding
many of the solutions and risk informed to provide decommissioning

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1 regulations.

2 MR. MEISNER: Hi, Mike Meisner. I'm with Maine Yankee and I
3 chair the NEI Decommissioning Working Group.

4 MR. BURNS: Ed Burns from Merin Engineering, supporting the
5 industry review of the draft NRC report.

6 MR. PARRY: I'm Gareth Parry. I'm an advisor for
7 Probabilistic Risk Assessment in Gary Holahan's division.

8 MR. CHEOK: I'm Mike Cheok. I work for the NRC and I work
9 on the Risk Assessment for Spent Fuel Pools.

10 MR. KELLY: My name is Glenn Kelly. I'm in the Branch in
11 NRR. I work for Rich Barrett.

12 MR. BARRETT: I'm Rich Barrett. I'm the chief of the Risk
13 Branch in NRR. And what I'd like to achieve in this meeting is a sound
14 technical basis for future decisions that all of our stakeholders can
15 understand and accept.

16 MR. CAMERON: Thank you, Rich, on a good note. Keep in mind
17 that we are going to have other people coming up to the table for some
18 of the other discussions, people with expertise in that area, and we'll
19 introduce them when they come up. We already have one action item
20 brought up by Paul Gunter, which is to involve Citizens Awareness
21 Network, Paul, and New England Coalition on Nuclear Pollution in any
22 further discussions we have on this particular issue.

23 Right now, let's go to Stu Richards for some opening
24 remarks, and then to Mike Meisner. Stu, do you want to use this one or
25 do you want to try that?

MR. RICHARDS: Oh, no, I'm confused.

MR. CAMERON: Try that one. That one works.

MR. RICHARDS: Does this work? Oh, all right.

I'm Stu Richards. I'm the NRR projects director for Region
4 and decommissioning. Can you hear me all right? I've been asked to

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1 make a few comments and then pass it on to Mr. Meisner.

2 For those who haven't been involved, this process has been
3 going on for several months, so I'd like to give you a little
4 background. I'd like to thank everybody for being here for next two
5 days. I think this is going to be an important workshop, to hopefully
6 establish a framework for regulatory oversight in the decommissioning
7 area for the years to come.

8 A little history: back in March, we met with the
9 Commission, as part of the NRR reorganization. We told the Commission
10 that we would take a pause and take a look at where we have been in the
11 decommissioning area, as far as regulatory oversight. There were a
12 number of rulemakings that were underway and we put a hold on those
13 rulemakings, the intent being to make sure that we've considered all the
14 experience we've gained over the years with decommissioning plants, take
15 a look at the various rulemakings and make sure that we were going to
16 integrate that effort to some kind of a common goal in the future.

17 So, what we told the Commission that we would do is that we
18 would undertake kind of a two-prong approach. And as such, we put
19 together two groups -- two working groups, if you will. One working
20 group is under my responsibility. That working group, being led by Bill
21 Huffman, has the job of taking a look at all the regulations that apply
22 in the decommissioning area and the way they are laid out in the 10 CFR;
23 to make recommendations as to how we could better package those
24 regulations, to make them clear to the industry and public; and
25 hopefully make it a simpler, more efficient process to deal with, as
plants go from the operation phase to the decommissioning phase. That
particular group's efforts is not a topic of this workshop today. So,
that's a little background material.

The second working group is under Gary Holahan, a so-called
technical working group being led by Vonna Ordaz. Their job was to go

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1 -- or is to go out and look at the risk associated with storing spent
2 fuel at spent fuel decommissioning plant and, hence, the workshop here
3 today.

4 We told the Commission we would try and do this in a public
5 way. Up to this workshop, we've had four or five public meetings.
6 They've been much smaller than this. Many of the people at the table
7 here have been at all or most of the meetings, and I think are familiar
8 with that information. But, this workshop is kind of a cumulation of
9 these four or five meetings, working towards trying to come up with
10 ideas on the preliminary results of the technical working group and
11 their thoughts on risk.

12 What's the goal today? We've asked the technical working
13 group to provide us -- us and Projects a product, which is basically
14 their assessment of the risk associated with the decommissioning plant.
15 They've produced a preliminary report and we're looking for feedback on
16 that. Ultimately, what we want to do is we're going to get the product
17 from the technical working group, and the people in Projects that work
18 for John Zwolinski and myself are going to take that and factor it into
19 rulemaking in the future. So, that's the ultimate goal, I hope, for
20 this workshop today.

21 We did send up to the Commission a SECY paper, dated June
22 30th. I think there were copies made available at the front door, when
23 you came in. If you don't have a copy of that paper, it's 99-168, and
24 it gives a summation of pretty much what I've just said. I think it's a
25 pretty read. The front of it is only eight or nine pages. So, if
you're looking for some background on what we're doing, that's a good
place to go.

I'd like to point out a few of the people, who are here with
us today. My boss, John Zwolinski, is here. John's boss, Brian Sharon
is in the audience. We have Sam Collins, the director of NRR, who

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1 intends to be here tomorrow afternoon for the wrap-up session. I think
2 the decommissioning area has gotten the attention of senior management
3 in the NRC. I think it's gotten the attention of the NRC Commission, as
4 a whole. So, this workshop and what we do here today is getting a lot
5 of visibility and I sure appreciate all your participation.

6 Mike?

7 MR. MASNIK: Thanks, Stu. I think one thing we can all
8 agree on, everyone in the room, is a common goal associated with this
9 workshop. And regardless of what your leanings are and your point of
10 view, I think we all need to have a better risk informed understanding
11 of decommissioning. That's very important for licensees and it really
12 goes to the issue of resources. We all have scarce resources, as does
13 the NRC. The more we can focus those resources on what's important to
14 safety during decommissioning, the better off we all are. That's kind
15 of the litmus test or benchmark we will be using, as we go through this
16 workshop, to see how we're progressing.

17 Up to this point, as Stu indicated, we've had a number of
18 meetings with the staff. And, you know, on some cases, those meetings
19 were a little contentious. But, in looking back over what we've
20 accomplished so far, I think it's real important to point out that the
21 framework -- the analytic framework that the staff has put together in
22 their draft report is actually an excellent approach and way to go.
23 When we look back over the discussions we've had in the past, what we
24 really come down to, some area of disagreement on only two issues: one
25 is how do we calculate the probability of a catastrophic seismic event;
and, two, how do we treat and deal with the potential for human error in
evaluating these sequences.

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I think that's something that we're going to focus most on
in this workshop. From discussions I've had this week and past week, I
think we've got a real opportunity here to come to some constructive

1 resolution of both those issues. And I'm not minimizing the fact that
2 there are other issues to discuss, as well. But, I think in the minds
3 of the industry, those are the two key ones. So, I expect today and
4 tomorrow, we're going to have a very positive constructive dialogue.

5 And I just want to finish by saying that we've got a lot of
6 industry folks at the table and out in the audience, and a lot more that
7 have been participating all along. And one thing I don't think we've
8 ever mentioned is that the majority of those participants aren't going
9 to benefit -- their plants aren't going to benefit at all from what
10 we're going here today, from what the NRC will do in the future in
11 rulemaking. We're trying to make a positive contribution to the future
12 of the industry and make things go easier for the next guy down the
13 road. Because, frankly, most of our plants, the ones that are actively
14 decommissioning now, are well beyond the issues that we'll be discussing
15 today.

16 What we do hope to accomplish, in investing our time and
17 effort in this, is to hopefully come up with a model for doing the same
18 thing for other areas of decommissioning. Today, we're treating the
19 front end, you know, the issues that plants and regulators have to face
20 in their first year of decommissioning. There's the back end of the
21 process, too: terminating the license, site release criteria, dry cask
22 storage and the like. And we're hoping that this kind of approach can
23 serve as a model for risk informing those areas of decommissioning, as
24 well, and perhaps even provide some benefit for doing the same thing for
25 operating reactors.

Thanks.

MR. CAMERON: Thank you, very much, Mike. Let's go to Gary
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Holahan now, who is going to give us some background on the study and
how we got here today. Gary?

MR. HOLAHAN: I think both Mr. Meisner and Stu Richards have

1 laid out a pretty good understanding of why we're here already. I think
2 Stu covered historical reasons and I think Mike began to touch on some
3 of the technical issues.

4 What I'd like to do is spend just a few minutes talking
5 broadly about how we decided to approach this issue. After this point,
6 we'll sort of -- we'll sort of break up the technical issues and sort of
7 try to digest them almost one at a time, and that's the way most of the
8 agenda is set up. So, I'll spend a few minutes talking about how we got
9 here in a technical sense.

10 If you turn the clock back six months or so, what we found
11 ourselves -- the position we found ourselves in is the being asked to
12 make technical decisions about issues related to spent fuel pool
13 decommissioning and whether it's emergency planning or other issues. It
14 required an understanding of the safety of spent fuel pools during
15 decommissioning. And what we noticed was that there had been lots of
16 decisions made before, but they were made really on an ad hoc basis.
17 Each licensee had asked for relief or for changes in some context, under
18 their special circumstances, for the issues they had a particular
19 interest in. Information was brought to the staff. It appeared
20 reasonable or there was a discussion and technical decisions were made.
21 But, they were very much ad hoc and it wasn't at all clear that there
22 was a systematic approach to making decisions that would really provide
23 a broad technical basis for going ahead and doing rulemaking or having a
24 really well understood set of ground rules for both licensees, for the
25 public, and for the staff, to understand how to deal with future issues.

So, as Stu mentioned, we decided to take a step back,
rethink where we technically, to put together a sound technical basis
for decision making. And what we realized is we are, you know,
surrounded by other issues going on in the Commission. The Commission
is really in the process of risk informing many of its activities. We

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1 wrote a policy statement a few years ago. We put out guidelines on how
2 to deal with operating reactor license amendment type issues. The
3 Commission recently approved us to go through and modify the reactor
4 regulations, as a whole, to put more risk information in that process.
5 The Commission has just started a pilot project to deal with operating
6 reactors in our oversight inspection and enforcement activities, to use
7 more risk information. So, it seemed ripe to take on the issue of
8 decommissioning and to use the tools, the techniques, the knowledge we
9 have of risk assessment approaches and to see how they could be applied
10 to decommissioning.

11 Well, what sounds good in the philosophical way, in fact,
12 sometimes turns out to be rather difficult, because we find there are a
13 lot of challenging technical issues. A number of the questions that
14 you'd like to answer technically have really not been, you know,
15 discussed and studied as extensively for decommissioning phase, as they
16 have been for operating reactors. And so there are a number of
17 difficult questions. You know, one that Mr. Meisner mentioned, and I
18 think we'll probably spend some fair amount of time on it, is how
19 reliable are human actions over, you know, long periods of time, days.
20 For operating reactors, you know, days are not the issue. Hours,
21 sometimes minutes, are important in making -- in deciding whether
22 operators are making correct and reliable -- taking correct and reliable
23 actions.

24 And so, when you go back and look at the research and the
25 literature and the experience that's available, it's available for
dealing with human reliability, in the context of operating reactors.
How do we extend this? How do we make decisions that are relevant for
spent fuel pool and decommissioning? Well, it's not so straightforward.
& And so, I think that's part of the reason that these issues are somewhat
difficult.

1 But, I think what we realized is drawing risk information
2 into the mix is the most rational way of making decisions for spent fuel
3 pool decommissioning. And so in order to do that, we really step back
4 and say, you know, where should we start. And, in fact, we decided to
5 start basically with a clean slate. And when you decided to do a risk
6 assessment from a clean slate, you start out by looking for sequences:
7 what can happen, what can go wrong. Then, you go on to look at
8 probabilities: more probable events need more protection; less probable
9 events, less protection. And at some point, the events seem so
10 improbable, so remote, so speculative, that, in fact, no level of
11 protection is required.

12 And so at this first stage, there is a lot of consideration
13 of, you know, what's relevant. So, there's sort of a completeness
14 issue. And you'll see that we've raised issues that some people were
15 uncomfortable with. Why are you worried about -- about reactivity
16 accidents? You know, we didn't worry about that before. The reason
17 we're dealing with that issue is for completeness. We want to have
18 consideration of a lot of issues, many of which won't turn out to be
19 significant in the end, but you have to deal with them.

20 So, I think you'll -- if you've looked at our draft report,
21 you'll see it deals with a spectrum of issues broader than we've seen in
22 the past on many decommissioning decisions, and likely, in fact, to be
23 broader than decisions in the future, because this is our opportunity to
24 have a broad consideration of technical issues. But as part of that, we
25 have to decide what's most important, what's least important, where do
we need to provide protection, where is it not important, so, in the
future, maybe we don't have to go through all these issues. Again, we
can focus on the things that are most important. So, part of this
process is, in fact -- and I think Mr. Meisner used the word "focus,"
sometimes we even use the definition of risk-informed regulation, as a

1 definition of focusing the NRC, its licensees, on those things that are
2 most important to public health and safety. So, that's part of what
3 this process is. This is the lens. We take all the issues, all the
4 light we can shed on this, and focus it down to the things that appear
5 to be most important.

6 In this process, we looked at lots of scenarios. In doing
7 this, we draw on operating experience, on logical relationship among
8 issues, analysis. Sometimes, we're challenged to do analyses that
9 haven't been done before in their realistic way. But, we try to put all
10 of these together. So, that's the stage that we are at here. It's our
11 first shot at a complete look at spent fuel pool safety issues, with our
12 first attempt at the probability and consequences of those events.

13 What we'd like to get out of this meeting is a review,
14 assessment, input, evaluation of what we've done in terms of
15 completeness, have we missed issues; in terms of probability and
16 consequences, have you overestimated or underestimated the consequence
17 of issues; are we about right or are we wrong in judging the probability
18 of issues. And in a related context, sometimes you can deal with issues
19 not by just finding out what's the likelihood of them; but, in fact,
20 doing something to intervene. And I'm hoping to learn something from
21 the industry today, whether in terms of information or commitments, that
22 says some of these issues can be dealt with by either showing that there
23 are already training and procedures and instrumentation or whatever
24 available to assure that good and reliable decisions are made by people,
25 that's the people part of the issue; or perhaps where it's necessary to
focus on important issues, additional training, instrumentation,
procedures, whatever is appropriate to the issue, can be brought to that
issue, to make what might otherwise be a questionable or a difficult
& decision a lot easier. So, I'm looking to learn more about where we are
now or what might be done to make safety issues either less significant

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1 or certainly better understand in this context.

2 I think that's about where we are in a general context. And
3 I think as we go on to the sessions, these sort of issues will be dealt
4 with on a -- you know, on a sort of issue by issue basis. So, Chip, I'd
5 like to turn it back to you.

6 MR. CAMERON: Thanks, Gary. I think that was an excellent
7 context for our discussions and we'll be coming back to many of those
8 points. I think we should get right to it, in terms of the details of
9 the study and go to Glenn Kelly for his presentation -- oh, Rich, sorry.
10 Rich is going to tee it up for us.

11 MR. BARRETT: You're using a golf analogy.

12 MR. CAMERON: Right.

13 MR. BARRETT: Can everyone hear me?

14 SPEAKER: Yes.

15 MR. BARRETT: Okay. I would like to also extend a welcome
16 to everyone, on behalf of the technical staff, who have worked very,
17 very hard over the last couple of months to get us to where we are
18 today. We really appreciate everyone's participation in today's
19 workshop and we look forward to a very successful day, based on what
20 we've been able to accomplish so far and the discussions we've had in
21 previous meetings.

22 I'd like to point you -- bring your attention to the staff's
23 slides, which we'll be using in the first session, which originally was
24 envisioned as being two sessions. And I will be briefly talking to the
25 first two slides, slide number two and slide number three. Some of what
I plan to say is the predators of what Chip and Stu and Mike and Gary
have said. But, if you live in Washington long enough, you'll know that
that's not at all unusual. Some years ago, Congressman Mo Udall stood
to speak in the House on an important issue and he was one of the last
speakers and he started his remarks by saying, "Everything that needs to

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1 be said on this subject has already been said, but everybody ain't said
2 it yet." So, please forgive me, if I repeat some of what's been said
3 before.

4 The NRC, in cooperation with NEI and other stakeholders, has
5 embarked on a process for resolving the risk issues associated with
6 decommissioning. And I think it's important to understand the process
7 -- the thought process that we're going through here, and I think this
8 is somewhat repetitive to what Gary said, what we wanted to do was a
9 complete analysis of all the risk implications of decommissioning and
10 put that on the table. That was step one. The second step is, based on
11 that information, to have a full and open discussion of these issues by
12 all parties, and that's where we are today. That's where we've been for
13 the last several weeks. And our hope is that the third phase will be
14 that this results in a sound technical basis for future decisionmaking,
15 that all of our stakeholders can understand and accept.

16 Now, the NRC has started this process by performing what
17 I'll call a scoping analysis. It's a preliminary, and I emphasize the
18 word preliminary, risk analysis intended to determine which accident
19 sequences are credible, which ones have the potential to be contributors
20 to risk. And we've identified four general types of accidents that
21 we're interested in and that -- those accidents are, first of all, loss
22 of heat removal accidents, which we are referring to here as long-term
23 accidents, because they evolve very slowly. The second tend to be what
24 we call loss of inventory type of accidents, and those are what we're
25 referring to as intermediate term accidents, because they tend to evolve
somewhat more quickly, but not very fast. The third are accidents
associated with heavy loads. These are accidents, which can cause
damage to the pool. And the fourth major category are seismically
induced accidents. And as you know by now, this entire workshop is
organized around these four categories, pretty much.

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1 We have documented our assessment for all the participants
2 to examine. We documented it in writing in our preliminary report, and
3 we've also had discussions on at least two occasions in public meetings
4 in the last month or two. The preliminary report documents our methods,
5 our assumptions, and our results. We have conducted what we think is a
6 useful risk analysis, in a very short period of time. And I appreciate
7 the kind words that Mike said earlier about the work that the staff has
8 performed over the past two to three months. A lot has been
9 accomplished. Nevertheless, we recognize that our results are based on
10 assumptions that may not represent the reality for future plants going
11 through decommissioning. And I want everyone to focus on that. What we
12 are concerned about is future plants going through the decommissioning
13 process.

14 Our report points out that there is no -- currently no plant
15 out there, which matches the assumptions that we have made. We have
16 based our assessment -- preliminary assessment on what we saw at
17 existing plants. But, we're not focusing on existing plants. What we
18 want to look at is, what is the basis for decisionmaking for future
19 plants.

20 We have requested feedback from industry and other
21 stakeholders, to help us to refine our assessment. We've already
22 received some very useful feedback from industry in the seismic area,
23 and we expect to get other very good feedback today on all of these
24 areas. We, also, anticipate today a free and open exchange of
25 information and of views for these next two days. We are not here to
defend the preliminary analysis. The preliminary analysis has already
served its purpose. We are here to refine and improve this assessment,
based on the best technical information that all of our stakeholders
& have to offer. That's our goal.

Our expectation from the workshop is that it will give us

1 the basis for finalizing the assessment, in a way that incorporates
2 these insights. We intend to use this information to derive a
3 consistent and predictable basis for future plant-specific decisions for
4 decommissioning plants, including exemptions as appropriate.

5 We want to produce guidance in two areas. We want to
6 produce guidance on how a licensee should analyze the risk associated
7 with decommissioning. We want licensees to understand what constitutes
8 an acceptable analysis for future decisionmaking purposes. And
9 secondly, we want to come out of this workshop with an understanding of
10 what design and operational features a future decommissioning plant
11 should consider -- should consider, in order to justify exemptions or
12 other regulatory actions.

13 Let me not dwell on this. Let me finish by saying that an
14 important goal of this effort is to assure that all stakeholders
15 understand the basis for our decisions; very important to us. We are
16 going to be discussing some highly technical issues over the next couple
17 of days in some highly specialized areas. Not all of us are specialists
18 in all of these areas. So, if anyone here finds that you need
19 clarification, in order to follow the discussion, I would like to invite
20 you to ask questions during the presentations. We don't want anyone to
21 get lost because of something we said that isn't understood by everyone
22 or because of some acronym we've used or because of some arcane
23 reference we've made to some technical document that two or three of us
24 might understand, but not everyone is familiar with. So, we invite you
25 to ask questions. And if you're not able to do that during the session,
we would invite you to approach members of the NRC staff during the
breaks, to get any clarification you need, in order to follow the
subsequent discussions.

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Based on all of the preparation we've had over the last
couple of weeks, I think that we have laid the groundwork for a

1 successful workshop. We're prepared for success today and tomorrow.
2 Again, I want to thank all of you for coming and I look forward to a
3 productive two days.

4 Glenn Kelly is going to start the discussion this morning of
5 the long-term and intermediate sequences with a description of what the
6 NRC did, how we approached this, what we found to be important, and what
7 result we got in our preliminary analysis. Earlier on, we had organized
8 this discussion, such that we would discuss the long-term sequences
9 first and then go into the intermediate sequences. But, when we got to
10 the point of preparing our slides, we realized that there was so much
11 commonality in the two; there were so many common issues and so many
12 common technical questions and assumptions that we decided to combine
13 the two. We're not going to go into all of the details this morning and
14 we're not going to make an attempt to justify the results. We're going
15 to describe what we got. I think the important thing today is to hear
16 what the industry and other stakeholders have to offer now, based on all
17 of the discussion that we have made in the past meetings and based on
18 the report that we've documented in the public record.

19 MR. CAMERON: I wanted to thank you for those remarks and
20 perhaps just say one or two things before we go to Glenn. Those were
21 all important remarks, Rich, and particularly the one on understanding
22 and clarity. And I would just remind people that if they don't
23 understand a particular point, to ask; and also to ask all of the people
24 around the table don't assume that everybody knows the acronyms
25 information, etc., etc.

And one point that you raised, Rich, that I want to put over
here in the paddock, because it may not be real obvious to people, is
the point about trying to get an understanding of how licensees should
perform the analysis. I'm not sure that really pops out on the agenda,
so we'll put it over there, so that we don't forget about it. And

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1 before we go to Glenn, we do have one new participant at the table. And
2 Ray, could you just introduce yourself to everybody and just, you know,
3 tell them what your affiliation is and what your concern is with this
4 issue, briefly.

5 MR. SHADIS: Briefly, my name is Ray Shadis. I'm with an
6 organization called Friends of the Coast up in Maine. We're involved in
7 the Maine Yankee decommissioning. I, also, am a staff person for the
8 New England Coalition on Nuclear Pollution. And we're here
9 representing, in essence, the public sector. Thank you.

10 MR. CAMERON: Okay, good. Welcome. Gary?

11 MR. HOLAHAN: I'm trying out your tent rules. I know it's
12 not explicitly on the agenda, but I thought since there are other
13 stakeholders at the table and possibly in the audience, before we go
14 ahead and get specific about individual issues, if there are -- if there
15 are questions or if there are different agendas or if there are, you
16 know, issues, in a general context, that people have a different
17 understand of why we're here or what needs to be covered, I think I'd
18 like to hear that from the stakeholders, in a sort of general context
19 before we go ahead and, you know, get down to any of the details.

20 MR. CAMERON: Okay. Let's get some -- let's get some
21 feedback on what we've heard so far, keeping in mind that we are going
22 to be going into detail on some of these subjects. Paul?

23 MR. GUNTER: All right. Again, my name is Paul Gunter. I'm
24 with the Nuclear Information Resource Service. In reading over the
25 materials, one of the -- one item is conspicuously absent. And if we
could clear this air right from the beginning, I think it would be
helpful.

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The NRC has gone to great measures to look at accidental
events. The question we have is what about intentional events.
Obviously, with regard to -- it was only a month or so ago that the

1 Nuclear Regulatory Commission, itself, experienced a bomb threat. And
2 in the course of evacuating I White Flint, II White Flint, there were a
3 number of issues that I think you all have become aware of, potentially
4 some people evacuating into a blast zone. But, clearly, the issue of
5 preparedness and drills, it made itself apparent.

6 It's conspicuously absent from your review of risk in this
7 overall subject, that we haven't looked at the issue of sabotage and
8 terrorism. And from our position, we think that this is a paramount
9 issue and that it raises the potential for the quickest time to fire; it
10 raises issues associated with the prevention or delay of mitigation; and
11 potentially raises your most serious events. But, it's absent.

12 MR. CAMERON: Thank you, very much, Paul, and we're going to
13 go to Gary for that. I did put that up on the paddock and, perhaps, we
14 can have a discussion of how, when that might be treated. Gary?

15 MR. HOLAHAN: Let me speak a little on this issue. It's an
16 important point. And we said that completeness is important and this is
17 exactly a completeness issue. And there may be others, who can speak to
18 this, also.

19 There are a couple of considerations. One is -- one
20 consideration is -- this subject is a little bit difficult, because the
21 Commission has told us, in establishing their safety goals, that we
22 ought to do risk calculations, except for sabotage. So, it's not really
23 in the numbers. But, I think in a broader context, although we don't
24 analyze sabotage type events, we don't put probabilities on what's the
25 likelihood of a saboteur showing up and doing x, y, and z. It doesn't
mean that this analysis is irrelevant from that point of view. In fact,
it's very relevant.

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What this kind of analysis -- risk analysis, including the
consequence analysis and all that, it shows you what the important
safety issues are. And so, you know, we don't mean this to be your

1 guidelines for sabotage; but, in fact, it's guidelines for protection
2 against sabotage, because it tells you, you know, what's important to
3 protect. The issues -- losing water from the pool; boiling water off
4 the pool; obviously sabotage doesn't mean causing seismic events, but
5 the fragility of the pool, itself, or its structural strength -- the
6 issues that we're dealing with are exactly the same relevant issue from
7 a security and safeguard point of view.

8 If I use the analogy of what we do for operating reactors,
9 we don't -- we don't do a probabilistic analysis of the likelihood of
10 sabotage. But, the safeguard people, the safeguard program looks at the
11 information coming out of our risk analysis, in order to decide, you
12 know, what's the most important parts of the plant to be protected,
13 decisions about -- about, you know, what to protect and what are
14 relevant safety issues, I think will, you know, necessarily be an
15 integral part of the study.

16 So, I think the study will be relevant for safeguard
17 decisions. The piece that won't be is what is the probability. The
18 truth is we probably don't know much about the probability of such
19 things anyway. Is there something technically that we will be missing,
20 so that we can't make good safeguard decisions in the future for having
21 not done it here, I think that's -- that's an appropriate question. It
22 doesn't come to mind that we're missing something; but if it is, then
23 maybe we ought to give some thought to it. So, I think if we complete
24 the study, the probabilities in the study won't tell you a lot about a
25 truck bomb or some other sabotage event, but the relevant nature of how
do I keep radiation and people separate, I think some of those
fundamental issues will be dealt with in this report. They will be
useful.

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MR. CAMERON: Okay. Paul, let me ask you, before we go to
anybody else, about Gary's explanation on this. Is that -- do you still

1 have a point?

2 MR. GUNTER: Well, obviously, the point that I want to make
3 is that this whole issue is about building public confidence. And if,
4 fact, there are events that currently affect public confidence and
5 safety at U.S. nuclear power stations, they should be dealt with in this
6 arena. Clearly, the fact that the public is aware that operational
7 safeguard response evaluations have shown that there are vulnerabilities
8 at U.S. stations, that the agency and the industry are backing away --
9 from our perspective, backing away from the -- for operating reactors,
10 leaves a big gap, in terms of what state of readiness we have at a --
11 for scaled down operations at U.S. reactors, with much larger
12 inventories of radioactive waste.

13 So, clearly, the question on -- the technical issue is, I
14 think the level of security left at stations and the various measures of
15 testing in qualifying those levels of readiness and security clearly
16 needs to be in your evaluation of risk.

17 MR. CAMERON: Okay. Any other comments? Stu, do you want
18 to respond to that?

19 MR. RICHARDS: Just very briefly. You know, the idea of the
20 security threats have come up before in our meetings. I think like Gary
21 said, it just doesn't lend itself to be risk informed. It does plant
22 vulnerabilities like you said. We told the Commission, in our paper,
23 that going forward, we would be integrating the various rulemakings,
24 which include security. I believe that's mentioned in our SECY paper.
25 So, as this security area is considered, if nothing else, as allowed by
the rulemaking process, it will go through the public participation
process.

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I'm not familiar how, you know, the security safeguards
aspect impacts that to the degree available. As we change the rules,
you know, there will be public participation.

1 MR. CAMERON: Is it -- before we go to Ray, is it fair to
2 say that -- I don't know if this -- I think it might fit into the action
3 item category, that security safeguards considerations will be
4 considered ultimately in the process to do a decommissioning rule?

5 MR. RICHARDS: Sure. We've said that we're looking -- as an
6 agency, we're looking at the safeguards rules, as they relate to
7 decommissioning, with the intent of being part of our integrated
8 rulemaking, which, of course, is a public process. But for this
9 workshop, safeguards is not really something that can be risked informed
10 and, hence, it's just outside the scope of what we've come prepared to
11 talk about today.

12 MR. CAMERON: Okay. Let's hear from Gary and then we'll go
13 to Ray. I think Gary has a point amplification on Stu.

14 MR. HOLAHAN: I think -- it seems to me that the relevant
15 issue -- there is going to be safeguards rulemaking, I understand, and
16 on a plant specific basis, there will be safeguards decisions made.
17 This technical study is not a substitute for any one of those. It seems
18 to me that the relevant question, in the context of this meeting and
19 this study, is: are we learning enough, as a technical basis, to make
20 good safeguards rules and to make good safeguards decision making in the
21 future; or is there something else we ought to be doing, you know, in a
22 technical context, so that good safeguards decisions can be made later.

23 MR. CAMERON: Okay. So, that's -- do we need to -- you're
24 sort of turning the relationship around, in a sense. Is there types of
25 technical information that we need now, in order to make good safeguards
decisions later on?

MR. HOLAHAN: Clearly, we don't want to be -- put ourselves
in the position where -- we have this report, you know, it's supposed to
be the technical basis for rulemaking and decisions in the future. And
then we go on to make those decisions, whether safeguards or anything

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1 else, and say, well, now, I'm at this, you know, second stage, but I
2 find that the report, in fact, isn't helpful, because it didn't do x, y,
3 z. I think what Paul is suggesting is that when we get to that stage,
4 you know, we will have missed out on something that we needed to have,
5 as support of the foundation.

6 MR. CAMERON: Do you have anything further to add on that,
7 before we go to -- let's go to Ray and then we'll come back to Rich.
8 Ray?

9 MR. SHADIS: Just a word about the issue of sabotage and
10 security. In a sense, there is risk informing that is built into this.
11 The problem, from our perspective, is that it is subjective. It's based
12 on best professional judgment on the part of your safeguards people.
13 But, it doesn't get the test of truth in the public arena.

14 The safeguards people have designed a reference bomb vehicle
15 and, apparently, they've assigned a budget to terrorist, so that it can
16 only purchase a limited amount of explosives. And, therefore, given a
17 certain mass of concrete and rebar and so on, they really can't do any
18 damage to spent fuel pools. And, therefore, we don't really need to
19 protect that fuel. So, we see this process, when we talk to the
20 safeguards people, that is, in some ways, analogous to the process that
21 you've used for the limited number of subjects that you've chosen for
22 your technical report.

23 And that's bothersome to us. Looking at it from the
24 outside, we just see this void, when it comes to dealing with that
25 particular subject of sabotage. It is real. Somewhere along the line,
somebody decided that -- within the NRC decided that the probabilities
were there. Maybe, they didn't quantify them, but they went right out
and ordered all -- as far as I know, all the U.S. nuclear facilities to
& construct vehicle barriers, to provide, and I hate to use the word, some
OCI defense-in-depth, to keep people away from critical areas. And that
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1 really needs to be addressed, as far as the risk is concerned, to shut
2 down plants.

3 My principle subject that I wanted to raise really has to do
4 with the way that the focus of this whole process, from the time that
5 the first meeting was announced to today, has continually narrowed down
6 to what have become obvious goals of satisfying an industry need, to get
7 rid of their insurance burden and their offsite planning burden as early
8 as possible. And I think that if you're going to do that, all well and
9 good. I think you've got a good start in your report. But, there are a
10 lot of scenarios. In particular, I'm thinking right now of different
11 fire scenarios: fire in -- resin container fire, for example; fire in a
12 waste storage building; fire in a container vehicle with waste stored in
13 it.

14 Almost every plant has done some analysis on this in their
15 FSARs and has concluded that the offsite doses are not going to, you
16 know, trigger any emergency response. However, if you're going to go
17 back and look again at seismic risk, if you're going to go back again
18 and look at is there a fire risk and try to quantify what the
19 consequences might be, I think that we're missing something, if we don't
20 go back on these other scenarios and look again to see if we can't more
21 accurately quantify what those consequences might be. I find it
22 difficult to believe that if we have a truckload of waste burning on a
23 coastal peninsular, that we're not going to have clouds of particular
24 crap floating across the bay at levels which, if they're measured in
25 particular places, would not trigger those emergency response
mechanisms. So, I -- what I'm asking is that that be looked at again.

The other thing that's very disturbing about this whole
process is that the NRC seems to have backed into it. What we really
have here is an initiative from the industry seeking relief from having
to pursue their exemptions. And if this were a citizen initiative, not

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1 an industry initiative, it would be suggested to us that we enter a
2 rulemaking petition and that we specify what it is we want in that rule
3 change. And I understand that NRC staff has offered to help citizens,
4 who want to enter a rules change petition. But, that really is the
5 proper way to enter this; then everybody knows, at the beginning of the
6 game, what the goals are, where we're headed. It's much, much easier to
7 judge the information, as it's brought forward, if we all know where
8 we're going at the beginning.

9 Thank you.

10 MR. CAMERON: Okay. Thanks, Ray. We have a couple of
11 comments on that point; first, Glenn, and then Stu. I did put up on the
12 paddock board what else needs to be considered, the point that you made.
13 And perhaps that will come up throughout the discussions and we can
14 revisit that at the end session of the day.

15 Glenn, you had comment, I think, that was --

16 MR. KELLY: My name is Glenn Kelly. I'm with the staff. I
17 wanted to say, Ray, you're exactly right about that we did not look at
18 being risk informed about the term -- about these design basis type
19 events, such as burning a building that's holding waste, because our
20 analysis here was specifically chosen to be one that was in severe
21 accident space. We were looking here to see whether there -- the
22 potential was high enough at these decommissioning plants for very
23 severe accidents that could potentially cause a large number of
24 fatalities. We wanted to look at that and determine whether that was a
25 sufficiently high potential that we really were going to be concerned
about it; or whether the risk was there, it was low enough such that
exemptions could be readily allowed. So, we did not attempt to risk
informed the deterministic aspects of the design basis type of
evaluations.

In the future, that may be an area that we get into for

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1 looking at risk inform in that area. But for right now -- because those
2 are not things -- even though they may -- if you burn one of these
3 containers, and I don't have the detailed knowledge to know what kind of
4 source term you're going to get, but it's my understanding that it's not
5 going to raise to the level where you're going to get fatalities; and,
6 therefore, you know, in our particular situation here, you know, we
7 haven't looked at it, because we were very focused in what we were
8 looking at.

9 MR. CAMERON: Okay. We'll revisit this issue, as we go
10 along, and perhaps later on in the day -- or later on in the meeting.
11 Let's go to Stu and Gary and then let's finish up with Ray and get onto
12 Glenn's presentation. Stu?

13 MR. RICHARDS: Yeah, thanks. I welcome your comments, Ray.
14 You know, you've been at most of our meetings, if not all of them, so
15 I'm glad to see you made it to this one. I do have to take some
16 exception with some of your comments.

17 First off, I think you said that we backed into this and
18 that the industry has put us up to it. I got involved in
19 decommissioning just a few months ago. My knowledge is, is that it's
20 not the truth. That's not what happened. Under Chairman Jackson, you
21 know, she challenged the staff, generally, to work with the regulations
22 and she put out some pillars. She wanted us to be consistent,
23 predictable, efficient, public confidence. And when we looked at
24 decommissioning, we looked at an area, where it seemed like each plant
25 would come in on an individual basis and would make, you know, requests
for exemptions and they'd all be handled on a case-by-case basis. It
was getting to where, you know, we couldn't very well compare what we
did two years ago to what we're doing today. The regulations are kind
of spread out throughout Part 50, which was really written for an
operating reactor.

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1 So, our intent here is not to make the industry happy. Our
2 intent is to carry out a mandate given to us by Chairman Jackson, which
3 was to try and make the whole process a more predictable and easier to
4 understand. And, in fact, I think we've gotten some positive comments
5 from members of the public, that's exactly what we should be doing,
6 trying to make this thing more clearer.

7 And as far as spelling out where we're trying to go, we put
8 it down in SECY paper to the Commission. I think we've been very timely
9 in making that available to the public. They haven't voted on it,
10 although we've asked -- you know, the staff has asked for comments from
11 the Commission by tomorrow. They don't always meet those time lines.
12 But, nonetheless, our SECY paper lays out very plainly where we're
13 trying to head.

14 And we're not prejudging here, you know, what the risk are.
15 That's the whole part of the workshop. So to the degree that you or any
16 other stakeholder can demonstrate where we're wrong about assigning a
17 level of risk to decommissioning activities, we welcome those comments.
18 On the other hand, I think, as others have pointed out, I don't think we
19 should be putting a lot of resources in areas where it simply isn't
20 warranted. Those are resources better spent elsewhere.

21 MR. CAMERON: Perhaps the underlying point here, including
22 Ray's reference back to petition for rulemaking, is that this process is
23 open and transparent and information is available to everyone to be able
24 to comment on this.

25 Let's go to Gary and then to Ray and then let's get back on
agenda.

 MR. HOLAHAN: I think I'd like to make two points and maybe
one commitment. And if this starts a trend of other people making
& commitments, that's okay with me.

 First comment is there are a number of reasons why

1 safeguards isn't done in PRAs. Some of them are fairly obvious. If you
2 look -- pick up our study and you see when we're worried about
3 hurricanes or tornado missiles or whatever it is, you'll see data, lots
4 of information, okay. The heart of this sort of scientific activity is
5 publicly available information that people can scrutinize and argue
6 over. That sort of information isn't available and isn't going to be
7 made publicly available in the safeguards area, you know. We don't
8 publicize -- and not just we, nobody in safeguards area puts their
9 information on the table in technically available reports, so that it
10 can be dealt with in a sort of open scientific environment. And that
11 makes this issue very difficult to deal with in that sort of way.

12 However, I started out saying that our goal was to be
13 complete in our addressing issues. And if we can't be complete, we, at
14 least, owe people an explanation of, you know, why we're not complete or
15 how otherwise these issues should be addressed. So, it seems to me that
16 we ought to take away from this, that there should be some safeguard
17 sabotage section in our report. Even if it's not a risk assessment or a
18 probabilistic approach, we should explain to people, you know, what
19 we've done and what we haven't done, you know, and the reasons for those
20 things.

21 One other point I'd like to make is, Glenn mentioned our
22 focusing on high consequence events -- the probabilities of high
23 consequence events. We don't do that arbitrarily. We haven't
24 arbitrarily said, well, let's look at severe accidents and let's not
25 relook at design basis. We do it, you know, for what we think is a very
good reason. What we're interested in is protecting people from
receiving doses. And the reason we focus on the high consequence event
is because the consequences are many more times more -- many times worse
than the difference in the probabilities. Although severe accidents are
less likely than a fire in the residence, the consequences are more than

1 a thousand times worse. And so when you look at it in a probabilistic
2 context, the severe accidents dominate the likelihood of citizens
3 getting doses.

4 But as with the previous discussion, it seems to me the
5 reason that we are addressing spent fuel pool, large releases associated
6 with oxidation of that fuel, and that we've said, you know, nothing
7 about these others needs to be explained to people, okay; why are we
8 addressing these issues, why are we not addressing the much lower
9 consequence, but higher probability events, you know, and what's
10 appropriate to deal with those. I think we owe an explanation of why
11 we've chosen to do what we've chosen to do. And I think we can take
12 that away, also. These are not arbitrary. There are reasons for them.
13 To the extent that we haven't explained to people, then I think we
14 haven't done the job very well.

15 MR. CAMERON: Okay, thanks, Gary. And I'll put both of
16 those points up for action items. Ray, how about a final point on this
17 issue, and I thank Gary for opening up this broad train of thought for
18 us, and then we'll go to Glenn for his presentation. Ray?

19 MR. SHADIS: Thank you. I'm glad to get that prolific
20 response. You have really two curves here, which meet at some point
21 between consequences and probabilities. You have a high probability for
22 these different fire scenarios, for example, and other scenarios, and
23 perhaps the consequences are less. Although, from what we've heard in
24 the previous meetings, we're down to talking about gap releases and
25 everybody has poo-poo'd the notion that this is of any great
consequence. So, you know, maybe the consequence curves are also
beginning to approach one another.

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The -- well, you know, what I'm saying here is that I
appreciate your -- the position you're coming from, in terms of what
you're choosing to do. But, I don't agree with it. I think that if

1 you're going to put something out under the title of a risk informed
2 decommissioning rule, then you ought to talk about decommissioning, not
3 specifically the spent fuel pool scenarios. And, you know -- and even
4 there, I mean, I'm not sure where we are with some of the cask drop
5 things. I guess we'll get to that. I hope we'll get to that in these
6 sessions.

7 MR. CAMERON: Yeah, we will and we'll -- so, we'll be
8 revisiting that. Gary, one response.

9 MR. HOLAHAN: I think in our commitment to explain why we're
10 doing what we're doing and not doing it, we will -- we will effectively,
11 I think, address this idea of higher probability, lower consequence.
12 This has been done for reactors. There are probability consequence
13 curves that deal with more than just severe accidents. There's a whole
14 -- you know, it's been -- this is an old topic. It's been done in the
15 early '70s. It's called Farmer Curve for operating reactor issues. And
16 it seems to me, we can plot a few of those points and, I think, give a
17 better understanding of what the lower consequence, higher probability
18 end of this issue is and what the high consequence, low probability
19 issue is. And I understand that we should be putting that out, in a way
20 that you can -- that the public can react to.

21 I think we're still going to show that we're looking at the
22 right end of the curve. Most of the public protection needs to be at
23 the high consequence, high probability curve. But, we ought not to
24 argue it up, because we haven't given you the -- we haven't given you
25 the story. And I think that, you know, as part of the next phase of
this, we need to put that on the table. And, for now, that's about the
best we can do.

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MR. CAMERON: Okay. Mike, before we go to Glenn, you have a
comment?

MR. MEISNER: Real briefly. As Ray pointed out, the kinds

1 of issues you're talking about now are within the design basis of the
2 plants. We've got a lot of information analysis. The industry would be
3 happy to provide that stuff.

4 MR. CAMERON: Okay, great. Well, that was -- I think that
5 was useful discussion. Glenn, are you ready to talk about the study?

6 MR. KELLY: Okay. My name is Glenn Kelly and I'm going to
7 assume in my presentation here that you're at least somewhat familiar
8 with the report or with the information that we've talked about here, in
9 that I'm not going to be going into a huge amount of detail. I'm going
10 to be giving you an overview of how we performed our analysis, in order
11 to look broad based-wise for what the potential risk were for spent fuel
12 pool. And I did want to take a second of why we, also, focused on the
13 spent fuel pool, because we looked around at a decommissioned plant and
14 we said to ourselves, what else can cause early or latent fatalities to
15 the public, if there was a problem that occurred at the plant. And,
16 basically, we came to the conclusion that the only place that we really
17 saw that was in the fuel that's being stored in the spent fuel pool. So
18 that's why our analysis concentrated on that area. By the way, if you
19 don't have a copy or aren't familiar with the report, there are copies
20 of the report that we performed the draft technical study at the door.

21 The primary thing that we were looking at, in our draft
22 report here, was the estimation of the frequency of the zirconium fire.
23 And, again, why did we choose the zirconium fire? And the reason is
24 that, in order to get consequences out to the public, there had to be a
25 sufficiently energetic source to drive the radionuclides offsite and get
them out. And we realized that, effectively, in the spent fuel pool,
because there's not a lot of energy compared to what you have with an
operating reactor, that what you were -- the energy that you did have,
& in order to create something that would take it offsite, you needed a
fire, in this particular case. And zirconium fire turned out to be a

1 potential concern.

2 And we looked at that from a deterministic standpoint, to
3 determine whether or not it could occur, and we felt that, yes, it
4 could. So, then, we looked at it from a probabilistic standpoint to
5 say, okay, what's the chances of a zirconium fire occurring. And if you
6 look up the equation on the slide, you'll see that the frequency of
7 getting a zirconium fire is equal to the summation of the initiating
8 events times the failure of whatever mitigating systems there were --
9 that were needed to prevent that fire from occurring. And we go in the
10 report in a lot of detail to explain exactly what these sequences are.
11 We give the event trees and the fault trees and we give the assumptions
12 that are associated with them and all the numbers. And it's all laid
13 out there in detail for you to look at. But, this is basically how we
14 went about doing it. It was the initiating event times the probability
15 that either equipment was going to fail or the operators made a mistake
16 or they just kind of lost track of what was going on.

17 Next slide, please. Now, a number of questions have come up
18 about how we came up with some of our numbers, in particular the human
19 error numbers. And I just wanted to kind of basically just quickly go
20 through this, and this is a little bit simplified, but I think it will
21 be useful for you. For a lot of the long-term and intermediate-term
22 sequences, the initiating event frequencies were right around one in a
23 hundred per year. And then when we looked at the potential failures of
24 mitigating systems, we found that what would happen is that for
25 operators errors -- and here, when I say operator errors, we're really
talking about organizational errors, where the organization has fallen
down, in following what's happening in the event here. The
organizational errors we're talking about were things that happened
9,999 times. After having this initiating event, they would have gotten
it right. It's that one time out of 10,000 that the organization

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1 misunderstood it.

2 And to kind of put that in context, you can think of that at
3 Three Mile Island, we had a one-for one. We had an organization that
4 looked at an even that was occurring and they lost track of what was
5 happening. They didn't understand that the PORV block valve was open.
6 And they wondered down one path thinking that they were doing all right,
7 they were doing the right thing, and it turned out to not be the right
8 thing. And it was a matter, in that case, the operators didn't have the
9 right information; they weren't properly trained. And -- but that is a
10 case where an whole organization went down the wrong day. And that's
11 the type of thing we're talking about there, that one out of 10,000
12 times, that's going to happen.

13 And that's -- from our standpoint, there are people that
14 would argue that maybe the number is significantly lower than that. And
15 we just don't believe that there's adequate information out there to
16 justify a lower number. Now, in reality, it may be lower. But, I can't
17 tell you how much lower and I think it would be very difficult to
18 accurately quantify that.

19 So, from our standpoint, what we've done is we've looked our
20 results and we said, rather -- we don't want sit here and justify the
21 bottom line numbers that we've come up with and say, you know, the NRC
22 has come up with the exact correct number or what the frequency of a
23 zirconium fire is. What we have come up with is we have found that
24 there are sequences that lead up to have concerns about certain areas at
25 the plants and what we're looking now is to understand -- have a better
understanding of what exists out there in the industry today; what will
be existing in the future, which is even more important; and why we
should feel comfortable about these areas and understand are they or are
they not potentially significant risk areas.

Next page, please. I wanted to talk about some of the

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1 sequences that we felt were credible long-term mitigation events. Now,
2 they're long term -- and this -- for this series of sequences, because
3 you're talking about days and days, that this event has to go along
4 before you end up getting fuel uncovering and zirconium fire.

5 The first one starts out with a loss of offsite power from
6 either a plant centered or grid related loss; the diesel driven fire
7 pump fails to start; offsite power isn't recovered; and no recovery from
8 offset sources, such as fire engines. That lack of offsite recovery is
9 really lack of the operators adequately calling in the offsite
10 resources. It's not that you can't get offsite resources, in most
11 cases.

12 The next sequence was loss of offsite power from a severe
13 weather event. Let me just take one second to go back and talk about
14 that. You can say to yourself, well, how would something like that
15 actually happen. I mean, why would somebody be so foolish as to not do
16 something, if they see this. And, well, part of it may be that utility
17 keeps believing that they're going to get their power back. Utility
18 keeps thinking that they're going to be able to fix this pump. And
19 their focusing attention on getting the fire pump to work, or getting
20 offsite power, and they're not looking at the overall process. And when
21 we did these analyses, we realized when I went and visited four
22 decommissioning plants, that they did not have procedures that were
23 specific that would say, for example, if the water level got to be five
24 feet over the fuel, that I'm going to call the local fire department,
25 tell them to bring their fire truck out here, or anything like that. It
was an ad hoc type of decision, on the basis of the -- for the
operators. And so, we've taken that into account in our calculation of
the human error rate.

The next set of sequences is the loss of offsite power from
a severe weather event, where you're not getting any recovery of offsite

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1 power in the time period. Diesel fuels to start or run. This is the
2 diesel driven fire pump. There are no -- we assume there are no diesel
3 generators at the decommissioning plant. And the operator does not call
4 in the offsite sources or they have difficulty getting there, because of
5 a -- if it had been a large hurricane or other type of severe weather
6 event. And, again, that's similar type evaluation to what we did
7 before.

8 Go to the next set of slides. Loss cooling initiating
9 event, then failure of control room alarms, operator fails to notice the
10 spent fuel pool steaming and levels dropping, during walkdowns. And
11 another thing, gee, why would an operator not notice something like
12 that? Well, these are not operating reactors and the concern was that
13 over time, might the operators become much less diligent in doing their
14 jobs. After a year, there is no onsite NRC oversight at the
15 decommissioning plants. Might this -- at the decommissioning plants I
16 visited, they were working four-day weeks. Might this has been an event
17 that occurred right at the beginning of a long weekend, where the
18 operators -- and take this with the understanding, the plants that I
19 went to, the operators -- the certified field handlers were very
20 qualified, they were -- I was very impressed with the level of attention
21 that they had, their instrumentation and everything. We're looking for
22 a plant down the road that might not have the same kind of quality,
23 because it's not required currently by our regulations.

24 So, we're worried that maybe I set -- somebody set their
25 T.V. up in their control room and they're sitting there watching the
T.V. over the long weekend, and they just -- because, there's no
requirements that NRC has that you have to go in there every shift and
check out and see what's going on, and they just -- the guys were just
& watching the T.V. I mean, that's a potential type thing that you look
at.

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1 How do you quantify that? It's very hard. Is it possible?
2 Yes. But when we looked at it, we say, this is the type of thing that
3 could happen. Do PRA do a good job of calculating those numbers? No.
4 But, when we look at our numbers, we realize that this is all -- I'm
5 giving you one potential scenario out of many potential scenarios. This
6 is an idea of how something like this could occur. But, I do want to
7 come back again that I was very impressed with the plants that I
8 visited, with the quality of the operators and what they were actually
9 doing at the spent -- at the decommissioning plants today.

10 The next sequence is one where there's a fire that's not
11 suppressed in a building. It has the spent fuel. And that fire fails
12 either the offsite power or the cooling pumps, and the operators fail to
13 refill a pool using a diesel driven fire pump and we don't have recovery
14 from offsite sources.

15 Let's go to the next slide. Now, based on -- based on these
16 sequences, we've come up with a number of staff concerns. One of them
17 is operator attentiveness. And, again, these are not concerns at
18 current plants; these are -- current decommissioning plants; these are
19 concerns potentially for future plants. Operator attentiveness, where
20 they're not -- currently, they're not required to visit -- actually go
21 out and look at what's going on in the spent fuel pool. We don't -- as
22 I said, we don't have that daily NRC oversight after a year. The
23 instrumentation in the control room is not required to be operable.
24 Even the radiation monitors are not required to be operable, unless the
25 licensee is moving fuel. And if the -- so, if the fuel is just sitting
 there in the pool, it's not being moved, so, therefore, the -- even the
 radiation monitors don't necessary have to be operators.

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 Now, we gave them credit for them being operable in our
 analysis. But, we note that they don't have to be operable. There are
 no automatic actions by any mitigating systems. They are all --

1 everything is done by operator action. All the responses are done by
2 operators.

3 The procedures at plants deal with basically slow leaks and
4 how to deal with them. And I did not see procedures that effectively
5 said at certain type -- that gave you information about, at a certain
6 level, you're supposed to seek additional offsite help or anything like
7 that. I might have missed that, but when I was there at the four sites,
8 I didn't notice that of any of them. Generally, the procedures are not
9 driven by the level of water in the pool.

10 The next -- the fire pumps and the capability of making up
11 for the spent fuel pool is also a potential concern. Under our
12 regulations, the utility is allowed to decide -- make a decision on what
13 fire equipment it needs at a decommissioning plant, in order to keep the
14 plant save, and that may or may not include, from NRC regulations, the
15 -- keeping the operability of the diesel-driven fire pump. It's my
16 understanding from conversations with various people in industry that
17 their insurance companies make sure that their fire pumps are operable.
18 And they have other reasons to believe that their equipment is operable,
19 and that's something that we're interested in hearing, how the reality
20 of the plants may differ from the assumptions that we've laid out in our
21 analysis.

22 I was very impressed by the training and experience of the
23 current crop of certified fuel handlers that I found at the four
24 decommissioning plants that I visited. I thought they were very highly
25 skilled. Most of them were former senior reactor operators, but that's
not in a necessity. The utilities are allowed to propose a training
program for their certified fuel handlers and theoretically. They could
take any individual and train them, whether or not they had a lot of
previous experience at the reactor and that person would then be a
certified fuel handler.

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1 And finally, we come to redundancy, defense-in-depth,
2 diversity of equipment, margin of safety type questions, because what I
3 found that in spent fuel pool, cooling systems, who are out at the
4 plants, they were primarily one train system, in the sense that they
5 were running off of -- as a matter of fact, most -- a lot of the plants,
6 all of the spent fuel for cooling equipment is running off of one bus.
7 There were no diesel generators that were there to provide backup.
8 There were no uninterruptable power sources. And we felt that, at
9 least, it would be very important to address the -- what
10 defense-in-depth means for a decommissioning plant, what type of margins
11 to safety do they have, and how do they maintain redundancy there.

12 Now, I'm going to skip on to the next one. Just to give you
13 an idea about what kind of numbers we came up with, and these are
14 numbers that came out of our report, for the frequency of fuel
15 uncovered. Now, you notice here I'm talking about frequency of fuel
16 uncover; but, earlier, I was talking about frequency of zirconium fire.
17 And there's a little disconnect there, and I'd like to explain that
18 disconnect.

19 It was relatively straightforward, in a certain way, to
20 calculate what was the frequency of fuel uncover, because you know how
21 fast the water is going to ball off, based on the decay heat levels that
22 you're assuming. So, we could do that calculation pretty well. But the
23 -- what actually happens when you start uncovering the fuel and you
24 start getting your zirconium -- you know, how quickly you get to
25 zirconium fire. We don't have as much information in those areas.

 It was also assumed, and that was partially a simplifying
assumption, that it would be impossible for the operators to get in
there and affectively mitigate the accident, in the event that the fuel
was uncovered. And this was a -- assumed that this was true, based on
the potential dose rates associated with the spent fuel pool being

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1 uncovered. That's something we're also interested in understanding
2 better, in case that we've greatly misunderstood that concern. So,
3 we're assuming that once the fuel gets uncovered, effectively, you can't
4 get in there and mitigate it and, therefore, fuel uncovering effectively
5 leads to zirconium fire. So, these frequencies here give you -- tells
6 you what the initiating event is. And then on the right hand side, it
7 tells you what is our chance of getting fuel uncovering.

8 Now, you notice it says for case one -- if you look in our
9 report, we had three different cases. Case one was kind of the as found
10 case, based on how I found the four decommissioning plants to be staffed
11 and operated. Case two looked at that same reactor, but assumed that
12 instead of the last fuel being moved one year previously, assumed the
13 last fuel was moved one month previously. And case three was where we
14 looked at if a utility went in and kind of went bare bones with minimum
15 or a little bit better than minimum amounts that are allowed by the
16 regulation, what would their configuration look at, and we analyzed that
17 particular case. But, we feel case one is the one that's most
18 applicable here.

19 Next slide, please. Okay. These are the intermediate
20 mitigation events. And these are events where -- the intermediate
21 mitigation events, what's happening here is that we're getting a pipe
22 break or a hose has fallen into the spent fuel pool and then we get a
23 siphoning event, so that somehow, we're siphoning water out of the pool.
24 And we're looking -- we assumed that the water was effectively siphoned
25 down to, oh, about eight feet above the fuel. And then at five feet, as
assumed that the -- five feet, does evacuation begin, Mike, or we start
telling them about evacuation?

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Five feet was the time of evacuation. So, that's the
difference. These events occur faster than the previous events, which
took days to occur. These occur in a day or less, okay.

1 The first event there, you have a small loss of inventory
2 event that occurs and the data for this came from actual data at
3 decommissioning plants. Spent fuel pool level is not restored either by
4 the makeup pumps or the fire pumps, and that's because either the
5 operators made a mistake or they had hardware failure and they didn't
6 call an offsite recovery.

7 The second one was a large loss of inventory. The
8 difference between the small loss and a large loss is that a small loss
9 can be handled by the standard makeup pumps that the spent fuel -- of
10 the spent fuel pool cooling system. For the large loss of inventory
11 event, you need the fire pumps, because they have significantly greater
12 capacity. And, again, it's the same basic scenario, where they're not
13 able to make up or they don't make up and then they don't call in
14 offsite resources.

15 And the last one is a loss of -- small loss of inventory
16 event. Control room alarms don't go off and the operators fail to
17 notice the condition during their walkdowns.

18 Now, we have the same basic staff concerns for the
19 intermediate, as we did as the long term. But, the other staff concerns
20 that are additional here is that we're concerned about vacuum breakers,
21 because we've found instances in the literature, where vacuum breakers
22 have not been adequately sized or tested and there have been actual
23 experience with that at plants. It's our understanding, at this time,
24 that there are probably not any large pipes penetrating this spent fuel
25 pool near or below the fuel level that are not capped off. But, we
would want to have that type of thing confirmed when someone comes in.
And similarly, there are no intermediate size or large size pipes,
either permanent or temporary, that extend significantly down into the
spent fuel pool and it could act as siphons.

So, that's -- that's really what I wanted to tell you about

1 our analysis for these type of events. And, again, the key is we wanted
2 you to not focus on the numbers, but to focus on the insights that we
3 got out. What are our concerns that we see from the analysis? The
4 analysis tells us that there are certain things that kind of stare at us
5 when we look at the PRA results and tell us that maybe this is an area
6 that we need to look at a little bit closely. And, hopefully, we can
7 hear more about that.

8 MR. CAMERON: Okay. Thanks, Glenn. I know there's going to
9 be lots of comments and questions on the presentation. What I'd like to
10 do is to go to Ed Burns and get his information on the table and then we
11 can take a break and then come back for full discussion. And I would
12 note that there is a penalty for knocking the microphones into the well
13 here. But, you --

14 SPEAKER: Only the live ones.

15 MR. CAMERON: Only the live ones, okay. I'm glad we
16 clarified that. At any rate, Ed, how would you like to do this? Would
17 you like to use this microphone and stand up here and do your
18 presentation?

19 MR. BURNS: This is an effort that was the result of a
20 NEI-sponsored review of the NRC draft probabilistic analysis. And
21 included in that review, we looked at seven other related NRC-sponsored
22 evaluations that also looked at spent fuel pool risks. And this effort,
23 as was pointed out earlier, to provide really a constructive feedback on
24 the draft assessment and to provide any information that the industry
25 might have or any perspective that we may have relative to what's
important, as we view it.

Some of the major topics that I'd like to talk about is the
general purpose of the draft document and of this discussion that we're
providing. Some of the previous probabilistic perspective have been
performed by the NRC and their contractors. Talk a little bit about

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1 consistency of analysis assumptions and then the design of the decision
2 criteria that are used, basically, the success criteria for each of the
3 N states; then realism in accident sequences, particularly the
4 initiating event frequency, the crew response, and then the time allowed
5 for operator actions. And then, we'll talk a little bit about what the
6 dominant contributors might be, if we -- if we would requantify those
7 sequences. And clearly any requantification presentation that I would
8 give you would be very superficial, based upon we've only had a short
9 time to look at this; and then finally, some risk insights that we've
10 identified, as part of our review of the report.

11 We certainly agree with the draft staff report assessment
12 that the quantification that was presented in that document was a near
13 an upper bound. And we'll discuss what the implications of that upper
14 bound might be. And, secondly, we certainly agree that the framework
15 that's presented in the draft report is -- appears to be very usable and
16 applicable, as a tool and framework for characterizing the risk
17 perspective.

18 MR. RICHARDS: Ed, can you give us a little background on
19 your background?

20 MR. BURNS: Let's see. I've been doing risk analysis since
21 1976, mostly in the BWR area, for at power risk analysis. Some of the
22 original work that we did was started with some -- actually, some
23 safeguard work for Sandia that we did originally, to try and see whether
24 safeguard work could be performed in a probabilistic framework. I've
25 done five full at power PRA developments and participated with the BWR
owner's group industry and in various probabilistic risk assessment and
arguments relative to regulatory requirements.

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What we want to do is we want to make sure that we can
effectively use PRA arguments in a risk informed environment. So, risk
informed regulation really uses PRA input to optimize the allocation of

1 limited resources. And as stated in the draft report, it's to reduce
2 unnecessary conservatisms associated with current regulatory
3 requirements. So, those are the kinds of purposes that we've set up, to
4 look at reviewing this document.

5 Previously probabilistic analysis of spent fuel pool and
6 severe accidents at decommissioning plants have looked at -- primarily
7 considered seismic-induced spent fuel pool, as one of the primary
8 mechanisms of causing risk. Additionally, the cask drop accident has
9 been identified previously, although NUREG 1353 identified that
10 resolution of the generic issue 836 resolved that issue and made it a
11 non-dominant contributor to severe accident risk.

12 If you examine some of the seven or so previous documents
13 that have been identified, have been developed to look at risk under
14 severe accidents at spent fuel pools, you'll see that, in general, they
15 come to the conclusion that seismic induced spent fuel pool failure is
16 one of the dominant contributors. And that's the one area that I'm not
17 going to cover today and we're going to cover that tomorrow. Tom O'Hara
18 will be here to discuss that contributor to potential risk.

19 You'll see that there are several other contributors that
20 have been identified by various NUREGs. The currently draft report that
21 we're discussing discusses -- or identifies those -- virtually each of
22 those ones that have been identified previously, as risk significant.
23 So, it says that each of the ones that we've identified, that have been
24 talked about and identified before are all risk significant.

25 One of the things that triggered the concern, I think, at
NEI was that in -- with the numerical numbers that were presented in the
report, involved the fact that in NUREG 1353, which looked at some of
the risks that might be associated with this spent fuel pool, the risks
were generally considered to be, in terms of draining the pool,
relatively low, a 10 to the minus eight, the 10 to the minus range,

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1 except for the seismic event. Whereas the draft report that was given
2 to NEI for review indicated that there were a large number of
3 contributors that could be in the 10 to the minus seven to 10 to the
4 minus six range. Admittedly, there's a difference between what 1353
5 identified as best estimate and what the draft report identified as
6 upper bound or you might call it worse case analysis. So, we're looking
7 for some consistence in those calculations and what exactly we would
8 like the characterize the risk with.

9 The consistency argument revolves around whether we can
10 identify a well recognized measure of risk that we're all comfortable
11 with. In other words, if we can't identify something that is consistent
12 with the safety goal, what other surrogate measure that we have that we
13 could use in place of that. And it's difficult currently to correlate
14 that in-state -- an in-state in a spent fuel pool with the analysis that
15 we've done thus far in PRA relative to core damage frequency. We have a
16 feeling for what core damage frequency means and we have a feeling for
17 what large early release means and we have a feeling for what those
18 relationships are to the quantitative and qualitated health effects on
19 the public. But for the spent fuel pool, there's a much less comfort
20 regime relative to any surrogate measure that we have.

21 So, to try and get a clear technical basis for evaluating
22 severe accidents at spent fuel pools, we want to make sure that there's
23 a clear connection between any deterministic analysis that's performed,
24 i.e., the zirc fire analysis, and what the probabilistic analysis is
25 saying, so that there's a connection or, if you will, a direct
relationship between a probabilistic analysis that's performed and the
deterministic offsite health affects that are developed. And that would
be consistent with -- and the fact that we want to make that a best
estimate calculation would be consistent with reg guide 1174, the
several accident policy -- or the safety goal policy statement and the

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1 way that the current ASME PRA standard, regarding PRA as being
2 developed.

3 So, connecting risk measures in end states with what we know
4 or what the probabilistic analysis, that's definitely a difficult area.
5 Different sequences result in much different potential challenges, in
6 terms of timing, complexity of action, and resources that can be brought
7 to bear. An that's one of the areas that seems to be missing from the
8 draft report, is that connection. The draft report uses frequency of
9 fuel uncovering, as a risk measure, but that is a little bit -- it's
10 different, in terms of draining the pool versus a boil-down scenario.
11 So, you've got -- and the eventual inference from the report is that the
12 frequency of fuel uncovering does equal what's called a release to the
13 zirc fire. So, that connection -- or that inference is not convincingly
14 made in a probabilistic framework.

15 Alternatively, what we could --

16 MR. KELLY: I didn't understand what you were saying there.
17 Could you -- the last part, could you explain what you mean by that?

18 MR. BURNS: Normally, what we would do, if you wanted to
19 draw an analogy between a level one PRA and a level two PRA, you'd have
20 some kind of a bridge tree or you'd have a connection between the
21 consequences or the progression or the mitigation of the severe
22 accident, once you had determined that there was some challenge to the
23 fuel. So, if you wanted to declare the end state of the first part of
24 your analysis to be failure of frequency of fuel uncovering, that would be
25 fine. And then, you'd want to look at what the mitigation measures are
subsequent to that, that you still had available. So, you may still
have resources that you can be -- can be brought to bear to prevent a
zirc fire, even though you've reached the point of the top of the active
& fuel.

Alternatively, though, we could use the frequency of fuel

1 uncovery as a measure to show that risk was below what was credible.
2 So, if you could demonstrate that all of the frequencies that could get
3 you there are so low that you are not concerned about it, then that
4 would still be -- then that would provide an adequate measure of risk, I
5 think. But, that's not currently what the draft report says.

6 The other area of potential disconnect between the end state
7 and the probabilistic analysis, that previously, as we mentioned, the
8 probabilistic analyses that had been performed indicated that the loss
9 of pool water was the dominant contributor, mainly through a seismic
10 event. And the deterministic calculations that had been performed,
11 regarding the zirc fire analysis and the off-site doses, were generally
12 consistent with that. So, we don't have a direct correspondence between
13 the consequences of a boil-down event, which is now one of the more
14 dominant contributors in the analysis, and what the off-site doses would
15 be.

16 This just is to reiterate that there does appear to be a
17 need to make a stronger correlation between a front end probabilistic
18 analysis and the consequence event for release to the public. And just
19 another reiteration of the same topic is that even the recent reports,
20 INEL report, upon which most of the data -- or a lot of the data is
21 used, is derived for use in the draft NRC report. The INEL report was
22 really for an operating plant and it, also, had a different end state.
23 It used near boiling frequency, not the frequency of fuel uncovery. So,
24 the end states that were in the two reports were different and, yet, the
25 data, the timing, those kinds of things, appear to be taken to be the
 same.

 So, if there is an inconsistency in the end state, that
 might be considered a flaw in the analysis. We think that the framework
 is still excellent and usable. And as part of the review, we've tried
 to requantify some of the sequences, to see if they can be identified as

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1 still below what would be considered a credible accident and, therefore,
2 allow the use of frequency of fuel uncovering to be a surrogate measure
3 that we could use to show that while we're below -- we're below this
4 value and, therefore, the risk could be considered very low.

5 This is my pitch for best estimate accident sequence
6 frequencies. Really, in the risk informed regulation, we depend a great
7 deal on the ability to characterize on a best estimate basis the
8 accident scenarios. This best estimate characterization can then be
9 used to prioritize resource allocation. I think that's consistent with
10 the direction that the Commission is heading and the ACRS has pointed
11 us. The use of upper bound or worst case assumptions to demonstrate the
12 importance of an issue is difficult to fit into that risk informed,
13 unless you can demonstrate that the upper bound or worst case tells you
14 that there is no risk.

15 MR. KELLY: Could you point out -- this is Glenn Kelly,
16 could you point out where you feel the analysis uses upper bound or
17 worst case assumptions, as we're going through here, so we can help
18 understand what it is specifically you mean?

19 MR. BURNS: Sure. I guess I was going by the fact that the
20 report said you used upper bound analysis.

21 MR. KELLY: No, it doesn't say that.

22 MR. BURNS: Maybe I misinterpreted what I read.

23 The conservative analysis that I -- the conservative ideas
24 that I found were that conservatisms included -- the reasons that we
25 want to take out conservatisms are to make sure that we have a level
playing field for addressing, on a realistic basis, what are the
accident sequences to be concerned with. We want to ensure that the
analysis is not an upper bound and we want to avoid conservative bias.
The contributors, then, could be compared equally across the board.

These are the -- in the limited time that we had to look at

1 the report, these are the items that we've identified as potentially
2 conservatisms. And I certainly don't want to mislead you and say there
3 are no non-conservatisms in the analysis, because I think that there may
4 be some areas that -- particularly, with HRA dependency, that may not be
5 treated. But, in terms of conservatisms, the HEPs, we believe are
6 relatively high for the accidents that we're looking at. The LOOP
7 initiators, AC power recovery probabilities, the diesel fire pump
8 reliability, the times that are being used as the time frames appear to
9 be relatively short, and the temperature of the zirc ignition for the
10 consequence analysis.

11 As far as the HRA goes, the analysis appears to cite INEL
12 document as the basis for the HRAs. The INEL document, in turn, says
13 that the HRA methodology that was used was a simple approach. It was
14 established in the draft report, which doesn't appear to have been
15 reviewed. One, I'd like to see people like Alan Swain or Gareth Parry
16 try to review that methodology before it was used. We -- it was
17 described in the INEL document as a relatively quick and conservative
18 methodology to estimate HEPs, and it appeared to not be sensitive to
19 whether -- what the operating characteristics of the procedures were.

20 Also, the time windows that were used in the INEL report
21 were very short, based upon they were full core off-load and in an
22 operating plant, as I said, earlier, and, therefore, they were much
23 shorter than the time frames that we're discussing.

24 The kinds of information that the HRA -- you would like to
25 see in an HRA is credit for self checking from the crew, the second crew
member check, additional shift attention in recovery, additional cues
causing increased attention -- that would mean multiple spaced alarms;
in other words, the temperature alarm, the level alarm, and the
& radiation alarm are all staggered in time relative to most of these
sequences -- and the long reaction times. Particularly, there is also,

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1 because of the multiple days involved, there's a management oversight
2 question of whether that would add some level of additional benefit to
3 the operating crew and the organization response.

4 The desirable features of an HRA would include considering
5 the performance shaping factors of the complexity that he has to deal,
6 in terms of the accident, the time available that he has, what
7 management oversight over multiple days occur, and the shift changeover.
8 Those are all things that would affect the performance shaping factor of
9 the response to the accident. They don't seem to be addressed in the --
10 at least in the draft that we looked at.

11 What we were looking for were things like in PRA, the Swain
12 handbook and the EPRI cause-based methodology; identify things related
13 to shift changeover, as a beneficial effect, in terms of reducing the
14 probability of failure of an operating crew or organization to respond
15 to an accident. And not very much credit is given for that shift
16 changeover for -- and this is really related more towards valve
17 dispositioning or annunciators that are out of commission or such
18 things. But, in this particular case, if you just use that relatively
19 conservative approach, you get very low numbers, in terms of what the --
20 what the shift changeover should benefit you. In addition, the
21 annunciation response, those numbers are very low and the diagnosis by
22 the control room personnel for a one-day event are extremely low. So
23 those are the kind of numbers that one might expect to see.

24 But, when I tried to look at some of the numbers if found in
25 the report, it appeared that the recognition, for example, of loss of
cooling had very long time, maybe 15 shifts of people looking at this
information, and the HEP assigned to it was relatively high. You'll
notice that the ranges of HEPs that are identified here are from three
to a minus three, to one minus two, a pretty narrow range, considering
the long -- very long time frames and the different actions that are

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1 being taken. So, each of these -- so this was an area that we thought
2 might be desirable to have a second look at.

3 For comparison, if you look at what's used at at power PRAs,
4 you'll find that back in 1978 and 1980, when we did the ATWS rulemaking,
5 which was a risk -- one of the risk informed applications of PRA, at
6 least in my judgment, that we looked at what kind of operator actions
7 could be taken under ATWS conditions, under very short time frames, and
8 at power PRAs. And we used human error probabilities in the range of
9 ten to the minus two, to ten to the minus three, under relatively short
10 conditions. And in at power PRAs, we used, under the 24 hour mission
11 time, if he has long times to take actions, we credit - generally credit
12 numbers in the 10 to the minus five to 10 to the minus six probability
13 range for those kinds of actions. So, there is a precedent for using
14 relatively low numbers.

15 For the loss of cooling event, which is identified in the
16 draft report, this is one of the most -- this is the most
17 straightforward one for the operating crew to respond to and it's also
18 one that has a dominant contribution in the draft report and one that's
19 relatively -- I'll say relatively new, in terms of the past 12 years in
20 risk analysis of the spent fuel pool.

21 The characteristics of the event scenario, we have alarms
22 that occurring not sequentially and not closely spaced in time, in terms
23 of level of temperature and radiation. I may have a camera that are
24 observing that condition in the spent fuel pool. Shift lock down of the
25 area, which should provide a substantial benefit, in terms of
identifying the problem and a substantial amount of time for offsite
recovery repair and bringing creative conditions to bear.

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The loss of offsite power event, which is in the same
category as the loss of cooling event, is just caused by the loss of
offsite power, in this case. In this case, I know I have a problem. I

1 don't need an alarm. I know I don't have any cooling to the spent fuel
2 pool. So, the HEP could be argued to be even lower, in this case. In
3 fact, the stress level might be -- if you remember the swing curve of
4 optimum stress, you might be under optimist -- it's not a routine
5 situation and it's not an immediate life threatening situation. So, the
6 HEPs that one might assign could be argued to be even lower than
7 strictly just the loss of cooling event.

8 I don't want to go down a primrose path, though the PRA
9 methods really are very poor in this area. We have examples of where we
10 include recovery in PRA over 24 hours. They're usually procedurally
11 directed, sometimes will include the exponential repair model, which is
12 included in the draft report and sometimes will invoke off-site
13 resources. But, that's rare.

14 If you go beyond 24 hours, I don't think it's unreasonable
15 to expect that ad hoc actions by the crew and the offsite engineering
16 would be applied, nor that corporate resources could be brought to bear.
17 So -- but there really isn't a methodology that's been developed, and I
18 think that's been said earlier, to cope with such a problem --
19 methodology problem.

20 What I would -- what are the implications of all of this, in
21 terms of HRA? I think that the draft analysis is inconsistent with past
22 PRA practices regarding best estimate HEP quantification. Again, they
23 appear to me to be more upper bound calculations. The long duration of
24 events is not explicitly incorporated in the quantification of the loss
25 of cooling event, at least in my judgment. Reductions of factors of ten
to a thousand in the HEP's could be considered consistent with current
practice. In fact, Swain acknowledges that some of the HEPs can be slow
low as not being needed -- need to be considered further, in the
& analysis.

The present analysis provides -- because of this sort of

1 uneven conservatism, which affects mostly the lost of cooking events,
2 could lead -- mislead the decision makers by saying that the loss of
3 cooling events are extremely important in the context of spent fuel pool
4 analysis, since the HEPs dominate many of those accident sequences.

5 I will skip over the next few slides. These are other
6 examples of conservative bias. The LOOP initiated event frequency, if I
7 use the latest NRC data from offsite power, I'd get a factor of two
8 reduction in LOOP frequency. If I use that same data, the offsite AC
9 power recovery goes down by a factor of 10. And I can argue that the
10 frequent -- total frequency of fuel uncovering is down by an order of --
11 two orders of magnitude, if I run through the HEPs on that analysis.

12 The next is the curve that I used to grab those -- it's
13 based upon the NUREG analysis. The cask drop and accident analysis,
14 again, in 1355, it was identified to be three times 10 to the minus
15 eight and the draft analysis is identified to be two orders of magnitude
16 higher.

17 The diesel fire pump, the value that's used for the diesel
18 fire point is 20 percent of the time, it's not working. You probably
19 should rip it out of the plant, if it's only 20 percent. Eighty percent
20 reliable, it's probably not worth even having there.

21 The time frames are one of the crucial items, especially in
22 the loss of cooling event. In the draft analysis, it appears that the
23 first 24 hours, which is the pool heat up time, which is the time when I
24 would expect to find the problem, which -- I need to find the problem
25 when the pool is heating up to boiling. It appears that the draft
report gives me credit for 24 hours; whereas on a realistic basis, I
would expect that pool heat up to occur over 90 hours, which is still --
which is a substantial difference. The boil down time, for the purposes
of this diagram, I just used the same value that's in the draft report.
But, again, I think that's a relatively conservative value. If you add

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1 up all these numbers, how long this event is occurring, it's occurring
2 over seven days. So, this is a seven day evolution that's happening.

3 The last item that I'll identify as a conservatism is the
4 ignition temperature for the zirconium. The draft report clearly states
5 that the information indicates that the zirc condition could be higher
6 than 16,000 degrees centigrade. So, the onset of oxidation would appear
7 to be a more conservative estimate of what that -- what that temperature
8 is.

9 We would advocate that the draft report continue with the
10 framework that exists and that some consideration be given to
11 requantifying the sequences, maybe eliminating some of the conservatisms
12 that have been identified and may be identified in the future.
13 Basically, to reassess the operator actions that would be logical to
14 credit and ensure that best estimate evaluations of the initiating
15 events and equipment response be included.

16 My cut at that, and this is certainly just a very -- very
17 preliminary analysis, would say that if you did that, you could get a
18 best estimate evaluation of the sequence frequencies that are around
19 four times 10 to the minus seven, versus the one time seven minus five.
20 This does not include seismic, so that number of four minus seven would
21 change, based on whatever the seismic evaluation would indicate.

22 Now, if I was -- if I was imaginative, I would have had the
23 two pie charts together, with the relative size as a function of the
24 area. But, I don't have that. This is a distribution of accident
25 sequences, as a result of the draft report. And you can see that other
than the seismic event and the cask drop event and the loss of
inventory, these other events, these other contributors are loss of
pooling events that make up the rest of the pie.

For the reanalysis that -- requantification, this indicates
the distribution, where the loss of offsite power due to severe weather

1 was the dominant contributor in the revised frequency that I calculated.
2 The table that's present here gives a very brief description of some of
3 the rationale that was used to change some of the numbers. I'll skip
4 that and go directly to what risk insights could be derived and they are
5 very similar, in some cases, to the ones that were identified by Glenn.
6 We would want to make sure that the reliability of the gate seals in the
7 spent fuel pool is sufficient to make sure that they're not going to
8 leak; that the spent fuel pool cooling system has adequate siphoned
9 break valves; that any temporary pumps that are used as part of the
10 spent fuel pool also have controls on the suction of discharge and the
11 siphon breaks. And then we would want to make sure that we had the
12 capability to align the diesel fire pump to the spent fuel pool without
13 actually access to the refuel floor. Those are the basis for a lot of
14 the numbers -- or some of the numbers that I used as part of the
15 requantification.

16 I guess I would summarize by saying that the approximate
17 requantification indicates that there's a substantial conservatism in
18 the NRC estimates and that a requantification of the risk analysis to
19 reflecting past NRC analysis and current PRA HRA practice, and best
20 estimate versus worst case analysis would be appropriate.

21 MR. ZWOLINSKI: Say, Ed, John Zwolinski?

22 MR. BURNS: Yes, sir.

23 MR. ZWOLINSKI: Could you go back to your risk insight
24 slide, just before your summary? Are these the kinds of things that you
25 would expect to see in a plant in the future adopt, as common practice,
or ensure exist, along with addressing some of the human performance
issues you were talking earlier to?

MR. BURNS: What I personally would expect, yes.

MR. ZWOLINSKI: Okay. I'm trying to get the context for
your --

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1 MR. BURNS: Yes, exactly. I tried to incorporate those in
2 the analysis.

3 MR. ZWOLINSKI: Okay.

4 MR. MEISNER: John, let me expand on that just a bit -- just
5 to expand real briefly. We all knew coming into the workshop that what
6 would be most constructive is to come prepared with a set of commitments
7 that if, in fact, those commitments would be credited in the reanalysis
8 for the PRA and demonstrate that lower risk level, that the industry
9 would be willing to make. These are some examples. Don't take this as
10 a complete set. The next sessions we're going to be getting into will
11 deal more with the procedural aspects of things that also might go to
12 lowering human error probabilities. So, you need to look at -- this is
13 more design related and the next session we'll be talking about more
14 procedural oriented commitments that the industry is willing to put into
15 FSARs, for instance, given the sufficient credit in the staff's
16 reanalysis.

17 MR. CAMERON: Okay. Those are good clarifications. And I'd
18 like to let Ed finish up here and then we're going to take a break. And
19 I have a question for all of you to consider on that break, in terms of
20 our future discussions. But, go ahead, Ed.

21 MR. BURNS: So, I'm down to the last slide. Frequency of
22 the zirc fire sequences, at least for the non-seismic events that I've
23 looked at, appear to be below what I would call a credible range, 10
24 minus six range. Accidents that have higher frequencies might be more
25 considered as part of future analysis involving fuel handling mishaps,
for example. They would have higher frequencies and may be more
appropriate to be considered as part of the severe events that could
occur and cause offsite doses.

MR. MEISNER: And if you don't mind, I'll just expand on
that a bit. And it goes back to what Ray Shadis said earlier, that once

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1 you correctly characterize some of these oddball events, what you're
2 driven back to is what can really happen. And what the industry is
3 proposing is to start considering now things like the real probable
4 events, like fuel handling accidents. Do your calculations to determine
5 when those accidents, for instance, offsite consequences, drop below the
6 one rem EPA PAGs for emergency planning, as an example, and use those
7 kinds of insights on probable occurrences, to drive the kind of
8 rulemaking and relief for exemptions that we're all focused on.

9 MR. CAMERON: Okay. Thank you. We're going to take a break
10 in a minute. But, as you can see from Ed's presentation, there is a lot
11 of information here and, of course, we'll put this in the transcript,
12 attach a copy of this. Glenn, also, went through a lot of information,
13 including staff concerns.

14 What we need to figure out how to do, to use our time most
15 efficiently, is how do we organize our discussion when we come back from
16 the break. Some of the material in Glenn's presentation, some of the
17 material in Ed's presentation may be more appropriate for the mitigation
18 sessions, okay, rather than this general session. We could spend the
19 whole time just reacting to some of the slides that Ed put up, and I'm
20 not suggesting that that would be a bad way to do it. But, we really
21 need to figure out are there major organizational chunks that we can
22 proceed through in our discussion, when we come back.

23 And I see Mike has his tent up and that's good. I just
24 remind everybody when we do come back, if you want to talk, put your
25 name tent up. But, I don't -- you know, I sort of hesitate to jump off
onto the organizational discussion, before we give everybody a chance
to, you know, get out of here for a little break. But, Mike, do you
want to wait until we come back or do you have a --

MR. MEISNER: Two quick things. One, I just want to
indicate that in addition to the presentation, we've got a draft report

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1 that goes into more detail in all this. We need to flush it out and
2 we'll provide it to the staff.

3 MR. CAMERON: All right.

4 MR. MEISNER: The second things is my recommendation for
5 after we come back from the break is to focus on the area that dominates
6 the whole analysis and that's human error.

7 MR. CAMERON: Okay, that's one suggestion for everybody to
8 think about. And I guess I would like to talk to some of the NRC staff
9 during the break on any of those suggestions. John, do you want to say
10 something?

11 MR. ZWOLINSKI: Just for clarification, the draft report
12 you're alluding to, this would be something you would docket sometime in
13 the future?

14 MR. MEISNER: Yes.

15 MR. CAMERON: Okay. All right, let's go for a break and,
16 you know, let's be back here at 11:00. That gives you 20 minutes.
17 That's a good break. And think about the organizational issue I posed.

18 [Recess.]

19 MR. CAMERON: Okay. Just two administrative announcements.
20 One is if you haven't signed it out front, please sign in and leave us
21 your address, so that we can get any information on this workshop or
22 future discussions of this issue or related issues out to you. And
23 secondly, just for all of the NRC staff here, the NRC is going to have a
24 small caucus 15 minutes before we are scheduled to come back from our
25 lunch break, whenever that is going to be.

I talked to a couple of people about the organizational
issue and I think David may have some comments on that, and we'll go to
him in a minute. But, it makes sense to, I think, deal with any
methodology issues, any issues on initiating events, sequences, generic
PRA issues. The HRA issue, as we've been calling it, has a lot of

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1 discussion that's going to come up in the mitigation sections. But, I
2 think that it what Mike was referring to before is that there's a
3 generic issue there, in terms of assumptions that are made. I think he
4 wants to discuss that.

5 So, I would like to see if we can -- whatever we agree or --
6 agree on, in light of the items that we're going to discuss to finish
7 out this session on sequences, to see what should be placed up here on
8 the action items, in terms of next steps that NRC, the industry,
9 whomever, are going to take, to try to close out those issues one way or
10 another.

11 Okay, that's my two bits on this subject. David, do you
12 have some ideas of where we should go on this now?

13 MR. LOCHBAUM: Not really. I was just going to -- I have
14 three comments, based on this morning's session. Should I go into those
15 or do we want to discuss organizations?

16 MR. CAMERON: Let me see if anybody else has some
17 organizational thoughts. I don't want to discuss substantive issues
18 now, okay. But, does anybody have a disagreement? Does everybody
19 understand my vague description of where we're going to -- what we would
20 like to do in this -- to finish off this session and does anybody have
21 any disagreement or anything to add on that?

22 [No response.]

23 MR. CAMERON: Okay. Let's do that. Now, David, I'm
24 assuming that, you know, your comments are probably going to be relevant
25 to this particular session; but they may be relevant to something else,
too. But, that's fine. Why don't you go ahead.

MR. LOCHBAUM: Well, the first comment addressed that
directly. There's been some discussion about future safeguards activity
in a decommissioning area. Without a program, it's very difficult to
figure out how this effort fits into the overall big picture of what the

1 NRC is doing on decommissioning. So, I don't know if comments are --
2 should be spoken at this session, or if there's something coming up down
3 the road that it would be better to address it in that forum. We don't
4 know. This is -- as far as we know, this is it. This is the only --
5 the only one ever. We don't know that there's going to be something
6 down the road. We've heard some illusions to it, some implications,
7 but, again, without a program, we don't know.

8 MR. CAMERON: Okay. That's an -- you know, that's an
9 important point and I think that probably that would fit into tomorrow
10 afternoon's ending session. But, maybe we can get that off the time
11 now, in terms of -- we had some discussion about safeguards. And as
12 Gary pointed out this morning -- a couple of things pointed out by the
13 NRC this morning, is: one is that this report should explicitly address
14 how the safeguard issue is being handled or not handled, why it isn't in
15 here, some of the discussion from this morning. And, Gary, if I
16 mischaracterized that, please correct me.

17 We, also, heard, I think from Stu, that the safeguard issue
18 is going to be dealt with in a future rulemaking. Does the NRC have
19 anything more explicit to add, at this point, in terms of a score card?
20 In other words, when and how is the safeguards issue for decommissioning
21 going to be addressed? Or will the NRC say that yes, we're going to
22 make a commitment to address it in such and such a way? I guess there's
23 some supporters out there for something that I just said; I'm not sure
24 what. But, Gary, Stu -- and I don't know, Stu, this maybe more in your
25 bailiwick. I don't know. But, can you give anybody an idea about when
and how the safeguards issue is going to be address?

MR. RICHARDS: Not much beyond what I've already said. And
the reason I'm somewhat hesitant to speak to it is that I don't -- you
know, I don't have any personal experience with the peculiar rules that
may go along with dealing with safeguards information in security

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1 rulemaking. So, I can't really sit here and say though, you know, there
2 will be an opportunity for public comment on that; and then later find
3 out that because of the safeguards information, that's not the way it's
4 done. I just don't know.

5 I do know that there has been some discussion internally
6 that the -- you know, the safeguards issues need to be addressed. It's
7 part of our integrated approach. We're talking with the security people
8 on that. And I'm sure to a degree that the process allows public
9 involvement in rulemaking, we'll allow it.

10 MR. CAMERON: Well, if you -- can the NRC, at least, commit
11 to specific evaluation of what type of process --

12 MR. LOCHBAUM: Before you --

13 MR. CAMERON: -- might be used and when? Go ahead, David.

14 MR. LOCHBAUM: That wasn't what I was looking for.

15 MR. CAMERON: All right, okay. Go ahead.

16 MR. LOCHBAUM: I was using safeguards as an example of --
17 there's this decommissioning meeting on spent fuel accidents. There's
18 also some talk about the safeguards in the decommissioning arena. All I
19 was asking for was some program, as to what the NRC's big picture plans
20 are for decommissioning, whether it's one task, three tasks, nine --
21 whatever, safeguards being an example of something else that's going on.

22 MR. CAMERON: Okay. Broader issue. Do you want to address
23 that now or do you want to do that tomorrow afternoon?

24 MR. RICHARDS: Maybe, I can talk with David separately. As
25 I mentioned before, we put our broad plan in front of the Commission in
the SECY paper that's available as a handout. You know, I don't know
what kind of detail you're looking for, but that SECY paper lays out
what we're looking for and we're still waiting for feedback on the
Commission -- from the Commission on whether we ought to do it or not.

MR. LOCHBAUM: Did we -- you did mention the safeguards. I

1 assume that it was complete, but it lacked that element.

2 MR. RICHARDS: SECY didn't mention safeguards?

3 MR. GUNTER: No.

4 MR. RICHARDS: I think it's in there.

5 MR. LOCHBAUM: Can you point it out for us?

6 MR. CAMERON: Okay. I have a suggestion here on this one.
7 While we're looking for that, let's explicitly have this discussion
8 again about the plan for decommissioning tomorrow afternoon, okay.

9 MR. LOCHBAUM: Sure, as part of the closing.

10 MR. CAMERON: All right.

11 MS. ORDAZ: It's under background on page two. That's where
12 it's first mentioned. And Diane mentioned it's also on page six as a
13 bullet.

14 MR. CAMERON: Okay. Let's, you know, specifically flag
15 those and point those out for David. But, we are going to revisit --
16 we'll specifically revisit this issue and, you know, hopefully, you
17 will, you know, be able to be with us. But even if you're not, I think
18 we know what your concern is, so we'll do that. Now, your second point.

19 MR. LOCHBAUM: The second point was the NRC -- the
20 discussion today seemed to be focused on not killing members of the
21 public, which we're all in favor of. But the NRC, also, has a rule or
22 an obligation to protect plant workers. And the focus on severe
23 accidents, or specifically spent fuel pool accident, is only -- or its
24 primary function is to protect the public. There are less severe
25 accidents, including things that lead to spent fuel uncovering without
zirc fire, that can pose a very severe threat to plant workers. And
that seems to be totally ignored in this decommissioning arena. We
think it should be covered, because the worker need to be protected, as
& much as the members of the public do.

The third point was on human performance. In the last 15

1 years, 23 operating nuclear power plants have been shut down for a year
2 or more due to safety problems. They weren't safety problems caused by
3 workers making mistakes, they're not following procedures. It's
4 basically bad management that led to these problems. After a plant has
5 been shut down for a year or more, the NRC does -- takes away its
6 resident inspector. The plant no longer produces any revenue. The NRC
7 is no longer providing the same level of oversight as it did when it was
8 operating. So why should the public have any belief that the management
9 would be any better at a shutdown plant than it's been at operating
10 plants in the past? So, I think the true human performance factor that
11 should be looked at is plant management, not just where the workers
12 follow procedures or respond properly to an alarm.

13 MR. CAMERON: Let me ask the NRC staff, first of all, plant
14 worker implications for plant workers, how is that or will that be
15 factored into this? And I guess that at the same time, the management
16 issues, how will that be -- is it being factored in? Will it be
17 factored in? And is there some session that's coming up this afternoon
18 or tomorrow, where this would be relevant to have more of the discussion
19 on this issue, rather than just noting it for future discussions. Stu?

20 MR. RICHARDS: My answer may not be very satisfying. Mr.
21 Lochbaum and others have brought up some topics that I think are valid
22 points to consider. I'd like to respond to some, after having had a
23 chance to read our paper. As far as what's being covered in this
24 workshop, I think we're starting with what my boss calls the tallest
25 tree in the forest, which has been identified in the past as the zirc
fire issue.

The other issues, within design basis issues, I think Gary
Holahan already mentioned that we need to -- you know, we need to
discuss how we're going to deal with that. I think the worker
protection issues is just like -- well, all the other parts of our

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1 regulation still apply to decommissioning plants, for instance, Part 20.

2 You know, I don't want to see this workshop broadened in
3 scope. I think we have a pretty full agenda dealing with -- what's
4 perceived to be the higher risk events right now. But, I will say that
5 I believe our paper does discuss the fact that going forward in the
6 future, we intend to have an integrated rulemaking, as far as the
7 rulemaking process. Of course, there's a lot of public input. So, I
8 think there's going to be ample opportunity to address all of these
9 issues before we reach any kind of -- we're talking years here to
10 complete the rulemaking process.

11 MR. CAMERON: Does -- let me ask -- in light of that, let me
12 ask Gary, Gary there were two issues that you thought that it would be
13 useful for the study, to at least explain why they were not dealt with
14 or how they are going to be addressed. Does -- do these two issues that
15 David brought up, do they -- would they merit benefit from the same
16 treatment in the study?

17 MR. HOLAHAN: I think there are a little -- the two of them
18 a little different. The organizational element and its effects on human
19 performance and the accidents, itself, I think need to be discussed, as
20 part of the mitigation system -- mitigation discussion after lunch.
21 Because, I think even if you look at Glenn's view graphs. I mean, we
22 are talking about organization breakdowns, rather than individual
23 operator failures. And I think that's an essential element of the
24 study. And the reliability numbers that we talk about, you know, have
25 to reflect that.

The worker dose issue, I guess I'd have to think about a
little bit. It might fit into the category of things that we ought to
explain. I think I need to think about that a little bit, to see
whether, you know, other requirements, like Part 20 and, you know,
maintaining a low risk to public health and safety or, you know,

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1 adequately address that issue. So, if you're writing -- if that noise
2 as writing on the board that you're doing, I think, the word "consider"
3 is okay. But, I'm not sure that I'm committed to another section of the
4 report, yet.

5 MR. CAMERON: I said -- I said possibly consider on that
6 one.

7 MR. HOLAHAN: Okay.

8 MR. CAMERON: And I think what you're saying, and David, you
9 can, you know, when we go to the mitigation sessions, we'll make sure
10 that we try to explicitly address what Gary called organizational
11 breakdowns, okay, which I think has maybe -- your sense was the
12 management confidence issue. But, we'll try to work that in. Mike?

13 MR. MEISNER: Just to address maybe -- or suggest a
14 framework for the worker does issue. If I understood what you said,
15 David, it was a -- it was a situation maybe where you had -- you had it
16 drained down and then covered the field, but it didn't progress to a --
17 to a zirc --

18 MR. LOCHBAUM: That's just one scenario. There's -- all the
19 things that go on during decommissioning, if they go wrong, could
20 present a threat to the workers, as well as the public. Both hands of
21 that equation need to be properly dealt with and sure that both parties
22 are protected.

23 MR. MEISNER: Okay. I just wanted to suggest, except for
24 draindown situation, all the rest of that is within our license basis.
25 So, we have to consider it under the regulations.

As far as the draindown that doesn't progress to a zirc
fire, I would also suggest that exactly the same things we're talking
about here, and that's the probability of the draindown or loss of
cooling or whatever associated with the mitigative actions would not
only protect public health and safety, but would do the same for the

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1 workers. In other words, what you want to do is prevent the water
2 getting down below the top of active fuel. Having done that, you assure
3 that the dose is from the spent fuel pool, itself, or not accessible
4 with respect to worker dose. I just want to say I think it's pretty
5 much one in the same.

6 MR. CAMERON: Gary, do you want to amplify on that, or
7 follow it?

8 MR. HOLAHAN: Yeah. I think David has raised an important
9 point. For certain periods of time, when you are providing extra
10 protection because a zirc fire is possible, and we talked about things
11 like alarms or training or whatever, I think those measures do provide
12 some level of protection to the workers, as well. They are the same
13 issues.

14 However, it's not clear that, let's say, later on, after
15 three years or five years or whatever it is, when zirc fire is no longer
16 the driving issue, whether the same level of, you know, procedures and
17 instrumentation and all of that would still be kept in place. And if it
18 were to be kept in place, it might be needed not because you're worried
19 about driving material offset, but because of the on-site element of it.
20 So, it might be a reason for maintaining some of the things that you do
21 early in the shutdown for later purposes. So, you would shift from
22 needing that protection for public health and safety, to needing those
23 for worker safety. But, I don't think we thought about that very
24 carefully, yet.

25 MR. CAMERON: But, it sounds like that we're going to,
because of these remarks.

MR. HOLAHAN: It sounds like we're going to consider what we
should do about such a thing.

MR. CAMERON: All right. Paul, I take it that Gary's points
sort of was what you were going to say?

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1 MR. GUNTER: No. I'm going to defer to Ray.

2 MR. CAMERON: To Ray? Okay, Ray.

3 MR. SHADIS: A lot of stuff went by us this morning here, a
4 lot of details -- point by point details. And I want to know if we're
5 going to be addressing them again this afternoon, with an opportunity to
6 comment point by point?

7 MR. CAMERON: Yeah, I think that we're -- that's our -- our
8 general objective is to take a look at all the specifics that were
9 talked about within the context of the proper agenda item and to deal
10 with that. Right now, I think to finish out this morning, what we'd
11 like to do is to see -- to consider the points that were made, that are
12 on initiating events; the sequences, see if there's agreement,
13 disagreement on those. Look at the generic -- what I'm calling a
14 generic PRA methodology issue that Mike has alluded to on human
15 reliability assessment, HRA. So -- and if you don't -- you know, I
16 mean, it's all of your responsibility around the table, if you see a
17 point that you want to -- in the proper session, if you see a point that
18 you think needs to be discussed, let's put it on the table and we'll
19 discuss it, okay.

20 What I'd like to do is to see if we can get those -- any
21 points that relate to this front end, rather than mitigation, that we
22 clear up now. And I might ask Mike to start us off with his issue. Go
23 ahead, Mike.

24 MR. MEISNER: Okay. Well, to cover both your points, in the
25 interest of time efficiency and initiating event frequency, and there
I'm referring to some of the things that Ed brought up, like lots of
outside power frequency, AC recovery, the amount of time to boil, diesel
driven pump failure probabilities and the like. We're simply looking
& for the staff to take that back and mull it over and see if it makes
sense. I'm not sure that those things are worth much discussion time

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1 today. And if that's acceptable, I'll be happy to kick off an HRA
2 discussion.

3 MR. CAMERON: Let's discuss what Mike just said. And I
4 guess, Mike, for everybody's benefit, you ran through those rather
5 quickly. Is there one page or two pages or a section of the -- of Ed's
6 viewgraphs that deal with that, so that we can be clear about what we're
7 talking about it?

8 MR. MEISNER: Yeah. Look primarily at pages 26 -- oh, wait,
9 these are all numbered different. Well, the pages are numbered
10 inconsistently. Starting with page 26, that has conservative bias
11 examples on it, through the next roughly six pages, most of those deal
12 with initiative event frequencies.

13 MR. CAMERON: Okay.

14 MR. MEISNER: I skipped over cask drop, because we are going
15 to talk about that as a separate issue.

16 MR. CAMERON: Okay. Conservative bias examples and the next
17 several pages after that, with the exception of cask drop, which, of
18 course, is going to be talked about. NRC staff, Gary?

19 MR. HOLAHAN: Let me start off in general to say, we
20 certainly will take your suggestions and go back and look at them. I
21 think what's important for today is that we understand what it is that
22 you want us to look at. And so -- I mean, I can't judge that, at this
23 point. I just ask the staff to acknowledge or nod or something, do they
24 understand what you're suggesting well enough to take it as a comment,
25 to make a judgment about whether it's helpful or we agree with it or
don't agree with it.

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Personally, I didn't quite understand the rather large
differences in the heat up analysis. And I thought heat up analysis was
sufficiently easy, so that even I could do it. And to think that there
were big differences in our calculations versus a realistic, I think --

1 I think I'd like to hear something about what those differences are, so
2 that we know what it is that we're going to go off and look at.

3 MR. CAMERON: Yeah. I think that, you know, in light of
4 that comment, I think we need to, even albeit briefly, have a discussion
5 of this. Because, it may be one thing for the NRC staff to say they
6 understand it, but we also need to get the input of others on those
7 issues, so that the NRC, if any, so that the NRC staff can take that
8 back and include it in their evaluation. So --

9 MR. HOLAHAN: I'd like to take anybody's input. But, we
10 need to understand what it is that's being sent.

11 MR. CAMERON: Go ahead, Ed, I think you're on.

12 MR. MEISNER: The graph that shows the time line merely
13 shows what my interpretation of what the draft NRC document says about
14 pool heat up, which was that 24 hours was assumed -- greater than 24
15 hours, I think, were the words that were used, was assumed in the -- as
16 the time for the pool to heat up from ambient temperature to pool
17 boiling, and then 24 hours was used as the time that was allowed in the
18 HRA analysis for any operation actions to take place, as a result of
19 that.

20 But, if you look at what typical -- if you look on the next
21 page, there's a set of tables that talks about what typical fuel pool
22 load, as far -- in terms of mega BTUs per hour, and that fuel -- if you
23 use those kinds of loadings on the pool, you end up with times to boil
24 in the range of 90 hours for most plants. Even if you drop -- even if
25 you drain the pool to the bottom of the canal -- the transfer canal,
you'd end up with times in the range of 40 hours to time boil. So,
there's a substantial difference in the head load that's being used. I
think, 10 meta BTUS is being used as part of the analysis versus what we
see here. That's the difference.

MR. CAMERON: Comment from NRC staff on -- you understand

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1 the difference now, I guess.

2 MR. STAUDENMEIER: I'm Joe Staudenmeier, Reactor Systems
3 Branch, NRC. It looks like your heat service for the pool is under a
4 megawatt or something like that. I mean, we calculated decay heat loads
5 based on a full pool, at a specific time after shutdown. I don't know
6 what the basis is for your decay heat loads. Once you put the --
7 specify the volume in the pool and the decay heat load, it's just a
8 straightforward calculation. And I guess we can -- ours are for a full
9 pool, I think, one year after shutdown it may be. I don't know what
10 your numbers are based on. We're open to using realistic numbers for
11 the pool under consideration. I don't think there's any real
12 disagreement about how to calculate, it looks like, it's just that your
13 decay heat load is difference.

14 MR. BURNS: Yes, I think that's right. These decay heat
15 loads are based on existing fuel pools with one year -- one year after
16 the last fuel offload.

17 MR. STAUDENMEIER: I guess it depends -- that's a plant
18 specific type of thing and how close you are or how far your pool is,
19 because --

20 MR. BURNS: Right, that's why I gave three separate
21 examples. I don't have examples for everybody.

22 MR. STAUDENMEIER: Yeah, because just in things that we've
23 reviewed, I've seen pool heat loads that are significantly higher than
24 what you have down there for numbers for plants that we've looked at for
25 decommissioning.

MR. CAMERON: Okay. Glenn, any comment on that?

MR. KELLY: When we performed the deterministic analysis to
try to see whether or not there were concerns that we had to worry
& about, about spent fuel pools going to zirconium fire, when we looked at
ASS the draindowns, we assumed that the pool was configured in a manner that
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1 would be hopefully fairly enveloping for the industry, so that --
2 because when we started out, we wanted -- we were hoping that we'd be
3 able to say, you know, with an enveloping pool configuration and heat
4 loads, that we'd be able to say it wasn't a problem.

5 It didn't turn out that way. We were doing all of these
6 things in parallel, the deterministic, as well as the PRA analyses. And
7 so our deterministic analyses and looking at the heat loads in that
8 looked at a full pool and with significant heat load, based on that full
9 pool. And there are some plants that have -- may come in for
10 decommissioning that are less than that. But, when we did it
11 originally, and, you know, because we did it in a short period, we
12 attempted to envelop, as far as the deterministic analysis concerned.
13 We didn't try to envelop it, as far as the probablistic analysis.

14 MR. CAMERON: Okay. Gary, does that satisfy your need for
15 information on that spent fuel heat load -- is that right, spent fuel
16 pool head load?

17 MR. HOLAHAN: I think I understand why the numbers are
18 different now.

19 MR. CAMERON: Okay.

20 MR. HOLAHAN: What are the right numbers to go in the study
21 or whether, in fact, a spectrum of possibilities should go in the study
22 is something that I think we ought to address. We don't just want to
23 put in a few typical examples and say, these are okay; when, in fact,
24 you now, plants have licenses to allow them to put more fuel in the
25 pool. I think, you know, we want to be in a position of saying, you
know, any and all spent fuel pool situations would be safe, not just a
few typical examples.

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 But, this may very well be the sort of situation, in which
you say, I understand that, you know, realistically the heat loads are a
lot lower than the maximum allowed. There should be some mechanism,

1 either in a rule or in the licensee's analysis, that they could do an
2 analysis of what actually exists, you know, at the time. So, maybe time
3 is not the parameter, but an analysis to show that there's 90 hours or
4 something to that effect. But from the technical point of view of
5 understanding how long it takes to boil, I think -- you know, I think we
6 know that.

7 MR. CAMERON: Okay.

8 MR. HOLAHAN: What -- you know, what to do with it is a
9 little different question.

10 MR. CAMERON: Gareth, do you -- Mike, are you going to -- do
11 you want to respond to that?

12 MR. MEISNER: Well, I just wanted to say, take it with the
13 spirit with which it's given. And we're trying to come up with the best
14 estimate approach here, as opposed to an upper bound approach. These
15 are -- when you say typical, typical doesn't mean a few; typical means
16 typical. And that's the spirit with which we provided it. So, I'm just
17 asking you to take a look at it.

18 MR. CAMERON: Okay. Gareth, do you have a comment?

19 MR. PARRY: Yeah. In the spirit of trying to come up with
20 the best estimates, we have to be, I think, a little cautious about just
21 taking numbers from various sources and characterizing as better than
22 others. And just as an example, I'll talk about the loss of outside
23 power frequency and recovery that Ed showed in his graph, which is on
24 page 26. We've got to be careful that the date that he quotes from the
25 NUREG is, in fact, for operating nuclear power plants, which typically
have two or three incoming lines. And the recovery is likely to be a
priority for reestablishing the grid. It's not so clear, for example,
if those conditions are going to apply to a shutdown decommissioned
plant.

Now, this is -- this comment, I think, is generally broader

1 than this particular issue. I mean, we'll see the same thing when we
2 talk about human error probabilities. It's the conditions at the plant
3 that are going to drive what -- are going to drive the numbers and
4 they're going to determine whether they're reasonable or not.

5 MR. CAMERON: Okay. Let me ask -- go ahead, Stu.

6 MR. RICHARDS: As kind of a process, just so, you know, you
7 know where we're coming from, I think Rich made the comment, we're
8 looking at plants down the road. Most people hear their plants are
9 passed the point of which this is going to impact them. You know, we
10 can continue to deal with plants on a case-by-case basis, but that's
11 what we're trying to get away from. That's not an efficient way to do
12 business. So, we need to come up with, you know, a set of -- hopefully,
13 a set of regulations that envelops by and large the industry and allows
14 things to happen without a lot of industry submittals and without a lot
15 of staff reviews. So, that's -- you know, that's what we're looking
16 for.

17 I mean, you're talking about it all depends on the plant.
18 Frankly, that doesn't help me at all, because we're looking to come up
19 with some regulations that are enveloping here, not regulations that
20 tell us to go and look at each plant on a case-by-case basis, how we're
21 doing now.

22 MR. CAMERON: Would the information that you have developed,
23 Ed, and I think Mike said -- used the word "typical," will still --
24 would that still help to -- help the NRC to develop the envelop that Stu
25 is talking about?

MR. BURNS: No. I think the thrust of that diagram was not
to say that the specific fuel loading, in terms of mega BTUs per hour,
was two versus four mega BTUs per hour. The question was that in the
analysis -- the draft analysis, it appeared that the time to pool
boiling was set at 24 hours, even though it's greater than 24 hours. So

1 -- and for these loadings, it was 90 hours. Well, if it's four mega
2 BTUs per hour instead of two, well, maybe it's 40 hours instead of 90
3 hours, but it's still different than what was used in the analysis,
4 which was 24 hours. So, I think there's a difference between trying to
5 be enveloping and trying to be excessively conservative. That was the
6 only purpose of the slide.

7 I think the other point that I would make is that -- is that
8 in terms of risk informed input from PRA, we're looking for best
9 estimate, I think. I mean, always, that's what I've heard is what the
10 Commission wants, is what's a realistic examination of what kinds of
11 accidents can occur and what their relative relationship to each other
12 is. If I don't know that and I have things that are biased one way or
13 the other, then I don't know how to make a decision, based on that
14 information. That's my interpretation of what risk informed means.

15 MR. CAMERON: So, you're saying that the information that
16 you're presenting will -- goes to that point of best estimate?

17 MR. BURNS: There are areas that would seem like they're
18 logical areas to reconsider, to make sure that they're not excessively
19 conservative.

20 MR. CAMERON: Okay. Gary, do we -- is there any other
21 points that we need further information on, in order for us to evaluate,
22 and is there anything that we should put up as an action item for the
23 NRC, in terms of these initiating events and sequences and the
24 information that's been provided?

25 MR. HOLAHAN: Well, I think we will review the information
given and the report that was referred to earlier, in these areas. But,
I think it's worth -- and you can put that on the board, if you like --
I think it's worth clarifying one point. My understanding of the desire
to be realistic in risk informed regulation means for each plant, when
we make a safety decision relevant to that plant, it should be done on a

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1 best estimate basis; not that it should apply to half the plants and not
2 to the other half of the plants. You know, we want to make a safety
3 decision that's relevant, saying that each plant is safe; not that on
4 the average, they're safe, but there are a few that are not safe.
5 That's not my concept of good safety decisions.

6 MR. CAMERON: Okay. The report that NEI is talking about,
7 and I believe Mike, you said -- someone said two weeks or --

8 MR. MEISNER: Two to three weeks.

9 MR. CAMERON: -- something like that. Now, is that report
10 available for others to comment on? Ed?

11 MR. BURNS: It's coming in from NEI, sure.

12 MR. CAMERON: All right. So, the report will be out there
13 for everyone to see. Go ahead, Stu.

14 MR. RICHARDS: yeah, I think we've made a pretty good effort
15 to try and make sure that these involved parties get all the
16 documentation. Dick Dudley is our primary contact on that. So, if
17 somebody here is looking to be on an e-mail list for notification or get
18 things, please see Dick. Dick, can you -- and for instance, they
19 mentioned there's a couple of groups in New England, who want to be
20 notified when we do things. We'll put them on our list.

21 MR. CAMERON: I think Ray being on the list will cover one
22 of them and we'll make sure that the other one is on the e-mail list.

23 MR. RICHARDS: Yeah, when we get this report in from NEI, of
24 course, it will be publicly available and we'll make sure notification
25 goes out.

MR. CAMERON: Okay. And maybe I will put that up there,
just so we have a complete list. Gary?

MR. HOLAHAN: I think there was one thing that wasn't
mentioned yet that's part of our plan, and that is we are subjecting our
technical report to a review by National Labs and other experts under

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1 contract, as a sort of technical peer review, in addition to, you know,
2 collecting comments from stakeholders. We thought we would -- we would
3 try for independent technical input. And because that's going to take,
4 you know, several months -- to the end of the year, it seems to me that
5 if NEI or other interested parties are sending us input over the next
6 several weeks or even a month, that we'll have the time available and
7 the resources available to be looking at those comments. So, this is --
8 you know, written reports in this time frame, of the next month or so, I
9 think, would be useful.

10 MR. CAMERON: Okay. And at some point, people may be
11 interested in commenting on that schedule, also, and what steps we're
12 taking before this issue is resolved.

13 All right, maybe we should go to the generic PRA methodology
14 issue on HRA. And Mike, I'll let you frame that for us.

15 MR. MEISNER: Okay. Well, let me start by saying, I'm no
16 PRA expert. I thought I'd just begin by speaking in plain terms. What
17 we've -- what we've heard from the staff is that in the course of five
18 days -- well, in justifying why we wouldn't be successful in the course
19 of five days recovery. We've heard some fairly vague things. You know,
20 we've heard that the operators will be watching T.V. And not just
21 watching T.V. for a shift, eight hours, but watching T.V. for 15 shifts
22 in a row and not recognizing that there's steaming in the pool. Or
23 we've heard that because there's not daily NRC oversight out at the
24 sites, that somehow, again, over five days, the operators will fail to
25 recognize something is going on or even worse, that over five days,
they're going to fail to call the fire department.

I'd like to just start by bringing some common sense
approach to this. Let's assume that instead of ten to the minus two or
ten to the minus three or even ten to the minus four failure rates that
the staff has assumed in their draft report, but let's assume that it's

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1 a ten to the minus one. There's a one in ten chance that the operator
2 will fail to perform an action that he's supposed to. Let's give a
3 little twist to it. Let's say that that one in the ten chance applies
4 to a shift, eight hours, okay. Usually, in PRA space, at least that I'm
5 familiar with, you're talking about human errors associated with taking
6 an action, like, you know, starting a pump or closing a valve. Here,
7 we're talking about a long-term continuous failure to perform. But, it
8 seems to me that we could break it up into discrete chunks, eight-hour
9 period, one shift, and then a new set of faces come in and deal with the
10 problem. So, let's say it's ten to the minus one for that one shift.
11 Let's say it's ten to the minus one for that next shift. And let's keep
12 going throughout this five days. That, as a practical way, seems -- and
13 not being a PRA expert, seems to be a reasonable approach to take, in
14 evaluating these problems. And when you do that, of course, I mean, you
15 get driven right away to kind of these very low numbers that nobody
16 believes, which is probably why, in many PRAs, that after a certain
17 period of time, they just assume success.

18 The other thing that we're missing in all of this is that --
19 it's not one operator on shift; it's a couple. There's a management
20 team there. There's support personnel. There's engineers. And, you
21 know, there's even the NRC. Eventually, the NRC will be notified. We
22 don't have it quite right, I'm sure you all will tell us what the right
23 thing is to do. The point is, though, we have five days, seven days, if
24 you believe Ed's calculation. I, as a non-technical person in that area
25 of PRA, I just find it hard to understand, and I'd like to -- I'd like
to kick it off with just that plain sense point of view.

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And I guess just to finish, I would then jump off from what
Ed presented and -- like on the overhead about key HEPs expected, we --
the staff has assumed one error number for this whole period. Since it
appears that in the staff's view, that's the dominant area to evaluate,

1 shouldn't you get into something like a shift lead basis evaluation and
2 flush out that HRA model? Consider things like shift changes,
3 annunciation response, and the like, and model that maybe one sequence
4 in more detail, to convince yourself as to what would be a more accurate
5 representation.

6 MR. CAMERON: Okay, thank you, Mike. Before we go to the
7 NRC, let's hear from Paul Gunter on this issue.

8 MR. GUNTER: Well, obviously, from a public interest point
9 of view, we want to see conservatisms incorporated has that interest.
10 But, Mr. Meisner, there are real events that multiple shifts can commit
11 the same error. Clearly, one -- particularly when they are cost driven.
12 The unheated fuel handling building at Dresden 1 where service water
13 pipes were allowed to freeze suggests that a number of shifts weren't
14 maintaining the technical specifications for that building.

15 The fact that Nine Mile Point 1 had water in the basement.
16 And where -- it was the rad waste building, suggests also that multiple
17 shifts at that facility were not attentive to an issue.

18 But, clearly, the concern is that as reactors become -- as
19 they back out of a service sector and become more of a drain than a
20 faucet on the facility, that you have an economic driver that needs
21 extra vigilance. And I think that that is what we are looking to see
22 from the Nuclear Regulatory Commission is a provision for that
23 conservatism.

24 MR. MEISNER: I need to respond to that. First of all, the
25 examples you used don't relate to the spent fuel pool management
directly. Keep in mind --

MR. GUNTER: They do, too.

MR. MEISNER: Keep in mind that the operators that we have
on shift have no other job than to watch the spent fuel pool monitor
level and temperature and boiling concentration.

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1 The other thing is, underlying your premise, is a suspicion
2 that licensees will act differently under cost pressure. You can
3 believe that if you like or not, but let me inform you that that is not
4 the case in decommissioning. I hope everyone knows that the cost
5 associated with decommissioning is not borne by the owner of the plant,
6 it is not borne by the management of the plant, that is a direct
7 pass-through to the public. And what we are trying to do is be good
8 stewards of the money we spend in decommissioning. But the fact that we
9 might have to spend a little more money to get some safety benefit is
10 surely not going to inhibit us from doing it, from your suspicious point
11 of view, because it is not our money, it is the public's money.

12 We go through a rate-making process, at least with my plant,
13 Maine Yankee, through FERC. Other plants may go through FERC or they
14 may go through the local public utility commission. But the one thing
15 that is clear in all this is that it is not the owner's money.

16 MR. CAMERON: Paul, follow-up before we got to NRC?

17 MR. GUNTER: Just briefly. Again, you know, the issue of
18 multiple shifts committing the same problem, whether it relates directly
19 to the fuel issue, what it suggests is a human behavior pattern and that
20 is the context that I bring it up. In regards to the only job you have
21 to do, if we look at fire watches on duty, that is all they have to do,
22 we find them building nests in some of these plants and going to sleep.

23 Actually, that sole source of responsibility can lead to
24 such tedium, as we have seen in that particular arena, that it lowers
25 human response values. But -- so, I mean my concerns remain along that
avenue, that I think are justified.

 But with regard to, you know, that is a total pass-through,
I am still not convinced that with the rising costs of decommissioning
as projected over the last several years, that you are not going to look
for some kind of cost containment strategy. And I think that is what we

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1 are really here about is how to -- how the utility is looking to develop
2 a cost containment strategy for decommissioning operations, and this
3 raises -- this is the context that I raise that concern.

4 MR. CAMERON: Okay. Let's --

5 MR. MEISNER: Okay. And that is a valid point. But keep in
6 mind that what we are trying to do is not waste resources. Not waste
7 resources for the rate payers, not for the owners. You don't want us
8 out there having 25 people on shift when we only need two, and the only
9 thing standing between us and having two people is an NRC regulation
10 that isn't applicable to decommissioning facilities. We would be open
11 to a whole lot of criticism on the other side of being poor stewards of
12 the money that we are holding for the rate payers. You know, it is a
13 damned if you do, damned if you don't.

14 But I will tell you, the folks I know in the decommissioning
15 industry are pretty responsible people. They don't let people make
16 nests in the corner of the buildings, and they sure as hell are very
17 responsible in dealing with the resources they have. I think it is very
18 clear to everybody around this table that we wouldn't be here if the
19 regulations were well constructed for decommissioning plants. If you
20 don't believe that, then we should just quit the conference now, it is
21 not worth having.

22 MR. LOCHBAUM: Sounds good to me. I second that.

23 MR. MEISNER: We are here because the majority of people
24 here believe that, in fact, the regulations are -- and are clearly
25 demonstrable to be inappropriate for decommissioning plants and cause
excess cost. Yeah, cost is the issue, but the underlying suspicion that
you are suggesting, that somehow it pads the pockets of the owners,
doesn't -- is not true. We are trying to responsible stewards for our
rate payers.

MR. CAMERON: Okay. Let's go to the NRC for -- going back

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1 to the assumption that we started out with here.

2 MR. HOLAHAN: What I would like to do is to go back to
3 something to Mr. Meisner said early on, which is discussion of how can
4 things on shift after shift and not be discovered. And he used a word
5 that I think is important and he used the word "discrete" -- discrete
6 shifts. Well, I think in a probabilistic world you might say -- in an
7 analysis you might say independence, or you give credit in analysis for
8 this shift being different from the last shift when there is a reason to
9 think that they would bring, you know, different eyes to the issue.

10 And I think even though there are lots of argument around
11 and across the table, we all want the same thing. We all want operators
12 who do their jobs well. You know, we want them to be monitoring the
13 things that are important to monitor. And we want them to, you know,
14 reliably deal with issues.

15 One of the difficulties is making judgments about how
16 independent is this operator from that operator or this shift from that
17 shift. The TMI event has interesting aspects to it that I think are
18 relevant to both of these. I think it was mentioned earlier that,
19 obviously, you had a mindset in the control room when the event was
20 going on, you know, multiple people thought they were doing the right
21 thing. But it is also interesting to note that that situation didn't go
22 on for more than -- was it 2-1/2 hours? And, in fact, it was an
23 independent person coming in saying, this doesn't look right, why is
24 that valve -- that valve doesn't look like it is closed.

25 So, I think, you know, in real experience, we see both of
these things. We see problems that are carried over from one person to
the next, and I think absolutely -- Paul is absolutely correct, we have
seen situations carried over from one shift to the next. Well, if those
-- the last shift thought it was okay for that pipe over there to be
dripping, I guess it is okay.

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1 So it seems to me the solution to this issue, we want the
2 probabilities to be low. We are not arguing that we want the numbers to
3 be high. Okay. Nobody wants the operators to be unreliable, we want
4 them to be good. The question is, what do you need to do to make them
5 reliable? What do you need to do to give us confidence, to give the
6 public confidence that operators are reliable people? And to the extent
7 that, you know, 1 out of 10, or 1 out of 10,000 that they get it wrong,
8 that the next shift is, in fact, going to have, you know, an independent
9 set of eyes, so that, you know, we can confidently say, yeah, well, it
10 is not one in a thousand, it is one in a million.

11 I think we need to step away from the argument that says I
12 think they are great guys, or I have seen them building nests in the
13 corner and get down to the point of saying -- what is it that we expect
14 of the utility, of their management on-site, of their procedures, you
15 know, of the alarms available? You know, concrete things which at this
16 stage are just technical issues, which later on can be put in the FSAR,
17 or put in a rule, or a license condition or wherever they need to be, so
18 that people have assurance that, you know, that this is more than, you
19 know, comments made one Thursday morning, and is something that we can
20 be comfortable with the in the long run to cover, you know, 20 years
21 from now, you know, anyone who is decommissioning, you know, under
22 whatever economic conditions they are at.

23 You know, our first concern needs to maintaining safety.
24 Okay. And so we need to have assurance through some mechanism, other
25 than just talking about it, that we are going to have reliable
operators.

 I think part of this is an issue that we haven't dealt with.
Okay. And I think, in fact, some -- you know, we may need to go back,
and a bunch of people may need to go back to think about what kinds of
things. Ed Burns this morning suggested that the fact that alarms occur

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1 at different stages of an event may be a mechanism for realerting people
2 that there is something that they ought to do. Well, I think that is an
3 interesting thought. Okay.

4 You may, in fact, be able to write shift turnover
5 procedures, okay, that alert people to, you know, to do things that in a
6 way, you know, reset their clock. You may be able to put up a sign on
7 the wall that says, by the way, if the water drains out of that pool,
8 you are the first guy that is going to be dead, to remind the next shift
9 that, you know, these are real serious safety issues.

10 I think if you have done a calculation of the shine from the
11 pool, lethal doses are pretty easy to get. So it is the operators who
12 ought to have every incentive to knowing that things are working pretty
13 well.

14 So, clearly, there is lots of uncertainty how to do this.
15 Clearly, there is lots of suspicion and anecdotes. I think we need to
16 get to the point of putting on the table some concrete steps. I don't
17 know today that we know what those steps are. Okay. In one of Ed's
18 viewgraphs, he suggested that Gareth Parry look into this. Well, we
19 brought him to the meeting.

20 But I think this idea that experts need to think about this
21 issue is a good thought. But what the experts need to think about is
22 not just whether the number is 10 to the minus 4 or 10 to the minus 6,
23 they need to think about what kinds of things can you do to make
24 operators extremely reliable for long -- long-term type events. And
25 since I am not one of those experts, I would really like to hear someone
who thinks they are jump in.

MR. CAMERON: Just let me ask Mike, and I think we need to
hear what Ray has to say, too. On this last issue that Gary brought up,
what we need to do to have reliable operators, I think this is the type
of thing that the industry was prepared to offer perhaps during the

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1 sessions this afternoon about what procedures are in place or what you
2 might be willing to put in place.

3 MR. MEISNER: Yeah, that's right. And we will be talking
4 about that in great detail this afternoon. We are more than willing to
5 make commitments.

6 I need to say a couple of things, though. First of all,
7 before we cast too much aspersion on operators, you know, I got my ops
8 manager here and he is probably biting his tongue. NRC approves the
9 operator training program. NRC comes in and inspects it, you know, just
10 like you do in an operating facility. I am not sure why you have this
11 high level of suspicion that operators won't do what they are supposed
12 to do and somehow you need a sign up on the wall that says you are going
13 to be the first one to die. You know, I think that is just silly.

14 We will go into details of commitments, but I was trying to
15 generate a discussion that would -- of issues that would try to meet a
16 straight face test. Is there anybody around this table that honestly
17 believes that if they were on shift, that somehow over five days they
18 would fail to see steaming in the pool and subsequent major draindown to
19 the top of the active fuel? I mean that is what I am trying to present
20 here, that it doesn't make any rational sense at all.

21 You can see it on fast-acting events for operating reactors,
22 you know, when they have got two minutes to respond and they will make a
23 mistake, or -- you know, and you could probably see it on fire watches
24 who are minimally trained people who are working for minimum wage and
25 they are just sitting there in the plant waiting for a fire to happen.
But, my goodness, these are trained individuals that follow a program
prescribed by and approved by the NRC, who are dealing with simples
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systems and very few things can wrong. You can lose cooling, you can --
you know, you are getting a slow draindown. They know how to deal with
these issues.

1 And here we are talking about them as they are complete
2 dummies that won't be able to do anything for five days. That is what I
3 am trying to get across here. We will get into the commitment side of
4 it later. But I was just looking for a practical approach that says,
5 why don't you model this as it really should be? You know, you have got
6 different people coming in at different times and it is not just
7 operators, you know, our security people find a lot of things before our
8 operators do. There is all kinds of things to take into consideration
9 that we will be talking about this afternoon.

10 MR. CAMERON: Okay. I think that Mike pretty well
11 characterized what his concern is, and there may be a context that the
12 NRC can offer about the common sense aspect of this. And I see that we
13 have a bunch of cards up here. But let's go to Ray first.

14 And, also, I just want to tell -- Mike mentioned one of his
15 people out here. I just want to say that we will go on to people in the
16 audience for a brief period of time before we end this session, if we
17 ever end this session. But before we end this session, to hear what you
18 have to say.

19 But go ahead, Ray.

20 MR. SHADIS: I just want to give a little bit of perspective
21 on the economic driver issue that Paul Gunter raised and that is that
22 there are a number of companies out there who are eagerly pursuing
23 decommissioning contracts around the country, and they are did it on the
24 basis of I can do it cheaper than you. That is an economic driver that
25 is independent of the fact that the citizenry are going to be dunned for
the bill at the end. And it does have its effect.

 Additionally, you know, this is not the place for it, but we
could go through the line item budget for Maine Yankee's decommissioning
and see whether or not all the funds are appropriately applied to areas
that have the safety significance, and I think maybe we would find they

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1 are not.

2 So, you know, that particular argument that it is the rate
3 payer paying doesn't necessarily carry through. It may in Maine
4 Yankee's case, it may not in the case of another facility. And the same
5 thing is true for the training of these fuel handlers. It may well be
6 that we have a team at Maine Yankee that has the training and the esprit
7 de corps and so on to maintain vigilance. It may not be at another
8 plant.

9 But even in the best of facilities, we find that over time
10 with tedious tasks, that workers do tend to fail. Maine Yankee had that
11 experience in the spring of 1997 when their fire watch teams falsified
12 their logs. So, you know, it can happen to anyone. And I think that
13 Paul is absolutely correct, you really need to take a conservative view
14 of this and be cognizant of what is generally called the human
15 condition.

16 MR. CAMERON: Thank you. I guess that I would just caution
17 people, just for terms of, you know, perhaps efficiency, -- because we
18 can get into a lot of arguments about did this happen at this particular
19 place, or did that not happen at that particular place, -- that we try
20 to use examples that are meaningful, as that is, but not put anything
21 that might be in dispute on the table.

22 Glen.

23 MR. KELLY: I was really just -- two areas that I wanted to
24 quickly point out. First is that several people mentioned how they were
25 proposing at the -- they like the idea that the risk assessment should
be conservative, so that when they apply that, that they are going to
assure that they are getting good results, that the public will be
protected.

And from our standpoint, when we are performing
risk-informed decision-making, what we want to do is use the PRA to give

1 us the best information that we can get, which is a best estimate
2 analysis, and then from that we can decide what additional conservatism
3 we need to lay on top of it in order to protect the public health and
4 safety.

5 And that is in particular what we did here in our risk
6 assessment. The PRA was performed on a best estimate basis, The words
7 that Ed got out of the report near upper bound apply to one particular
8 deterministic input that was performed on the basis of a near upper
9 bound. And as I remember, that was one of the heatup times and that was
10 based, because we were trying to look at the pool configurations that
11 would be bounding, such that, if possible, we could envelope most of the
12 plants that were out there.

13 But when we do our PRA itself, it is, to the best extent
14 that we can, we are going to do it on a best estimate basis and that is
15 what we did.

16 And the second point that I wanted to make was about Mike's
17 common sense argument, and his description that he was not a PRA expert,
18 and I would agree with him in this particular case. It is -- as a
19 mathematician and a person who has been doing PRA for quite a few years,
20 you cannot merely use your judgment or your common sense to make
21 decision-making. If we did that we wouldn't need a PRA in the first
22 place, we wouldn't need the kind of insights that the PRA gives us.
23 What has turned out a lot of times is that things that seemed to common
24 sense when we did an analysis, gave us insights into new areas that we
25 hadn't appreciated were potentially problems.

And I think in this case what happened is -- I will speak
for myself. When I went into this evaluation, performing this risk
assessment, I thought we were going to come out with very low numbers.
It didn't turn out that way. That was my expectation. But we let the
numbers come out where they came out, doing it on a best estimate basis.

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1 In particular, in the area of human performance, I think it
2 is very important to understand that most of the time when we did our
3 evaluation it was not on the basis of assuming that these events were
4 independent and that a lot of times has to do with we have seen out
5 there, based on the kind of procedures, the things that we have, and I
6 will let Mike and Gareth talk in more detail about that. But we had
7 good reasons for coming up with our system and evaluating it the way we
8 did, and we don't want to -- we don't want to justify our numbers.

9 Again, I want to come back to the key that what we want to
10 do is use our analyses to point out where we want an insight that
11 something could be a concern. And then we want to understand what does
12 the industry have that makes that concern go away. And that is really
13 where we want to focus, not about what is the exact correct number.

14 MR. CAMERON: Gareth.

15 MR. PARRY: Yeah. I would just like to endorse what Gary
16 said. I think he had it right when he talked about what we need to do
17 is understand the conditions, the plant practices that would enable us
18 to make a judgment that a particular human error probability was low.

19 HRA has been struggling for many years to become a science
20 rather than a black art. And we have learned quite a lot recently about
21 the things that influence human performance, and I think it is important
22 to put those in a structured format for a technical basis document,
23 rather than just make arguments that, well, these guys are reasonable,
24 they have got five days, it will work out fine. We need a structured
25 process by which we can make those arguments for low probabilities, not
precise numbers, just whether we can believe that the likelihood of
success is correct or not. And it stretches through things like
characteristics of the administrative procedures at the plant, the state
of the instrumentation, response procedures, training, staffing levels.
And we have to address all those issues and understand the potentials

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1 for dependency across the different crew members, across the different
2 shifts before we can definitively say that we believe there is no human
3 performance problem.

4 MR. CAMERON: Okay. I think we are going to aim for
5 quitting at 12:30 here. Okay. And I guess that -- I don't know, Mike,
6 if you heard anything that answered your question about -- it seems like
7 it is just common sense that this wouldn't be ignored.

8 MR. MEISNER: I think what I heard was, let's get into the
9 next session where we can start talking about what kind of procedural
10 controls and other things are in place.

11 MR. CAMERON: Okay. Jon, the stenographer, did you get
12 that?

13 THE REPORTER: Yes.

14 MR. CAMERON: Okay. You got that.

15 And is there anything more that can be said or should be
16 said about this particular five-day, one-day, outside of let's get into
17 looking at this point, before we just ask the audience? Gary?

18 [No response.]

19 MR. CAMERON: All right. We are going to have about 10
20 minutes out here for anybody who wants to comment from the audience on
21 what they heard this morning.

22 Yes, sir. Just state your name and affiliation.

23 MR. CANAVAN: Ken Canavan. I am with GPU Nuclear. And I
24 guess I was a little confused this morning -- excuse me -- about the
25 purpose of the generic analysis. Originally, I had assumed that the
purpose of this generic PRA analysis was to risk-inform future
regulations for decommissioning. But I am a little concerned about some
of the statements that were made, such as you don't want to focus on the
& numbers, you want to decide where improvements can be made. But I think
the numbers are all part of that.

1 I think it was clear from some of the information Ed Burns
2 had put out that it can drive where you would allocate your resources,
3 depending on what you consider to be the human errors, what you consider
4 to be the hardware.

5 I tried finding some of the numbers in some of the
6 references and had trouble doing that, and also disagree with some of
7 the values, some of them seemed quite high, both in the human error area
8 and loss of off-site power and recovery, and in some hardware cases. So
9 I think that is an area that could be looked at. And I am not going to
10 comment on the HRA staff, I think that has been talked about enough.

11 MR. CAMERON: Okay. Thank you. Do you -- was there an
12 outstanding question on what the objective is here, or was that just a
13 comment?

14 MR. CANAVAN: Well, if I had it right, then I am okay. In
15 other words, if the purpose was to indeed make future regulations
16 risk-informed, then I think we are all set and I don't really have a
17 question. But if that is incorrect, I would like a clarification.

18 MR. CAMERON: Okay. Thanks, Ken.

19 MR. ZWOLINSKI: That is correct.

20 MR. CAMERON: It is correct. Okay.

21 Anybody else out there? Yes.

22 MR. HENRY: Bill Henry, engineer manager at Maine Yankee.
23 One thing I wanted to try to tie where we had a question about the BTU
24 content in the pool, in the 10 million versus the 3 million numbers Ed
25 had. I think what -- I think both sides may be correct. When we did
our analysis, we used the ANS methodology and had numbers up in the 6, 7
million range. We did a pool heatup test and they were 40 to 50 percent
lower. I think the tie may well be that, yes, you can base it on a 10
million BTU per hour content based on ANS, but a real number is probably
just 60 percent of that. So if you are looking for a best estimate,

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1 maybe that is where you tie can come in.

2 MR. CAMERON: Okay. Thank you very much.

3 Anybody -- anybody else? Yeah, Gary.

4 MR. HOLAHAN: I would like to follow up on that comment

5 because a 60 percent difference in decay heat makes an enormous

6 difference in anybody's analysis.

7 MR. HENRY: Especially a 60 percent upper bound, 40 percent

8 lower.

9 MR. HOLAHAN: I understand.

10 MR. CAMERON: We can't hear you.

11 MR. HOLAHAN: A 40 percent change is --

12 MR. HENRY: I believe there were at least three full heatup

13 tests done in New England, and they all showed similar numbers.

14 MR. HOLAHAN: I think we would like to see that information

15 to see if we could use it in some fashion.

16 MR. CAMERON: Can you get that information to him?

17 MR. HENRY: Sure.

18 MR. CAMERON: Yeah, he is going to get that information to

19 you.

20 Okay. It is about 12:25 on my watch. Let's be back here at

21 1:30, and we are going to start with an industry presentation on

22 mitigation. All right.

23 [Whereupon, at 12:23 p.m., the meeting was recessed, to

24 reconvene at 1:36 p.m., this same day.]

25

A F T E R N O O N S E S S I O N

[1:36 p.m.]

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3 MR. CAMERON: Okay. Good afternoon, everyone. We are going
4 to move into the next discussion segment, which on your agenda is called
5 "Mitigation of Events," and we are going to start out with an industry
6 panel led by George Zinke. And in a minute I will just ask the new
7 people to introduce themselves to you.

8 George is going to present some overview material, and I
9 think, if I understand this correctly, George, you are going to then go
10 to specific people for specific areas to say some stuff. Then George
11 was going to come back to the concerns that were express by the NRC.
12 And I think that that is what we will use to kick off the discussion
13 period with George stating one of the concerns. He will say something
14 about it, let's open it up for discussion, then let's go to the next
15 concern. And I don't need to -- we don't need to be rigid about that,
16 but at least that will give us some type of organizational structure for
17 this.

18 So, George, I am going to turn it over to you. And you may
19 want to introduce your team or have them introduce themselves.

20 MR. ZINKE: I guess we need to go ahead and introduce all
21 the new players. I am George Zinke, I am the director of regulatory
22 affairs at Maine Yankee.

23 MR. BALL: I am Bill Ball, I am the ops manager in Maine
24 Yankee.

25 MR. CURRY: Jim Curry, decommissioning engineering manager
at Oyster Creek.

 MR. HASELTINE: I am John Haseltine, the director of
Connecticut Yankee.

 MR. WITHROW: I am Greg Withrow, I am from Big Rock Point,
the manager of engineering, licensing and soon to be operations.

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1 MR. CAMERON: Okay. Thank you. George, go ahead.

2 MR. ZINKE: Yes. We are going to go through these slides
3 fairly quickly, but I will explain as we go along. You can put the next
4 slide up.

5 As we have already stated this morning, and this is kind of
6 a repeat, you know, the dominant sequences we have been looking at,
7 internal fire, loss of power, loss of spent cooling, for intermediate
8 term, loss of coolant inventory. Next slide, seismic and heavy load.
9 So as we looked at mitigating factors, we were looking at that grouping
10 of events.

11 Next slide. As we looked at these events and how they
12 eventually relate to public health and safety, the concern with internal
13 fire is that at some point in time, you know, with the fire, you get a
14 loss of cooling, with loss of power. It is the same kind of thing that
15 the real issue of concern is the loss of cooling, which would happen
16 immediate -- immediate when you lost power. And, of course, the loss of
17 cooling was event trees, you know, modeled by itself. And one of the
18 concerns with loss of cooling is that you eventually lose inventory, and
19 then we get into the zirc fire scenario. So all of the loss of cooling
20 are not an event, the end in themselves, but they drive to something
21 else.

22 The seismic, you know, concerns with the seismic could be
23 that either you lose cooling, or you lose inventory. And the heavy load
24 drop, the concerns ends up of a losing of inventory because the drop has
25 ruptured the liner or somehow caused a flow path that you could lose
inventory.

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The differences between these, as far as operator mitigating
actions, they are generally the same. The procedures are generally
going to be the same. With things like internal fire and loss of power,
there are some extra actions that may be taken upfront. But,

1 ultimately, the kinds of questions that were brought up this morning
2 that deal with, you know, operator error or management systems, of
3 culture, those are going to be the same for any of the scenarios.

4 One thing to keep in mind is the event initiators, next
5 slide. But there are several of these that are self-revealing or very
6 obvious when they occur. A loss of power is hard to miss because the
7 lights go out. And the seismic event, in order to get a seismic event
8 that is going to rupture, you know, an operator is going to know that --
9 you know, it is something he feels, you know, it is pretty obvious.

10 Heavy load drop is going to be obvious because if you are
11 handling heavy loads, there is somebody there, so he is going to see
12 that some event has happened.

13 The other three, internal fire, loss of cooling, loss of
14 inventory, as we have seen from some of the discussions this morning
15 even, that detection becomes important because they aren't
16 self-revealing.

17 The next slide. What I am going to do now is discuss very
18 briefly the fire and the loss of power, and then I am going to move into
19 the loss of spent fuel pool cooling. And at that point we will get into
20 the detail of all of the training and the procedures. So, really, what
21 I am going through in these first few slides is those things that might
22 be a little bit unique to fire and loss of power.

23 Dealing with internal fire, there are prevention
24 characteristics at a decommissioning plant. There are still work
25 controls, the control of combustibles. So it is not like we are going
to decommissioning and all the controls are off.

And these are regulatory driven. Detection, there's
operator rounds, there are security rounds, fire watches, detection
devices where the fire protection devices are tested because of the
regulatory framework they are in.

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1 When we go into decommissioning relative to fire protection,
2 we do come under a NRC rule, and it specifies I have to maintain fire
3 protection, but the purpose has changed. The purpose has changed to
4 decommissioning kind of criteria. And, indeed, the regulation itself is
5 not specific, saying how many smoke detectors I need or how many of
6 this. But a real key in the transition from operating to
7 decommissioning is that there is a change mechanism and a criteria
8 threshold that I have to meet, that I have to not decrease the
9 effectiveness of the fire protection plan.

10 So some of the things that we will talk about this morning
11 of, well, maybe this equipment is not required or this equipment gets
12 removed, before a decommissioning plant can do any of that, it has to
13 meet the threshold of not reducing the effectiveness of the plan by
14 regulation.

15 The mitigation of a fire, there's pre-plan strategies. What
16 I mean by pre-plan is that if one of the strategies has to do with
17 hooking up hoses to various locations or piping or system, that that --
18 you know, the hoses are either there or that we have got the right hoses
19 are pre-staged, you know, so that everything is going to fit. So you
20 don't end up in like a fire scenario and saying, well, now, what am I
21 going to do? You know, these have been pre-thought-out.

22 Trained on-site personnel for their fire responsibilities.
23 We train the off-site firefighters. They come to the site and this is
24 one of those things that changes throughout decommissioning. So if we
25 are changing the responsibility of the off-site firefighters, we bring
them on, train them, tell them this is what you would have to do, this
is where you would have to hook up. Find out what problems they would
have and make sure that, as best we can, we would have a successful
event.

 There are redundant fire pumps that carry over from the

1 operating plant. It is like I said before, in order to get rid of that,
2 you would have to show that it doesn't reduce the effectiveness. So,
3 fire suppression is routinely tested, and, again, because of a required
4 fire protection plan.

5 During this time, one of the big differences between a
6 decommissioning plant and an operating plant is that the concern, the
7 primary concerns is the fuel pool. And you don't have lots of systems
8 and lots of complicated cable runs. You are pretty well limited in what
9 you have in quantity compared to an operating plant, which makes a lot
10 of mitigation efforts much less complicated, given that you are only
11 trying to get cooling back or inventory versus the complexities
12 associated with recovering in an operating plant. So temporary repairs
13 of damage to cooling systems is more feasible because you are not
14 dealing with complicated controls and interlocks. You are just trying
15 to start a pump and get some water somewhere else. So there become a
16 lot more options and easy things you do because the task itself is
17 easier.

18 We end up with the water required. There are a lot more
19 options available, even off-site, availability of bringing in portable
20 pumps that can be real small, nothing special, hooking up hoses. The
21 kinds of strategies that we can follow, you know, it is many more and
22 much simpler than what it would have been for an operating plant of --
23 how do I get water into the vessel?

24 MR. ZWOLINSKI: George.

25 MR. ZINKE: Yes.

MR. ZWOLINSKI: For clarification, help me understand, are
you speaking in the context of the spent fuel pool and associated
systems being an isolated island of some sort?

MR. ZINKE: I would say either. There are some differences.
If it is an isolated island, then you have -- things are more together.

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1 If it is not in an island and you are taking those pieces that were
2 associated with the operating plant, you know, of course, you may have
3 longer cable runs and they may go through various rooms and, because of
4 that, your fire protection may have to be larger as far as, well, wehre
5 do I do fire rounds?

6 So there is difference relative to that. But what I am
7 speaking to is either, although there would be some difference. Both
8 have to be effective.

9 MR. ZWOLINSKI: So the actual fire protection program plan
10 is modified as systems are taken out of service, but what you were
11 talking about was the fire protection plan for anything that would
12 support the spent fuel pool and associated systems?

13 MR. ZINKE: Yeah. There is a number of regulations that get
14 tied in there and that is -- to be real precise, we have the 50.48, the
15 evaluation of the fire protection plan.

16 MR. ZWOLINSKI: Right.

17 MR. ZINKE: And then, if we are crediting systems for
18 emergency preparedness. So let's say I am crediting the fire pump for
19 emergency preparedness, then when I would change the emergency
20 preparedness plan, I have another regulation that is also tied to
21 effectiveness. And the same way it is in the SSAR for a variety of
22 reasons. If I am going to change it, then I have the 50.59. So there's
23 various regulations, but bottom line, to get rid of them, you have to
24 through these and make sure that all of their functions, that you are
25 not reducing effectiveness of those critical areas.

MR. CAMERON: George, can I just interrupt you one second?

MR. ZINKE: Yes.

MR. CAMERON: John's comment reminded me that I probably
should check an assumption I was making with the group. You know,
obviously, there is a number of ways to conduct discussion on this

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1 presentation. And I was a little afraid that if we just start asking
2 questions or having discussion on each slide, that we may never get to
3 the -- get it all in, get to the end of this. I was sort of assuming
4 that when you got to the discussion of addressing the concerns, that any
5 questions or comments about these previous slides would probably be
6 revised, so that we could wait for a discussion then.

7 But I also know that there may be instances where someone
8 doesn't understand something that is on a slide. So do you want to just
9 wait till we -- the group, I am asking, do you want to wait till we get
10 to the concerns to open up the discussion and deal with all questions
11 then, or do you want to have clarifying questions as we go along?

12 MR. ZINKE: I know from my point, if I am asked a question
13 and I know I am going to be covering it later, I will say that, so that
14 we kind of keep the flow. But I think it is going to be easier if there
15 is some -- just a clarifying question of what do I mean. Better to take
16 it at the time before everybody forgets.

17 MR. CAMERON: Okay. If there is -- if you need to know,
18 let's interrupt and ask. But if it is starting to get into the
19 commentary, dialogue, discussion, let's hold it. Okay. Thank you.

20 MR. ZINKE: Next slide. A loss of off-site power event.
21 Again, when an event happens at a plant, the operators will not just
22 follow one strategy. They won't say, okay, I have got to get off-site
23 power back, so I will work at it a few days, and if that doesn't work,
24 then I will try something else. As part of their training, that they
25 are expected to have multiple success paths going at the same time. And
this is the same kind of effort that happens in operating plants, which
may be difficult to model, but it is a fact that they -- that is what
the expectation is for the operators.

So, parallel mitigations strategies pursued, restoration of
the off-site power. There is going to be pre-planned off-site

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1 assistance. When we have planned for a -- What if you lose power for X
2 number of days? Where could we get a portable generator? Where would
3 we get fuel? Would this be reasonable if there is snow outside? You
4 know, those kinds of things are pre-thought-about such that the
5 operators are not having to invent things at the time.

6 MR. CAMERON: George.

7 MR. ZINKE: Yes.

8 MR. CAMERON: We have one clarifying question from Glen
9 Kelly.

10 MR. KELLY: Yes. George, earlier you made a comment that --
11 I hid my comment here. You were talking about the -- first, that
12 operators wouldn't follow one strategy. Is that actually
13 proceduralized? Does it say in the procedures that you are supposed to
14 follow parallel paths, or do you just leave it to the operator to have
15 the common sense to do that?

16 MR. CAMERON: Can we show people which slide we are on to
17 that deals with this question?

18 MR. ZINKE: Let me delay the answer to that one in a second,
19 because --

20 MR. CAMERON: Okay.

21 MR. ZINKE: You know, it is going to tie -- the same answer
22 is going to tie on the next slide.

23 MR. CAMERON: Great.

24 MR. ZINKE: So we are going to get into that in much more
25 detail.

MR. CAMERON: Good.

MR. KELLY: My second part here is you said when you
decommissioned, you don't decrease the effectiveness of the fire plan.
And I guess my question is -- let me throw out an example. My fire plan
may require me to be able to put out fires in a spent fuel pool area,

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1 but there is not a lot of things to burn in a spent fuel pool area. I
2 probably could handle it with some fire extinguishers, you know, a
3 battery of fire extinguishers, and, therefore, I might be able to argue
4 that I don't need fire pumps because my fire extinguishers are adequate
5 to put out any fires that I would have in there.

6 If I did that, then I could get rid of my fire pumps,
7 because I have not effectively decreased my fire plan effectiveness.
8 That is not the same as saying that I have not decreased my ability to
9 put water into the pool or to cool that. So, that is what I need to
10 understand, because you talked about it from the point of view of the
11 fire plan, and not against capability of providing makeup to the pool.

12 MR. ZINKE: Right. And that is the clarification I was
13 trying to make on the different regulations involved. So, you are
14 right, relative to its fire plan function, that gets evaluated under
15 50.48, under that criteria, relative to the fire pump's other functions,
16 you have to evaluate it under 50.59, which would get into probability
17 and consequences of an accident or an event. So --

18 MR. KELLY: Well, 50.59, I will debate 50.59. My
19 understanding of 50.59 is that it deals with design basis events, and we
20 are in beyond design basis space, in emergency preparedness space, and,
21 therefore, 50.59 would not apply, as I understand it. But I could be
22 wrong.

23 MR. CAMERON: Could we -- this is a generic, this is an
24 issue to discuss, so we will come back and discuss this. And then,
25 Mike, you can make your comment on it at that time. Okay.

MR. MEISNER: You can see me moving, right.

[Laughter.]

MR. CAMERON: Go ahead, George.

MR. ZINKE: All right. Next slide. This is the second
section we are going to get into more detail of the same kinds of things

1 that are also applicable on the fire and the loss of off-site power. In
2 general, what do the operators do and what is their training? From a
3 detection standpoint, we recognize -- in your draft report it credited
4 operator rounds once or twice per shift, on 8 to 12 hours shifts. We do
5 have control room annunciation, pool temperature level, irradiation
6 monitors.

7 The draft report made a distinction that there are times
8 when these are not required operable, which is not exactly right. The
9 term "operability" for an operating plant most often applies to those
10 things that are in tech specs. And these things are not in tech specs.
11 However, for an operating plant and a decommissioning plant, we have a
12 SSAR which does have requirements, and includes requirements on when
13 something has to be able to function. It won't necessarily use the word
14 "operable," just because of some fine points on definitions, but, in
15 practicality, if they are in the SSAR, they are required to be operable,
16 and they can't be just ignored. So there are controls, it is just
17 different than the tech spec controls.

18 And then again, like an operating plant, much of the things
19 that an operating plant has to maintain and keep working are in the
20 SSAR, not in the tech specs.

21 Operator turnover process, we are going to talk about that
22 in just a minute.

23 And then, additionally, we have security rounds that -- in
24 detection. People are in the plant. They would observe certain obvious
25 things. And that is not to say that a security officer would observe,
you know, a half inch change in level. But this is relatively long-term
accidents or events that we are talking about, such that in the
long-term, they would recognize large changes in levels, certainly
temperature.

From our experience with security people, they recognize a

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1 whole lot of things. They will recognize if a pump is off and they are
2 used to it being running. And they bring these things up.

3 Next slide. Mitigation. The first bullet, detail
4 procedures used following detection. Part of the discussion this
5 morning dealt with level of detail in a procedure. Indeed, generically,
6 our procedures are not such that for a fuel pool event, that it is going
7 to say if it drops one inch, do this; if it drops a foot, do this; if it
8 drops 18 inches, do this; if it -- you know, they are not prescriptive
9 in that sense, that would be covered more under the training and the
10 experience of the operator.

11 They are prescriptive that they provide that they provide
12 the options that are there and the "how to" -- how to implement an
13 option.

14 At this point, what I want to do is turn this over to Bill
15 Ball, who can go into a lot more detail from an operations standpoint
16 about the kind of rounds and the expectations, the expectations that are
17 in our off-normal procedures, and even the turnover process.

18 MR. BALL: My name is Bill Ball, I am the ops manager at
19 Maine Yankee. Let me -- I had a lot of things I wanted to say, so now
20 is my opportunity. Let me just go through and, hopefully, I will cover
21 the stuff George wants to me say -- go over.

22 But one of the things I want to bring up is these operators
23 are highly skilled individuals. They are not the normal craft labor
24 type individuals. They only have one thing to do and that is protection
25 of the spent fuel pool, and they take it serious.

We are required to take local rounds once or twice a shift.
Also, during the turnover process, they are also required to
collectively, together, check different instrumentation. That is
another check, or self-check, so to speak. They are also required, when
they take these logs out there, they bring these logs back and the shift

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1 manager is supposed to -- or he does, he reviews these logs and approves
2 the numbers, so to speak, what the actual level is, to make sure it is
3 in the acceptable criteria. So it is another check.

4 The other thing I wanted to mention, which was kind of
5 touched upon a little bit this morning, was how long of a shift an
6 individual can stand. That is all controlled by tech specs. An
7 individual normally can't work more than a 40 hour work. He normally
8 doesn't work more than an 8 or 12 hour shift, and it is all controlled
9 by tech specs that the NRC has approved.

10 And the training aspect, although the quantity of training
11 has been reduced, the quality has -- you know, the quantity being there
12 is less systems out there that the operator needs to worry about, but
13 the quality is still the same. He still gets trained on the design of
14 the system, the operations of the system, the mitigation accidents or
15 actions. He is still examined once a year. He still needs to take an
16 initial examination. And, overall, the training program is approved by
17 the NRC. That is all submitted for your approval.

18 I don't know if I touched upon everything you wanted me to
19 there, George.

20 MR. ZINKE: Talk about the rounds.

21 MR. BALL: The rounds, I did a little bit. The rounds are
22 done once or twice a shift. There are specific logs that they need to
23 take. They are, like I said before, they are second checked by the
24 shift manager.

25 MR. ZINKE: Tell them specifically how they would -- how
they look at level, what they look at.

MR. BALL: Oh. On level they have to -- on level, there is
a couple of things they do. They have, in the control room they have a
computer based monitoring where they check off on that, and then they
also go out locally and check level on a mechanical dipstick that we

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1 have. And I am sure most decommissioned plants have dual function level
2 indication. There is other checks out there that they check like
3 anti-siphoning devices, they need to check them clear.

4 All this stuff is in the DSAR and then we turn it --
5 operations turn those into logs, and then those logs need to be taken
6 and they need to be reviewed by management. All that happens.

7 MR. ZWOLINSKI: Bill, for clarification for all of us, have
8 you just shared with us the way business is conducted at Maine Yankee?
9 The advice -- are you sharing that is the way you see it generically
10 across the industry? So help us with that understanding, if you could.

11 MR. BALL: I think I share it across the industry. I
12 haven't done a formal, you know, go and ask every single decommissioned
13 plant out there, but I have got a very high confidence level that all
14 decommissioned plants operate like that. But these guys could probably
15 jump in.

16 MR. HASELTINE: John Haseltine from Connecticut Yankee. We
17 had some discussions on this yesterday just to make sure that what Bill
18 is saying is accurate, and we all concurred. But, basically, we do the
19 same at Connecticut Yankee. We make our rounds once a shift in our
20 case. They are required to record level and temperatures, discharge
21 pressures, check certain things, write them down and bring them to the
22 control room and they are checked, and they do the same thing on the
23 next round.

24 The training is very similar. In fact, I think the training
25 is even better on spent fuel than it was when it was an operating plant
because now it is quite a lot larger than it used to be, and I think the
operators are a lot more familiar with it because it is the only thing
in town. And it is a formalized training program. It requires you to
& get a grade, it requires you to get approval. It is audited and
inspected by the NRC and it is something, you know, you have to do in

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1 order to have an operator look over the pool.

2 MR. ZWOLINSKI: This is a regular Part 55 program.

3 MR. HASELTINE: Yes.

4 MR. WITHROW: Greg Withrow from Big Rock. I think actually
5 what they are stating is the minimum requirements we do. I know that
6 they do more than that, and so do we. I mean we have alarms on level,
7 alarms on radiation, that sort of thing. We also use beepers on
8 people's belts that are electronic beepers, so that if they get an alarm
9 on level, it goes off. You know, so there is a lot of things.

10 We record rounds twice a shift. We lot hourly those
11 readings and all of our stuff is alarmed, you know, so -- and that is
12 our primary responsibility, and the training is very similar. And in
13 your first year or two, you typically retain the same operations people
14 you have in the past. If you go out five, ten years, then I think some
15 of your questions come into the realm a little bit more. But I think if
16 you are looking in the one to two to three year timeframe, which is
17 concerned relative to zirconium fires and other things that are really
18 important, then I think you really have to look at the present operating
19 staff being carried through for at least a couple of years. At least in
20 all of our cases that is exactly what is happening.

21 MR. CAMERON: Okay. I would just note that John's point on
22 generic versus plant-specific, in this case, an individual plant, I
23 think it is a question probably that applies to all of these areas, not
24 just the loss of spent fuel pool cooling. So just something to keep in
25 mind.

Do we have some clarifying questions? All right. Go ahead.

MR. RICHARDS: Just some questions to try and gain on, you
know, your experience. I guess we have what, four plants represented?
I think the training probably isn't Part 55, because that is licensed
operator training and these are certified fuel handlers. But,

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1 nonethless, it is submitted to us for review and approval. Is that a
2 continuing training or a one time deal?

3 MR. WITHROW: Continuing.

4 MR. BALL: It is a continuing training program. It is very
5 similar to senior reactor operator continuing program. In fact, we
6 benchmarked it off our operator training program and massaged it, and
7 that is what we submitted.

8 We are required -- the crew is required to attend training
9 on a quarterly basis and take annual written exams and annual operating
10 exams.

11 MR. RICHARDS: Is zirc fire potential covered as part of
12 that training?

13 MR. BALL: No per se. The mitigation -- the mitigation
14 action for a lower level or loss of cooling is covered.

15 MR. RICHARDS: Could you tell us a little bit about the
16 instrumentation available? I mean you have do you have one level switch
17 or two? Do we have a TV camera? How many devices or redundant
18 indications of level do you have?

19 MR. BALL: I can speak of Maine Yankee and maybe each one
20 needs to speak of their own, because there may be a little bit of a
21 difference there. We have two remote level indications that provide
22 input into the control room. In addition to that, we have two local
23 level indications that the operator can use, and he does use when he
24 goes up and takes local readings. And in addition to that, we have a TV
25 camera from the control room that can basically zoom right in on the
level, indication level -- level indication also.

MR. RICHARDS: How much of that is required by regulation?

MR. BALL: I couldn't tell you. George might be able to
help. Tech-spec-wise.

MR. CAMERON: George.

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1 MR. ZINKE: As far as the details of how much is -- you
2 know, what -- how many indicators and how often you look, that level of
3 detail is not tech spec -- you know, generically, isn't going to be
4 tech-spec-based, it is not going to be driven by specifics in a
5 regulation. That level of detail is typically in a SSAR. Now, from
6 plant to plant it may differ. You know, one plant says I am going to
7 have two remote and one local. One plant may say I am going to have two
8 local and one remote. But it is going to start out, in moving into
9 decommissioning, it is going to start out with whatever you had an
10 operating plant. In order to reduce that, then you are back into some
11 kind of an evaluation, depending upon if we are talking about indication
12 or if we talking about fire equipment, or if we are talking about plant
13 equipment.

14 But the specific details are not going to be in actual
15 regulations or guidance.

16 MR. CAMERON: Can we continue our canvas in response to your
17 question? In other words, Jim and then John, and Greg, whatever you
18 have to offer on Stu's question.

19 MR. ZINKE: In just a second, my advisement, I wasn't real
20 clear. That level of detail isn't required for an operating plant
21 either. Yeah, so we are basically staying with the same level of detail
22 that was required when things were very complicated and complex and
23 massive.

24 MR. CAMERON: Okay. Thank you.

25 MR. BALL: Can I just mention one more thing? Just to
compare what we were when we were an operating plan, compared to what we
were for indications in a decommissioned plant, at Maine Yankee, what I
had in the control room was one high level -- one high and low level
& annunciator and one high temperature annunciator, compared to all kinds
of level pressures, temperature indications and alarm just for the pool.

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1 So at least at Maine Yankee, the focus has really been on just the pool
2 and to get the best detection capability as we can. And it has actually
3 improved from what we had as an operating plant

4 MR. CAMERON: Okay. Thanks, Bill.

5 Jim.

6 MR. CURRY: Yes. I am from Oyster Creek, so we are a plant
7 that hasn't yet shut down, hasn't yet made the decision to shut down,
8 but we will commit our kind of design philosophy is to put in the
9 appropriate instrumentation and system redundancy and system quality
10 characteristics to assure that we have an adequate reliability to
11 demonstrate that the draining of the fuel pool is not a critical event.
12 So we are listening for the success criteria. We certainly take clues
13 from our peers in terms of instrumentation that they think is
14 appropriate, the BWR standard tech specs, or Owners Group work in that
15 area.

16 So I think George has got some words up there about pre-plan
17 strategies commensurate with event speed, complexity. That is really --
18 that is really our key as we listen to these groups and come up with,
19 gee, what is -- how good is good enough? How low of a probability do
20 you need to feel comfortable that this event is not going to happen?

21 We are committed to designing our systems to that level of
22 confidence. So we will have whatever redundancy is appropriate to
23 achieve that.

24 MR. CAMERON: Okay. Let's go to John. And, you know, keep
25 in mind that we going to be revisiting these areas, too. So, you know,
what we don't get now, we will get out later on. John.

MR. HASELTINE: Yeah. At Connecticut Yankee the tech specs
do require us to have a level high and low in the control room alarms,
& as well as temperature alarms. We have since added continuous level
OC I indication and temperature, but we didn't have it when we were
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1 operating. And it is only a single track.

2 MR. WITHROW: Yeah, Big Rock is similar to Conn. Yankee. We
3 have it in our tech specs it requires instrumentation, single channel
4 for both level temperature and we also have radiation detection for area
5 monitors.

6 But, you know, being sort of simple guys from the Midwest,
7 we sort of like just going up and looking at the fuel pool and seeing
8 what the temperature reads on a thermometer and what it shows on a
9 little ruler up there and that seems to work pretty good when the
10 instruments aren't in service.

11 But, you know, the other things that are real critical is to
12 think about what those level indications tell you and where those alarms
13 are. Those alarms are probably, in our case, five, ten days before you
14 could ever get to a particular problem. And what I mean is they are set
15 at the very top level and just inches below normal operating level of
16 the fuel pool, where to get down to fuel you have to go ten -- you know,
17 10-15 feet. So you have lots of time between the time you get an alarm
18 and the time you have to do something relative to the type of issues we
19 are talking for significant releases.

20 MR. CAMERON: Okay. I think we have -- before you probably
21 were going to go to loss of inventory next.

22 MR. ZINKE: Yes.

23 MR. CAMERON: I think we have some clarifying questions over
24 here with Glen.

25 MR. KELLY: There were a couple of people that mentioned
places where people were -- and I want to emphasize the word "required"
-- required to take local rounds, required once or twice a shift to go
someplace, were required to take logs. What -- in the context at your
& plant, what does "required" mean? Is that something that you feel is an
OCI NRC requirement? Is that something that you have an administrative
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1 requirement that you set on your operators? What does requirement mean?

2 MR. ZINKE: I will take that. Generally, in the terms that
3 "required" have been stated here, if they said a tech spec required it,
4 you know, of course, that is much more closer to regulatory. A number
5 of the details like, you know, -- How often do you do rounds? What
6 specifically are they going to look at? -- part of that is driven by the
7 SSAR. So if it is in the SSAR, then it, -- you know, using that term
8 "required" because it requires it in the SSAR.

9 Beyond that, there will be things that, from plant to plant,
10 they will chose to do just because they think it is the wise thing to
11 do. Also part of the answer in that, in this discussion we are having
12 today, the very last slide, which I will just draw you -- you know, if
13 there are things that we are talking about that would significantly
14 change the PRA, then we are ready as an industry to commit to those
15 kinds of things like putting in, if it doesn't already exist, putting in
16 the SSAR that you would have rounds.

17 MR. WITHROW: So, do keep that in mind. Our difficulty
18 right now is not knowing, well, you know, are these things you have
19 already credited and we just can't tell from the report, or they are
20 things -- so that is why this open discussion.

21 MR. CAMERON: So this whole issue of what is required at one
22 plant, what is required industry-wide, what should be required is all
23 connected to the problem, too, or the issue of -- you can't really tell
24 what has been credited in the study in terms of requirements. And I
25 don't even know, if we talk about what is required or what you would
commit to, do we need to worry about what this in the draft study. But
we can talk about that.

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MR. ZINKE: Yeah. Just as a point of reference, because I
know, as we are going through this and look at the -- well, what is
assumed? A key thing was Case 3, and Case 3 was presented as being

1 slightly above regulatory requirements. But as we read through nearly
2 all of the assumptions on Case 3, they look to us that they are below
3 regulatory requirements, that there is now way you can say you are
4 complying with regulations if you have gotten into that kind of a
5 condition.

6 MR. CAMERON: The issue is still important in terms of what
7 the NRC does with the final study about are these requirements below or
8 above.

9 Glenn, do you have another clarifying question? Go ahead.

10 MR. KELLY: Two things. First, it was important to us to
11 understand whether some of these were administrative procedures that the
12 utility itself had imposed on itself, because that adds rigor to
13 something as against I just choose to do it because it seems like it is
14 a good idea and maybe I will do it this time, and maybe I won't do it
15 next time. There is no real penalty to me as an operator for not doing
16 that. It is important for us to understand to what extent it is
17 formalized, that this is expected that you are going to do this.

18 MR. HASELTINE: Let me try -- this is John Haseltine. One
19 of the things that is in our tech specs is Reg. Guide 1.33, and you have
20 to follow requirements in the Reg. Guide, and the Reg. Guide requires
21 you to have normal operating procedures for, in this case, spent fuel
22 cooling and the associated systems. It requires you to have annunciator
23 procedures for annunciator alarms. It requires you to have off-normal
24 procedures for any types of accidents. And, also, you know, in this
25 case, rounds, et cetera, it comes under procedures.

So it is not something that you can just say I am not going
to have -- I am not going to have these because it is not a requirement.

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It certainly is a requirement, and we do have all those, they are all
formalized and approved by, in our case, a PORC, and whatever the
equivalent of PORC is for other plants here. So it gets a detailed

1 review and every time we change it, it gets the same review. So this is
2 a requirement.

3 MR. BALL: And Maine Yankee is also tech spec'ed to the same
4 requirement.

5 MR. CAMERON: Okay. Thank you. Can we go to loss of
6 inventory then?

7 MR. ZINKE: Let me move to just a few more subjects on here,
8 because they are essentially the same as the inventory. We have talked
9 about the pre-plan strategies. Another key in an event is that
10 personnel resources do get supplemented. Now, there can be a variety of
11 things that drive that. You know, one that is regulatory driven will be
12 the emergency plan. Once you get to the thresholds in the emergency
13 plan, you will make a lot of notifications. If you got to threshold of
14 an NRC reportability, you are going to be making some notifications.

15
16 But another thing that drives that, I will let Bill talk
17 about, but I mean just because staffing is low, and the operator in
18 charge knows staffing is low, it seems that they are very aware of their
19 limitations and it seems less likely that they are going to hot dog it
20 or just try to handle it on their own than call for help.

21 Bill, can you expand upon the expectations for an operator,
22 particular on back shifts?

23 MR. BALL: Yeah. I think George pretty much said it. The
24 expectations that we have explained to the operators is there is almost
25 nothing that you have to do immediately any more, and they have been
trained like that. We only have -- we have one additional operator
besides the person in the control room. And the expectation is anything
out of the ordinary, they are supposed to call ops management and we
& will get them help. It doesn't mean they can't take immediate actions
OCI for things that need to be done, but number one on their list is get
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1 help.

2 MR. ZINKE: The next bullet, the multiple options available.
3 Again, as we look at all the plants, the options are different. But
4 what is consistent is that there are multiple options. There is going
5 to be multiple water sources. They may be different at every single
6 plant, but there are water sources available. Water transport
7 mechanisms like some plants may be able to transport it via pipe or
8 hoses or buckets, or whatever, but, again, the details may differ from
9 plant to plant, but the fact that there are multiple ways of
10 transporting water is consistent.

11 The same way with power sources. Some may keep a diesel,
12 some may bring in a littler diesel. Some may depend upon the ability to
13 get a generator on sight, you know, within a day. Some may keep more
14 than one off-site source, some may not. So the differences in design,
15 again, are going to differ from each plant, but the fact that there are
16 multiple options available seems to be consistent between the plants.

17 Now, inventory, next slide. The rest of these slides are
18 going to go pretty quick now because, in general, everything that we
19 have talked about --

20 MR. CAMERON: Let me just interrupt you for a second. I
21 think Paul has a clarifying question.

22 MR. GUNTER: Yeah. Do I need the microphone or can I -- can
23 you hear me over there for the transcript?

24 MR. CAMERON: Can everybody else hear him? All right. Go
25 ahead.

MR. GUNTER: I am wondering what kind of analysis goes into
common mode failure for, let's say, service water systems and how that
is picked up in risk analysis. And how is your level of confidence in
looking at common mode failure, where is that documented? You know, I
can hear you say that you have got multiple sources, but, obviously, if

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1 they are all frozen, that raises an issue.

2 MR. ZINKE: I am trying to think of how to -- as far as
3 analysis and PRA analysis, I would leave that to the NRC on how they
4 would have modeled something like that. For our purposes of determining
5 that there is redundancy or that we have multiple ways of doing this,
6 sometimes there may be a common mode failure, sometimes not. However,
7 for a great deal of what we are talking about in mitigation, it becomes
8 not a concern in the sense that particularly things like off-site are
9 pretty well independent of things on-site.

10 Generically, across the industry, some may have two sources
11 of water and maybe there is one common pipe between them. However, if
12 that froze, there is some connection that could bypass it with a hose.
13 So we don't have any specific analysis that analyzes the single failure,
14 but, in general, because of the kind of event we are talking about, even
15 if you have single failure modes like a pipe freezing up, there are
16 options of getting around that.

17 SPEAKER: George, those are just initiating events?

18 MR. ZINKE: Yes.

19 MR. CAMERON: Any other elaboration from -- Jim, go ahead.

20 MR. CURRY: Yeah. The consideration of single failure of
21 the PRA has to be done, so if you do have a single failure point, you
22 basically that failure probability. I mean George talked about a pipe,
23 a common pipe. The probability of a pipe failing, a passive failure is
24 what it is. When you look at the system, if you end up taking out two
25 components, you end up taking out two components.

But, absolutely, a PRA would be -- it is a common wisdom
that I think the industry has grown up with, don't overlook the common
mode failures. That is the great weakness and that is what you have to
be careful with when you start playing with these numbers, because
usually that -- once you design a system with adequate redundancy, it

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1 usually is the common mode failures that will actually limit how good
2 you can be.

3 We are taking a look at -- we are doing an analysis of the
4 probability of draindown, as many other folks are. If you like,
5 afterwards we have our resident expert here and he can give you a
6 detailed discussion of how he actually treats the common mode failure.
7 But I think the key point for this group is you can't overlook it in any
8 PRA.

9 MR. CAMERON: Okay. Could we just get a, hopefully, simple
10 statement from the NRC folks on common mode failure of whatever it is.

11 MR. CHEOK: For the staff's risk analysis, what we did was
12 we had assumed common mode failures for the hardware, the pumps and the
13 valves, but not from the sources. We assumed that from on-site and
14 off-site sources, they would be worse enough that the source common mode
15 failure itself will not be a problem, but for hardware failures we have
16 modeled that.

17 MR. CAMERON: Glenn, any further -- anything to add on that?

18 MR. KELLY: Well, the other thing was that the system that
19 we modeled was so simple, it had quite a few single failure points in it
20 that the common mode failures wouldn't have been the dominant
21 contributors. There are so many other places that a single failure
22 would stop the cooling system that you had to -- and then it will be
23 expected that they would have had to go to a fill mode where they just
24 add water to the spent fuel pool if they are unable to fix a failure
25 point.

MR. CAMERON: John.

MR. ZWOLINSKI: If we can back up, in the entire process
when we essentially review a licensee's application for an operating
& license, these plants are analyzed for common mode failures. And we
take that through their license life to assure that events haven't

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1 occurred in the industry in which we have identified potential common
2 mode failures, and that is when we might go into our retrofit type
3 activity.

4 MR. LOCHBAUM: Can I respond?

5 MR. CAMERON: Sure.

6 MR. LOCHBAUM: You are stating that during the operating
7 license review, the common mode failure reviews are applied for safety
8 equipment, not non-safety-related equipment like the spent fuel pools
9 are for most plants.

10 MR. ZWOLINSKI: It is primary safety-related equipment, that
11 is right.

12 MR. LOCHBAUM: So they would not be reviewed for the
13 equipment we are talking about today?

14 MR. ZWOLINSKI: I know we have done it for safety grade
15 spent fuel cooling systems, but many of the spent fuel pool cooling
16 systems are not safety-related.

17 MR. LOCHBAUM: So that review would not apply. The past
18 reviews would not apply to the four going forward decommissioning cases.

19 MR. ZWOLINSKI: Right. And I think that is where the PRA
20 folks went beyond the typical review that is performed when we issued a
21 license.

22 MR. CAMERON: Rich, maybe you had better --

23 MR. ZWOLINSKI: The issue that Paul raises, is common mode
24 failure an issue that the staff should be mindful to, so on and so
25 forth, is valid and we have attempted to get after it.

MR. CAMERON: Rich, why don't you try to add a final point
on that, and then we will go back to George.

MR. BARRETT: I am not sure how much I can add, but I do
want to say that there are some terms that have been used here that are
-- that perhaps interchangeably that might not -- might not have been

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1 the best thing to do.

2 It is true that, I believe it is true that for these systems
3 that are put into the plants during the decommissioning phase, they are
4 not reviewed for single failure. And in the licensing arena, in the
5 design basis arena, that is really the standard we go to, is the single
6 failure criterion, as opposed to in the risk arena where we try to make
7 a realistic assessment of availability, reliability and single point
8 vulnerabilities and common mode or common cause failure situations.

9 So, in the -- I would say at that at the current, in the
10 current situation, we do not have single failure proof systems for
11 decommissioning plants. However, in the risk analysis that we did, we
12 would have taken into account all types of failures, including common
13 mode failures. But as Glenn said, common mode failures were not as
14 important as single point vulnerabilities because of the simplicity of
15 these systems.

16 MR. CAMERON: All right. George, do you want to --

17 MR. KELLY: Mike showed me some numbers and he said that
18 there are a couple of cases where you have parallel, like you have two
19 pumps coming off a single line, and there were enough places where we
20 had parallel lines there where the common cause failures were high
21 enough that we can say that it was a no-never-mind. So we did look at
22 it, it is modeled in there, but it is not orders of magnitude different
23 from what we found for the single point failures, but we did consider
24 it, and it is modeled in what we did.

25 And I just want to say, I don't think common cause failure
is going to be an important point here so much that -- because the PRA
already does look at it, and I think we have got that area pretty well
handled.

MR. CAMERON: Okay. Great. George, you will see that have
a summary slide up there. I am not sure you are ready for that yet, but

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1 --

2 MR. ZINKE: That's all right, because we are going to -- the
3 next couple of slides had to do with loss of inventory. And the way we
4 have looked at loss of inventory is, basically, from all the subjects we
5 have talked about, it is the same, so there is nothing new on the loss
6 of inventory, but a major difference is the speed of the event, that it
7 is a quicker event. And we have maintained that the quality of people
8 that we have, the training, you know, particularly if we talk about
9 minimum requirements, that is sufficient to respond to these. It is not
10 all these extra things that we have done, but the regulations as they
11 are right now.

12 There was one thing said this morning as far as, you know,
13 the ad hoc decisions which gets into what level of detail is in this
14 procedure that I am required to have, and we feel that with the required
15 training and required qualified people in these positions, and the fact
16 that when they get into an event, they are going to supplement that with
17 a lot of second-guessing type people, that the ad hoc decision versus
18 very prescriptive, do this at this level or this at this minutes, that
19 we think from a probability of success, we don't see the issue.

20 MR. CAMERON: Okay. A clarifying question here, Rich
21 Barrett.

22 MR. BARRETT: Yeah. I understand the similarity between the
23 loss of inventory, mitigation strategies, and the ones that you have
24 just described for loss of cooling, but I am curious, has any of your
25 plants ever gotten into an evolution where you, for operational reasons,
deliberately manipulated the level of water in the pool?

MR. CAMERON: Okay. Bill Ball.

MR. BALL: We did I would say about a year ago, but PH was
too low and the pool was getting out of spec in chemistry, so we have
deliberately added and drained water out of the pool. Now, when I --

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1 when you say deliberate, we are talking probably a four inch difference
2 changes in the water, four or five inches of change, but it was to bring
3 chemistry back into spec. And it was done under an approved procedure
4 with an approved 50.59.

5 MR. CAMERON: Jim, John, Greg, anything on that?

6 MR. HASELTINE: Nothing that I can remember in Connecticut
7 Yankee.

8 MR. CURRY: Nothing significant that I can recall.

9 MR. CAMERON: Okay. Greg is shaking his head no.

10 All right. Go ahead, George.

11 MR. ZINKE: With regard to that question, I mean there may
12 be evolutions that maybe move water or, you know, that maybe have some
13 potential that, you know, something wrong happens, and that is why we
14 get -- you know, I am not emphasizing in this human performance part,
15 but you get into issues like seals on gates and siphon protection, so,
16 you know, we recognize that this particular presentation wasn't really
17 aimed all the hardware things that are particularly important for
18 preventing inventory losses.

19 MR. CAMERON: All right.

20 MR. ZINKE: Now, we are at summary.

21 MR. CAMERON: All right. Summary now time.

22 MR. ZINKE: To us, the things that seem the most important,
23 that make a difference, that better explain why, you know, the people
24 would actually, you know, be successful in their mitigation efforts, the
25 whole event scenarios that we are dealing with are much simpler than in
an operating plant. We are talking about something you can see. You
can see the fuel pool, you can see the water. You can see water drop.
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Very different than when you are dealing with a reactor and it is all
closed up and you are trying to figure out, well, what is going on
inside of it, and you make lots of assumptions and you have multiple

1 systems, and one has to work in 10 seconds and one has to work after
2 that 10, but not before something else.

3 What we are dealing with is much simpler than that.
4 Detection is assured. We have talked about the operator rounds, the
5 various methods of instrument detection, the turnover process that,
6 given a long-term event, it is going to be detected. And, again, the
7 long h for the long intermediate events, the mitigating actions are
8 simpler than they would have been in an operating plant. So when we
9 talk about, well, maybe we won't have a former SRO, but most of the
10 knowledge that former SRO needed, you don't need anymore.

11 I mean we don't have all those complicated systems. So the
12 knowledge that an operator needs, the things that he has to pay
13 attention to while on shift, he has got the fuel pool versus having to
14 make decisions of, you know, 15 things more important than the fuel pool
15 and which do I do first, he has got the fuel pool.

16 We move to the last slide, conclusion, and then we will go
17 to the staff concerns list from this morning. We believe the industry
18 approach assures mitigation, but we will commit to actions discussed,
19 provided appropriate credit is given in the PRA. And then we have
20 talked a little bit about that earlier.

21 MR. CAMERON: So that sort of gets around the problem of
22 whether Case 3 is above or below, because -- or at least starts to get
23 around it because you would commit to the action discussed previously,
24 or all the things that you had on your slides, and then there would be
25 credit given for those in a PRA. And I guess the question for the NRC
would -- you know, are there other actions that should be -- do we need
other actions?

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But maybe you should go into the concerns and then we can
get into -- let's get into a discussion of the concerns and get into a
discussion generally.

1 And I am sorry, Paul, go ahead.

2 MR. GUNTER: Just a clarifying question. On page 6 of the
3 mitigation activities, under parallel mitigation strategies pursued, you
4 have got here personnel resources supplemented on detection. Example
5 given, emergency planning. Okay. Am I incorrect to state that -- part
6 of what is going on here is to eliminate emergency planning, right?
7 Incorrect. Okay. Or to downscale -- scale down? Scale down at least?

8 MR. MEISNER: I will clarify it as soon as you are done.

9 MR. GUNTER: But I mean it seems -- I just want to be clear
10 where we are in terms of -- I mean it could be viewed as elimination of
11 effective -- of evacuation or emergency plan. If, in fact, you don't
12 have enough personnel on hand, that, in effect, is an elimination. And
13 what we are interested is on what -- where is the level of scale where
14 you lose an effective plan if you -- when you start cutting meat off of
15 the bone of this plan, how far do you pare it done before you can't work
16 it? And then why do you include in here that you would supplement it?

17 I mean I am just trying to get some sense of what the point
18 of that is.

19 MR. MEISNER: Okay. When go into decommissioning, there
20 comes a point in time that all of the events, accidents that you analyze
21 cannot result in an off-site dose of 1 rem, which is the EPA protective
22 action guidelines for evacuation of the public. So the focus of the
23 emergency plan exemptions and reductions have dealt with the division
24 between an alert and a site area emergency which has to do with the
25 off-site activations and the starting to evacuate interface with the
state and preplanned evacuations.

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The two things that lead into that, one, I have just
mentioned that if you can't -- if after analyzing the events and
accidents, that you can't get to that rad level, then that indicates,
well, why do I have to keep planning for something that I can't get

1 there?

2 The other thing that factors in, and I believe it is in the
3 -- you know, in the NRC, I know it has been in the SERs, is that there
4 may be some, maybe -- emergency plans were generally written for
5 short-term events, short-term response. So there comes a time that if
6 you have long periods of time to react, that even if you have gotten to
7 a scenario where you want to do something off-site, you have got so much
8 time available to get that to happen that the kinds of preplanning that
9 the regulation required for real fast events doesn't have the same
10 value.

11 With regard to on-site emergency planning, it stays
12 basically the same. The thing that drives some of the changes in
13 on-site planning is the fact that, again, scenarios are less complex, so
14 you may not need as many engineering people to figure out how to get
15 water in a pool as you would on how am I going to recover from an ATWS
16 in an operating plant. So they are relative to the complexity of things
17 you would expect, but you still have rad protection support, you still
18 have engineering support, ops.

19 The point on the slide as far as personnel resources
20 supplement, one of the points in the PRA, the staff's PRA had to with,
21 okay, you have skeleton staff on back shifts, and that is absolutely
22 true. You know, you don't --

23 MR. GUNTER: Off-site or --

24 MR. MEISNER: On-site. On-site staff. There is not much
25 working going on, so the operations staff, there won't necessarily be
any maintenance staff. You have a skeleton staff. So if something
happens during that timeframe, in order to ensure that -- you know, it
is not the expectation that now you sit around until the day shift comes
in. You go ahead and supplement the numbers of people that you have.
You call people. You may get help via the phone, you may bring them in.

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1 And e-plan is one of those things that if you ever got to that
2 threshold, you automatically call people in to assist.

3 MR. CAMERON: Rich, were you going to say something relative
4 to Paul's or something else?

5 Paul, do you have anything else to add or ask George?

6 MR. GUNTER: I think that gives me some insight into --

7 MR. CAMERON: Okay. All right. A clarifying question from
8 Rich.

9 MR. BARRETT: Actually, I would like to ask a few questions
10 here about how -- where do we go from here? Because I find this
11 presentation extremely interesting and very, very useful. Very valuable
12 insights in here, and not only from these slides but also from the
13 comments of people from other sites who have actual experience on how
14 decommissioning can be implemented in a safe manner. And so I have
15 really three questions. And I say that so that I can keep my little
16 tower up here until I am done.

17 First of all, I think it would be very useful for us to
18 understand, in what manner do you plan to document this presentation?
19 You know, we have these slides and the slides are very useful. I think
20 the comments that were made by all of you gentlemen, you know,
21 especially insofar as it relates to your direct experience and to what
22 actually, a little more of the detail behind some of these things. I
23 think that that would be very useful for us to understand, and not so
24 much to understand how current plants are operated, but to understand
25 what it is that is important as we begin to look at future plants,
future decommissioning plants that are going to go through this window
that we are concerned about.

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So my question is, to what extent do you plan to document
this in a more complete way so we can have it and refer to it as we go
forward with trying to resolve this issue?

1 MR. MEISNER: I guess I will respond to that with a
2 question. To what extent do you intend to credit it? And, you know,
3 documentation, you have got the overheads here, you have got the
4 transcript. We don't know what the staff's thinking is on this, and I
5 would hope that maybe they will take up the rest of the afternoon, then
6 we can talk about what will be documented and where.

7 We are not going to put anything on anybody's docket that is
8 not going to go anywhere as far as getting credit and risk reduction.
9 That really wouldn't be worthwhile.

10 MR. BARRETT: Yeah. I would certainly agree with that. I
11 think that, really, the whole purpose for being here is to understand
12 those operational and design characteristics that are important to
13 impacting what our perception of risk is, and that was the whole spirit
14 in which I asked the question, because that is where we want to go with
15 this thing. And so I would certainly hope that this would -- that this
16 kind of information, this real life information about the way plants are
17 designed and operated today, and how we would expect them to be designed
18 and operated in the future, would be the crucial information for driving
19 future NRC decisions about decommissioning.

20 MR. CAMERON: And when you talk about industry will commit
21 to actions, I take it that that would be generic actions across the
22 board for the industry generally, rather than any plant-by-plant?

23 MR. MEISNER: That's right.

24 MR. CAMERON: All right.

25 MR. BARRETT: Let me ask the second question then, and I
understand that it might be very useful to wait until the end of the day
or the end of the workshop to make decisions about what gets documented
and how. But the other question I have, and, again, I don't think it
& requires an immediate answer, but we heard two very interesting
ASS presentations today from the industry. One is a risk analysis and the
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1 other is this very useful information, and both analyses, both
2 presentations have been very useful and interesting to us. It would be
3 very interesting for us to understand the relationship between this
4 information and the risk analysis that you have presented.

5 One of the bottom -- actually, the very last conclusion that
6 you have drawn here is that you are willing to commit to some
7 operational and design characteristics to the extent that they can be
8 credited in the staff's probabilistic analysis.

9 So I think it would be useful for us, as we go forward and
10 try to resolve this issue, to understand the relationship of these very
11 real factors that you have brought to the table with this presentation.
12 The relationship of these to the risk analysis as you have presented it,
13 and to the risk analysis as it might be impacted further by things which
14 have not yet been credited in your risk analysis, I think that would be,
15 again, very useful for us to understand the relationship between the
16 risk analysis you presented and the operational assessment that you have
17 presented.

18 MR. MEISNER: In the discussion this morning, you heard a
19 rough requantification, using the staff's model, but not having all the
20 data. That rough requantification reflects in general the assumptions
21 of this afternoon.

22 Now, maybe a fruitful thing to do would be to take the
23 staff's report and look at all the decision points, essentially, like
24 out of Table 3.1-2, which has event probabilities and frequencies used
25 in the spent fuel pool risk analysis, identify those that are associated
with the things we have been talking about this afternoon, and talk
about a change in approach.

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Now, that may be the simplistic way to go. We also
discussed this morning the fact that I am not sure that a simplistic
single assumption over a five day period is appropriate, and maybe the

1 staff needs to do some more detailed work on determining what a real
2 human error probability is. But if you want to take the simple
3 approach, I think we could use -- pick out some of the key things in
4 that table.

5 MR. CAMERON: Let me ask a formatting question here. Where
6 does the discussion of the NRC staff concerns fit into trying to get to
7 the point that you are talking about? I know that George was going to
8 go through the concerns. Basically, if you put the -- if you address
9 the concerns, each concern, does that get us to where we want to be?

10 MR. MEISNER: I think it gets us there depending on what --
11 how simple you want to be.

12 MR. CAMERON: But at least it is a way to start, maybe the
13 simplest way to start.

14 Okay. Well, why don't we -- you don't you state, go through
15 the -- you know, start with the first concern. And these are in the
16 staff's presentation, okay, from this morning. Say something about
17 that, and then let's have -- you know, let's have a discussion of each
18 one and then let's see where we go with that. Is that fair?

19 Rich, do you have more to say? Okay. Go ahead.

20 MR. BARRETT: Yeah. I think that is a very good way of
21 proceeding. I am very anxious to hear how you plan to address the
22 staff's concerns, and I think that would be a very good next step from
23 where we are now.

24 But the third point I wanted to make, and I think this is
25 important for all us to keep in mind as we go forward here, and to some
extent I am echoing a comment that I think Paul made a while ago. What
we have heard today is real life experience at real plants as they exist
today, and the existing regulatory framework and the existing -- the way
& things are as we sit here today.

I think as we go forward, what we are talking about is a new

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1 set of rules, a new set of technical specification requirements,
2 possible exemptions to some of the rules that are out there. We are
3 moving into a regulatory environment that we cannot fully anticipate
4 what it will look like as we sit at this table.

5 As we go forward, it is important for us to sort out for
6 ourselves what it is that we are taking credit for here and make sure
7 that the things we are taking credit for here are not those things,
8 among those things which might go away as a result of exemptions, or go
9 away as a result of new rulemakings.

10 So I would just caution everybody to keep that in mind as we
11 go forward. With that, I am very anxious to hear the discussion of the
12 staff's concerns.

13 MR. CAMERON: Okay. George, do you want to lead us off with
14 the first one?

15 MR. ZINKE: Yes. The first item had to do with operator
16 attentiveness, and as Bill has stated, I mean, obviously, this is a
17 concern in the sense that -- a concern for a utility in that the
18 operator has to be attentive and we have to do whatever things are
19 necessary to make the operator attentive. This morning, in addition to
20 this narrow term "operator attentiveness," we talked about management
21 systems, and, indeed, it is important that a management system at a
22 plant, the management culture is that it promotes this.

23 Before I turn it over to just general, I would like Bill to
24 talk about some of the kinds of things that we have to do in just -- in
25 giving concern to operator attentiveness.

MR. CAMERON: Okay, this is Bill Ball.

MR. BALL: Yeah. Some of the things that we do at our plant
is we actually go and assess the operators. We go on rounds with them
on a quarterly basis, things like that. It is awful hard to say these
are the things that are going to make sure an operator is attentive.

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1 You are talking such a subject term, it is very difficult for me to say
2 that that is going to guarantee his attentiveness.

3 We make sure he has things to do. I mean he has logs that
4 he has to go out and take and take specific readings that are centered
5 around the safety of the spent fuel pool. I don't know if there is much
6 more than I can say to the subject.

7 MR. CAMERON: Mike Meisner.

8 MR. MEISNER: I guess I would add, too, I am not sure -- if
9 what the staff is going to is, geez, we need rulemakings on operator
10 attentiveness or something of that order, I suggest that you also need
11 the same thing for operating plants. We all know that these are
12 long-term acting events in decommissioning, and operator inattentiveness
13 for a period of minutes or even a few hours really has no bearing one
14 way or another on the progression of the event. Yet, operator
15 inattentiveness on the part of an operating reactor, over a few seconds,
16 may make a big difference.

17 I guess I can gut-wise get a feel for what the staff concern
18 might be, but I would say that you need to rely upon the general
19 regulatory framework that requires staffing, training, a course of
20 study, and then the inherent management structure that makes those
21 things happen without being subject to NRC violations.

22 I am not sure where else you can go with this particular
23 concern.

24 MR. CAMERON: We have a number of people who want to comment
25 here, but I was just reminded of one possible disconnect here that we
may be able to do something about. We just went through a whole list of
industry responses to various events. Okay. Now, we are into NRC staff
concerns, operator attentiveness. Now, it would be nice, in theory, if
you could correlate the operator attentiveness concern with some of the
things that were brought up in the industry presentation, and I know

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1 that we haven't done that cross-walk, and it may be difficult to do, but
2 I think that if we can talk about addressing the staff concerns, some of
3 that may be through what you have in your presentation, George. Some of
4 it may be through other things, or maybe we don't need to do that at
5 all. But I would just state that.

6 And, Greg, I want to get Greg on here because he is part of
7 the panel. Why don't you say what you were going to say?

8 MR. WITHROW: Just a little comment here, and I think David
9 asked the question earlier, and I am not sure we are going down the
10 right path here, is that what timeframe are we really dealing with for
11 this particular issue? And I think we are dealing with two to three
12 years, right, after shutdown, basically. And what David and the other
13 guys are asking here is, well, we want to understand the full picture of
14 decommissioning. Well, for this particular issue we are talking about,
15 we are only talking about the first three year timeframe, let's say, for
16 argument purposes.

17 If you look at it in that light, I think it operator
18 attentiveness is very similar to what we have today with operators that
19 are trained and qualified to operate the plant. Those people mostly
20 likely will be there for the first two to three years. We will have
21 change-over after that time period, I am pretty sure of that, you know.
22 But in the time period of concern for this particular issue, I think
23 operator attentiveness is very similar to what it would be for an
24 operating plant.

25 Secondly, you know, to correlate the information that we
gave you to your concern about how do you know they are going to be out
doing stuff, well, the bottom line is we have alarms in our control
room. We have beepers at -- this is specifically to Big Rock, we have
& beepers on their belts that tell them if they have an alarm. We require
ASS them to go on rounds twice a shift, and usually they alternate those
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1 rounds, so that we have two people on shift, each one takes an alternate
2 shot at it.

3 We log our readings hourly, okay. And then beyond that, we
4 have security people that are making rounds around the plant. And even
5 beyond that, most of the plants, and this is not across the board, but
6 most of the plants have moved their monitoring stations, i.e., control
7 rooms don't have a control room anymore, they have a monitoring station,
8 down into the security area. And the reason we did that was, (1), to
9 get it out of where we wanted to take stuff apart, but (2), so that the
10 operators would have other people to communicate with to keep their
11 attentiveness up. You know, that was very purposely thought out of why
12 we did we move those people there, that was one of the reasons.

13 So I think, just following up with David's question, I mean
14 we need to look at what timeframe we are really doing this analysis for.
15 It is not for five, ten years out when you would really be worried about
16 turnover of personnel.

17 MR. CAMERON: Okay. Before we go to NRC, let me get David
18 on the record here. And, Greg, thank you for that little bit of a
19 cross-walk, and there is also the time sequence that you brought up.

20 David, you may want to use this.

21 MR. LOCHBAUM: I think the way we look at operator
22 attentiveness, it is not hand-eye coordination tests, or anything like
23 that, that is not what we think would be appropriate. But it is how
24 often the operator rounds are done, things like that. I realize Reg.
25 Guide 1.33 requires you to have operator rounds and alarms and things,
but it doesn't necessarily say you have to do it every shift versus once
a week. So I think -- and you could put all that stuff in the
decommissioning safety analysis report, but with 50.59, you could take
it out the next week and return it to once a week.

So I think if the NRC were to set certain guidelines that

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1 said, based on having operator rounds once a week, or whatever else the
2 nice things they wanted was, and in the decommissioning plants, if they
3 choose to meet those guidelines or that criteria, then they would get a
4 certain operator response success rate or something like that. And
5 without that, absent those kind of checks, it would be less of a success
6 rate because you don't have the nice bells and whistles you have with
7 those criteria.

8 So having that kind of criteria and that kind of industry
9 response would be one way to approach operator attentiveness and
10 probably many of the others on that list as well. But just having Reg.
11 Guide 1.33 doesn't necessarily assure that rounds are done once a shift,
12 or once a day for that matter.

13 MR. CAMERON: Vonna, why don't you address that and whatever
14 else you wanted to.

15 MS. ORDAZ: Okay. I just had a few questions. Reg. Guide
16 1.33, I know that is included in your tech specs for operating reactors.
17 Is that translated into your defuel tech specs generically? You are
18 shaking your head, is that for everybody?

19 MR. HASELTINE: It is for Maine and Connecticut. I am not
20 sure about Big Rock.

21 MS. ORDAZ: So it is not fully applied generically to all
22 plants, two out of the four.

23 MR. CURRY: Well, Oyster Creek hasn't developed its tech
24 specs. We are closely watching the BWR Owners Group work in that area.

25 MS. ORDAZ: Okay.

MR. CURRY: So that is why --

MR. HASELTINE: The standardized tech spec draft that the
staff put out for PWRs does have it in there.

MR. WITHROW: Reg. Guide 1.33 is committed to in our QA
plan.

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1 MR. HASELTINE: Okay. So they have equipment another way.

2 MR. CAMERON: Let's go to this gentleman here.

3 MR. FORD: Brian Ford, I am with Millstone. I just happen
4 to be working the BWR generic tech specs. And, yes, it stayed in there
5 because that was one of the things that didn't change, go away when you
6 changed your plant state. So I have a high degree of confidence that
7 what the industry is going to propose is generic tech specs for
8 decommissioned plants, still has it because I put it in there.

9 MS. ORDAZ: Okay.

10 MR. FORD: And the committee has already voted on it.

11 MS. ORDAZ: Okay. So that might be another outcome of the
12 commitments.

13 MR. CAMERON: Okay. Thanks, Brian.

14 Go ahead, Vonna.

15 MS. ORDAZ: Okay. Yeah, that is what I was wondering
16 because, you know, that is what gets you into all these procedures that
17 we are looking for -- to see if you have for level and temperature, et
18 cetera.

19 The other question I had was on management oversight of
20 operators. We are talking about operator attentiveness as one of our
21 concerns, and it gets back to another question that is in your tech
22 specs, I guess in the admin. section, and this is a generic question --
23 is that consistent throughout the level of management that you have on
24 shift? And security, like you mentioned security does rounds, and all
25 the other individuals, is that -- is there a minimum set of individuals
that is always there and is that consistent throughout?

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MR. ZINKE: Let me answer that. From a generic standpoint
the people on shift, operations, is specified in tech specs, so that it
will have a minimum amount in the tech specs for each facility. For
security, the people, it is going to be in the security plan, and so it

1 will be specific. Now, that may vary from plant to plant, I don't know,
2 because, as we talked this morning, sometimes that security stuff being
3 safeguarded, you don't know what everybody else is doing, but that is
4 where it is specified.

5 With regard to oversight, of what kind of oversight do I
6 have of people doing activities, that will tend to generically not be
7 specified in the same manner. One reason is, you know, I know even in
8 the plan it talks about, you know, you have -- we have an Appendix B QA
9 program. However, the regulations that are in such, the Appendix B QA
10 program, deals with safety-related items, and the oversight that would
11 be related to a fuel pool, even radiological issues, tends to be a
12 commitment by the utility to augmented QA, which may differ from plant
13 to plant.

14 But, generally, there will be some commitment about
15 oversight, but it may be a little bit different.

16 MS. ORDAZ: Okay. Thank you.

17 MR. CAMERON: Can I ask one question relative to what David
18 suggested? His suggestion, I believe, was that if the NRC set
19 guidelines, however those guidelines would be institutionalized, that
20 this would give some assurance. Is this any different than the industry
21 making various commitments that we were talking about in the NRC giving
22 appropriate credit for those commitments?

23 I am trying to figure out whether that would accomplish the
24 concern that you have, David.

25 MR. LOCHBAUM: Does it make a difference to me, or does it
-- you are talking about --

MR. CAMERON: Well, no, I am just wondering, is it -- you
know, are we talking about something that is completely different in
nature, or would the industry commitments to this satisfy what you were
talking about in terms of guidelines?

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1 MR. LOCHBAUM: It probably would, but from a perception
2 standpoint, right now, there is a general public perception that the NRC
3 is not a regulator, it is basically doing whatever the industry wants,
4 after the Senate hearings. So if the NRC were to establish criteria
5 that the industry met, that looks a lot better to the public than the
6 NRC just doing whatever the industry wants, even though it may be the
7 same thing.

8 MR. CAMERON: Okay. But I wondered whether there would be a
9 difference there. Mike.

10 MR. MEISNER: Yeah. Chip, I would guess it is more a matter
11 of optics like David, than anything else, and maybe a cart before the
12 horse. You know, we set up this workshop so that the industry could
13 give the NRC a basis to change their assumptions. In fact, what I think
14 will really happen after that is done is the staff will put together a
15 rulemaking package that rests on certain presumptions or criteria, that
16 if a licensee wants to take advantage of the new rule, it is going to
17 have to meet.

18 So, you know, I think either way, it is both 50.59 and maybe
19 some other sort of unchangeable commitments if we want to take advantage
20 of new regulations.

21 MR. CAMERON: Okay.

22 MR. LOCHBAUM: So I don't think it matters either way.

23 MR. CAMERON: But we need to have this starting point before
24 we can figure out what the exact vehicle is to put the requirements on
25 the industry.

 All right. Operator attentiveness was the first concern.
Mike.

 MR. MEISNER: Yeah, I think what we haven't heard yet is
from the staff. I am not sure we understand exactly what they mean by
operator attentiveness, nor is it clear -- I can't trace a path back to

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1 their analysis as to what they means, like I can, for instance, with a
2 procedure for restoring water.

3 MR. CAMERON: Okay. I think that is a fair question. Do we
4 have Glenn or Rich? All right, this is Glenn Kelly.

5 MR. KELLY: I would change that, I would rewrite that to be
6 organizational attentiveness, but that the concern was that we are
7 worried about the very type things that also sound good, about the
8 systems being simple and the operators having only this to do. That
9 works very nicely one way in the sense that the operator is not
10 overburdened with things. At the same time it can become exceedingly
11 dull and boring and basically kind of put you to sleep about what is
12 going on if you are just doing this day after day and nothing is happen.
13 You know, the pool level stays the same, you know, yeah, the pool is
14 still there. Okay, I can go back and check it eight hours from now.
15 The pool is still there. Okay. I am okay there.

16 As an organization, I am not being challenged like I am on
17 an operating reactor. So we are worried here that is really easy, we
18 see, for an organization to get a little soft if they are not used to
19 dealing with these hard problems now and they are -- particularly if the
20 expectations are that nothing bad can really happen with the spent fuel
21 pool, it is just basically a big swimming pool. If I look at the
22 procedures, all I can do is, you know, it takes about maybe I can use 5
23 gpm pump to take care of any leaks. There is no expectation I am going
24 to get a 150 gpm leak or what I am going to do with something like that.

25 So, generally, this just had to do with the fact that
organizations may not be prepared, really prepared for having a
significant problem with a spent fuel pool. And in the event that there
is an accident, without having -- we saw that the potential was that an
organization could end up, as we talked about happening at Three Mile
Island, they start going down one path, and they miss seeing what is

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1 happening over here. Or they are concentrating on fixing that
2 diesel-driven pump because they just know they are going to get it done
3 in another day, it is going to get fixed and this whole thing will go
4 away, and so it is okay in the meantime while the pool is heating up,
5 because they just know it is going to -- they are going to get it fixed.
6 And every plant has probably had that. But they just knew they were
7 going to get a piece of equipment fixed, and, oh, we didn't quite make
8 it, which is why we have NOEX.

9 MR. CAMERON: I guess there is a process question here in
10 the sense of, one, what has the staff heard from the industry
11 presentation that would make them feel more comfortable about now
12 organizational attentiveness? And the other thing is is that does the
13 industry have a good enough idea from our concern about what they might
14 do, or what they might commit to, to satisfy our concern? Mike.

15 MR. MEISNER: Well, first of all, I think you are mentioning
16 apples and oranges here. You started out talking about lack of
17 attentiveness and being bored and somehow drew the conclusion that that
18 leads to somebody fixating on restoring a pump to the exclusion of
19 anything else.

20 You know, I think you cautioned us earlier against a common
21 sense approach, and it sounds to me like you are dabbling in that
22 yourself. I think the issue of attentiveness is not the issue, but
23 rather, is there a procedure in place to direct that the operators do
24 those actions.

25 What I am trying to get to is, where in your model, where in
your analysis, do you credit or discredit operator attentiveness, as
opposed to all those other things up there? In other words, what can we
do? What is it you are looking for? What commitment of substance would
there be that would make a difference in your conclusions?

MR. CAMERON: I think that is a fair question, and before we

1 go to Paul, I would like Rich -- Rich Barrett to answer that.

2 MR. BARRETT: I would like to answer two questions here.
3 First of all, address Chip's question regarding what is it that we might
4 have heard in the most recent presentation from the industry that would
5 lead us to feel more comfortable, let's say, about organizational
6 attentiveness and the sense of alert and readiness, the sense of
7 urgency, the sense that this is really an issue that has to be dealt
8 with day after day, shift after shift.

9 And I think that taking into account the perspective that
10 this is a situation that will exist for three years, and some of the
11 thermal-hydraulics indicate that it might be less than three years, that
12 you have an organization that is coming into this from the experience of
13 operating a nuclear plant, which is to say an organization that is a
14 highly tuned organization, that is a situation in which, by and large,
15 the operational staff are, in fact, the same people who were operating
16 the reactor up until that point.

17 I think there are a number of factors such as those that
18 would lead us to believe that the organizational attentiveness would be
19 high, in spite of the tedium that would certainly -- you would certainly
20 expect to set in at some point. I think also in the first couple of the
21 three years there is probably, I would imagine, more than the average
22 amount of activity, ancillary activity at the plant, associated with the
23 decommissioning process itself, associated with the movement of fuel
24 perhaps. Then there might be, in the longer-term, after you have passed
25 the window during which a zirconium fire might be a concern.

So, to answer your question, Chip, I think we heard a lot in
this presentation, and I certainly -- I don't know that I have been
exhaustive in coming up with examples of what those things were, but I
think when we go back and we think about this, we will find a lot in
there that would give use a sense, a better sense of about

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1 organizational attentiveness.

2 With regard to where in the model this is modeled, I think
3 it would probably be asking too much of this model to say that we have
4 -- you know, we have gone in at that level of detail, and specifically
5 have gone into performance shaping -- human performance shaping factors.
6 Maybe I should let Glenn speak to that. But this is -- I don't believe
7 it is that sophisticated a model.

8 MR. KELLY: Well, Mike and I were just talking about that
9 and rather than my paraphrasing what Mike told me, I will let Mike go
10 ahead and speak directly.

11 MR. CHEOK: In the model, how we modeled this was in the
12 HEPs pretty much, and I think Ed alluded to this earlier this morning in
13 the dependencies between HEPs. When someone fails to do something, an
14 earlier action, how does this affect his later actions? Are all these
15 actions independent? I think that is how, you know, we modeled the
16 organizational attentiveness. How does the organization respond to --
17 sort of generically.

18 MR. CAMERON: Has there been -- well, go ahead, Stu.

19 MR. RICHARDS: I think in order to keep the dialogue moving
20 -- thank you.

21 SPEAKER: Go ahead, Stu.

22 MR. RICHARDS: I think he asked a fair question. You know,
23 what we are supposed to be doing here is talking about mitigating
24 actions. We haven't gotten past number one yet. I think he asked --
25 and I am thinking, too, the PRA was supposed to highlight areas of
concern from a risk perspective, and I think the purpose of the workshop
was to talk about, well, what can you do to address those risk concerns?
So we are kind of talking around the issue here.

The question is, what can we do to make things better in
operator attentiveness? And the industry has kind of -- like, hey, I

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1 don't know what you are talking about. And what was the question to us.
2 Do we have any idea what we want them to do to address that? If not, if
3 it is kind of a philosophical thing, why don't we move on to number two.

4 MR. MEISNER: Thank you.

5 MR. CAMERON: And I guess that one suggestion here is that
6 the industry came up with a number of suggestions of things that they
7 might to commit to, and their suggestions are organized in regard to
8 certain events. Will the staff take a look at that to see what credit
9 should be given in the PRA, including -- and that would include taking
10 those suggestions and running them against these concerns. The industry
11 could be required to do that, but I think that, as we are finding out,
12 with some of these concerns, the industry is not exactly sure what the
13 nature of the concern is. Is that correct?

14 I am just looking for -- I know we are going to have a
15 discussion of a bunch of other things, but if we want to come out of
16 this afternoon with something that the staff is going to do, to commit
17 to move this ball ahead, we need to be thinking about that.

18 Rich, go ahead.

19 MR. BARRETT: If the question is, does the NRC intend to
20 take all of this information into account in order to change our
21 perception of the risk associated with zirconium fire?, the answer is
22 absolutely. That is why we are here.

23 If the question is, does the staff intend to go back and
24 requantify?, I am not so sure about the answer to that. I am not sure
25 that that is necessary, a necessary step toward resolving this issue. I
am not sure that it is possible either.

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What we are doing here -- where we are here is in a region
-- a regime where probabilistic safety analysis is not normally done.
We are not generally dealing with accidents which are totally dominated
by human error probabilities. We are not normally in a situation where

1 we are talking about 10 to the minus 4 human error probabilities or five
2 days to take human actions. So what we have tried to do here is to use
3 probabilistic risk assessment, to the extent that we could, to highlight
4 those areas, those types of sequences which we have a concern with, and
5 to challenge the industry to come in and tell us, deterministically,
6 what features can best address those sequences, so that we can come to a
7 bottom line, on a qualitative basis at least, that risk has been
8 addressed, the risk of these sequences has been addressed.

9 MR. CAMERON: Are you suggesting that with the consideration
10 of what the industry has put forward, and a consideration of what we
11 have heard from other people, that when we take that back, we may put
12 the probabilistic -- the probabilistic study may have served its purpose
13 and may not be the driver of this? For example, it could be we think
14 these industry commitments, deterministic information, will satisfy us?

15 MR. BARRETT: That is correct.

16 MR. CAMERON: Okay. You know, we are getting close to a
17 break time again, but I want to hear Paul and Ray and Mike, and I want
18 to hear from the audience. So let's do that, and then let's come back.
19 I think it should take us an extraordinarily long time. Paul.

20 MR. GUNTER: Thank you. Maybe this is an
21 oversimplification, but it seems to me that the issue -- with this
22 particular issue of operator attentiveness, it is something that could
23 be dealt with by a level of enforcement commensurate to the risk that
24 would keep the utility attentive. And I am sure there are people in
25 here from the Navy, but what is the penalty when you fail the
requirement of your watch? I mean does anybody -- can somebody tell me?
I didn't serve in the Navy, but what, you know, what is the penalty?

And -- it may be.

But the issue is, I mean, you know, you assess the situation
that this watch has been assigned, commensurate with risk, and then you

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1 assign an appropriate enforcement level to deal with. Now, I think that
2 is how you get a utility's attention. And, frankly, I think that this
3 exchange back and forth really needs to -- we need to establish, you
4 know, who is running the ship here.

5 MR. CAMERON: All right. Ray.

6 MR. SHADIS: Yeah, I just want to take a minute to confess
7 that you all have me thoroughly confused. Individually, I seem to be
8 able to understand each one of you, but then when I try to put the
9 conversation together, it fails. I am very pleased to hear about the
10 different programs that these different power plants have in place to
11 deal with their spent fuel. And it is always nice to see the industry
12 doing more than is required by regulation. But I am confused about the
13 issue of the industry making commitments to this or that. I don't know
14 how it is relevant -- honest to God, I don't -- to regulation.

15 I wonder if before there were speed limits, anybody broke
16 the speed limit. I mean if there wasn't some idiot out there going
17 faster than everybody else. And you are in the business of establishing
18 regulation. This is a fairly serious matter. I am not sure that the
19 question really was answered as to what the NRC means by operator
20 attentiveness, or how, if they can define that, how they intend to get
21 there so they have operator attentiveness. I really don't think that
22 was answered yet.

23 But I would like to hear that at least, and then, you know,
24 I can tell you, representing my own constituency out there in the
25 public, that we don't want to depend entirely on the professionalism and
the good will of people working in the industry. We want to know that
there is a body of regulation there that requires our protection.

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And I think before you even get to that, and this is -- I am
sorry, but you have been doing this for a while and it has got me really
confused, before you even get to that, you need to tell me if it is 100

1 days that you are talking about or 700 days that is a window that is
2 going to require this operator attentiveness in order to avoid an
3 off-site impact that will, you know, in turn, require evacuation. Where
4 are we with it? I think you need to get that physical portion settled
5 first and then we need to talk about how you avoid those accidents.

6 MR. CAMERON: At some point before we go to Mike, I think
7 that, you know, we do need to have a clarification on the time element
8 here, and I understand your confusion about where we are going with
9 this. And I guess that where I thought we were going was that the
10 industry actions were going to form, eventually form the basis for a
11 regulatory regime. And let me go to Stu to talk about that.

12 MR. RICHARDS: I agree with you to a degree, Ray, that there
13 is a little confusion here, which is probably a good reason to take a
14 break.

15 But beyond that, I heard what, you know, what our staff said
16 as far as operator attentiveness. This is the idea you go from an
17 operating plant with a lot going on, and, clearly, people are generally,
18 you know, have good reason to pay attention because they are a lot of
19 activities to this passive system, you know, a large pool of water with,
20 you know, a reactor core sitting in it, which you could argue lends
21 itself to tedium, I think was the word that was used.

22 I heard the industry respond to that, saying, well, we
23 require our people to go out and make rounds. We require them to take
24 logs. We train them, we give them periodic tests and retraining. So
25 they did bring to the table a couple of things here to say that, you
know, we don't just hire people and put them in the control room, we
train them, we require them to do activities. We relocate them to
ensure that they have other people to interact with.

I think where the disconnect is coming is the industry has
asked, how are our comments affecting the way we view our draft PRA

1 results? And you know, we need to make that connection. I think maybe
2 this particular topic doesn't lend itself well to that, as some of the
3 others will, such as having procedures in place.

4 But I think your idea of taking a break to talk internally
5 about how we proceed is a good one.

6 MR. CAMERON: And I think you are right about what you just
7 said.

8 Mike.

9 MR. MEISNER: Okay. I am going to take a couple of minutes
10 here. We have got several very fundamental issues. First of all, this
11 notion of operator attentiveness, what I was trying to get down to was,
12 Mike said very clearly he modeled this in his analysis. What we need to
13 know is, what he modeled and what would make a difference in the model?
14 If we are not going to get down to those answers, we are not going to
15 get anywhere.

16 Secondly, the bigger picture, on this notion of
17 requantification, and I am going to answer Ray's question in the process
18 as to why we are talking about this commitment process and all. What we
19 have here, from the viewpoint of the industry, is a self-created issue
20 on the part of the staff. They have put together a model that ensures
21 that human error is the sole and only focus of the model, and in our
22 point of view they have done it incorrectly and it is fatally flawed.

23 The reason we are getting into commitments is to try to
24 break an impasse here. It is not something we normally do. We would
25 much prefer that the objective technical approaches prevail here, but we
don't think that is going to be the case. So our band-aid approach is
to identify areas where the industry can provide assurance and
commitment to cause the staff to change their model. If the staff is
& unwilling to change their model and, clearly, they are by unwillingness
ASS to requantify, then we had better take a significant break and everybody
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1 go back to the drawing boards.

2 The model has to be requalified if we are going to have a
3 risk-informed approach to decommissioning. That is what the Commission
4 asked for. I heard that clearly on March 17th. You can go -- and I
5 have read the SECY that the staff just issued, too. Clearly, the staff
6 is intending to develop a rulemaking in the context of the backfit rule.
7 You are never going to be able to demonstrate compliance with the
8 backfit rule unless you have got some level of quantification of what
9 the level of risk is and in order to turn that into some cost benefit.
10 If you do it some other way, I think you are not playing by the rules.

11 So our expectations is that we are going to provide you
12 concrete commitments if you will tell us what it is in the model that
13 makes a difference. And having given you those commitments, it is our
14 expectation, and I thought we went into this workshop with some level of
15 agreement, that the staff would take that and factor that into their
16 model and credit it. And it as simple as that.

17 So I would hope that we are going to get some answers
18 specifically on attentiveness, what it is in the model that makes a
19 difference, and what in the staff's view would make a difference, and is
20 a straight commitment, because, for the life of me, I haven't got the
21 vaguest idea what it is.

22 MR. CAMERON: Okay. We will address that as I think a
23 threshold question when we come back, at least starting off with
24 generally what the staff is going to do with the information. And I
25 think that we can put a much finer point on that.

Let's just go for anybody out here who wants to say
anything, and then let's take a break.

MR. CANAVAN: Yeah, I will also keep it quick. Ken Canavan,
GPU Nuclear. I thought this was a real appropriate time to say that I
thought that this was an historic day. Making history is kind of

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1 traumatic sometimes, but it is historic in that the NRC is here with all
2 the stakeholders. They are here with industry, they are here with the
3 public, to make new rules, to optimize safety and resources. The
4 question is -- how? So I know it is late in the day and everybody gets
5 a little testy, so I thought I would throw that out. We are really just
6 working at "how," and it is a common goal.

7 But to bring us all back just one step, I wanted to talk a
8 little bit about the operator actions and the PRA study. I am a PRA guy
9 and I do take issue with some of the human error probabilities that are
10 in the current generic study. And the reason why I do is because I
11 think some of the HEPs and some of the things that shape a human error
12 probability weren't really considered.

13 We talked earlier today about loss of spent fuel pool
14 cooling going on for five days. Well, this is a big Olympic size
15 swimming pool that evaporates into the building over these five days,
16 condenses inside the building and, basically, it starts raining in the
17 building. All that water goes into the sumps and drains and goes down
18 and some pumps start, along with all these annunciators go on, and 15
19 shift crews come in and out and don't notice it is raining in the
20 building.

21 So as far as an HEP goes, we can basically say that that is
22 probably a really low value. Now, I don't know what value you stick on
23 it, and I don't know what method you use to get there, but the current
24 value in there is not what I would consider a really low value, and it
25 is just to a point that some of the HEPs or some of the performance
shaping factors may not have been considered like it is raining in the
building.

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And that was the contrast, what had been going on earlier in
the day. That is how the action is different from all the other actions
that are typically in a Level 1 online PRA. And earlier everybody was

1 contrasting similarities -- pointing out the similarities between other
2 actions and how things can be missed. I am pointing out how it is a
3 little bit harder to miss this particular one.

4 And there are some other issues, and the problem with
5 conservatisms in the PRA, you might draw the wrong conclusion, you might
6 draw number 1, you might draw that one of the biggest concerns is
7 operator attentiveness, where maybe that isn't the concern, because you
8 were way conservative on one part of the model. You need -- what I
9 think we need to do as a group is get a little less conservative on some
10 of the parts of the model, be realistic through the whole thing, so we
11 have a really good pointer as to what the issues are. And then more
12 important issues get more important rulemaking and more important
13 enforcement, as Paul pointed out earlier. Less important issues, less
14 important items, less attention. And this allows us to focus our
15 resources and focus on safety.

16 And the last thing -- the last thing I had written down was
17 that there were some insights in the generic study, specifically,
18 numbers 3 and 4, that didn't seem appropriate to draw from what was in
19 the study. I read the whole thing and couldn't see how you got 3 and 4
20 out of it. All of a sudden we jump to having a release and evacuating
21 people. And it was unclear as to how numbers 3 and 4 were actually
22 drawn out of the study, and I guess that is more or less a question.

23 MR. BARRETT: Could you remind everybody of what 3 and 4
24 were?

25 MR. CANAVAN: Right here. Three and 4 are -- basically,
there is a point in here that it says, it appears that there would only
be five to seven hours available for local emergency response. This may
be too short for an effective evacuation to preclude some early
fatalities. And I was unsure, had anybody done any release work? Had
anybody looked at release categories? And had anybody looked at the

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1 dispersion of the fission products outside the buildings? Because it
2 really depends on the building and the configuration on how fission
3 products get out.

4 And I guess the last one was number 4, was similar to that,
5 that action levels for the e-plan higher than alert might be needed. I
6 was also wondering, had anybody done any fission product transportation,
7 or even any fission product release type work?

8 MR. KELLY: This is Glenn Kelly with the staff. The answer
9 is yes.

10 MR. CAMERON: Okay.

11 MR. BARRETT: Unfortunately, in the report we did not
12 include the consequence analysis, and so I could see where that would be
13 -- would appear to be a non sequitur, yeah.

14 MR. CAMERON: Let's take a break and come back at 4:00 and
15 see if we can get to some fundamental bottom lines about where we are
16 going. And I think that probably the NRC staff has to -- might want to
17 caucus at this point.

18 All right, 4:00.

19 [Recess.]

20 MR. CAMERON: Okay. If we could get everybody back to the
21 table. All right. Thank you.

22 We have got -- let me just -- we have got -- the staff is
23 going to start off and try to state its intent in the context here, so
24 that we can see if we can all get back on the same page. And I would
25 propose that we try to do that, because that is the fundamental starting
place where we need to be to go forward on the details. And I would
suggest we will run till -- we will run till 5:00.

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We will adjourn at 5:00. We are going to try to get this
fundamental issue resolved to everyone's satisfaction, and then we can
begin with details of how we are going to -- of any of the details

1 tomorrow.

2 But I guess, John, do you want to say -- do you want to
3 start before Rich gets started.

4 MR. ZWOLINSKI: Thank you. One of the things we are
5 constantly challenged with from our office director is what process are
6 we in and how do we see ourselves going forward, regardless of topic.
7 And one of the things that has evolved over the last few hours is an
8 apparent little bit of shaking of which processes are we following and
9 where do we see ourselves going.

10 As we have said in the SECY paper going to the Commission,
11 our technical working group has an important role to play, but there are
12 other corollary activities that we are sponsoring. The fundamental --
13 the activity of today and tomorrow was to put much of our shoulder
14 towards the technical working group's activities that have been
15 completed to date, and move forward with advancing the ball in that
16 arena.

17 I am sensing that there has been some degree of frustration
18 that you all are sharing information and you are not quite sure where it
19 fits, and so on and so forth. I kind of felt it was important to maybe
20 re-zero, going back to where we were this morning, and some of the words
21 that I thought -- some of the presenters were all on the mark as far as
22 our hopeful thinking, wishful thinking, that we could collegially at
23 least have a common understanding of what we were attempting to do with
24 the workshop.

25 With that as a little bit of a backdrop, I have asked Rich,
as the key technical sponsor of the technical working group's report,
and efforts today, to kind of share our vision of how we see all the
information that is being shared to us today, being transcribed, being
& available to us as we move forward, ask Rich to kind of like ensure that
everyone understands the context of the information and how we intend to

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1 take our next few steps in moving -- advancing the ball.

2 So with that, Rich, would you mind re-zeroing the clock for
3 us, please?

4 MR. BARRETT: Okay. I would like to start by saying that,
5 as often happens, sometimes the most important part of a meeting is the
6 break, and I think what we just had was a very good break. I think we
7 all had an opportunity on the NRC's side to share notes and share
8 perceptions, and get an understanding of where we are and where we
9 perceive we are, and what we have been saying and what we have been
10 hearing. And I think it is a very good thing at this point to stop and
11 go back and rephrase some things so that there are no misunderstandings,
12 or, hopefully, no misunderstandings about where we are and where we go
13 from here.

14 So let me just review the bidding of where we have come
15 from, where we are, and where I think we go from here, and what I think
16 we can accomplish, and what the next steps are.

17 As we said so many times today, the analysis that we put on
18 the table was a preliminary one and it was put on the table for the
19 purpose of initiating a dialogue, stimulating your thinking and giving
20 you a basis for coming in to tell us what you think is important for us
21 to consider. That was the purpose and I think that the preliminary
22 analysis accomplished that.

23 This afternoon we have heard a lot about the way in which
24 you operate your plants. I think it is going to be very important for
25 us to take a look at your slides and at the transcript to get a better
idea of what you do and what you think is important about what you do to
ensure safety for a decommissioning plant. And for us, that is the most
important of our four focuses, and that is to maintain safety.

How close are we to resolution here? I have made the
mistake on many occasions of making predictions, but I will do it again.

1 I think that our preliminary view is the types of things that you have
2 discussed today, the types of safeguards, the types of care that you
3 take to ensure human reliability, and the types of equipment that are
4 provided at your plants are exactly the types of things, of operational
5 and design features that we believe address the issues that are raised
6 by these intermediate and short-term -- I'm sorry -- intermediate and
7 long-term sequences. So what we have heard is very promising.

8 What I think we need to do next -- and, by the way, we want
9 to hear more. We want to have you briefly go through and talk about the
10 things as they relate to our concerns. But what I think we need to do
11 next is for the NRC to take this information, go back to the offices and
12 spend some time, and do a thorough job of bouncing this information
13 against our model, and asking ourselves, which of the factors that you
14 have told us about, in combination, have the greatest impact on those
15 factors that are driving our analysis? And to understand what
16 combination of these safeguards can allow us to say that the issues that
17 are raised in our analysis have been properly addressed, and that allow
18 us to say that sequence, this sequence, this sequence, this sequence,
19 that the risk from those sequences has been addressed to a level that we
20 believe is appropriate.

21 To the extent it is possible, we would go in and show
22 specifically how these factors affect the analysis. To the extent it is
23 possible, we would even go in and try to requantify the sequences. We
24 don't think that is a necessary step. We think that we can reach
25 resolution without doing that, but we understand that is a concern of
yours that we try to requantify it, and we will try to requantify it.
Keep in mind, however, that we have a concern about pushing PRA beyond
where we feel the NRC might lose its credibility and putting down
numbers that we can't stand behind.

But, in any event, we feel that the information you have

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1 given us, we can go back and we can go into our model and we can show
2 how your information addresses the concerns raised by our model, and
3 addresses the concerns related to the sequences we have raised here.
4 And, as I said, hopefully, we can do some requantification as well.

5 At that point, we will come back to you, we will come back
6 to all of our stakeholders with a proposal on what are the kinds of
7 operational and design safeguards that we believe are prudent and
8 necessary to address the sequences we have raised and to bring the risk
9 to an acceptable level. And then that, we would hope would be the basis
10 for a further dialogue.

11 So with that, I hope what I said here serves to address your
12 concerns rather than raise further concerns. But if you would like, I
13 can -- I would like to hear your reaction and I would like to talk about
14 it further.

15 MR. CAMERON: Mike.

16 MR. MEISNER: I am not quite sure of my reaction yet. I
17 wanted to ask a few questions. At the end you talked about coming back
18 with those safeguards that would, in your mind, be necessary to bring
19 risk to an acceptable level. What is an acceptable level?

20 MR. BARRETT: Well, that is a good question. I think that
21 what is an acceptable level is going to depend on the decision you are
22 making, and I think that is a question we will have to address. As you
23 know, there is a lot of guidance out there on criteria to be used for
24 regulatory -- for risk-informed decision-making.

25 And Regulatory Guide 1.174 is certainly not the definitive
answer on all of these issues, but it is certainly one that is typical.
It is a set of guidelines that are typical and that are consistent with
other guidelines that exist in the industry for other purposes, and
exist in the regulatory process for other purposes.

If you are talking about, again, -- and, by the way, I would

1 say Ed brought up some very good points earlier about defining how this
2 type of an accident relates to the kind of accidents that we talk about
3 in Reg. Guide 1.174, because there we talk about core damage accidents,
4 which this is not, and we talk about large early releases, which this is
5 not. In some aspects, this is perhaps something in between the two.
6 And so we don't have any hard and fast criteria.

7 But, as you know, in that document we talk about core damage
8 estimates that are in the 10 to the minus 5 range -- or deltas, rather.
9 Changes in core damage in the 10 to the minus 5 range are typically of
10 concern. And accidents which lead to large early releases, that lead to
11 changes in that probability, tend to be in the 10 to the minus 6 range.

12 Also, in the regulatory analysis guidelines, there are
13 similar criteria which may or may not trigger -- which tend to trigger
14 whether the staff initiates a backfit analysis.

15 So I think that the question -- the answer to your question
16 depends on what decision you are making. If you are talking, for
17 instance, about a change to the -- an exemption, for instance, you would
18 have to go one step beyond the analysis we have done already, because
19 what we have analyzed here is the baseline risk.

20 MR. MEISNER: Well, Rich, I am just talking about
21 rulemaking.

22 MR. BARRETT: Well, for rulemaking, if the staff -- the
23 staff has many options to go in, and I can't say that I know exactly
24 which way we are going. But if you are talking about rulemaking that is
25 justified by cost benefit analysis, then there is a threshold of 10 to
the minus 6, it is an informal threshold, but it is used, and it is in
the regulatory analysis guidelines for a large early release, and 10 to
the minus 5 for -- typical of a core damage, delta core damage
frequency, and then you would combine that with a cost benefit analysis.

If you were talking here about a rule that was being passed

1 as an option for the industry, in other words, the industry could adopt
2 this option, or stay with the current regulations, as modified with the
3 possible exemptions, there might not have to be a regulatory analysis at
4 all.

5 Similarly, if the staff felt that -- made the case that we
6 were going to impose a new set of decommissioning regulations on the
7 industry and that this was to be an adequate protection issue, there
8 would also not be a risk threshold for making that decision. That would
9 be a decision that would have to be made in absence of a regulatory
10 analysis.

11 So I don't know if that answers your question.

12 MR. MEISNER: I was asking a real simple question in
13 response to what you said, and that is that you are going to identify
14 those safeguards. It is not our decision, it is yours. We were going
15 to identify those safeguards necessary to bring risk to an acceptable
16 level. I just wanted to know what that meant.

17 MR. BARRETT: Right. And I think we are going to have to
18 have some discussions within the staff as what kind of decisions are
19 going to be driven by this.

20 MR. CAMERON: Mike, you had some other -- I mean you have --

21 MR. MEISNER: I am just starting.

22 MR. CAMERON: All right. Good.

23 MR. MEISNER: Well, you also said -- I mean the way I read
24 the recent SECY that came out, the staff was going to develop this
25 rulemaking in the context of the backfit rule. Is that right, John, or
Stu?

26 SPEAKER: I can take it out and quote it, but I think that
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27 MR. RICHARDS: No, I think when it talked about the backfit
rule, I think it was talking about the Commission's direction that we

1 apply the backfit rule to decommissioning plants and we are going to
2 roll that in. We haven't gotten into the rulemaking far enough to
3 address, you know, --

4 MR. MEISNER: We will find it. Never mind.

5 MR. RICHARDS: Yeah, but we have to live by the rules, Mike.
6 But I think what you heard here from Rich is just an option for going
7 down the line. We either have to comply with the backfit rule, because
8 the Commission has already told us we have to do that, or we write a
9 rule that is an option for you to follow and you can stick with the way
10 we have been doing business.

11 MR. MEISNER: What I am trying to get to -- now I understand
12 exactly what you are saying. What I am trying to get to is so many of
13 these things revolve around quantification. And you said at one point
14 that you were going to requantify, and then later you said we can do
15 some requantification as well. What are we talking about here?

16 And here is why I am concerned. Okay. We started out with
17 a risk-informed approach for decommissioning. And that is something
18 that, by its nature, at least for this kind of issue, needs to be
19 quantified so you know the order of magnitude of what you are dealing
20 with. If I am going to apply resources, I am going to apply them
21 differently to a 10 to the minus 5th sequence than to a 10 to the minus
22 7th sequence. Otherwise, I have got no basis on which to apply those
23 resources.

24 Similarly, you now have put out a draft report that, if it
25 is never updated or quantified, will be used as a target for every
intervenor on every decommissioning plant down the road, regardless of
all the nice words you say about it afterwards. Our point is, it is
essential, it is not even negotiable, that that report be finalized, and
& we would hope it would be finalized using the industry input. And that
is what the purpose of the workshop was, I think.

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1 MR. BARRETT: I agree with you 100 percent, we have to
2 finalize that report. We can't leave that preliminary risk analysis out
3 there.

4 MR. MEISNER: I am not talking about twisting words here. I
5 am talking about -- when I say finalize the report, I am saying
6 requantify the model and rewrite the report. We have told you right
7 from the beginning, we reiterated again this morning, the model you put
8 together is good. We think it captures anything that could conceivably
9 be important to decommissioning, spent fuel pool safety.

10 The only thing we have a concern about is we think you have
11 gone way overboard on the numbers and assumptions that you have put into
12 the model. So no one has argued about the model, but we do think it is
13 very important that that model be requantified and done so in an
14 even-handed, not an upper bound type of approach, which we think it
15 characterizes now.

16 And if we are in agreement with that, I think we can
17 proceed.

18 MR. BARRETT: II think -- what I can say is that we will
19 make -- we are going to take the information that we have, we are going
20 to go back into the model and we are going to address the issues that
21 are in the model. And, as I said, we will make every effort to
22 requantify. There may very well be -- I think we need -- let me say
23 this, I understand your concern. I understand your concern that you
24 don't want to have numbers out there that are only qualified by words.

25 And what I want to do is I want to try to -- I want to
address that concern. Okay. And whether that means republishing or
finalizing the report with requantified numbers, if that is possible,
that is a possibility. If it means finalizing the report in such a way
that it doesn't reflect the preliminary numbers, I don't know, but I
will -- we will do everything we can to address the concern you have

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1 about the possible perceptions that are raised per that analysis.

2 MR. MEISNER: Perceptions are only half the concern. We
3 need to have a usable piece of work here that can tell us where to focus
4 our resources. What is important to decommissioning safety? And having
5 -- pulling back the model and relying on a range of staff judgments is
6 not risk-informed in my mind.

7 MR. BARRETT: I do want to take issue with this concern
8 about what is risk-informed and what is not risk-informed. We have used
9 -- we have resolved issues, licensing issues in a risk-informed manner
10 without actually quantifying anything. For instance, we have looked at
11 issues, licensing issues, in which we have had a concern about whether a
12 change in a license commitment for a plant might affect the ability of
13 operators to take actions in a severe accident situation, even though
14 severe accident was not part of that analysis.

15 And we went into the analysis and we asked ourselves, which
16 operator actions might be important? And how much time -- how much less
17 time might this operator have to do that operator action? And we came
18 to a qualitative judgment that it didn't make any difference to have 5
19 percent less time to do an action that already had plenty of available.
20 I think that is risk-informed but it is not quantitative.

21 MR. MEISNER: Yeah. I whole-heartedly agree with you, Rich,
22 there are a lot of situations, and we working with NMSS on several
23 where, you know, the potential risk is in the 5 millirem range, and they
24 want to do a PRA. Why? You have already got the whole insight out of
25 it. You are already risk-informed.

The problem is that here is an area where we are not talking
about something like that. It is not a narrow issue. You have raised
all kinds of concerns that, in fact, if you used your worst case,
decommissioning plant risk exceeds every plant CDF that is operating in
the country. We can't leave that stand.

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1 We need to have a scrutable type of process where, if the
2 staff says that you need to commit to X because it provides risk
3 reduction, we need to know how much. We are already to the point --
4 this model was put together in a very biased fashion. You overloaded
5 entirely on human error. We don't believe that any objective reviewer
6 would agree with your approach. How do we get around it? By saying,
7 okay, staff, here, you go put together a set of commitments, and we will
8 go along with it and we will throw away the models?

9 We need to understand what level of risk reduction is
10 associated with something. The only way you can do that is to
11 requantify the model. And the only way then to go into rulemaking and
12 validly meet the backfit rule is to have a quantified model.

13 And I need to say something else, too. You noted earlier
14 when you were talking that one of the reasons you may not want to
15 requantify, if I got it right, is that you have a concern that you are
16 pushing PRA too far, and that you wouldn't feel comfortable standing
17 behind such low numbers. I think I interpreted that correctly, did I?

18 MR. BARRETT: I think -- that is close enough.

19 MR. MEISNER: All right. So my point is then, that the
20 numbers we are talking about are in the 10 to the minus 6th and 10 to
21 the minus 7th range. And what you are saying is that, for any backfit
22 issue, the staff will always default to not doing numbers and we will
23 never reach the conclusion that something is a backfit because you will
24 refuse to quantify down into the range where those numbers apply.

25 MR. BARRETT: No, that is not the case. In general, when we
do a PRA for an operating plant, we generally have a mix of operator
actions, along with automatic equipment responses. And so we are
generally giving a certain amount of credit for the equipment to operate
& automatically and a certain amount of credit for various types of
operator actions.

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1 In this particular case, there really are no automatic
2 actions. And so the analysis is dominated by this question of whether
3 -- you know, whether the organization will fail to respond effectively
4 one time out of 10,000, or one time out of 100,000. So that is what I
5 -- that was the concern I have, is that we are out in an area where PRA
6 generally doesn't have to deal. And as you pointed out, we are out at
7 five days, which is another area where PRA doesn't have to deal.

8 But, no, absolutely not. In cases where we are doing
9 backfit analysis for an operating plant, where you have both automatic
10 and operator activated actions, where you have defense-in-depth, where,
11 you know, you have the containment, you have all of the safeguards that
12 have been built in, and, admittedly, you also have accidents that are
13 happening a lot faster, the PRA methodology is more comfortable in that
14 regime.

15 But, Mike, let me say this, we will make every attempt to
16 requantify.

17 MR. CAMERON: Okay. I wanted to let John say something
18 here, but I think that Mike has indicated the need for requantification
19 and taking the information they have. Rich has said that we are going
20 to do that.

21 MR. MEISNER: I haven't heard that yet, but --

22 MR. CAMERON: Rich, do you --

23 MR. ZWOLINSKI: It is our intent, to the extent practical,
24 to do some requantification. But, fundamentally, we want to take much
25 of the information that we have heard today and apply it to the various
sequences that have been developed. And some of these may go away by
inspection. And it is not clear to me that it bears a lot of
intellectual curiosity to devote resources to requantification when, by
inspection, some of these go away with simple commitments, whereas
others in which -- and which we will take a look at, may arguably be

1 worth the time, energy and effort. So to make a uniform statement that
2 we will requantify the entire product, I am not sure that is the best
3 use of our resources, Mike.

4 And if in going forward, we can make use of a lot of
5 excellent insights that I felt I gained from the four plants, folks
6 representing the four plants, things of that nature can be adopted
7 across the industry, it seems that goes a long way towards the next step
8 in the process, and that is the independent review that we have had
9 advertised from the very beginning. And one of the things we felt was
10 very important was to, essentially, get outside stakeholders beyond this
11 room to take a hard look at the work, in total, which means the work our
12 staff has done, the work we will do in folding in what you all have
13 shared with today, what that results in, the requantification to the
14 extent we can do some.

15 And I just don't want to say it is 25 percent, 50 -- I am a
16 little nervous to commit that we want to redo everything when several of
17 these may essentially be dispositioned essentially by inspection. So I
18 think there are some issues in that report that are maybe a little bit
19 taller trees than others, that you may be talking to specifically.
20 Others, I am not sure really warrant the vigor or the rigor of the full
21 test. And that is where I think I sense a little bit of a disconnect.

22 But, fundamentally, this has been excellent information to
23 help structure where we see ourselves going with our technical working
24 group report. But it also has give many of us on the process side
25 additional insights as to, when you start going into rulemaking space,
what are the kinds of things that you would look for as a set of
conditions that you would expect to essentially see at a plant, in a
decommissioned phase of operation, and for what kind of a period of
time? And we are still working through that. But we are talking a few
years or in that general neighborhood. But that would be an

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1 underpinning, I would think, statement of considerations most likely,
2 that we would essentially put in that new Part XX that we referred to in
3 the Commission paper. So --

4 MR. CAMERON: Mike, is this enough to allow you to go
5 forward with a discussion tomorrow on a cross-walk between the
6 presentation that George did today and the NRC concerns? If that indeed
7 is one of the things that is going to be the most valuable for this
8 consideration of requantification, I mean is this -- you know, can we
9 proceed on that road?

10 MR. MEISNER: I think we need to talk a little more. And I
11 am not sure what the staff's reluctance is to fully requantify. My
12 simplistic view is, if you have got a model, you change the numbers and
13 you requantify it. We have got some industry experts out here. I don't
14 know, is that -- are we talking about hundreds of man-hours or tens of
15 man-hours? Ken.

16 MR. CANAVAN: I don't know the particulars of that model.
17 But depending on how it is built, and who built it, and are they still
18 around, it can range dramatically.

19 MR. MEISNER: Well, I know when I was at Grand Gulf, we
20 requantified the entire Level 1 model on all PCs overnight, and it was
21 not a big deal. Maybe I am missing the point. But the issue still is,
22 and perhaps, you know, I talked about the staff being suspicious about
23 our organizations and operators before, but there is -- I don't know how
24 we are ever going to have comfort in the results without seeing the
25 model requantified. How are we going to know that the staff gave us
some credit for a range of commitments? As opposed to the staff taking
a menu of things that they would like to have and just throwing it into
a requirement stack?

MR. CAMERON: Can we get some succinct answers to that
question? Because then maybe we can agree to where we are going to go

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1 from here. Rich.

2 MR. BARRETT: I think they are basically -- I will just try
3 to answer your last question, and that is, how can you get some level of
4 assurance that the commitments that you want to make address the
5 concerns that the staff has raised in our analysis? And I will say that
6 I think there are three ways of doing that.

7 Number one, to the extent that it is possible, and credible,
8 we will requantify it. To the extent that it is possible and credible.
9 Where that is not possible or credible, we will go back into the
10 analysis and show explicitly how the commitments that we are talking
11 about, that we think are important, address the factors that are driving
12 the model to the results that we got earlier, and we will come to the
13 conclusion explicitly that in our -- from a qualitative perspective or
14 from a quantitative perspective, that the issues are dealt with.

15 Failing that, and I don't think we will fail that in any
16 cases, or, certainly, very few cases, we would default to qualitatively
17 addressing the issue and appealing to engineering judgment and to the
18 experience of the PRA analysts as a last resort in assuring all of our
19 stakeholders that, from the NRC's perspective, the commitments that we
20 are talking about address the issues to our satisfaction and that we can
21 walk away from the sequences of interest.

22 So that, those are the three steps that I would say we would
23 go through to -- in that priority, to address your question.

24 MR. MEISNER: I am not sure why it would not be credible to
25 recalculate a portion of a PRA. I am not sure what you mean by that.
But let's try a specific example. We talked before the break about
operator attentiveness. Mike very clearly said that is modeled in the
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PRA. Let's -- why don't we have a discussion about how it is modeled
and what could possibly be done to make a difference in that model and
how that might change the results.

1 MR. CAMERON: I am not sure you, you know, want to have it
2 now, but you want to have it, right? And that might illustrate the
3 difficulties or the ease, is that what you are suggesting?

4 MR. MEISNER: Chip, I am merely trying to get something
5 concrete. We are talking all around this. You know, well, we will
6 requantify to the extent we consider credible. We will, you know, -- we
7 came in with specific suggestions here, concrete things that we are
8 willing to do, and we were expecting to get some feedback on what
9 difference that would make. What things do you feel are important in
10 the model?

11 You know, before the break, I tried to ask, well, what is
12 it? And I am still -- I would just like a straight answer.

13 MR. BARRETT: Mike, I think we have -- we may have organized
14 this session -- we may not have organized this session along the lines
15 of what you want. We went through our analysis a couple of months back
16 when we had the meeting at the ACRS. We talked about what we did, what
17 was the basis for it, and what results we got. We documented that
18 information in a preliminary report, and I can tell you that I was very
19 reluctant to do that, given the preliminary nature of the information,
20 but at your insistence we did document it, we made it available to
21 everybody.

22 And we did so because we were convinced that that was the
23 best way to go in terms of efficiently and effectively resolving this
24 issue. That it was better for us to put the information out there in
25 its preliminary form rather than to have it reviewed for quality before
it is put on the public record, because we were convinced by you and by
others that that was the way that we could most expeditiously find out
what were the strategies that could resolve these issues and get on with
it. And we did that.

So we put that on the public record and we came back on the

1 21st of June, and, again, we described the analysis and the basis for
2 the analysis, and the results of the analysis.

3 So we came in today feeling that, having done all of that,
4 our best strategy for today was to describe our analysis in a very -- in
5 an overview fashion, and then turn the podium over to the industry to
6 allow the industry to come in and show us your analysis, and to talk to
7 us about what it is that you feel is important. And so we felt that
8 today we were in a discovery mode.

9 And I think that, my personal opinion is that the best way
10 to continue to conduct this meeting is to continue to find out what kind
11 of experience we have from these gentlemen in the various plants that
12 addresses these sequences, that addresses -- tomorrow, addresses the
13 heavy load sequences, to talk about the analysis that you have already
14 brought forward regarding the seismic, which we think is a good
15 analysis, and to continue with the agenda as it is. And then we have a
16 basis for going back and for us to understand.

17 I feel that it is difficult to take a shred of information
18 that has been handed to us and begin to try to reanalyze our sequences
19 based on that. I think we need time. This is an area that requires
20 thought and care.

21 MR. MEISNER: I agree with you, Rich. And you hit it
22 exactly right, that when we got together with Sam and others, the
23 purpose for the workshop was to identify the strategies that would
24 resolve the issues. So you put out your report, we read it with care.
25 We identified a number of strategies. We come into the meeting today
and we find the number one staff concern -- the number one concern is
operator attentiveness. And we are simply asking, how does that fit
into the model, because it is not in the report, and what can we do to
& reduce its impact? That -- it is a real simple question.

MR. CAMERON: Can we start to try to answer that simple

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1 question? Okay. Starting tomorrow with each one of these one concerns,
2 saying, okay, here is what the model said about operator attentiveness.
3 Here is what impact the procedures, commitments, the industry has put
4 forward would have on that concern. And that would at least begin to
5 see about taking us down the road towards whether we could requantify
6 that. Isn't that -- is that true? Can we do that?

7 MR. BARRETT: No, we can do that. I think that I would
8 qualify that a little bit. I think that what we could do is to say,
9 here are the various -- here are some of the things we heard yesterday
10 that would clearly have an impact on that. I don't think we would want
11 to come out tomorrow and say the impact would be X or Y. But these are
12 the things that would have an impact on that particular factor, and
13 these are the things that would not. That is something that we could
14 talk about.

15 MR. CAMERON: And that is at least a first step towards
16 knowing whether you are going to be able to requantify?

17 MR. MEISNER: No, we are missing the point here. I am not
18 sure that operator attentiveness is even modeled in the study. We sure
19 don't see it in the report, yet it is raised as a large general concern.
20 I want to know what it is and how it fits into the model.

21 MR. CAMERON: Can we come back tomorrow prepared? I mean
22 someone brought up prioritization before. In other words, which -- we
23 have all these concerns. Which ones are more important than the others?
24 Which ones can we specifically document in terms of their contribution?
25 Can we do some homework tomorrow? And operator attentiveness was at the
top of the list, not necessarily because it was the most important, but
can we come back tomorrow and say here are the more important -- here
are the most important ones? Okay. Here is what we heard from the
industry that we think is applicable to a revision. And then -- and
take it from there in a discussion? I mean does that make sense?

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1 Mike or --

2 MR. BARRETT: We can do that, we can certainly do that. But
3 I think what we are doing if we do that is we are going back to previous
4 meetings in which we are talking about what the NRC has done. I
5 personally am much more interested in hearing more about what the
6 industry -- what information, real information the industry can bring to
7 the table, the type of things we heard this afternoon.

8 We have had an ample opportunity to go back and forth about
9 the NRC's analysis. I think it is time -- I think it is a better use of
10 our time tomorrow to continue along the lines we have been on for this
11 meeting, and allow us to take that information back and, in a more
12 systematic manner, in a professional manner, deal with the information
13 in a way that we are proud of and we can stand behind, rather than
14 continuing meeting after meeting after meeting having the NRC present
15 information and then -- and justify the information in a model that we
16 fully expect is not going to be the final basis for the rulemaking.

17 MR. CAMERON: It may not, it may not be. But we presented
18 our information. The industry came back with their information. And I
19 think what they are seeking is some discussion at least about from -- a
20 discussion between everybody around the table about how their
21 information might affect what we have done. Is that correct, Mike?

22 MR. MEISNER: That is half of it. We are looking to
23 understand the staff concerns where it has never been put on the table,
24 either in the report or our previous meetings. I have never heard
25 personally about operator attentiveness as a major staff concern. If
that is the case, we need to hear about it. I have never heard about
lack of automatic actions by mitigation systems as a staff concern. I
don't have the vaguest idea about how that could fit into the model.

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We are ready to make commitments that will resolve the risk
-- those issues that are risk significant in the staff's mind. We don't

1 believe, though, that they are risk significant to begin with. So we
2 would like to be fairly carefully selective on what it takes to change
3 the staff model. Is that clear? We don't -- we believe the staff model
4 is fatally flawed, but we are willing to step up and be constructive and
5 provide those commitments that will resolve those specific issues in the
6 staff model. And we have to have an agreement to completely requantify
7 that model, not just piecemeal.

8 MR. CAMERON: Gareth, can you --

9 MR. PARRY: Yeah, I think we have got hung up on the word
10 "attentiveness." I don't really think -- I think what it is, it is a
11 surrogate for the fact that what we are concerned about is human
12 performance in response to disturbances at the plant. That is
13 intimately tied in with human error probability. I think you heard us
14 say this morning that the things that we would like to understand are
15 things to do with what types of procedures, what types of training, what
16 types of instrumentation, some of which you have addressed this
17 afternoon. And those are the things that will ultimately allow us to be
18 able -- allow any HRA analyst to be able to say whether he believes that
19 the probabilities assigning to a particular action is or high.

20 So that is the issue, I think. It is just -- and the
21 primary things I believe are instrumentation, equipment availability,
22 staffing, procedures, training, all those issues. And so, given that we
23 understand all those conditions that are present at the plant, I think
24 that we can make more rational decisions about the right levels of human
25 error probabilities to include in the model. But that is -- I think it
is not an easy analysis because, as you probably know, there aren't any
universally accepted models that will give you the right answer. It is
going to be ranges. But I think we could make more rational decisions
once we understand the conditions that impact human performance.

MR. CAMERON: Okay. I am going to make a suggestion here.

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1 That we come back tomorrow prepared to -- the staff prepared to specify
2 what these various concerns mean in terms of the model, to hear from --
3 to get a discussion with the industry about what commitments they were
4 talking about today that go to mitigating those concerns, and use that
5 as a step for the staff going back to see about requantifying on each of
6 those concerns.

7 I mean does that make -- I mean I don't know what other path
8 forward we have at this point.

9 MR. MEISNER: I would only add that if there is something
10 that is hidden in the model that isn't apparent from the report, the
11 staff needs to bring that out if it is going to make a difference. And
12 I hope that we can stop qualifying quantification and just say we are
13 going to requantify it, in mass, across the boards, and reissue.

14 MR. CAMERON: Okay. Yeah, I think that we need to be
15 specific about where it is in the model. So, let's be back here at
16 8:00. We are going to start off with -- maybe we should pick something
17 other than operator or organizational attentiveness. But let's start
18 with that and let's move through it. And it is not just the staff
19 listening to what the industry is going to bring forward, but really
20 informing the industry about exactly what the nature of that concern is,
21 and where it is in the model.

22 And, hopefully, by the end of the day, we will have
23 something that we are satisfied with. And, Ray, we will see you
24 tomorrow.

25 MR. SHADIS: Yes. I would be pleased to see some of these
initiating events requantified in terms of their probability with
specific analysis of changed plant conditions over the years. The
increased frequency, for example, of air flights over some of these
plants. The changes that have been recorded and are predicted by the
U.S. Weather Service in terms of severe weather phenomenon.

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1 There is a number of things that I think the staff may be
2 relying on dated information for, including seismic risk analysis, and
3 we would really like to see those not only requantified generically, but
4 also with some site-specific examples.

5 For New England, we have some recent analysis on what is
6 called the Miramichi fault, which runs down through the New England
7 states, and, you know, we would like to see that reflected.

8 Additionally, the industry is very concerned that their
9 comments have somehow been buried and not paid attention to. I would
10 like to see the comments of some of the public participants reflected in
11 some of the work of the staff as it is brought forward also.

12 MR. CAMERON: Yeah, I think that is -- a watchword is that
13 whatever is done with this, whatever product comes out with it, we need
14 to show how we dispositioned people's comments. We plan to do that.

15 Okay. We will be here at 8:00 tomorrow and thank you all
16 very much.

17 [Whereupon, at 5:08 p.m., the meeting was recessed, to
18 reconvene at 8:00 a.m., Friday, July 16, 1999.]

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