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3 UNITED STATES OF AMERICA  
4 NUCLEAR REGULATORY COMMISSION

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6 BRIEFING ON THE STATUS OF LESSONS LEARNED  
7 FROM THE FUKUSHIMA DAI-ICHI ACCIDENT  
8 (PUBLIC MEETING)

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10 THURSDAY

11 JULY 31, 2014

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13 ROCKVILLE, MARYLAND

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15 The Commission met in the Commissioners Hearing  
16 Room at the Nuclear Regulatory Commission, One White Flint North,  
17 11555 Rockville Pike, at 9:00 a.m., Allison Macfarlane, Chairman,  
18 presiding.

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20 COMMISSIONERS PRESENT:

21 ALLISON M. MACFARLANE, Chairman

22 KRISTINE L. SVINICKI, Commissioner

23 WILLIAM D. MAGWOOD, IV, Commissioner

24 WILLIAM C. OSTENDORFF, Commissioner

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EXTERNAL PANEL:

NORMAN P. NEUREITER, National Academies Study

B. JOHN GARRICK, National Academies Study

JIM SCAROLA, Fukushima Response Steering Committee

PETE SENA, FirstEnergy Nuclear Operating Company

JEAN-CHRISTOPHE NIEL, Director General, ASN

JOSEPH G. KLINGER, Illinois Emergency Mgt. Agency

DAVID LOCHBAUM, Union of Concerned Scientists

NRC STAFF PANEL:

MIKE JOHNSON, DEDO

JENNIFER UHLE, NRR

JACK DAVIS, Japan Lessons Learned Division

DAVE SKEEN, Japan Lessons Learned Division

CYNTHIA PEDERSON, Regional Administrator, Region III

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

9:02 a.m.

CHAIRMAN MACFARLANE: Good morning, everybody. All right. So, today's topic for this Commission meeting is the lessons learned from the Fukushima Dai-ichi accident. It's of course an area of great interest to the public, to the industry, to those of us at the NRC and to the international regulatory community as well.

Our last briefing on the status of our response to lessons learned was April 2013, so this is timely. There have been quite a few accomplishments since the last briefing. There's been a lot of progress made on seismic hazard evaluations, reevaluations, flooding hazard reevaluations, response to the mitigating strategies order. I think we're going to hear a little bit about that probably from our industry guests and from our own staff a little later.

But of course while significant progress has been made on a variety of fronts, we have to make sure that we continue our efforts to make sure we achieve the timely goal of implementing the lessons learned as committed to. And there's more lessons learned that we feel we have to look at at the NRC as well. At the same time, as information becomes available we're going to hear from the National Academy, from their report today. We need to thoroughly assess the new information as it comes in and integrate it into our own work as we go forward.

So this morning we've got quite a diverse panel that includes the National Academy of Science, the nuclear industry, the French Nuclear Safety Authority, the Illinois Emergency Management

1 Agency and the Union of Concerned Scientists. And then after the  
2 external panel we're going to take a break and then we'll invite our own  
3 staff to come up and talk to them today.

4 Now before I go on, I want to note a couple of major  
5 milestones today, and they all have to do with Commissioner Magwood.  
6 Today is Bill's last Commission meeting with us before he goes on to  
7 assume the -- to be the Nuclear Energy Agency's Director-General  
8 starting in September. And Bill's had, he reminded me, four-and-a-half  
9 years of service here at the Commission, but a long, long distinguished  
10 career in Government service before the NRC at the DOE. Bill's been  
11 a very articulate advocate for nuclear safety and security over the  
12 years, and I'm sure he will continue to be so at the NEA.

13 Bill, I just want to let you know I've really appreciated  
14 working with you, learning from you and I look forward to our continued  
15 relationship, but in a slightly different way when you go over to Paris.  
16 So I just wanted to take this moment to wish you very well and to thank  
17 you very much for your service.

18 And also; as I said, there was more than one event, it's  
19 Bill's birthday. So happy birthday.

20 (Laughter)

21 CHAIRMAN MACFARLANE: That was well-timed.

22 Now, maybe some of my other fellow Commissioners  
23 want to say something.

24 COMMISSIONER SVINICKI: Yes, thank you,  
25 Chairman.

26 And, Bill, it's been a real honor to serve here at NRC

1 with you. And both our personal friendship and our working  
2 relationship are a manifestation of that thing that happens in life where  
3 people's path cross and re-cross and they keep bidding farewell to each  
4 other and then they find a few years later that they're working together  
5 again. So I look forward to that next opportunity where our paths are  
6 going to cross again, and I'm sure they will.

7 There is one other very significant milestone today that  
8 I thought maybe the Chairman would mention, but I'll give some context  
9 as to why I know this. My staff is very observant and they noted a  
10 number of months ago that the Federal Energy Regulatory Commission  
11 conducted its 1,000th meeting, and therefore FERC issued a press  
12 release and had a large celebration before their meeting and really  
13 made note of this.

14 So it caused a member of my staff, Alan, to be very  
15 curious about how many meetings NRC had had. So in December he  
16 asked the Secretary of the Commission and her staff where were we in  
17 a count total. They provided a number, and my staff has been keeping  
18 very careful track since December of last year counting the meetings,  
19 and they are counting our closed and open sessions. Today, by their  
20 count; and I know this is NRC and someone will quibble with this, this is  
21 the 5,000th meeting today of the NRC.

22 CHAIRMAN MACFARLANE: All right. We win.

23 (Laughter)

24 COMMISSIONER SVINICKI: So I wish you all the  
25 best and thank you for being here for this very -- all these milestones  
26 which are very significant.

1 COMMISSIONER OSTENDORFF: I'd like to, Bill,  
2 add my well wishes and thanks for your service to those from Allison  
3 and Kristine. It's been a real pleasure. We went through the  
4 confirmation process together, sworn in the same day back in April  
5 2010, worked very closely together on a number of issues. I've always  
6 highly regarded your work ethic and your approach to things. This  
7 Agency is far better off your having served here.

8 And my only regret is I've been unable to influence you  
9 in what I thought was a pretty simple thing. We traveled together  
10 -- and this telling some dirt on Bill, but we traveled together the fall of  
11 2011 out to Diablo Canyon and San Onofre, and I was appalled to learn  
12 that Bill Magwood does not own a pair of blue jeans.

13 (Laughter)

14 COMMISSIONER OSTENDORFF: And I've been  
15 working with Patty Bubar and his staff to try to change that over the last  
16 X number of years and I've been unsuccessful. And I don't know that  
17 going to Paris is going to change that for you.

18 But Bill is a great colleague and friend. It's been my  
19 privilege to work with you and wish you all the best.

20 COMMISSIONER MAGWOOD: Well, thank all of you  
21 for your comments. You're very generous. I've already made the  
22 observation that serving on the Commission is a very unique  
23 opportunity that other than those who have actually done it, it's  
24 impossible to explain what it's like, because it's probably one of the  
25 most intensive professional relationships one can ever have. You  
26 spend so much time talking with four other people on a continuous

1 basis and your lives intertwine. You find out about all the things that  
2 are going on in your personal lives as you go through these things  
3 because you're trying to schedule things and you find out about  
4 birthdays and family members' issues and things like that. And so you  
5 do get very close and you do become friends.

6 And I think that our Commission over the last couple of  
7 years under Chairman Macfarlane's leadership has shown that we are  
8 able to disagree agreeably and that we have done that and that we  
9 have advanced the cause of nuclear safety in this country, I think, very  
10 significantly. And I've been very proud to be part of that and very  
11 proud to work with the three of you and with George Apostolakis and  
12 look forward to seeing the great things that you will continue to do after  
13 I depart the Commission next month.

14 Now regarding the blue jeans, it is true that I do not  
15 own a pair of blue jeans. In fact, I have never owned a pair of blue  
16 jeans since turning perhaps nine.

17 (Laughter)

18 COMMISSIONER MAGWOOD: And I can assure you  
19 that I will stay consistent in that in the future and will attempt to try to  
20 convince you that perhaps your reification of blue jeans may be  
21 associated with your misunderstanding about the game of football --

22 (Laughter)

23 COMMISSIONER MAGWOOD: -- and your  
24 continued completely beyond understanding alliance with the Dallas  
25 Cowboys, which one would think by now you would have learned just  
26 isn't going to get you anywhere.

1 (Laughter)

2 COMMISSIONER MAGWOOD: But all three of you  
3 have been excellent colleagues to work with. Commissioner  
4 Ostendorff and I joined the Commission together and have worked very  
5 closely together on many issues over the years.

6 And Commissioner Svinicki and I have known each  
7 other for a very long time, as she noted, in different capacities, and it's  
8 always been interesting to work with Commissioner Svinicki. I think  
9 you're probably the hardest working person that I've ever met and I  
10 think that people who observe the Commission from the outside  
11 probably just have no idea of the kinds of effort that you put into  
12 everything that you do, and I just respect that tremendously.

13 And, Chairman Macfarlane, I just appreciate what you  
14 came into a couple of years ago when you joined this Commission.  
15 You were a breath of fresh air that we needed. You were a restorative  
16 for the whole Agency. And whatever happens in the future, just always  
17 know that I think everyone in this Agency appreciates what you brought  
18 to it. So thank you.

19 And thank all of you for coming to my birthday party  
20 today.

21 (Laughter)

22 COMMISSIONER MAGWOOD: This is the biggest  
23 party I've had in quite some time.

24 (Laughter)

25 COMMISSIONER MAGWOOD: And people coming  
26 from overseas, Dr. Niel coming. So all of you, it's really just too much



1 and I -- but again, thank all of you and I look forward to your comments  
2 today.

3 CHAIRMAN MACFARLANE: Great. Thank you.  
4 Okay. So we're going to start off with the external  
5 panel and we're going to start by hearing from the National Academy of  
6 Science. And they get a bit of extra time because they've spent quite a  
7 bit of time and hard work doing a thorough analysis of the Fukushima  
8 accident and lessons learned from it. So we're going to start off with  
9 them, and we're going to be hearing from Dr. Norman Neureiter and Dr.  
10 John Garrick, who are the chair and the vice-chair of the panel. So,  
11 we'll start with you guys.

12 DR. NEUREITER: Great. Thanks very much. First  
13 of all, Commissioner Magwood, happy birthday, since that's important.

14 As you know, this report was issued last week.  
15 There's been a certain amount of press coverage from it; some of it  
16 good, some of it not so good, in my opinion not so accurate, and we will  
17 go through the details of it today and hope you give us some questions.

18 But I wanted to start by thanking the NRC, the staff.  
19 They have worked with -- officially you're the sponsors of this report, but  
20 your staff has worked with us very well. They supplied the information  
21 that we've needed and they've come and met with us and so on. And  
22 so it's been a very good and I hope effective -- certainly in my view it  
23 was a very effective relationship.

24 I'm going to run through some background slides and  
25 then John will enter in a bit of those, and then we can take questions at  
26 the end.

1           So are you seeing the slides or you're not seeing  
2 -- there you are. So the background. It was requested by the  
3 Congress, and curiously by -- in a conference report from the  
4 Consolidated Appropriations Act of 2012. Officially you at the NRC are  
5 the sponsors of it. And we appointed a committee of 21 members,  
6 which is a fairly large committee, and we also had 23 reviewers on it.  
7 And, yes, that was the work of the Academy of Sciences. I'm with the  
8 American Association of the Advancement of Science, but I am a  
9 member of the Academy.

10           Now a very abbreviated statement of the task. And  
11 you all know this of course, the causes of the Fukushima accident.  
12 Task No. 2 was the reevaluation of the conclusions from previous NAS  
13 studies on safety and security of spent nuclear fuel and high-level  
14 radioactive waste storage. And we did not have time to take that up.  
15 And that will be another report. We'll begin that in another month or so  
16 and it will be out sometime, we hope, next year.

17           The key lessons learned. The first one, Task No. 3,  
18 the lessons that can be learned from the accident to improve  
19 commercial nuclear plant safety focusing particularly on the security  
20 systems and the operations of the plants. And then the next one,  
21 lessons focusing particularly on security regulations that relate to plant  
22 safety. So this whole report deals with Tasks 1, 3 and 4, and Task No.  
23 2, the fuel security and safety will be taken up in a subsequent report.

24           Now our objective, it's really intended to be a  
25 broad-scope and high-level review of lessons learned from this  
26 Fukushima situation to improve the safety and security of U.S. nuclear

1 plants. And we considered many previously published reports on the  
2 Dai-ichi accident. And I know of at least 21 reports that have been  
3 written, so there was a lot of review which took place. And I do want to  
4 compliment the NRC on the Near-Term Task Force. It took us two  
5 years to do this job and it took them just a very short time, two months,  
6 and they came out with a fine piece of work. This study also evaluated  
7 previously published accident timelines to get a better understanding of  
8 key events and unit interactions -- and that's an important issue -- unit  
9 interactions at Fukushima.

10 Now to define our words, findings, things listed as  
11 findings are really lessons learned. And then the suggestions for  
12 implementing those lessons learned in the U.S. are presented as  
13 recommendations. And the recommendations that you'll hear much  
14 about later are not prioritized. There's no order in which they should  
15 be considered. And the report does not make policy  
16 recommendations that involve non-technical value judgments. In  
17 other words, we're quite restricted in the Academy. We do not make  
18 policy recommendations based on anything but technical -- we don't  
19 really make policy recommendations, but we do examine issues and  
20 assess them in their technological terms.

21 Going through the selected findings in brief, the causes  
22 of the Fukushima accident, it was initiated by the March 11 earthquake  
23 and tsunami. The personnel at the plant responded to the accident  
24 with great courage and resilience, and actually their actions likely  
25 reduced the severity and the magnitude of off-site radioactive material  
26 releases. However, several factors relating to the management,

1 design and operation of the plant prevented that personnel from  
2 achieving greater success and contributed to the overall severity of the  
3 accident.

4 And, John, you had something to add here.

5 DR. GARRICK: Yes. Before I do, I just want to  
6 indicate that it's sort of a reminder of some past history to be here. As  
7 a member of the Advisory Committee on Nuclear Waste for 10 years I  
8 made many visits to this room and had many exchanges, and all of the  
9 exchanges were very beneficial, and I'm sure this one will be in that  
10 same category. And I'm pleased to be here.

11 When we talk about this report, Norm and I, we have to  
12 remind ourselves that this is a report that was put together by 21  
13 people. This 21 people included some of the leading people in the  
14 country on several of the topics that are involved. So they deserve  
15 representation that's beyond what I'm probably capable of providing,  
16 but I just want to acknowledge that the report was a result of a lot of  
17 effort, not only the 21 committee members, but the 24 reviewers. I've  
18 been on lots of such committees and I don't think I've ever been on one  
19 where the report was scrubbed in quite the fashion that this one was.

20 But I want to talk a little bit just a moment here about  
21 the causes, because to explain the cause in terms of this slide, you  
22 have to realize that the devil is in the details and that -- just want to  
23 telegraph a few thoughts that I'll expand on in a little while.

24 Of course we all know that the -- sort of the overarching  
25 cause was the failure to protect critical plant systems from flooding. If  
26 you had to mention one word that was the cause, I guess flooding

1 would be it, unless you get into the administrative side of the issues.

2 But to break that down a little, there are two or three I  
3 just want to mention a little bit, and one is of course the loss of AC and  
4 DC power. Of all the risk studies that I have been involved in; and  
5 that's been a lot of them, it's pretty clear that we have -- this represents  
6 maybe almost a singularity in terms of lessons learned because of the  
7 depth that's required to really examine and evaluate the role of losing  
8 AC and DC power the way it was done because the industry up until the  
9 Fukushima accident had been thinking pretty much in terms of if for a  
10 station blackout we may be out of AC power for anywhere from four to  
11 eight hours. And we probably -- and it's very unlikely that we'll ever be  
12 out of DC power. Well, we all know now that that's not the case. We  
13 were almost 72 hours without either for Units 1 and 2, even though Unit  
14 3 had some DC power for some 36 hours.

15 And we also learned with respect to the DC power  
16 issue that the DC circuits control the fail-safe logic associated with the  
17 system and that the time constance associated with the fail-safe  
18 circuitry of course is much shorter than the time constance associated  
19 with the response of mechanical systems and what have you to the  
20 signals. And this indicates that if we are going to truly represent the  
21 role that power plays and losses of power plays, that we have to dig  
22 pretty deep with respect to the issue of the race between DC logic  
23 circuits that control the fail-safe logic and the isolation valves and the  
24 loss of AC and DC power. This was a rather profound experience that  
25 is an opportunity for us to have an impact on with much more rigorous  
26 analysis than has generally -- than we were able to see in our review.

1                   The other thing that I just want to mention at this point  
2 is the need for information, computers that are on long life batteries  
3 under these conditions such that such things as mass and balance,  
4 mass and energy balances can be made and that there are ways of  
5 getting some approximations of critical thermal dynamic parameters in  
6 the reactor pressure vessel and in the containment and in the spent fuel  
7 pools. In the case of the reactor pressure vessel, it's absolutely critical  
8 that some insights always exist regardless of the availability of  
9 resources, of water level, of pressure, and of temperature. And in the  
10 case of the containment, certainly pressure and temperature. And in  
11 the case of the spent fuel pools, water level and temperature are also  
12 absolutely critical. And these are all parameters and performance  
13 indicators that can be easily calculated given certain inputs that are  
14 always available.

15                   The other thing that I just want to mention here is that  
16 this was a situation where they were in a domain of activity that they  
17 had never thought would exist, and they just were totally unprepared.  
18 And so the role of ad hoc reaction was very evident and the resources  
19 dealing with the accidents involved very long duration of periods, unlike  
20 anything that had every been considered in the past, anything that had  
21 ever been a part of a rigorous risk assessment.

22                   And then there's no doubt about the complications that  
23 come from the idea of multi-unit interaction and the kind of event or  
24 threat that does physical damage to the site in terms of its accessibility  
25 and what have you.

26                   But those are just a few of the things that we got into in

1 considerable detail and that sort of indeed sets this event apart from  
2 just being a flooding event. And I'll come back to that a little later when  
3 we get into the issue of what's different about our report.

4 DR. NEUREITER: Going to the findings in brief, the  
5 overarching finding is the following: Nuclear plant licensees and their  
6 regulators must actively seek out and act on new information about  
7 hazards that have the potential to affect the safety of nuclear plants.  
8 We'll say a lot more, but if there's one overarching finding, that's it.  
9 When you get new information, when you learn about new potential  
10 hazards, you got to get into them and you got to deal with them.

11 So here are some selected things in brief. On the  
12 nuclear plant systems we think that the NRC and the industry should  
13 give specific attention to improving the following: First; and you've just  
14 heard this from John, DC power for instrumentation and safety system  
15 control. Second, the tools for estimating real time plant status during  
16 loss of power. Three, decay heat removal and reactor  
17 depressurization and containment venting systems and protocols.  
18 Four is instrumentation for monitoring critical thermal dynamic  
19 parameters and reactors, containments and spent fuel pools. Next,  
20 hydrogen monitoring and mitigation. Absolutely critical. And you  
21 know there were three explosions, hydrogen explosions at Fukushima.  
22 Instrumentation for on-site and off-site radiation and security  
23 monitoring. And then finally, communications and real time  
24 information systems to support the communication and coordination  
25 between control rooms and technical support centers, but also control  
26 rooms in the field and also between on-site and off-site support

1 facilities. And as you all well know, every one of these issues had a  
2 part in this Fukushima disaster, and a disaster it truly was.

3 Okay. With respect to training, the NRC and the  
4 nuclear industry should give specific attention to the following: One,  
5 staffing levels for emergencies involving multiple reactors at a site that  
6 last for extended durations and/or that involve stranded plant  
7 conditions. And again, it was a great surprise to the Japanese that not  
8 one reactor was affected, but all of them. Next, strengthening and  
9 better integrating emergency procedures, extensive damage mitigation  
10 guidelines and severe accident management guidelines.

11 I'm not a nuclear person. Now, I know those are  
12 SAMGs. And there's a lot of acronyms in this business.

13 Anyway, training of operators and plant emergency  
14 response organizations. There are a couple aspects to that. On the  
15 use of ad hoc responses for bringing reactors to safe shutdown during  
16 extreme beyond-design-basis events. And then secondly, to reinforce  
17 understanding of nuclear plant system design and operation to  
18 enhance operators' capabilities for managing emergency situations.  
19 Training, extremely important.

20 Next is risk assessment, and that is definitely John's  
21 specialty, so, John, you'll comment on this.

22 DR. GARRICK: Yes. And it has had its headaches  
23 for being my specialty, to be sure.

24 But here when we talk about strengthening capabilities  
25 and supporting industry and talking about incorporating modern risk  
26 concepts, the primary target of this recommendation is a more rigorous



1 treatment of natural events, including their integration into the basic  
2 safety and risk analysis models and making sure that we're asking the  
3 right question with respect to the natural events. And that question is:  
4 What do those events -- how do they affect the risk of the nuclear power  
5 plants? There's a tendency to get into kind of a runaway analysis  
6 mode of trying to put so much attention on what is the risk of the natural  
7 event? Even though we have maybe developed the analysis to the  
8 point where we know how it affects the operation of the plant, there's a  
9 tendency to go beyond sometimes what is necessary.

10 And when we talk about modern risk assessments, we  
11 refer to several areas: One is an improvement in the way in which we  
12 integrate internal and external events, getting away from kind of the  
13 stylized assessment of the natural event and making darn sure that it is  
14 in fact only, in mass speak terms, another element in the initiating event  
15 vector so that you assure yourself that in fact it is an integral part of the  
16 basic model. And also to extend the scenarios to ensure consideration  
17 of what we refer to as beyond the design-basis events and more  
18 in-depth analysis of the uncertainties.

19 And why do we want to quantify the uncertainties?  
20 The big reason we want to is because it gives us the information we  
21 need to know how far we need to go in the depth of the analysis of the  
22 external events. So the issue here is one of breadth and depth.

23 And the issue also is to be sure that when we talk about  
24 risk assessment for a specific facility that the boundary conditions are  
25 well understood, the limitations are well understood, because there's a  
26 tendency for the outside world, if you've done a Level 1 risk assessment

1 on a plant to interpret that as a full-scope risk assessment. And maybe  
2 the practitioners; and I'm certainly one of them, have not been as  
3 attentive to that as we need to be. There's very few full-scope risk  
4 assessments. There were a number of them done in the 1980s, but  
5 since that time the risk assessments have been downsized. And now  
6 they're on their way to expanding, thanks a lot to the NRC's programs,  
7 to try to reach back into the issue of what should a full-scope risk  
8 assessment look like?

9 So I think I'll stop on that for now.

10 DR. NEUREITER: After risk assessment, the next  
11 was off-site emergency response. And the industry and organizations  
12 with emergency management responsibilities should assess their  
13 preparedness for severe nuclear accidents associated with off-site  
14 regional scale disasters. And secondly, the industry and organizations  
15 with emergency management responsibilities should examine and, as  
16 needed, revise their emergency response plans, including the balance  
17 between protective actions to enable effective responses to those  
18 accidents.

19 The next is nuclear safety culture. We actually had a  
20 big discussion; and that's Chapter 7 of the report, on nuclear safety  
21 culture, and we really had a lot of discussion on nuclear safety culture.  
22 And our conclusion here was, the finding was, the recommendation, the  
23 NRC and the industry must maintain and continuously monitor a strong  
24 nuclear safety culture in all of their safety-related activities. The  
25 leadership of the NRC must maintain the independence of the  
26 regulator. And then secondly, the NRC and the industry should

1 examine opportunities to increase the transparency of and  
2 communication about their efforts to assess and improve their nuclear  
3 safety cultures.

4 Now, I'll just say a word about the discussion of nuclear  
5 safety culture, and then comparing the U.S. and Japan. I'm sure if you  
6 ask the Japanese, they will say, sure, we have a safety culture, but the  
7 problem in Japan is it's an intersection of two cultures. They have a  
8 Japanese culture and it's just flat different from ours. And the  
9 combination of their respect for authority and also their respect for the  
10 government is terribly important. And I think one simple example is  
11 they'll say, look, Norman, we couldn't tell the people that were doing  
12 something to make the plant safer because we told them it was safe.  
13 And then if we started doing something to make it safer, they'll say, gee,  
14 you have been lying to us. It isn't safe after all. And so we didn't do  
15 anything. Now that is a safety culture which doesn't work. And I think  
16 that's extremely important. You saw that in the Kurokawa report. He  
17 talked about it. He called it a manmade disaster. But clearly to me  
18 that's what he was talking about.

19 You've probably surmised from this comment; and I'm  
20 not a nuclear expert by any means, but I did live in Japan for five years,  
21 worked for Texas Instruments, and so I do have a lot of experience with  
22 the Japanese. And they have a big issue with this. When they do  
23 something, they've got a procedure, it's beautifully done and it's precise  
24 and so on. And that's why they were so successful in  
25 micro-electronics. But when it comes to this whole system, it's a big  
26 challenge. And that's why nuclear safety culture is a big issue.

1                   Now many of the findings and so on in this report do  
2 reflect those of other organizations including your Near-Term Task  
3 Force. However, I think you will find that the NAS report does provide  
4 some different perspectives on some issues. And John is going to run  
5 through those chapter by chapter.

6                   DR. GARRICK: Okay. Report perspectives. The  
7 idea here was to try to give you some perspectives that indicate what's  
8 different about our report, and most of it has to do with degree rather  
9 than kind of issues, but there are some issues that were definitely  
10 examined I think more thoroughly than we've seen in the other reports.  
11 We did have one major advantage, and that was that this report came  
12 late and we had the benefit of the ANS report, the EPRI report, and the  
13 INPO report, and the Japanese reports. And so, one of the things that  
14 does make it a little different is that we had a much more diverse  
15 information base to consider in answering some questions about things  
16 like accident causes.

17                   And as far as the slide on report perspectives and  
18 accident causes, it emphasizes the challenges that the plant operators  
19 faced in responding to the accident. There's never been anything  
20 quite like this. Having to work in the dark, having to work without any  
21 indication, any sensors operating, having to work under conditions of  
22 severe damage, no guidance, no rules to go by was indeed a challenge  
23 never before faced in this business. Yet it did emphasize the important  
24 role that operators played in lessening the severity of the accident and  
25 operators were a source of resilience and their improved solutions were  
26 a strength of keeping the consequences down to where they were.

1                   And as a matter of fact, if you look at the events, there  
2 were six reactors and five of the reactors had fuel in them. And the  
3 Units 5 and 6 were going through tests, and in one of them the  
4 containment was open, one of them was pressurized, not operating.  
5 They were in a shutdown mode. But nevertheless, they were under  
6 pressure conditions. And the work that they did to salvage those two  
7 plants was rather impressive. As you know, all of the diesel  
8 generators failed except a diesel generator that was air-cooled and  
9 provided power for Unit 6. Well, they were able to cross-tie from Unit 6  
10 to Unit 5. And so they knew how to do the kind of things you need to  
11 do in order to steal electric power from available sources.

12                   The experience and the causes of the accident  
13 provided some very unusual opportunities, and of course the hydrogen  
14 explosions were a game changing event because of the amount of  
15 damage they did and the impact it had on providing support services to  
16 the plants.

17                   So as far as the issue of plant improvements the  
18 accident and this study emphasized the availability, reliability,  
19 redundancy and diversity of plant systems and equipment for DC  
20 power, for instrumentation and safety system control, tools for  
21 estimating real time plant status during loss of power and  
22 instrumentation of on-site and off-site radiation and security monitoring.

23                   The issue here was the need for giving greater  
24 attention to instrumentation and performance indicators with respect to  
25 extreme threats, and of course what this means in many cases is the  
26 sorting out of the absolute minimum indicators and systems that you

1 need to operate under these recovery periods from such an accident  
2 and doing everything that can be done to harden those systems to  
3 make them available in conditions that are very uncomfortable with  
4 respect to accessibility, with respect to lighting, with respect to support  
5 of resources.

6 Training. In Chapter 5 we talk a lot about training.  
7 Norm's mentioned it already. So here the report emphasizes training  
8 on the use of ad hoc responses for safe shutdown during  
9 beyond-design-basis events and more general training to enable more  
10 effective response to unanticipated complexities. For example, they  
11 do not have a simulator at each of their plants. They do not  
12 necessarily train on their simulator against the scenarios of their risk  
13 assessments and the opportunities to do that exist. And of course  
14 these plans that they have and that they are initiating are certainly  
15 moving in that direction.

16 And as far as the risk is concerned, here the report  
17 emphasizes the need for strengthening capabilities, for identifying and  
18 evaluating managing risk from beyond-design-basis events, and better  
19 estimating the broad range of off-site environmental, economic and  
20 social consequences. The whole idea of what constitutes a full-scope  
21 risk assessment has gone through a transition as a result of the  
22 Fukushima event, and I think the report highlights that pretty effectively.  
23 And that transition is that we can no longer really think of unit risk  
24 assessments, only unit risk assessments, because even there we have  
25 been limited in the scopes of our risk assessment. We have to think in  
26 terms of multi-unit and we have to even go further than that and think in

1 terms of transitioning from unit-specific risk assessments to  
2 site-specific risk assessments.

3 The report emphasizes the inadequacy of the  
4 design-basis accident as a paradigm for preventing core melt accidents  
5 and mitigating the consequences. The situation that the  
6 scenario-based way of looking at the risk allows you a much broader  
7 perspective of what the design-basis maybe ought to be because it  
8 attempts to answer the question of not only what can go wrong and  
9 what the consequences are, but how likely are they and how likely are  
10 they that allows us to importance-rank the contributions.

11 And then Chapter 6 of our report emphasizes the  
12 importance of the scalability of emergency response capabilities to deal  
13 with accidents associated with regional disasters and emphasizes the  
14 need for assessing the balance of protective sections.

15 And then of course Chapter 7 emphasizes the importance of a  
16 strong nuclear safety culture, an independent regulator and greater  
17 transparency and communication. As far as the report is concerned,  
18 this issue was probably the one that had as much discussion and  
19 diverse set of opinions as any. And we worked very hard to make darn  
20 sure that the chapter reflects a variety of differences with respect to the  
21 matter of nuclear safety culture.

22 So did you have anything you wanted to add?

23 DR. NEUREITER: No, I just wanted to say that that is  
24 basically our last slide. But when you read the report, you will see that  
25 instead of trying to draw a single conclusion about safety culture  
26 -- except this one sentence, assuring the independence of the regulator

1 and then greater transmission to the public and so on with respect to  
2 what one thinks and what one does in setting those up.

3 But we did talk about particularly various views of  
4 various people on the committee; remember, 21 people, and the views  
5 that they had on safety culture. And so you will see a number of  
6 examples and views reported there in this chapter. It's really quite an  
7 interesting chapter to read on the subject of safety culture.

8 Madam Chairman, that concludes our formal  
9 presentation, but let me say one thing: The real success of this report,  
10 if you consider its size, I attribute to Kevin Crowley, our staff director.

11 And, Kevin, thanks so much, but I'd like you to stand up  
12 and take a bow. If you'd do that.

13 He's also here in case either of us doesn't know  
14 something, and then Kevin will fill in for us. Anyway, that's it.

15 CHAIRMAN MACFARLANE: Great. Great. Thank  
16 you. Thank you very much.

17 And thanks, Kevin. We know that you're the great  
18 repository of knowledge of all of this stuff. A true expert.

19 So we'll turn to our next panelist, who is Jim Scarola,  
20 the executive director of the U.S. Industry Fukushima Response.

21 So, Jim, you have 10 minutes.

22 MR. SCAROLA: Thank you very much. I would like  
23 to just start out in thanking you for the invitation. It really is about the  
24 leadership that you've set for the whole Commission here as we look  
25 back over the last several years of setting a culture that seeks and  
26 values the diverse input from the stakeholders, and this certainly being



1 an opportunity for us to provide that input. And I'd like to thank you for  
2 that.

3 And, Bill, also having had the opportunity to go to the  
4 IAEA meeting with you in the past and seeing you display that same  
5 leadership in the international forum as well as here of seeking input,  
6 we certainly thank you for your service over the years.

7 Just starting out today just going back in time and talk  
8 about some of the accomplishments. But before I do that, I want to  
9 really talk about the way in which we went about seeking and getting  
10 the lessons from Fukushima, and it started out with a response built on  
11 an existing culture of continuous improvement. And when I say  
12 continuous, I don't mean that lightly. We are far from done and  
13 building a continuous improvement environment is a check and adjust.  
14 And as we continue with the implementation of our lessons, there are  
15 many opportunities to continue to check and adjust our plans through  
16 reviews, through inspections, through drills, through work shops that we  
17 have, and through sharing in international work shops we'll continue to  
18 strengthen our actions over the years.

19 Our operational focus has been maintained throughout  
20 the evaluation of lessons. And we emphasize that every day to our  
21 operating staffs that the most important thing that we do is operating the  
22 plant on a day-to-day basis and none of our actions are allowed to or  
23 are promoted to displace that focus. Also at the beginning of this we  
24 had a lengthy discussion about this event and a tsunami. And we  
25 made a commitment to ourselves and as an industry that the  
26 differences that exist would not be a barrier for us learning, and there

1 are many differences. But there are many opportunities for us to learn  
2 and we continue today to not look at this as an event that's a tsunami,  
3 but look at this as an event that was not predicted. And our actions I  
4 believe today display that in our strategies.

5 And then finally, we recognize that we can overwhelm  
6 the industry and our technical resources and experts with lessons, and  
7 it's extremely important from a leadership standpoint to prioritize and  
8 ensure that we are focused on those things that deliver the greatest  
9 improvement to public safety and focus our attention on  
10 implementation. And that's where we are today.

11 The next several slides I back up the clock. So in  
12 2011, just from an overview, it was really focused in on first assistance,  
13 understanding the event, and then establishing an infrastructure that  
14 we could carry the improvements forward. And I've got several bullets  
15 down there. I won't read each of them in the interest of time, but I think  
16 that one that is extremely important that we did accomplish early out  
17 was the readiness of our on-site portable equipment. We recognized  
18 that we needed to take immediate action in 2011. It involved the  
19 walkdowns of the power plant in terms of our rigidity and margin for  
20 natural events. Some early actions were taken at the time of those  
21 walkdowns, but it also was a time for us to validate our portable  
22 equipment and its readiness for service. And we did find opportunities  
23 there and we acted on those opportunities early out.

24 Another significant accomplishment in 2011 was the  
25 report that put out the timeline of the event, and that report became a  
26 pillar for learning not just here in the U.S., but throughout the world.

1 And INPO certainly is credited with doing a very thorough job in putting  
2 out that timeline.

3 In 2012, we now turned our attention to prioritizing and  
4 focusing on how to deliver the early improvements. And right at the  
5 top of this is the mitigating strategies, what we had initially started as  
6 our FLEX strategy. And this was really about establishing the  
7 capability to respond to extreme events. And we began this as an  
8 unpredicted event. It was not focused in on a flood. It was not  
9 focused in on wind. It was not focused in on seismic. It started out  
10 with looking at our engineers and saying how do we deal with  
11 something that we did not previously predict?

12 And the key element of this continues to be it's a  
13 diverse set of equipment that is installed. We still have our robust  
14 design and our defenses associated with that robust design. But this  
15 was about providing yet another set of alternatives. And we have  
16 created both on-site and off-site alternatives with that strategy.

17 Also in '12 we signed out an Industry Response  
18 Protocol, and this really formalizes the defense-in-depth that the  
19 industry has of ensuring that all organizations throughout the U.S. that  
20 are in the generating business with nuclear power are able to support  
21 each other. And we have INPO, NEI, EPRI -- all the suppliers and  
22 operators are all party to an agreement as to how we would interface  
23 and focus that support if ever need be.

24 In 2013, it has been a year of focus on implementation.  
25 And we also began the process of moving our thoughts well beyond the  
26 hardware and understanding the behaviors that are necessary, the

1 command and control that is necessary, the leadership that is  
2 necessary to succeed in this extreme event condition. And we start to  
3 see things of the importance of relationships. And when I talk about  
4 relationships, it's vendor relationships, it is local community  
5 relationships, it is government relationships that all need to come to  
6 bear and work in unison to mitigate an extreme regional event of which  
7 the nuclear plant may be one of many things that are impacted during  
8 that event. As we did that, we continued to focus on command and  
9 control and the importance of while we have many organizations that  
10 will be involved, we cannot lose focus of clarity in command and control.

11 In '14, it now transitions to the reducing on the  
12 variability of implementation. So we took what was very well thought  
13 out strategies of how to build the additional safety margin in our power  
14 plants and we had maybe several hundred people that were working in  
15 this industry in building that plan. We now have several thousand  
16 people that are implementing that plan. And it is incumbent on us to  
17 make sure that we continue to keep alignment in that plan as we move  
18 forward. And there is variability and strategy from site to site, but in  
19 terms of execution we are assuring that we all meet a certain level that  
20 was intended when those plans were set out. And that's being done by  
21 reviews. We see the variability as we do reviews at each of the sites.  
22 We provide feedback. We provide actions into our Corrective Action  
23 Program and we continue to level that playing field as we move forward.

24 Also in '14 is our year to bring the regional or now what  
25 we're referring to as the National Response Centers into service. And  
26 this really has been a tremendous effort united through the industry to

1 put together additional sets of equipment off-site that can be mobilized  
2 and brought to any plant in a short period of time throughout the U.S.

3 So I'll turn over to the conclusion slide in the interest of  
4 time here, and it really is about adding safety margin. And that's what  
5 as I look back over the last several years I am proud to be in an industry  
6 that has accomplished this task and does not look at this task as  
7 finished. This, as I started out, is a continuous improvement. And we  
8 will continue to look for opportunities to strengthen our defenses long  
9 past the event at Fukushima and long past the lessons at Fukushima.

10 But as we started out and we did our initial walkdowns,  
11 we've recognized that there has been a change in knowledge base in all  
12 our organizations. That's extremely important when we think about  
13 natural events and the defenses to natural events. And people are  
14 aware now of the importance of a conduit seal, the importance of a seal  
15 around a doorway. That did not exist previously. It does today and  
16 there's programs in place to maintain it. There's also readiness of  
17 portable equipment that exists today as a result of programs now being  
18 put in place that maintain and test it.

19 We're adding, as I said earlier, a significant layer of  
20 defense with FLEX, fortified the response plans and training for  
21 extreme events. And this still has a lot of opportunity in front of it. As  
22 we go through the drills we'll discover more training opportunities.  
23 We're strengthening the capability of leaders to maintain the clear  
24 command and control. And then finally, as I said, the independent  
25 reviews are a catalyst for ongoing improvement. And we're committed  
26 to do those through both self-assessments and industry initiatives to

1 review each of the sites. That concludes my comments.

2 CHAIRMAN MACFARLANE: Great. Thank you.

3 Next is Pete Sena, who is president and chief nuclear  
4 officer of FirstEnergy Nuclear Operating Company.

5 MR. SENA: Good morning, everybody. Appreciate  
6 the opportunity to speak to the Commission.

7 But again before I start, Commissioner Magwood, I do  
8 want to extend my personal well wishes to you. Thank you for your  
9 service. All of my interactions with you, you've been extremely  
10 professional, deliberate, insightful, thoughtful and your service to the  
11 country is duly recognized by the industry. So thank you again and  
12 well wishes.

13 And again, thank you for the opportunity to speak here  
14 and go through the FLEX implementation strategy, the successes, the  
15 challenges, the lessons learned. And let's start -- back up and let's talk  
16 -- what's the fundamental problem statement? And again, it's decay  
17 heat. It's that seven percent decay heat that we're trying to manage,  
18 right? And when you have a reactor core that's 4,000 thermal  
19 megawatts, 7 percent; do the math, that's significant. So how do we  
20 manage that decay heat with the loss of off-site power, with the loss of  
21 on-site power, right, without the connectivity to the ultimate heat sink.  
22 The solution developed needs to be developed regardless of whatever  
23 the initiating event is. Maintain the fission product barriers. Maintain  
24 the core cooling. Maintain containment integrity. So let's develop a  
25 FLEX strategy with this overarching theme in mind.

26 So we have existing strategies for loss of all AC. Let's

1 build upon those strategies, so we have an existing strategy, all right,  
2 for loss of all AC and procedures developed. On a personal note,  
3 when I was licensed, my license exam by the NRC on the simulator was  
4 actually a loss of all AC power. So let's build upon that knowledge  
5 base, build upon that strategy and take it to the next level for an  
6 extended loss of all AC. And again, build upon, as Jim said, the  
7 continuous learning culture that we have in the industry and our margin  
8 management culture that we have. And I do truly appreciate the  
9 comments to the gentleman at the right with respect to the differences  
10 in Japanese culture.

11 So one of the items I'm going to talk about shortly is the  
12 reactor coolant pump shutdown seal. That is one of the weak links in a  
13 loss of all AC power. The modification that the plants were putting in  
14 place was already in the books to install the shutdown seal. This was  
15 not a result of the Fukushima actions, but as a result of our looking at  
16 weak links and what's the margin improvements we can make at our  
17 facilities? And again, I'm going to talk shortly about leveraging the  
18 existing leadership capability.

19 So what's the weak link? Again, if I have to solve  
20 decay heat, it's power and water. And I don't want to oversimplify it,  
21 but if I don't have the on-site power, I don't have the off-site power, I  
22 don't have the connectivity with the ultimate heat sink, I have to bring to  
23 bear portable water sources, backup upon backup upon backup. So at  
24 the on-site we have the N+1. We have the same standard equipment  
25 at the additional neighboring nuclear facilities and finally at the national  
26 response facilities. Modifications are underway across the entire

1 industry. And again, what are we doing here? We're continuing to  
2 apply the same philosophy -- defense-in-depth and redundancy.

3 So the standard connections are under way. Just  
4 pictures here of auxiliary feedwater connections, river water  
5 connections to heat exchangers, AC power quick connections for 480  
6 volts. These are standard modifications being put across the industry.  
7 Why? Because the equipment is standard. Many of you have  
8 already visited the National Response Centers. The pictures here at  
9 my facilities are the same equipment that we have at the National  
10 Response Centers. It's all plug-and-play. Simplicity in deployment  
11 and implementation is key.

12 One of the things that quite frankly has concerned me  
13 in the past about the strategies is not to overcomplicate this. So if you  
14 build upon the existing strategies -- so how do you deal with a loss of all  
15 AC at a PWR? Well, it's a natural circ cooldown. Operators are  
16 already trained on natural circ. So now what do I need to bring to  
17 bear? What is the additional training? All right. How do we do DC  
18 load shedding to extend the life of the battery? That can be done.  
19 How do we start this equipment? My concern has been if we  
20 overtrain/overcomplicate this response to this beyond-design-basis  
21 scenario, we take away valuable operator training time from high-  
22 probability/low-consequence events. I've said this to my staff and I've  
23 exaggerated it for effect, but do we teach the operators how to drive the  
24 fire truck in lieu of basic operator fundamentals?

25 Now when I look at this equipment, simplicity is the  
26 key. So this 480-volt generator, if you have a generator in your home,



1 it's the same method of operation. So let's simplify it with a hard card,  
2 a simple pre-start checklist. What do you need to do to start it? Place  
3 the on/off key switch to on, start the green button, confirm speed,  
4 voltage and frequency, and close the breaker. So simplicity is the key.  
5 Let's not over-complicate this.

6 So again, the weak link. The RCP seal. Every  
7 operator, every engineer in the country will tell you this seal is the weak  
8 link. If you can protect this seal when it has no cooling, you can protect  
9 the RCS integrity. You protect RCS integrity, you protect containment  
10 integrity. Seals are going in. The first seals have been installed  
11 across the industry. We are on track for this timeline. The important  
12 point I can't over-emphasize, with this seal RCS inventory is  
13 maintained. RCS integrity is maintained. Containment integrity is  
14 never challenged.

15 So here's an example: Seven days post-event,  
16 assuming no cool down with a zero-leakage seal, put in the calcs and  
17 we assume one gpm still leaks out the seal, just for conservativeness,  
18 and you're looking at four pounds in a containment system seven days  
19 out with a design pressure of forty-two pounds and a yield pressure of a  
20 hundred and twenty pounds. You protect the fission product barriers.

21 So again, everything we're doing here -- the question  
22 has been asked multiple times by the Commission, by the staff, by  
23 industry, are the plants safe today? The answer that always comes  
24 back, yes, they are safe today. So everything we're doing today is  
25 about a margin improvement. Rightly so. What are your margins?  
26 What are your weak links? Build upon those and improve your

1 margins.

2 So if it's a margin dialogue, we can also have a  
3 dialogue about what is the industry doing and what's the cost? So for  
4 four units you can see the numbers there. Now multiply that by 25.  
5 So for margin improvements you're talking about a 3 billion-plus  
6 commitment by the industry to improve our safety margins.

7 But it's not just a financial commitment. It's a  
8 leadership commitment. I have here an article from the *Harvard*  
9 *Business Review* that talks about Fukushima Daini and how leadership  
10 shaped the outcome. So what the U.S. industry is trying to do is put  
11 the leadership up front. Let's shape the outcome of the FLEX strategy  
12 to ensure that we can be successful up front.

13 So on each of every one of these strategies the  
14 leadership team is looking at is it successful, is it deployable, can we  
15 win it, can we do it? All right. I'm licensed at Beaver Valley. My  
16 executives are licensed at all of my facilities. So we are challenging  
17 our staff. Is it execution-able, is it doable, is it successful? We  
18 critique, we challenge, we drive into the details and we desire to  
19 improve.

20 So bottom line, the U.S. industry is committed to FLEX  
21 implementation. And we have through INPO peer-to-peer  
22 accountability. Review visits being accomplished. Where are we  
23 with respect to each other? Are we holding each other accountable?  
24 And if we're not, we hear about it from each other, quite frankly. And  
25 the lessons learned as we do these review visits are being  
26 communicated across the industry.

1                   So what are the challenges going forward? And  
2 again, I think we all understand the staff is under a tight timeline. The  
3 industry is under a tight timeline. So again, these are fast-track mods.  
4 Fast-track mods do bring forth risk with respect to the engineering, the  
5 procurement, the construction. So it does require a significant amount  
6 of management attention to be put forth to bear that we get this right,  
7 get it right the first time and implement these mods per the scheduled  
8 timeline.

9                   And again, with so much management attention there  
10 is competition with other activities. Plant reliability modifications. So  
11 there's only so much time in the day to do so much work. So as we put  
12 forth these mods, if something comes on the table, what also comes off  
13 the table? And we have to be very deliberate in that decision making.

14                   And finally, on the Gen 3 shutdown seal, I do  
15 appreciate the NRC staff being very vigorous in their review of the  
16 vendor that proposed this design. Fifty-nine tests have been done.  
17 Ten thousand hours worth of testing has been done. Advanced  
18 chemical testing has been done. So the staff fully persecuted and  
19 prosecuted the viability of that seal, as did we. And that needed to be  
20 done. But again, the proof is going to be in the pudding. So even  
21 though it's been tested in the lab, what needs to be done, that seal  
22 needs to come out at the first plant that's installed it this coming spring  
23 and do a proof testing post-installation.

24                   And with that, again, thank you for your time and I  
25 appreciate the opportunity to speak.

26                   CHAIRMAN MACFARLANE: Thank you.

1                   Okay, next we have Dr. Jean-Christophe Niel, who is  
2 Director General of the French Nuclear Safety Authority.

3                   Bonjour. Bienvenue.

4                   DR. NIEL: Bonjour. Thank you for giving me the  
5 opportunity to present our actions.

6                   So, my name is Jean-Christophe Niel. I am the EDO,  
7 in fact, of the French Nuclear Safety Authority.

8                   And so, it is a pleasure, Chair and Commissioners, to  
9 have this opportunity to present our action.

10                  Next slide maybe.

11                  CHAIRMAN MACFARLANE: Next slide.

12                  DR. NIEL: Okay, thank you.

13                  So, after the accident at the Fukushima site, I took  
14 immediate actions.

15                  First, we organized a campaign of targeted inspections  
16 of French nuclear facilities. These inspections were open to  
17 stakeholders

18                  Second, we launched a complementary analysis of the  
19 safety of nuclear facilities. This analysis complies with the European  
20 Stress Test process which followed the European Council conclusions  
21 of March 2011. This complementary analysis is applied to about 1250  
22 French nuclear facilities; 58 nuclear power plants; one nuclear power  
23 plant is in construction, EPR; fuel cycle facilities with each reactor.

24                  It covers extreme natural events, loss of the ultimate  
25 heat sink and loss of electrical power and severe accident  
26 management. It is complementary to existing continuous

1 improvement process of safety through periodic safety review and  
2 integration of operating experience feedback.

3 Next slide, please.

4 On this slide, you can see that the process was paved  
5 by ASN position. I will come back to this. But it was also paved by  
6 proposition and justification from EDF, if I stay on nuclear power plants,  
7 EDF, which bears the primary responsibility for nuclear safety. IRSN,  
8 our technical support organization, and our technical standing groups of  
9 experts were also involved in this process.

10 Next slide, please.

11 On the 3rd of January, 2012, in a public position,  
12 following a first assessment of the nuclear facilities, ASN concluded  
13 that there was no need for immediate shutdown of a nuclear facility, but  
14 at the same time ASN also concluded that there was a need to increase  
15 robustness to withstand extreme situations beyond safety margins as  
16 soon as possible.

17 ASN indicated in this position that main measures were  
18 to be implemented. The first one is a so-called hardened safety care,  
19 which is a limited number of material and organizational dispositions to  
20 guarantee safety functions in extreme situations.

21 And second is the creation of a Nuclear Rapid  
22 Response Force. We call it in a French acronym "FARN," which is an  
23 EDF national intervention team able to supply local team staff and  
24 materials. It has to be fully operational in 24 hours.

25 Next slide, please.

26 Very schematically, regarding increasing hazard

1 severities, the prevention and limitation of accident and releases rely on  
2 design conditions that are justified in the Safety Analysis Report and  
3 regularly updated during the Periodic Safety Review. And we have  
4 some cliff-edge effects on hardened safety core.

5 Next slide.

6 On the 26th of June, 2012, I sent a legally-binding  
7 resolution for each site. Each resolution is composed of about 30  
8 requirements, with the objective to:

9 Reinforce the safety margins beyond design-basis  
10 level earthquakes and flooding.

11 Implement new and robust safety measures rather  
12 than performing sophisticated analysis.

13 And implement the safety improvements as soon as  
14 possible, not waiting for the next Periodic Safety Review.

15 Next slide.

16 The first requirements of each of these resolutions  
17 describes a safety goal of the hardened safety core for the situation  
18 considered in the Stress Test that are:

19 To prevent or mitigate the progress of a core melt  
20 accident.

21 To mitigate large-scale radioactive releases.

22 And to enable the licensee to perform its emergency  
23 management duties.

24 The system, structure, and components, SSCs, part of  
25 the hardened safety core, shall be:

26 Designed with significant margins in relation to the

1 requirements currently applicable.

2 And they will be composed of independent and  
3 diversified SSCs. The licensee shall justify the use of undiversified or  
4 existing SSCs.

5 Next slide, please.

6 So, resolutions identified equipment to be  
7 strengthened:

8 An additional ultimate electricity-generating set for  
9 each reactor.

10 A diverse emergency cool-down water supply for each  
11 reactor.

12 New crisis management premises for each site with  
13 greater resistance to hazards and being accessible and habitable at all  
14 times and during long-duration emergencies.

15 Mobile devices and means of communication essential  
16 to emergency management.

17 Technical and environmental instrumentation.

18 The ASN resolution requires, also, the creation of the  
19 so-called Nuclear Rapid Response Force. So, it was proposed by  
20 EDF. And the so-called FARN is composed of specialized teams able  
21 in less than 24 hours to:

22 Take over from the personnel of a site affected by an  
23 accident.

24 And to deploy additional emergency response  
25 resources.

26 It should be able to manage simultaneously

1 intervention on all reactors of a four-reactor site by the end of 2014, this  
2 year, and a six-reactor site by the end of 2016. We have one site of  
3 this type in France, in the north of France.

4 More recently, on the 21st of January, 2014, ASN took  
5 a new set of resolutions. The resolution sets more detailed safety  
6 goals for the hardened safety core. And we call on EDF to:

7 Prevent core melting when the reactor coolant system  
8 is pressurisable by giving priority to cooling by the secondary system.

9 To guarantee the performance of the containment.

10 And to allow residual heat removal from the  
11 containment without opening the venting system.

12 This resolution also requested EDF to define the list of  
13 SSCs, system, structure, and components, composing the hardened  
14 safety core and their qualification requirements.

15 So, new SSCs should be designed according to  
16 industrial standards.

17 And existing SSCs verified according to industrial  
18 standards or verified according to methods allowed during Periodic  
19 Safety Reviews.

20 The resolution also defines seismic hazards to be used  
21 for hardened safety core design. Normally, it is based on the return  
22 period of 20,000 years.

23 To set requirements regarding external hazards, other  
24 than earthquakes and flooding.

25 The resolution requests to verify pools structural  
26 resistance behavior under hardened safety core situations.



1                   And to prevent dewatering of the fuel assembly in  
2 spent-fuel pools.

3                   The resolution requests to ensure dropping of control  
4 rods under hardened safety core situations.

5                   And the request to provide independence of hardened  
6 safety core I&C and electrical systems from existing ones.

7                   And to define hardened safety core instrumentation.

8                   This slide describes a schedule of implementation of  
9 these measures resulting from the Stress Test process in France.  
10 Three phases can be identified.

11                   The first phase, from the accident, 2014-2015, covers  
12 the definition of the hardened safety core, the implementation of the  
13 Nuclear Rapid Response Force, and transitory measures. For  
14 example, one diesel generator is added to each reactor. It covers  
15 improvement regarding seismic hazards.

16                   The second phase, 2018 to 2020, covers the  
17 implementation of the large part of the hardened safety core equipment,  
18 mainly the ultimate diesel generator and the ultimate water makeup  
19 system, one for each reactor; the bunker emergency crisis center, one  
20 for each site. Other equipment will have to be designed to withstand  
21 extreme natural hazards beyond design.

22                   The third phase covered remaining modification. That  
23 lies, actually, in discussion between EDF and ASN.

24                   Next slide, please.

25                   So, this is a representation which shows the situation  
26 today. The objective now on hardened core situation is to cool the

1 reactors through steam generator as soon as possible. Mobile pumps  
2 and provisional diesel generators are installed, and the nuclear rapid  
3 response is ready to operate.

4 This representation shows the final situation with the  
5 ultimate heat sink to evacuate power from containment, the ultimate  
6 water system and emergency feedwater system to bring water to the  
7 reactor, the ultimate diesel generator to prevent station blackout, the  
8 emergency crisis center to deal with severe accident, the Nuclear Rapid  
9 Response Force is fully operational.

10 Next slide.

11 One slide on the interaction with the European level.  
12 So, these Stress Tests were performed by ASN in the framework of the  
13 European Stress Tests. Benchmark and peer reviews among the  
14 European safety authorities were performed.

15 Following this benchmark and peer reviews,  
16 conclusions and recommendations were drawn, both in each country at  
17 the national level and at the European level.

18 In the document provided by the European level, which  
19 is shown on this slide, the following conclusions were identified:

20 The first one, European guidance should develop an  
21 assessment of natural hazards and margins, including earthquakes,  
22 flooding, and extreme weather conditions.

23 Important, Periodic Safety Reviews for continuous  
24 improvement of safety was underlined. It should comprise  
25 re-evaluation of natural hazards at least every 10 years. Periodic  
26 Safety Review of the existing reactors should be guided by the

1 objective of avoiding offsite contamination.

2 The national regulator should consider implementation  
3 of the recognized measure to protect containment integrity for NPPs,  
4 not yet equipped; notably, to depressurize the primary containment in  
5 order to prevent high-pressure core melt, to prevent hydrogen  
6 explosion, and to prevent containment of air pressure.

7 The last conclusion of these four main conclusions is  
8 that there is a need to implement measures to prevent accidents in the  
9 case of extreme natural hazards and to limit their consequences.

10 I would like to come to my conclusion now.

11 First of all, I think it is very important to recall that the  
12 complete experience feedback from the Fukushima accident will take at  
13 least 10 years.

14 Second, Stress Tests were performed in the European  
15 framework. The European benchmark will continue, and it is part of  
16 the new European Directory of Safety which has been approved quite  
17 recently.

18 Stress Tests lead to strengthen the robustness of  
19 NPPs to beyond-design situations, to prevent accidents resulting from  
20 unforeseen extreme nuclear hazards and to limit their consequence.

21 Two main set of measures are defined in France: the  
22 hardened safety core and the Nuclear Rapid Force.

23 And before full implementation of these two main sets  
24 of measures, transitory measures are requested.

25 Thank you for attention.

26 CHAIRMAN MACFARLANE: Merci.

1                   Okay, next we have Joe Klinger, who is Assistant  
2 Director, Division of Nuclear Safety, the Illinois Emergency  
3 Management Agency.

4                   MR. KLINGER: Thank you.

5                   Good morning, Chairman, Commissioners. Happy  
6 birthday, Commissioner Magwood. A small gift, I have no slides today.

7                   (Laughter.)

8                   It is an honor to serve on this very impressive panel  
9 today to discuss the Illinois perspectives on the lessons learned from  
10 Fukushima and implementation of safety improvements related to  
11 station blackout and mitigating strategies.

12                  In general, I am pleased to report that the Illinois  
13 Emergency Management Agency agrees with the methodology to  
14 implement the NRC Mitigation Strategies Order. In particular, the  
15 external hazards review, including flooding and seismic events,  
16 spent-fuel pool makeup and instrumentation, hardened vents at  
17 appropriate stations, the station blackout coping mechanisms have and  
18 will continue to enhance nuclear safety in Illinois.

19                  We also concur with the industry's response through  
20 NEI's guidance for developing, implementing, and maintaining  
21 mitigation strategies and how it is being applied to Illinois power plants.

22                  The March 2012 Mitigation Order requires a  
23 three-phased approach. Phase one, using installed equipment.  
24 Phase two, using portable equipment stored onsite. And phase three,  
25 using portable equipment stored onsite augmented with additional  
26 equipment and consumables obtained from offsite in Memphis and

1 Phoenix. And I understand those centers are open now. So, kudos.

2 For phase one and two, State involvement in Illinois is  
3 primarily through our onsite resident inspectors. The IEMA Resident  
4 Inspection Program is unique and provides the State a  
5 senior-reactor-level qualified inspector at each of the six sites housing  
6 the 11 operating reactors.

7 It also affords the State of Illinois the unique  
8 opportunity to have direct involvement in all three phases. This is  
9 accomplished through inspections of equipment, procedures and  
10 training, and interaction with the onsite NRC inspectors as part of their  
11 normal duties.

12 We are confident our Resident Inspector Program  
13 adds value to our NRC partnership and is critical to nuclear safety  
14 emergency preparedness in Illinois.

15 Now Exelon is our utility, of course. I met with IEMA  
16 on January 30th, this year, to begin the development of the interfaces  
17 necessary to implement FLEX phase three, response using equipment  
18 stored at an offsite location.

19 State and local interfaces and resources would be  
20 needed to actually transport the equipment to a site in an emergency.  
21 Exelon proposed, and we are incorporating, the following wording to  
22 include "FLEX" in the Illinois Plan for Radiological Accidents.

23 Quote: "As preparation for emergency situations,  
24 Exelon will coordinate designated routes with IEMA for the purposes of  
25 police escort, snow removal, ice mitigation, debris removal, or any other  
26 activities that are designed to provide full access to the designed roads

1 for purposes of moving emergency equipment to the station, as  
2 requested in a severe environmental event."

3 This is really important because in a major event  
4 getting that equipment, you could get it out of Phoenix or Memphis, but  
5 getting it to an appropriate staging area and getting it to the site in an  
6 expeditious manner is very challenging because usually we are not only  
7 dealing with -- or we may not only be dealing with a nuclear event, you  
8 may have some other events going on that are going to be competing  
9 for those same resources. So, it is very important.

10 So, as a result of the meeting, the following activities  
11 are ongoing in Illinois:

12 The routes and transportation agreements with various  
13 airports, the staging airports, are being created to support the use of  
14 equipment stored offsite at either Memphis or Phoenix.

15 The challenges: these airports have to be or the goal  
16 is to be between 25 to 35 miles from the site, based on the  
17 communication zone and the medium rotary lift capability to get the  
18 equipment eventually onto the site. The goal is to receive equipment  
19 at staging 20 hours after activation and at the site within 24 hours.  
20 That is pretty ambitious. I mean, it is great, and, hopefully, we will  
21 never have to use this, but we really have to plan ahead for this and we  
22 have to coordinate.

23 Exelon is assisting with any IEMA planners in  
24 identifying airports that meet the level of support needed to implement  
25 FLEX. For example, electrical power, temporary or permanent, space.  
26 It takes a lot of space for these vehicles to turn around and to load up

1 and get the equipment out. Lighting for nighttime ops, things like that.

2 To assist this effort, IEMA has helped coordinate with  
3 the other State agencies, like the Illinois Department of Transportation,  
4 the Air Division, and other agencies that are affected.

5 The challenge: some identified airports are reluctant  
6 to sign MOUs. We are working on alternatives.

7 And also, it is really important for industry to reach out  
8 to the states because, when we first met, we looked at some of the  
9 airports that they were looking at using, and we go, "Oh, that's great,  
10 but we've already planned on using that ourselves." So, we have to  
11 coordinate and we need to do it beforehand rather than wait for an  
12 emergency. So, it is really important work that is going on right now.

13 IEMA and Exelon have briefed the 13 counties on  
14 FLEX because the counties need to know what is going on. What is  
15 FLEX? What is all this? What are the three phases? And include the  
16 locals in the planning efforts because local police, local fire, all those  
17 are going to be instrumental in getting this equipment there, should we  
18 need it for phase three.

19 IEMA and Exelon have created language in support of  
20 FLEX to be added to all IPRA volumes. Those are the site-specific  
21 emergency response plans for each of the power stations.

22 So, a lot of good work. Each plant is on a timeline to  
23 have all State, county, and staging area agreements in place, starting  
24 with Byron in September of this year, and the last one at Dresden in  
25 November of 2015.

26 In conclusion, we applied the additional NRC

1 requirements and the nuclear industry initiatives, and we will continue  
2 to support and help ensure compliance with these important efforts in  
3 Illinois.

4 And finally, thanks for your continued support and  
5 partnership with the states. Commissioner Ostendorff spoke at our  
6 CRCPD Annual Meeting in Atlanta. We really appreciate it. And,  
7 Chairman and Commissioner Magwood, we look forward to seeing you  
8 in Chicago at the Organization of Agreement States in a few weeks.

9 So, thank you again.

10 CHAIRMAN MACFARLANE: Excellent. Thank you  
11 very much. Okay.

12 And then, we finally have David Lochbaum, who is the  
13 Director of the Nuclear Safety Project at the Union of Concerned  
14 Scientists.

15 David?

16 MR. LOCHBAUM: Thank you, and good morning.  
17 Thank you for soliciting our views on this topic.

18 Next slide, please.

19 Overall, we would rate the progress to date as good,  
20 although with a fairly large caveat. My remarks today will focus on the  
21 Mitigating Strategies Order, but the themes apply more broadly.

22 Next slide, please.

23 The station blackout rule assumed that either the  
24 offsite power grid or onsite emergency diesel generators would be  
25 restored within hours. It provided no protection against power outages  
26 lasting longer than the assumed coping durations. A strength in the



1 Mitigating Strategy Order is that it relies on no subjective duration.

2 Next slide, please.

3 But have we solved the problem or just swapped  
4 problems? The Mitigating Strategy Order assumes that FLEX will be  
5 deployed in time to prevent core damage. UCS is not convinced that  
6 the order's assumption is valid.

7 Next slide, please.

8 My apologies to Entergy for drafting Pilgrim to illustrate  
9 our points. My Pilgrim-specific comments generally apply to all  
10 operating reactors.

11 A potential strength of FLEX is in providing at least N+1  
12 options when N is required for success.

13 Next slide, please.

14 This map of the Pilgrim site shows that multiple points  
15 are envisioned for connecting FLEX's makeup pumps.

16 Next slide, please.

17 But even a dozen connections would be useless  
18 because none of the FLEX pumps can provide high-pressure makeup.  
19 The reactor pressure must be reduced by non-FLEX methods for  
20 FLEX's teeny-tiny pumps to work.

21 Next slide, please.

22 Entergy's analysis for Pilgrim also shows that a  
23 tornado could disable all of the FLEX equipment. Having more  
24 equipment that workers cannot use is not the proper goal here.

25 Next slide, please.

26 To guard against a tornado affecting both of the FLEX

1 storage locations, Entergy positioned them more than a stone's throw  
2 apart at the site.

3 Next slide, please.

4 The NRC assumed that one, and only one, location  
5 would be compromised by extreme weather. Apparently, the tornado  
6 that devastated Moore, Oklahoma did not know about this 2400-foot  
7 rule when it destroyed larger portions of that city.

8 Next slide, please.

9 Entergy claims to have N+3 capabilities in some areas,  
10 but N+3 may only equal N, unless extreme weather cooperates by only  
11 cluttering-up one tiny area.

12 Next slide, please.

13 As the NRC's review of Entergy's plan noted, they only  
14 have one debris remover, and it may not be able to free up the N+1,  
15 N+2, and N+3 equipment areas in time. The Japanese word for this  
16 situation may be Fukushima.

17 Next slide, please.

18 Another strength of the Mitigating Strategies Order is  
19 that considerably more equipment is now staged onsite. Workers  
20 literally have more options to apply.

21 Next slide, please.

22 But will that equipment be damaged before that need  
23 arises? There are no regulatory requirements to monitor the storage  
24 shed heaters or to fix them within some timeframe, if one happens to  
25 notice that they are broken. Monitored and tested safety equipment  
26 has been disabled by cold weather and other extreme conditions, but

1 the NRC assumes, for some reason, unmonitored and untested  
2 equipment somehow avoids this outcome.

3 Next slide, please.

4 Regulatory requirements have workers periodically  
5 inspecting the air inlet and outlet ports for dry storage systems to  
6 ensure ventilation flow paths are not obstructed. But the NRC  
7 assumes that FLEX's unmonitored storage sheds on the same  
8 locations are somehow immune to such blockage events.

9 Next slide, please.

10 This is the NRC summary of Pilgrim's plan developed  
11 in response to the Mitigating Strategies Order. As previously noted,  
12 the plan non-conservatively assumes that the reactor pressure is  
13 magically lowered to allow the little-bitty FLEX pumps to work.

14 Next slide, please.

15 And the plan non-conservatively assumes that plant  
16 instrumentation not covered by any of the NRC's post-Fukushima  
17 reliability orders somehow continues to work just fine and guides the  
18 operators into taking proper and timely mitigating actions.

19 Next slide, please.

20 The plan also non-conservatively assumes that the  
21 Reactor Core Isolation Cooling System, called RCIC, will only draw  
22 water from the suppression pool and provide it to the reactor vessel for  
23 core cooling. This water will return to the suppression pool as steam  
24 flowing through the relief valves. When RCIC draws water from its  
25 normal source, the condensate storage tank, the suppression pool will  
26 fill up much faster. But somehow RCIC is magically realigned to its

1 non-preferred supply source and the very bad outcome of the  
2 suppression pool overfilling is conveniently averted. This assumption  
3 is non-conservative and non-flexible.

4 Next slide, please.

5 The Mitigating Strategies Order would be better if it  
6 resulted in pumps that work under both high and low reactor pressure  
7 vessel conditions, if these pumps and collateral equipment were stored  
8 in locations less susceptible to common-mode losses, if regulatory  
9 requirements ensured sufficient monitoring of the equipment while it is  
10 in storage, and if the many non-conservative assumptions were  
11 eliminated that transform beyond design-basis external events into  
12 barely-beyond-design basis external events. Yogi Berra may have  
13 had this situation in mind when he said, "It's deja vu all over again."

14 Two decades ago the NRC mandated hardened  
15 containment vents be provided on boiling water reactors. After  
16 Fukushima demonstrated that this safety upgrade would not work  
17 during the very accident that it was most likely to be needed, the NRC  
18 mandated that the old hardened containment vents now be made  
19 reliable.

20 Two years ago the NRC mandated that mitigating  
21 strategies be provided for all nuclear power plants. Will it take another  
22 disaster before the NRC then mandates that the old mitigating  
23 strategies be made reliable? The answer is literally in your hands.

24 Thank you.

25 CHAIRMAN MACFARLANE: Thank you.

26 All right. Thank you all very much.

1                   We will now move on to questions from the  
2 Commissioners. And the first one to go is Commissioner Magwood.

3                   COMMISSIONER MAGWOOD: Thank you,  
4 Chairman.

5                   And thank all of you for your comments today.  
6 Welcome to the 5,000th Commission meeting.

7                   MR. LOCHBAUM: Or does it just like that.

8                   (Laughter.)

9                   COMMISSIONER MAGWOOD: I think Annette has  
10 actually sat through all 5,000.

11                   (Laughter.)

12                   MS. VIETTI-COOK: It feels like it.

13                   (Laughter.)

14                   COMMISSIONER MAGWOOD: First, let me begin by  
15 thanking Dr. Neureiter and Dr. Garrick for their presence today. This  
16 was a very good presentation this morning. We appreciate that you  
17 lent your experience and knowledge to this cause.

18                   And I hope we have a chance to talk, Dr. Garrick. I  
19 don't think we have ever met, but we have some mutual friends I think  
20 we can talk about.

21                   And I also wanted to thank you for your  
22 presentation -- I didn't attend the presentation last year at the American  
23 Nuclear Society, but you gave a paper on PRA-based risk management  
24 history and perspectives, which I read. Commissioner Apostolakis  
25 actually sent it to the whole Commission. And I found it very, very  
26 informative. So, I just wanted to thank you for that.

1                   To start with the National Academy panel, as I read  
2 through the report, I saw that there were some instances where it  
3 seemed that the Committee was giving observations and advice to our  
4 Japanese colleagues because there were some things that seemed to  
5 be more aimed in that direction, and there were some that were clearly  
6 more intended for NRC.

7                   And to give you a chance to sort of highlight for us what  
8 perhaps you think -- I know what you think the biggest lessons are.  
9 You made that clear. But what actions do you think the NRC should  
10 take? Are there things that, as you look at this and you see the  
11 situation that we have today with the Mitigating Strategies Order  
12 coming in place and FLEX being implemented, what is the remaining  
13 gap that you think still exists that we should pay most attention to?

14                  DR. GARRICK: Well, of course, we were very careful  
15 in what we were asked to do and doing it. And that was to try to garner  
16 from the accident and all of the people involved with it, and all the  
17 reports that have been written about it, what are the important lessons  
18 that we have learned from it.

19                  And I am not going to rank those, but I think that there  
20 is no question that the back-end of the issue, namely, the recovery  
21 stage, the severe accident management stage is something that in the  
22 view of the Committee needs continued and diligent evaluation.

23                  It is not to say that the existing programs, whether it be  
24 Emergency Operating Procedures or Severe Accident Management  
25 Guidelines or extensive mitigation guidelines, or what, aren't good,  
26 because they certainly are. But it is to say that this whole accident was

1 a tremendous eye opener with respect to something that was thought to  
2 be very low probability, very low likelihood. It was not.

3 And one of the things, I think the message out of the  
4 report is that, because of how it happened and because, essentially, all  
5 of the serious accidents have been, more or less, in the  
6 beyond-design-basis category, that this suggests that more attention  
7 be given to those kinds of events, particularly in terms of managing the  
8 accidents that are resulting from something severe, as a super-tsunami  
9 or a super-earthquake or a super-volcano. And the next one could be  
10 a super-geomagnetic disturbance.

11 And so, I think there is quite a bit of emphasis in our  
12 report on those, not necessarily because they are rare events, because  
13 we are not sure how rare they are. That is pretty obvious from what  
14 happened. But because there needs to be an increasing fundamental  
15 understanding of them in terms of how they can happen and how to  
16 protect from them.

17 COMMISSIONER MAGWOOD: Do you think that we  
18 will be able to develop probabilistic approaches to incorporating these  
19 external events into risk models? Because you seem to indicate that  
20 that should be a next step.

21 DR. GARRICK: Yes, well, we didn't evaluate that  
22 specifically, but I think the report alludes to that; that if we are  
23 suggesting increasing the emphasis on the beyond-design-basis  
24 events, I think we are also saying that we think that that can happen,  
25 that that can be done.

26 I know that the response about rare events is always

1 that there is not enough data, but the one thing that we have learned  
2 from the risk assessment business is that the absence of such events  
3 does not mean the absence of information about such events, because,  
4 after all, the success state was there, and that has to be a very  
5 important element of the evaluation.

6 And I think that my observation about information and  
7 data is that there are two kinds of people in the world with respect to  
8 data: one that says that there is never enough data, and the other one  
9 that says we never use the data we have. And I think they are both  
10 right, and I think we see that.

11 We saw that in Fukushima. There was information  
12 about tsunamis. They were important and relevant in what you might  
13 call risk space.

14 And so, the hope here is that this urges us in this  
15 business to look at the unexpected very seriously and, more  
16 importantly, as one of our findings says, to account for it in our safety  
17 analyses and in our expanding-scoped risk assessments.

18 COMMISSIONER MAGWOOD: I appreciate that.

19 DR. NEUREITER: Just a very brief comment. I think  
20 this point about safety culture at the end, that this is a continuous  
21 process. This never stops. You've got to keep thinking about this and  
22 working on it and imagining what might happen, and so on.

23 That is why I think some of the comments, whether you  
24 liked them or not, from USC are important, to listen to those things,  
25 because they do think about what might happen.

26 COMMISSIONER MAGWOOD: I appreciate that,



1 and I also agree with many of the points the Committee raised about  
2 safety culture. I think that the cultural and training issues may actually  
3 be more important than some of the hardware issues that we spend a  
4 lot of time talking about. And that is something that has not got enough  
5 emphasis.

6 I wanted to sort of shift to an issue. You know, you  
7 heard Dr. Garrick talk about the beyond-design-basis events. As we  
8 go through the process of understanding how to protect plants against  
9 beyond-design-basis events, one of the really inconvenient things  
10 about beyond-design-basis events is they start at -- one threshold is  
11 within design basis and the other end seems to be somewhere over the  
12 horizon.

13 So, what has been your experience as you have  
14 engaged in thinking about this? And how do you protect plants against  
15 these events? You know, there's lots of analysis about flooding. For  
16 example, where does the flooding stop? How do you get your heads  
17 around that?

18 MR. SCAROLA: I will take a shot at it, and then, let  
19 Pete jump in as appropriate.

20 But this is a point of great debate right now for us in the  
21 industry. We have all grown up in a history of clearly-defined design  
22 basis. And quite candidly, we are comfortable with that. As  
23 engineers, we love to have parameters and we can build to those  
24 parameters.

25 What we have difficulty with is when you take away the  
26 parameters and say, "Now build me a design that will encompass all

1 parameters." And the reality is that that is not practical.

2 But what is practical is to look at the symptoms that you  
3 are concerned with and say, "How do I diagnose those symptoms and,  
4 then, how do I have a portfolio of options that the operators, the people  
5 that are in control of the event can look at that portfolio and, with the  
6 knowledge and training, they can lay out a success path?

7 So, I don't think you can ignore new information that  
8 should be changing and improving your design basis. We are not  
9 suggesting that. But it can't stop there. While you will always move  
10 on the knowledge that you have, you, then, need to go to the step  
11 beyond and say, okay, now what about that that we didn't predict?  
12 And that is really the basis of our focus and strategy, is making sure that  
13 we have well-trained operators that understand the objective.

14 And as Pete so clearly stated, it is about core cooling; it  
15 is about containment. They understand the objective. They  
16 understand how to meet that objective. Now we have to provide them  
17 potential additional options of what might survive the initiating event, so  
18 that they have options to deliver that strategy.

19 COMMISSIONER MAGWOOD: Okay. Thank you.

20 MR. SENA: And if I may, so am I worried about a  
21 tsunami coming down the Ohio River or off Lake Erie? No. All right.  
22 However, I think it is the right decision that the NRC and the industry  
23 has undertaken to let's reexamine our margins. So, what could those  
24 external events be? Use new data. Use the latest technology and  
25 new tools, and let's see where we stand today. And if the margins are  
26 not there, then we need to take action.

1                   Again, I understand your role as a regulator, but also  
2 understand my role as an owner/operator of a nuclear facility. It is my  
3 plant; it is my people; it is my community.

4                   So, if we see that the margins are not there, this is the  
5 right action to take. Again, regardless of the initiating event, can we  
6 maintain adequate core cooling, protect efficient product barriers, and  
7 what tools are being placed in front of the operators to be successful?

8                   I have no argument with the course of action being  
9 taken.

10                  COMMISSIONER MAGWOOD: Okay. Well, thank  
11 you very much. Thank you to all of you.

12                  I didn't have a chance to ask questions on this side of  
13 the table, but just, again, greetings, Dr. Niel. We appreciate your  
14 coming over to visit with us. I am sure my colleagues will have  
15 questions for you.

16                  And, Mr. Klinger, always a pleasure. And your  
17 comments were really very interesting. I really hope that you are  
18 working with others in state government to make sure that this kind of  
19 activity is underway.

20                  And while I didn't have a chance to ask David some  
21 questions, I thought your presentation was excellent, and I actually  
22 agree that there are some really important points you raised. In fact, I  
23 am going to raise a couple of them with the staff panel. So, they  
24 should be prepared for that.

25                  Thank you.

26                  CHAIRMAN MACFARLANE: Great. Thank you.

1 Okay, on to Commissioner Ostendorff.

2 COMMISSIONER OSTENDORFF: Thank you,  
3 Chairman.

4 I thank all the panel members. I think your  
5 presentations and perspectives are vitally important to the Commission  
6 and the NRC. So, thank you for being here.

7 I am going to start out with the National Academy's  
8 group. I appreciated the explanation of how this report is different. I  
9 think you made a key introductory comment there that was important for  
10 the Commission to take and to digest a bit, because there are a lot of  
11 reports out here on Fukushima from different perspectives. And so, I  
12 appreciated that you highlighted why yours provides perhaps a unique  
13 perspective.

14 I also will echo your commendation of Kevin Crowley.  
15 I have known Kevin for over a decade, and I have worked with him in  
16 prior jobs. And I appreciate Kevin's role in the National Academies  
17 and what he does for the country, quite frankly.

18 I am going to make one comment and, then, maybe a  
19 couple of questions.

20 Dr. Neureiter, I appreciated your commentary on the  
21 importance of training. I think, as a nuclear operator under Rickover's  
22 Navy for many years, and run hundreds, if not thousands, of drills under  
23 dark, wet, hot conditions, I think your training comments are really  
24 important. I think industry also has embraced that to a very large  
25 extent.

26 But I think that emphasis on training needs to be said

1 and refocused and reiterated time and again. So, I appreciate your  
2 highlighting that in your introductory comments.

3 A question I perhaps have for both Dr. Neureiter and  
4 Dr. Garrick is, I recognize that your report is different and a different  
5 perspective, but how should we at the Commission read your  
6 report -- and Commissioner Magwood got a little bit to this in his  
7 commentary -- about where do you agree or disagree with the actions  
8 taken to date by the NRC? So, I will give you a couple examples of  
9 things in your report that I am trying to understand what should we take  
10 away from this.

11 One was that emergency response plans should be  
12 revised. And we have embarked upon a rulemaking in this area. We  
13 have worked on control room staffing, multi-unit capabilities, upgrades  
14 to ERDS systems, those kinds of things.

15 And then, I would go to a different areas completely  
16 where in your overarching comment about nuclear plant licensees must  
17 actively seek out and act on new information, in the context we have  
18 taken a lot of steps in the seismic hazard analysis. The seismic  
19 walkdown says seismic evaluations, different Tier 1, Tier 2, Tier 3  
20 categories for plants.

21 So, I am just trying to understand, do you make a  
22 judgment or come to a conclusion on the adequacy or not of NRC  
23 actions to date? Whoever wants to address that, please feel free to.

24 DR. NEUREITER: I don't think that was really our  
25 role. It was not to evaluate either the safety of the nuclear plants or  
26 whether you all are doing your job.

1                   But I think we did try to draw some conclusions from  
2 this experience, and we hope that laying those out is useful. And that  
3 is something that you all have to process and deal with.

4                   This is not quite fair, but, well, first of all, John, you  
5 should say something. But, Kevin, if you have something to add to  
6 this, please do. We want to give you a chance to say it.

7                   DR. GARRICK: Yes, the one thing that it is very  
8 important to understand is that the Committee is not saying that the  
9 activities that are going on now, the safety assessments that have been  
10 performed, the PRAs that have been performed, the Probabilistic Risk  
11 Assessments, the emergency response station blackout, that these are  
12 not good rules, good regulations, and good guidance, because they  
13 are.

14                   It is really just saying that this is a very important  
15 business we are in. We need to continuously search for how we can  
16 improve not only our rules and regulations, but the methods by which  
17 we use to form the basis for rules and regulations.

18                   And each time we have had an accident there has  
19 been kind of a step change in that. The Three Mile Island accident, it  
20 was clearly a case of the owners' groups getting together and trying to  
21 come up with a better approach to dealing with severe accidents and  
22 severe management guidelines.

23                   It was the trigger for moving in the direction of  
24 symptom-based procedures, which are critically important and have  
25 been very beneficial, just as 9/11 was the trigger for the extensive  
26 damage mitigation guides and being able to cope with an environment

1 that involves the type of things that happened at 9/11. These have all  
2 represented very important changes.

3 I think that one of the things we are trying to say is that  
4 the analysis, the investigations, the studies that provide us with a  
5 knowledge base with which to make these kind of decisions has  
6 considerable opportunity for improvement.

7 The studies and the PRAs themselves have been very  
8 good as far as they have gone, but they don't go far enough. And  
9 particularly when the major threat that we are trying to do a better job of  
10 preventing is natural events, we have opportunities to better integrate  
11 the natural event analysis in with the so-called internal events. It is  
12 clear, and I think everybody would agree, that the level of, the depth  
13 and rigor of the internal event analysis is much greater than that of the  
14 external. And that is catching up. The things that you are doing now  
15 are steps, clearly, in that direction.

16 So, I think the whole idea of what constitutes full-scope  
17 analyses has changed as a result of Fukushima. I don't think that  
18 questions having to do with the infrastructure in the area impeding the  
19 ability to get support sources in terms of people and equipment, we do  
20 not give a sufficient amount of attention to that. We do not give a  
21 sufficient amount of attention to the interaction between units.

22 So, there have been studies done in both of those  
23 areas, but the ability to do a lot more exists, and we are not talking  
24 about just opening a can of worms with respect to analysis. We are  
25 talking about being smarter about the kind of analysis we do.

26 But I think that our message is we need to keep

1 improving what we have, and here are some areas that seem to be  
2 reasonable directions to go.

3 COMMISSIONER OSTENDORFF: Thank you for  
4 that clarification. I appreciate that.

5 Okay. Let me talk to Mr. Scarola just for a moment. I  
6 appreciated the time sequence you laid out year-by-year. What is the  
7 hardest thing going forward for industry?

8 MR. SCAROLA: So, I think, as I look forward, it is that  
9 I anticipate that 2015 continues to be an implementation year, but also  
10 a leveling year, where we get to review processes down, we get the  
11 feedback down to where we narrow the dispersion in a way in which we  
12 have implemented in the industry.

13 By 2016, I would anticipate that we have all the  
14 processes in place to maintain the gains and that we have integrated  
15 our activities here that have been fast-tracked backed into what I would  
16 call a new normal prioritization system, that they get prioritized with the  
17 other safety improvement activities that we have ongoing, not just those  
18 at Fukushima.

19 So, that is what I anticipate for the years ahead.

20 COMMISSIONER OSTENDORFF: Okay. Okay,  
21 thank you.

22 Dr. Niel, I really appreciate your coming here from  
23 France. I think the relationship between the ASN and the NRC could  
24 not be stronger. It is a very positive relationship.

25 I know when I have meetings with Mark Satorius, Mike  
26 Johnson, Eric Leeds, David Skeen, and so forth, that I think we all



1 benefit from that relationship.

2 The big picture -- I am going to run out of time  
3 here -- but, from ASN's perspective in the post-Fukushima action arena,  
4 what is the biggest difficult or what is the area of greatest difficulty for  
5 ASN?

6 DR. NIEL: I guess there are two kinds of difficulties.  
7 We have a strong technical discussion with EDF because all these  
8 topics are difficult to fix. When you speak of seismic hazards, you  
9 know, many experts with many positions; it is not always easy to find  
10 the right way. So, that is the first point.

11 The second point is to deal with delay of  
12 implementation. You know that in France we have one unique  
13 operator with 58 operating reactors. And so, there is, from the point of  
14 view of the operator, an organization of the implementation of the  
15 maneuver.

16 I think one of the difficult parts of the discussion with  
17 EDF, I mentioned, for example, the fact that the ultimate diesel will be  
18 installed in 2018. Indeed, it will start before; 2018 will be the  
19 installation of the last one, and the first one should be in 2015.

20 So, I would say this is one of the main difficulties in the  
21 discussions.

22 COMMISSIONER OSTENDORFF: Okay. Thank  
23 you.

24 Thank you all again for being here today.

25 Thank you, Chairman.

26 CHAIRMAN MACFARLANE: Thank you.

1 Yes, thank you all very much. Unfortunately, I am not  
2 going to get to all the questions that I have for all of you. I would need  
3 probably about an hour or two for that. So, I regret that.

4 But, anyway, let me try to weave together a number of  
5 thoughts that I heard, and, then, ask some questions specifically of the  
6 National Academy folks. And then, we will see how far we can get.

7 So, thinking about David's comments and Pete  
8 Senna's comments, I appreciate Pete's focus on, you know, what is the  
9 fundamental problem? Heat removal, et cetera. But I am a little  
10 concerned that sole focus on backup equipment, you know, may  
11 actually prevent you from -- there may be other issues. Let me try to  
12 be more fluent here. There may be other issues that prevent you from  
13 ever getting to use this equipment.

14 Flooding. If you have high water -- and I have been to  
15 some reactors where, you know, the reactor building can flood pretty  
16 high; that is the design basis -- you are not going to ever get to use your  
17 backup equipment necessarily.

18 Or if you have hydrogen buildup, and you guys  
19 highlighted hydrogen buildup and a consequent explosion, that could,  
20 as we saw in Fukushima, certainly get in the way of you ever using your  
21 backup equipment.

22 Or if you have loss of water from your spent-fuel pool  
23 and you have a problem with that, et cetera. So, we can imagine a  
24 variety of situations there.

25 So, that sort of takes me back to your comment about  
26 one of your findings and recommendations is that the industry and the

1 NRC should seek out information about new hazards on a regular  
2 basis. And you emphasized timely action. You talk about how, with  
3 Fukushima, there was mounting evidence of a tsunami, new tsunami  
4 wave height calculations, and that wasn't used.

5 But the problem is, when do you know to act? Like  
6 how do you know when the right time is? So, as a geologist, I am  
7 pretty close to this issue. Really, it is not just the tsunami. That is one  
8 piece of it. What created the tsunami? The earthquake. Well,  
9 seismologists didn't accept that mega-quakes could happen on that  
10 subduction zone until the mega-quake occurred off Sumatra in 2004.  
11 And it took the seismological community a number of years to get  
12 religion on that.

13 And then, really, everybody is getting onboard, and, all  
14 of a sudden, boom, there is a big, you know, there is a 9.0 off the coast  
15 of Japan.

16 Now we could have worked backwards because we  
17 did have paleoseismic evidence of large tsunamis from a thousand  
18 years ago or 800 years ago, or whatever it was, the Jogan tsunami.  
19 Brett will correct me if I'm wrong.

20 But we only know what we know at the time. And I  
21 agree that we have to work towards that. But these things are difficult  
22 to predict.

23 And then, we run into the problem, and I have run into  
24 that over and over again, sitting here at the NRC, which is, well, these  
25 are very low-probability, but high-consequence events. So, should we  
26 really act? Should we really make the investment to make a change?

1 These are really difficult questions.

2 DR. NEUREITER: It would have been very helpful  
3 even if, let's say, at Fukushima Daiichi they had not built everything so  
4 low. It would have been helpful if they had water-tighted those building  
5 down below very near the water at 3 meters or something. And had  
6 they been, and had you not destroyed the battery system, you would  
7 have had DC power and you would have done something.

8 There is also another thing which appeared that  
9 seemed to me to be new, and, remember, this is not my field. So, if I  
10 have got it wrong, tell me. But it was that in the isolation condenser.  
11 There was a lot of discussion early on Unit 1 and the isolation  
12 condenser. But only very late in our study -- and we have been at this  
13 for a long time -- only very late did it emerge that there was a logic  
14 system which automatically closed the valves when the power went off.  
15 And so, they actually --

16 CHAIRMAN MACFARLANE: Where did you find this  
17 information from?

18 DR. NEUREITER: Where did it come from, Kevin?  
19 Joe Shepherd had it. Go ahead.

20 CHAIRMAN MACFARLANE: Yes, go ahead. That's  
21 what it is there for.

22 MR. CROWLEY: This is Kevin Crowley.

23 Actually, the Committee discovered it for itself by  
24 pouring through the accident investigations that had been done. And  
25 then, when the Committee realized that there was an inconsistency in  
26 some of the accounts, they started talking to design experts who

1 understood how these systems were built and how they operated.  
2 And it was only through a lot of discussions that they came to that  
3 understanding.

4 CHAIRMAN MACFARLANE: Okay. That is a very  
5 important insight I think.

6 MR. CROWLEY: It is, yes.

7 CHAIRMAN MACFARLANE: Yes.

8 DR. GARRICK: I think you ask a very good question.  
9 And the whole issue is, how do we structure a set of scenarios that we  
10 have confidence in? And then, secondly, how do we relate the  
11 supporting evidence to those scenarios in a systematic way?

12 And that is what the so-called triplet definition of risk is  
13 all about. What can go wrong, how likely is it, and what are the  
14 consequences?

15 And that is exactly what we did with respect to the  
16 isolation condenser issue. We just kept burrowing-in on what  
17 happened there. Why did it work the way it did? The reactor core  
18 isolation system and the isolation condenser and the high-pressure  
19 injection system are all subject to the same basic failsafe logic. It is the  
20 same kind of logic. So, why did in one case, in the case of Unit 2,  
21 which was the reactor core isolation, were they able to operate the  
22 reactor core isolation cooling system, and in the case of Unit 1 with the  
23 isolation condenser they could not?

24 CHAIRMAN MACFARLANE: Uh-hum.

25 DR. GARRICK: And the simple answer, on burrowing  
26 into the information, is that what happens was, we thought what

1 happened was that, because they turned the closed valve on the inside  
2 of the containment on the Unit 1, and that they did not do that with  
3 respect to Unit 2, with respect to the so-called RCIC, that that was the  
4 cause.

5 But, on further examination -- and this is what we're  
6 talking about to really answer your kind of question -- it was more  
7 fundamental than that. The truth is it depends upon the position of the  
8 valves at the time of the incident and it depends upon the timing  
9 associated with the loss of power. And you have got to orchestrate  
10 those issues in such a way to avoid getting in a position that, when you  
11 lose DC power, these valves automatically close. And so, now they  
12 are faced with a system that really is a very good system, the isolation  
13 condenser, being totally made useless to them because of some fault  
14 logic, some fault logic that was based on protecting the core against a  
15 break in the line associated with the isolation condenser. So, that is  
16 what the logic saw when it was working.

17 CHAIRMAN MACFARLANE: Okay.

18 DR. GARRICK: And when the DC went off, it treated  
19 it as if there was a pipe break and shut things down.

20 CHAIRMAN MACFARLANE: All right.

21 DR. GARRICK: Well, there were differences between  
22 the timing and between the position of the valves between the two  
23 reactors. And those differences were just enough for the system to  
24 work in the case of Unit 2, but not to work in Unit 1.

25 So, the problem of this business, and to answer the  
26 kind of questions you have, just seems to be a matter of -- and this is a

1 creative part of the risk assessment business -- of structuring a set of  
2 scenarios that you have confidence in, that you have reasonably  
3 covered the full space that you are interested in. And then, it is a  
4 matter of seeking out the evidence that supports those scenarios and  
5 quantifying them.

6 And the uncertainty sciences allow us to do that. You  
7 may not like the answer because of the amount of uncertainty involved,  
8 but there is no doubt about the fact that you can create the curves that  
9 communicate to you what the likelihood is of any event.

10 CHAIRMAN MACFARLANE: But you and I have had  
11 this discussion before.

12 DR. GARRICK: Yes, we have.

13 CHAIRMAN MACFARLANE: We only know what we  
14 know, and the problem is what we don't know.

15 DR. GARRICK: Yes.

16 CHAIRMAN MACFARLANE: Kevin wanted to jump  
17 in.

18 MR. CROWLEY: Yes, let me take --

19 CHAIRMAN MACFARLANE: Briefly, because I am  
20 running out of my time here.

21 MR. CROWLEY: Sure. Yes, let me take a swat at  
22 your question here.

23 It is very instructive to look at what happened at  
24 Fukushima Daiichi versus the Onagawa plant.

25 CHAIRMAN MACFARLANE: Versus the?

26 MR. CROWLEY: The Onagawa plant --

1 CHAIRMAN MACFARLANE: Onagawa, uh-hum.

2 MR. CROWLEY: -- which is north.

3 CHAIRMAN MACFARLANE: Uh-hum.

4 MR. CROWLEY: They were both operating on  
5 essentially the same set of information. And yet, the plant at Onagawa  
6 made several upgrades to protect it from tsunamis; whereas, the  
7 Fukushima Daiichi plant did not, even though there were opportunities  
8 to make some fairly simple changes; for example, making ground-level  
9 doors water-tight, perhaps raising elevations of pumps, you know,  
10 moving some of the diesel generators to higher elevations. None of  
11 that was done as far as we could tell.

12 CHAIRMAN MACFARLANE: Uh-hum. Okay.  
13 Okay. Well, I am out of my time. So, I will stop right now.

14 On to Commissioner Svinicki.

15 COMMISSIONER SVINICKI: Well, I add my thanks to  
16 all of you for your presentations. They were very interesting, and it is  
17 very easy to fall victim to wanting to share some commentary and  
18 observations, and not leaving time for questions. So, I will attempt to  
19 do both here.

20 I would like to begin by thanking the Committee  
21 members of the NAS Study Committee. Although you didn't throw the  
22 slide up on the screen, you do have in your background materials, so I  
23 think it will be in the record of this meeting, the listing and affiliations of  
24 all of the individuals who served on the Committee. I certainly thank  
25 them for their service in doing that.

26 I have noticed, as you very deftly have handled the



1 questions of my colleagues, that it is a very precise tasking that the  
2 Committee had, and there were certain things that they were not tasked  
3 to do. So, you have handled responding to that well.

4 And, Dr. Neureiter, you said, you know, what we have  
5 done is laid out a set of information and observations, and we hope that  
6 it is useful. And I, having looked at it, conclude that it is very useful.  
7 And I say that because of the fact that it comes along, as you noted, at a  
8 time after the accident where there has been some other work and  
9 study and investigation done. And I think that, as Dr. Niel said, we will,  
10 at least for a decade -- I sometimes say two decades or three  
11 decades -- we will continue to learn about the exact sequence of events  
12 here and the contributors and the causes.

13 It is also very helpful for me, when I reflect, that the  
14 public gets all these expert reports. And sometimes I wonder what do  
15 we expect them to take away from this. And something that I believe is  
16 very noteworthy is that, from our Near-Term Task Force, which, as you  
17 commented, had a very short period of time to look at these issues, to  
18 your report being released very recently, at a high level these diverse  
19 groups of experts are identifying that the same fundamental issues are  
20 the priority and are the areas that we need to keep looking at.

21 I also observed from the presentations today that at  
22 this point in time we are beginning to pivot away from a nearly-exclusive  
23 look at hardware and other mechanical issues and fixes. There has  
24 been discussion today about nuclear safety culture. I liked the simple  
25 statement that was made of nuclear safety culture is a big issue.

26 (Laughter.)

1                   And I think it was interesting for me to hear what a  
2 vibrant discussion there was behind the scenes amongst the  
3 Committee members. And you were very diplomatic in talking about  
4 your experiences with the Japanese culture and the society there and  
5 the nuclear safety culture.

6                   I maybe am not as diplomatic, but I would observe I  
7 have had an opportunity as Commission to visit nuclear facilities around  
8 the world. And when I return to the United States, I do not return with a  
9 new or significant concern that there is deficient nuclear safety culture  
10 in the United States.

11                   So, I am trying to be a little bit diplomatic there, but  
12 chief among my worries, upon looking at the United States safety  
13 culture versus other countries that I think have bigger challenges in that  
14 area, but that in no way means that you become complacent about it.  
15 So, I appreciate that the Committee had a vibrant discussion about, that  
16 it is a focus.

17                   And also, I want to thank those of the panelists who  
18 talked about leadership. There was mention of the Harvard Review  
19 article that talked about how leadership shaped differing outcomes at  
20 Daiichi and Daini.

21                   I want to note I also found the article very interesting  
22 and wanted to note that one of the chief authors was a former NRC  
23 staffer who was deployed earliest over to the U.S. Embassy in Tokyo  
24 and spent a very, very significant deployment over there. And he is  
25 one of the authors of that. So, again, it is one piece of a mosaic about  
26 this event, but I thought very interesting.

1                   And it is time, three years after the event, to be looking  
2                   at these issues like leadership, like safety culture, and the very  
3                   significant -- now that we have put preliminary regulatory responses in  
4                   place, I think we have time to turn to the very nuanced and complex  
5                   issues that were obvious contributors here.

6                   So, that will end my commentary period. One of the  
7                   real benefits of a panel like this is I can ask panelists to react to other  
8                   panelists' presentations.

9                   So, one of the perspectives shared in the NAS report is  
10                  on training. And while I second Commissioner Ostendorff's view that  
11                  training is important, this is another one of these maybe  
12                  secondary/tertiary issues that now is the appropriate time to be looking  
13                  at that very closely.

14                  But there is a perspective here about having a greater  
15                  emphasis for operators and others on ad-hoc responses, on these  
16                  events that have a lower probability of being encountered during the  
17                  career of any given operator.

18                  I had the opportunity this summer to address the  
19                  summer meeting of the Professional Reactor Operators Society here in  
20                  the United States, and I have engaged with operators in that forum and  
21                  other fora about concerns that they have expressed that their training  
22                  regimes could, are not now but could, if the wrong emphasis is placed,  
23                  have too much time spent and emphasis on events that have lower  
24                  probability as opposed to evolutions or incidents that they have a much  
25                  higher likelihood of experiencing as operators.

26                  So, I wanted to ask those representing operators and,

1 also, Mr. Lochbaum, who has extensive background on these types of  
2 issues, how does one strike the right balance there, and not overreact  
3 and tilt the training balance too much?

4 MR. SCAROLA: I will comment to begin with. In  
5 2010, the industry took on an initiative, following some low-level events  
6 in the industry here in the U.S., and we recognized at that time that we  
7 had become very rule-based-focused in our training programs. And  
8 we started to take on a balance of knowledge-based versus rule-based  
9 and bring that pendulum back into the middle.

10 And this is precisely what the focus was. It is that we  
11 found that over time that, while we were very well-trained, we were very  
12 well-prepared on those things that we could predict. And we had some  
13 events, a fire at one of the plants that put us into some unpredictable  
14 space, not rehearsed, where we had a verbatim procedure to follow.  
15 And we had challenges in that in the operators not taking an optimum  
16 path.

17 So, that caused us to back up at that point in time and  
18 start to pull us back into knowledge-based training and put our  
19 operators in conditions that were not specifically guided by the  
20 procedures, where they had to depend on their knowledge,  
21 understanding of systems, understanding of things like DC logic, and  
22 what that might mean to the control circuits in terms of losing power in  
23 events. And we continue to work on that. I won't say that that is  
24 solved.

25 But this question of threshold and focus of training, as  
26 we move now into these extreme events, that balance is very delicate.

1 But we think and believe that the proper balance is knowledge versus  
2 rule. And we may not have rules for every extreme event, and we  
3 won't have, but we will have the knowledge, and our desire here with  
4 our actions is to provide equipment to execute that knowledge with.

5 MR. SENA: And if I may add, I think one of the most  
6 important aspects of training that we give to our operators today, and  
7 then, who are, thus, examined by the NRC, is the overall integrated  
8 plant knowledge, the interfaces between the systems, how they work,  
9 how they interface, what can be accomplished, what can't be  
10 accomplished.

11 And I just have my own personal example. Back in  
12 1997, within one month of standing watch, there is a transient at the  
13 plant I was working at. I was on shift and we did not have a procedure  
14 to handle that transient. And that was a deficiency, mind you. We  
15 should have had a procedure, but we didn't.

16 But, based upon my integrated knowledge, my crew's  
17 integrated knowledge, we were able to take all the right actions, right?  
18 And when you go back and look and say, well, what were the actions  
19 taken, well, the procedure was thus developed based upon what we  
20 did. That is because of that integrated plant knowledge.

21 So, there is going to have to be a balance -- and I  
22 mentioned that -- as we train for these beyond-design-basis events.  
23 Maintaining that overall operational fundamentals, how does a plant  
24 operate, respond, and interface with other pieces of equipment and  
25 man/machine interface?

26 And then, just knowing what actions we have to take

1 regardless of the event. So, how do we not overcomplicate the  
2 training that needs to be done? And that is why I mentioned, you  
3 know, a simple hard card.

4 So, do I want to spend all this time training how to start  
5 a 120-volt AC generator or do I want to have that overall integrated  
6 plant knowledge to be able to respond, regardless of what that initiating  
7 event is? It is going to be a fine analysis.

8 And I was there with you on what the reactor operator  
9 said. I hear their concerns.

10 COMMISSIONER SVINICKI: Thank you.

11 David, did you want to share?

12 MR. LOCHBAUM: Yes, just shortly. I agree with  
13 those concerns. That is an important concept.

14 I think one of the things the NRC could do to help the  
15 industry's processes is use its generic communications process to more  
16 than just things that happened bad yesterday.

17 The example that comes to mind, I thought the NRC  
18 staff did a real good job of looking at the Columbia Shuttle Report and  
19 extracting transferrable lessons. If they would have supplemented  
20 that with an Information Notice, a Regulatory Issue Summary, the  
21 licensees review that for corporation-applicable lessons into their  
22 training programs and other programs. It doesn't necessarily mean  
23 you have classroom or simulator training time, but it may be in the  
24 lessons learned or things that you read.

25 So, I think the NRC should broaden its general  
26 communications to include some of these lessons learned from the

1 NAS study, from the Columbia Shuttle study. And other things that are  
2 hard lessons need to go out to let the licensees determine whether that  
3 falls in their triage to incorporate or not. So, I think there is a missed  
4 opportunity there.

5 COMMISSIONER SVINICKI: Okay, thank you.

6 Thank you, Chairman.

7 CHAIRMAN MACFARLANE: Okay. I think  
8 Commissioner Magwood as an additional question. So do I.

9 COMMISSIONER MAGWOOD: Just a very quick  
10 question for Mr. Klinger, towards the end of my time period, you kind of  
11 nodded when I asked about the interaction states have been having  
12 with other utilities in preparing for FLEX. Could you give us some  
13 insights as to what is going on and what kind of conversation you have  
14 had with your State colleagues?

15 MR. KLINGER: Well, we have reached out to all the  
16 13 rep counties and talked to them. As far as other states, I really  
17 haven't reached out to the other states. I can't really address that.

18 But I know it is a high priority in our State. It seems  
19 like a simple thing. We have this big equipment that is coming in, and  
20 what could be difficult about that? But there is a lot of coordination.

21 And we just went through a CAPSTONE-14 exercise  
22 where we simulated a 7.7 seismic event on the New Madrid and a 7.2  
23 on the Wabash Valley. And it is just amazing the devastation and stuff  
24 that is created in events like that, in a regional catastrophic event, and  
25 the challenges, and communication and transportation and power, and  
26 things like that.

1                   So, we look at this as another all-hazards-type event,  
2 that we would have some specific strategies to get that equipment in  
3 there to take the mitigation activities as soon as possible.

4                   So, real challenges, but not insurmountable, as long as  
5 we plan ahead, get those plants up-to-date, and then, train and  
6 exercise to those plants.

7                   COMMISSIONER MAGWOOD: Okay. Thank you  
8 very much. Thank you for highlighting that. It is an important issue.

9                   Thank you, Chairman.

10                  CHAIRMAN MACFARLANE: Great. Thanks.

11                  I have a question for Dr. Niel. I want to understand a  
12 little better what the reactors in France have done so far in terms of  
13 implementation of lessons learned. And I know you gave us a  
14 timeline, but I would like to know if they have taken actions already.

15                  DR. NIEL: Good. So, at the present time there have  
16 been actions regarding the seismic situation of plants.

17                  CHAIRMAN MACFARLANE: Uh-hum.

18                  DR. NIEL: But for design, there has been the addition  
19 of this, we call them "mini-diesel". They are anticipating the real  
20 reinforced diesels that should come between 2015 and 2018.

21                  Regarding pools, there has been reinforcement of the  
22 measures on the situation of pools level where temporary transformed  
23 declassification.

24                  We were asked to reinforce the existing emergency  
25 center on the site, anticipating the bunkerized one which will come in  
26 the future, before 2018.



1                   And last, the last big measure is the rapid emergency  
2 force, which is located on four sites. In fact, one, you know, French  
3 reactors are quite similar, but they can be classified in more or less four  
4 families. Okay?

5                   CHAIRMAN MACFARLANE: Uh-hum.

6                   DR. NIEL: And so, there is one team of this Rapid  
7 Force on four sites, and they are ready to intervene. Now on all sites  
8 to date at least with one reactor and at the end of the year it would be for  
9 four reactors, and in 2016, for six reactors, at the same time you have a  
10 problem on six reactors. And you have one site like this in France in a  
11 place called Gravelines.

12                   So, there are the situations, the modification are  
13 already in place. And at the same time, we have discussion and we  
14 gave already some authorization to EDF to proceed on some  
15 components. For example, the ultimate diesel, EDF has launched the  
16 permit, okay, to buy them after we have agreed on the requirements,  
17 because this diesel must withstand a high level, they must have a high  
18 protection level, much more than the existing one on site. We have  
19 already two diesels by reactors. This third one would be upgraded in  
20 resistance to external events.

21                   CHAIRMAN MACFARLANE: Uh-hum.

22                   DR. NIEL: Okay?

23                   CHAIRMAN MACFARLANE: Okay.

24                   DR. NIEL: So, it is a broad view.

25                   CHAIRMAN MACFARLANE: Great. Thank you very  
26 much.

1 Commissioner Svinicki?

2 COMMISSIONER SVINICKI: I seek one clarification  
3 also from Dr. Niel. On your slide 9 you describe the Nuclear Rapid  
4 Response Force and indicate that, in less than 24 hours, they must be  
5 able to -- and this is the language of the slide -- "take over from the  
6 personnel of the site affected by an accident".

7 And I don't know if I misunderstand, but is this to take  
8 over the operation of the plant and the response to the events; in other  
9 words, to take control from those at the site?

10 DR. NIEL: I suppose at the same time going to control  
11 with a team operating, but also to bring materials, mobile materials, to  
12 help, to massage the situation. Twenty-four hours is, indeed, the  
13 requirement. In fact, EDF expects to be operational in 12 hours, but it  
14 is not our requirements. It is their own organization. Okay? Indeed,  
15 it is 24 hours. After, they have been triggered. Okay? There might  
16 be an action of the site saying, "We need this force," and then, the  
17 requirement is this one.

18 COMMISSIONER SVINICKI: I think what I am  
19 reacting to is the phrase "take over from the personnel of the site".  
20 And if I understand that correctly, it would be a key departure from the  
21 U.S. We would leave the operator of the site in control of responding  
22 to the event, and we would not have an outside group come in and take  
23 over the response of the unfolding accident or event.

24 And so, is this that these individuals will take control  
25 and decide what the response actions are from those who are currently  
26 managing the event?

1 DR. NIEL: There are two modes which will be  
2 decided in action. One mode is to be ready to help, and the other  
3 mode is take the lead. Okay? And it will be a choice during the  
4 course of the actions.

5 Up to now, the objective of all the number of people is  
6 about 350 people. It is a point you are looking for carefully because  
7 EDF wanted skilled people. So, they are taken from an operating  
8 team. Okay? And every day it is --

9 COMMISSIONER SVINICKI: So, they are  
10 knowledgeable of the operation?

11 DR. NIEL: Yes, and they shoot to replace them.  
12 Okay? So, we are looking at this to be sure that the fact we create this  
13 Force and take skilled people out of the system doesn't make the  
14 system weaker. Okay?

15 COMMISSIONER SVINICKI: Okay. Thank you.

16 CHAIRMAN MACFARLANE: Okay, well, I think we  
17 have reached the end of our questions right now.

18 I thank you all again for joining us this morning and for  
19 your presentations and the discussion. I think it was very helpful. I  
20 will call for a short break while our staff panel get ready. So thank you  
21 very much.

22 (Whereupon, the foregoing matter went off the record  
23 at 11:24 a.m. and went back on the record at 11:34 a.m.)

24 CHAIRMAN MACFARLANE: Okay. So now we are  
25 going to hear from the NRC staff. I will turn things over to Mike  
26 Johnson, who's the deputy executive director for Reactor and

1 Preparedness Programs, and the lead on the Fukushima Steering  
2 Committee.

3 MR. JOHNSON: Thank you, Chairman. Good  
4 morning, Chairman and Commissioners, and I wanted to start with  
5 adding the staff's congratulations, first of all, Commissioner Magwood,  
6 for your birthday. I didn't realize. Happy birthday, and we're not going  
7 to sing, as we decided. But we also did want to thank you for your  
8 service and your leadership at your time on the Commission. So I  
9 wanted to just start with that note.

10 Of course today, we're going to provide an update on  
11 the status of the actions taken by the NRC and licensees in response to  
12 the accident at Fukushima Daiichi nuclear power plant in March of  
13 2011.

14 Before I go to my slides, though, I did want to note that  
15 there is another noteworthy event today, and it is that today is actually  
16 Dave Skeen's last presentation for the Commission, as a member of the  
17 Japan Lessons Learned directorate or now division, and a key leader in  
18 our response on that activity.

19 Of course probably Dave, more than anyone else, is  
20 the face behind or the face that is recognized when you think about the  
21 NRC's response on all things Fukushima. So Dave's going to go on  
22 and continue to do great things elsewhere in the agency. But we  
23 certainly are going to miss him as a part of our efforts and the  
24 leadership role, and this will be the last time hopefully you see him on  
25 our panel in these activities.

26 First slide, please. It's been almost three and half

1 years since the accident, and I want to just touch on a couple of themes  
2 that Chairman, I think you started with, certainly you heard in the first  
3 panel, and they are first and foremost that the NRC and licensees have  
4 in fact taken real action, and those real actions have resulted in  
5 significant safety improvements at the plant.

6 As members of the first panel indicated, we're well into  
7 implementation on many of the Tier 1 activities. I will be providing the  
8 staff's perspectives with respect to where we are on those individual  
9 activities. We think that's important.

10 A second theme is of course there is more to do. So  
11 it's important. We'll say this a number of times probably that we,  
12 throughout our presentation, that we remain focused, in order to make  
13 sure that we complete the work that we've started.

14 The slide that I'm talking to actually has a number of  
15 pictures that sort of depict activities that are ongoing in various areas.  
16 On the left, there are pictures of mitigating strategies equipment that  
17 you've seen, a facility up top, and then at the Industry's response  
18 center.

19 In the center of that picture is a flood door that actually  
20 prevents migration of flood water to facility, and then on the right side of  
21 that picture is a drawing of a spent fuel pool, level instrumentation. Of  
22 course, those activities are ongoing and also at the bottom seismic  
23 analysis work that is going on, again all depicting work that is underway  
24 and going very well.

25 Next slide, please. Early in our efforts, as a part of the  
26 Steering Committee, we established principles to guide what we did,

1 our approach to lessons learned as a Steering Committee and as a part  
2 of the Japan Lessons Learned Directorate, and we've lived with those  
3 as we've gone. They've shaped our activities.

4 First and foremost, we didn't want to distract NRC or  
5 licensees from their focus on operational safety and security. We think  
6 that's important. Also, we wanted to make sure that we don't displace  
7 other high priority work, recognizing Fukushima enhancements are  
8 important, but they're not the only thing that is important.

9 We also wanted to be disciplined in all of our activities,  
10 including screening additional activities, including establishing a sound  
11 basis for decisions that we've made and continue to make, and making  
12 sure that we do things right the first time. Those principles that we  
13 established then that guided us will continue to guide us as we go  
14 forward.

15 Since our last Commission meeting, I had the pleasure  
16 of leading a team to go to Japan with Cindy and all of the regional  
17 administrators, with the office directors in the Offices of Nuclear  
18 Reactor Regulation, Nuclear Security and Incident Response, New  
19 Reactors, along with Dave Skeen, along with Scott Flanders, who is in  
20 the audience.

21 It gave us an opportunity to provide -- to obtain  
22 insights, firsthand insights regarding what happened, to provide greater  
23 context to the work that we are doing. That trip left us with several  
24 overarching themes, if you will. First, we do want to make sure that the  
25 industry and the NRC continue to prepare for the unexpected. That  
26 was discussed on the earlier panel.

1           We want to ensure that licensees have a deep  
2 understanding of their facilities, and certainly that the NRC and that the  
3 industry has sufficient technical expertise. Finally, we came back with  
4 a redoubled sense of the need to make sure that those things that we  
5 implement are maintained and continue to be effective, as they relate to  
6 the lessons learned.

7           So like the principles on the slide, those themes  
8 continue to guide us, and we'll carry those going forward. So now I'd  
9 like to stop and turn it over to Jennifer. Jennifer will discuss the high  
10 level status of the Japan Lessons Learned activities. Jennifer.

11           MS. UHLE: Thanks, Mike. Good morning. My  
12 name's Jennifer Uhle. I'm the deputy director of the Office of Nuclear  
13 Reactor Regulation, and as Mike indicated, I'll be providing a high level  
14 of the significant progress that we've made, but I'll also talk about some  
15 organizational changes that we've made in the Office of Nuclear  
16 Reactor Regulation, to improve our operational efficiency.

17           Before I get into the details of my discussion, though,  
18 I'd like to do some introductions for the team at the table. To my far left  
19 is Jack Davis. He's the deputy director of the Japan Lessons Learned  
20 Division, and he'll be focusing his talk on providing an update to the  
21 three orders that we issued back in March 2012.

22           Dave Skeen, who's the director of the Division of the  
23 Japan Lessons Learned Division will then update you on the actions in  
24 the area of seismic and flooding, discuss the status of the rulemaking  
25 efforts underway, the status of the Tier 2 and 3 activities, and our  
26 involvement with our international partners.

1 Cindy Pederson, to my right, is the regional  
2 administrator for Region III, and she will discuss inspection issues and  
3 our further plans. So next slide, please. That's Slide 5.

4 So significant progress has been made. We will  
5 continue to work to provide additional safety enhancements at the sites  
6 by the end of 2016, although some of our activities are going to extend  
7 beyond that time frame, and that's in large part due to the time needed  
8 to perform the detailed technical analyses to support the technical basis  
9 for our activities, and on the licensee's part the time to perform design  
10 and construction work at the site.

11 So the activities that will extend beyond 2016 include  
12 the completion of the flooding and the seismic reevaluation, and  
13 completion and implementation of the rulemaking.

14 So next slide. So to give some specifics here about  
15 the progress, the staff has completed 63 interim staff evaluations for the  
16 mitigating strategies order, seismic and flooding walkdowns to identify  
17 vulnerabilities or deficiencies at the site have been completed.

18 Any issues identified were put into the licensees'  
19 corrective action programs and many of those corrective actions have  
20 been implemented. We have completed activities associated with the  
21 near-term Task Force Recommendation 1, which was associated with  
22 potential changes to the regulatory framework. The staff has  
23 completed an assessment of the expedited transfer of spent fuel from  
24 wet to dry storage.

25 As we've made this progress, we've taken  
26 opportunities to adjust our approach, to provide in some instances for a



1 more integrated and earlier implementation of action. So a perfect  
2 example of that would be the implementation of the mitigating  
3 strategies order.

4 As many of you are aware, the Near Term Task Force  
5 Recommendation 4.2, which the mitigating strategy order was modeled  
6 to implement, the Recommendation 4.2 was focused primarily on  
7 ensuring that the B.5.b equipment or that equipment mandated under  
8 10 C.F.R. 50.54(hh) was protected against the effects of external  
9 events, and also that there's adequate equipment to be able to respond  
10 to multi-unit events.

11 So in implementing the recommendation for the  
12 mitigating strategies order, we took the opportunity to add additional  
13 requirements, including equipment and strategies needed to protect the  
14 plant against extended station blackout. We also implemented major  
15 parts of the spent fuel pool makeup and spray capability, which was a  
16 Tier 2 activity, so we did that earlier.

17 We also implemented major parts of the  
18 recommendation concerning emergency preparedness training,  
19 exercises and equipment, which is also a Tier 2 activity. So including  
20 these additional requirements results in more holistic strategies, and  
21 has led to additional safety measures being implemented much earlier.

22 The staff has also looked to capitalize on opportunities  
23 to deliver early safety benefits when the activities that we were focused  
24 on, we needed time to develop the technical justification to support  
25 them. An example would be the expedited transfer, I'm sorry,  
26 expedited approach used for the seismic hazard reevaluation work.

1 We use the word "expedited" too many times, I think.

2 But nonetheless, in the expedited hazard, expedited  
3 approach for the seismic hazard reevaluation, there is going to be --  
4 these activities are going beyond the 2016 time frame. So an  
5 expedited approach is being used to augment the robustness of the  
6 licensees' sites, to the hazard that's beyond their design basis, while  
7 they're completing their activities in the seismic PRAs, that will then  
8 define what their new hazard will have to be.

9 So as -- next slide -- as we reflected back on our  
10 progress to date, we did identify a means to enhance our efficiency and  
11 effectiveness by standing up a new division, that is the division of the  
12 Japanese Lessons Learned. This was done primarily to enhance our  
13 ability to accommodate addition work surges that occur. It allows us to  
14 have a more flexible structure.

15 When we do have these additional work surges in  
16 specific technical areas, we matrix out to the other organizations in  
17 NRC, that is, New Reactors, who's got the lead for the seismic and the  
18 flooding reevaluations and walkdowns, and then also to the Office of  
19 Research for their technical capabilities dealing with severe accidents.

20 We've also organized this new division so that we have  
21 sufficient management oversight to support the activities, and also to  
22 handle all the communication that does occur. That is a big part of  
23 what we do, communication to the Commission, to the other offices  
24 here internal to the agency, as well as communication to all our external  
25 partners.

26 So we've essentially merged two directorates, the

1 Mitigating Strategies Directorate and the Lessons Learned Directorate,  
2 the Japanese Lessons Learned Directorate, and we've added  
3 additional project management resources. The division, again, is  
4 staffed to handle the day-to-day workloads, and we will matrix out to the  
5 other organizations as we need to.

6 So next slide. So this slide provides more details.  
7 It's a graphical snapshot of the progress that we've made on the orders.  
8 We've completed regulatory action on the orders, and licensee actions  
9 are well underway as you can see on the slide. Specifically, for the  
10 mitigating strategies and the spent fuel pool instrumentation orders,  
11 licensees have been obtaining equipment and making any necessary  
12 modifications to their facilities.

13 Relative to the vent order, licensees have submitted  
14 their design plans and at NRC we've begun our review. The staff has  
15 been and will continue to provide strong oversight of these activities  
16 through both our technical reviews and audits that occur at the sites.  
17 We have also made progress on initiating these orders into our  
18 inspection plans.

19 Next slide. So as my final slide, this is the progress of  
20 the other Tier 1 activities, aside from the orders. Of particular note is  
21 that we have completed the seismic and flooding walkdown and the  
22 emergency response data system modernization initiative.

23 We're making good progress on the other activities,  
24 such as the reevaluation and seismic and flooding reevaluations, and  
25 the combined station blackout mitigating strategies rulemaking.

26 So my presentation provided just a brief overview.

1 You don't get a lot of details from my slides. However, the next  
2 speakers will get into those gory details, and so as this stage, I'll turn it  
3 over to Jack Davis, who will start with some details about the Tier 1  
4 orders.

5 MR. DAVIS: Thanks Jennifer, and good morning to  
6 the Commission. I'll start with the mitigation strategy order, the slide  
7 on that one. With regard to mitigation strategies, progress continues  
8 on schedule. As you know, we issued interim staff evaluations in  
9 February of this year, and that was for all of the sites.

10 These evaluations give licensees and the public  
11 assurance that licensees are on a success path to meeting the order  
12 compliance state, if it's implemented as described. That's the -- those  
13 are the key words there.

14 The sites have been procuring equipment. They've  
15 been making modifications, and again, these are in line with the  
16 integrated schedules that they have and the overall integrated plans,  
17 and this is in compliance with Order EA-12-049.

18 As licensees complete their activities, we continue to  
19 review their progress, through both an ongoing e-portal type of audit, as  
20 well as an on-site portion of an audit. So that's another key point I think  
21 that's important here. It's an ongoing effort. Just because we issued  
22 the ISEs in February of this year does not mean that that was the end  
23 point. It continues.

24 Typically, the onsite audits are going to be conducted  
25 two to six months prior to the first unit at a site being in compliance, and  
26 then with those audits, we will look at the open and confirmatory items

1 that we've identified as part of the interim staff evaluations and attempt  
2 to close those particular things out.

3 Again, if they've implemented as described, and that  
4 the analyses and calculations have come out as we would anticipate.  
5 Ultimately, final safety evaluations will be issued after all the units at a  
6 site are in compliance. Watts Bar will be the first site that will come into  
7 compliance, and their safety evaluation is planned for later this fall.

8 Then subsequent safety evaluations going forward are  
9 scheduled for issuance starting in spring of next year.

10 Industry has also chosen to establish and maintain two  
11 geographically diverse response centers, as you know, for housing the  
12 portable emergency equipment to meet Phase III of the order. That  
13 part of the order requires that they obtain sufficient offsite resources to  
14 sustain core cooling, spent fuel pool cooling and containment integrity  
15 indefinitely. Those are the words of the order.

16 The staff is actively engaged in looking at that regional  
17 response center capabilities, to see if it does actually meet Phase III of  
18 the order. We've had a public meeting this past May. We've talked to  
19 them about expectations about what type of documentation we need  
20 and what kind of evidence that we would need, to say that those are  
21 actually operational.

22 Recently, we participated in two proof of concept  
23 exercises, where we observed them, look at both a truck transport and  
24 an air transport scenario, to see how that went. Our plan is to  
25 document our findings, our conclusions in a report that we'll be issuing  
26 later on this fall on whether we believe it could actually meet the Phase

1 III order requirements.

2 Next slide, please. With regard to the spent fuel pool  
3 instrumentation order, initially both this order and the mitigation strategy  
4 order were on a parallel but separate path. We've since combined  
5 both of those reviews into one to gain efficiencies, both of process and  
6 resources, of both NRC and the licensees.

7 As you heard the previous panel talk about, there's a  
8 lot of things on their plate, and we're trying to do this in the most efficient  
9 manner possible. Also as part of that more efficient approach, after we  
10 merge them, we instituted the audit process that we were conducting  
11 for mitigation strategies, for the spent fuel pool instrumentation order.

12 We went out to look at the three vendors that are  
13 providing these pieces of equipment. It's Westinghouse, AREVA and  
14 MOHR, and after we've audited them, we are in the process right now of  
15 developing those audit reports and we expect those to be out by the  
16 end of August.

17 Licensees. It's important to note that licensees are on  
18 track to meet the original order compliance dates, and again staff will  
19 document our review as part of the overall mitigation strategies safety  
20 evaluation reports.

21 Next slide, please. With regard to Order 109 on  
22 severe accident capable hardened vent, Phase I of the hardened vent  
23 order, as you know, established the requirement to have a reliable  
24 means for their wet well vent. It's following a similar process that we're  
25 using again for both the other two orders.

26 Licensees have submitted their overall integrated

1 plans this past June, and staff has started into those reviews. The first  
2 set of plants that will have a compliance outage date of fall of 2016, we  
3 will issue those, our interim staff evaluation for those at the end of this  
4 year, and then the remaining plants are integrated, excuse me, our  
5 interim staff evaluations will be issued by June 30th of next year.

6 For Phase II of the order, which deals with the drywell  
7 venting, requires licensees either to install a severe accident capable  
8 drywell venting system, or develop and implement some type of  
9 strategy that would make it unlikely that you would need that. We're on  
10 schedule for that as well.

11 Industry has recently, I guess I would say, proposed  
12 that compliance for Phase II of the order should first focus on water in  
13 addition to water management, that would help them further or better  
14 define the design parameters for the drywell vent if they were to need  
15 one, and it also provides safety benefits sooner.

16 So we have been in discussions previously with them  
17 on this in the last month. There's more discussions in August that are  
18 going to take place. We certainly recognized the safety benefit of  
19 water, additional water management. We just need to make sure that  
20 we're doing the right thing and that we're meeting the order.

21 Next slide, please. We've been reviewing and  
22 considering for some time now on how best to capture the long-term  
23 regulatory treatment of the orders. This is to ensure the durability and  
24 establish an appropriate regulatory process for change management,  
25 particularly while still recognizing the beyond design basis nature of the  
26 events we're talking about and extreme natural phenomena.

1                   Certainly, the rulemaking effort will codify all this. But  
2 we still need a licensing basis process that's durable and looks at how  
3 you deal with changes and modifications going forward, because there  
4 likely would be, as the years go by. Likewise, staff is also redoing and  
5 considering how to execute a long-term oversight process for these  
6 activities.

7                   Certainly, short-term compliance verification is going to  
8 be accomplished through inspections under a Temporary Instruction.  
9 You are going to hear Cindy Pederson give you a lot more details about  
10 that later in this presentation.

11                   But with regard to the overall long-term approach,  
12 there's two aspects to it. One is the mechanism of oversight. That is,  
13 what's the regulatory process, what would the frequency be, how would  
14 we accomplish that, and then the other piece of it is what do you if you  
15 have any findings? How do you disposition those findings? And  
16 again, understanding that in the context of it's a beyond design basis  
17 type of event, the nature of the redundancy of the equipment, the  
18 redundancy of the strategies, and then there is a further nuance to it,  
19 and that's to understand that there's a difference between the onsite  
20 portion and what we do in an oversight capacity, and then what we do  
21 with the regional response centers or the national response centers, as  
22 they're called now.

23                   There's a difference between those, and we need to  
24 look at that carefully and recognize that there may be a different  
25 approach, rightfully so, for an oversight of that particular entity versus  
26 the onsite portion.



1                   No matter what, whatever approach we take, at the  
2 end of the day, what are we trying to do? We're trying to ensure that  
3 these strategies, that the equipment, the people, the training, it's there  
4 when you need it, if you ever need it. That's the bottom line. With  
5 that, I'm going to turn it over to Dave, and he's going to continue to tell  
6 you about other Tier 1 activities.

7                   MR. SKEEN: Well thanks Jack, and good morning  
8 Commissioners and Chairman Macfarlane. As always, it's a pleasure  
9 to come and brief you on the progress that we're making on the  
10 Lessons Learned. While this will be the last time I do this, I'm sure our  
11 paths will cross on other issues, as I go into other things.

12                   Even Commissioner Magwood, moving on to NEA.  
13 Since I'm moving on to the International Programs side, our paths may  
14 cross as well. So -- for my portion of what we're going to talk about  
15 today, Jack's described the orders pretty well. We're going to talk a  
16 little bit more about the other additional Tier 1 activities that are ongoing  
17 right now.

18                   So I'm not going to into detail on this slide, but I will talk  
19 about each of these things in the subsequent slide. So next slide,  
20 please.

21                   We'll start with the seismic hazard reevaluations, and  
22 as you may recall, because we had updated information from the U.S.  
23 Geological Survey on the seismic hazards in the Central and Eastern  
24 portions of the United States, the seismic hazard reevaluations were  
25 split into two groups: the plants that were in that area of the country and  
26 then the plants that were in the western part of the U.S.

1                   So the staff received the central and eastern U.S.  
2 seismic reevaluation reports from our licensees in March of 2014. The  
3 majority of those reevaluated hazards did align with our independently  
4 calculated estimates that the staff had performed.

5                   However, for those sites that differed from our  
6 estimates, we've held several public meetings to talk about what our  
7 differences are, and to understand maybe where we need to revise  
8 either licensee estimates or our estimates.

9                   These meetings have been very effective in identifying  
10 the information needs and reducing the differences between the two  
11 sides. So those have been very helpful. So now by September of this  
12 year, we hope to have an understanding that we can -- of any of the  
13 remaining issues that we don't resolve, that we can ask RAIs, requests  
14 for additional information, by the fall, and then so we can get final  
15 resolution on the areas that are outstanding.

16                   Then after completing the technical reviews, we'll issue  
17 staff assessments on the hazards reevaluations some time beginning in  
18 May of next year, and that will probably go out to the end of August by  
19 the time we get all the plants done. That is being done to support the  
20 licensees' ongoing reviews, if they have to move into the seismic PRAs  
21 or the high frequency evaluation pieces for the seismic issues.

22                   So currently, we're developing a template that the  
23 licensees can use to submit their evaluation of a set of key plant  
24 systems or components, that can maintain the reactor in a safe  
25 shutdown condition, even if they have a larger earthquake than what  
26 they were designed to.

1                   We call this the expedited seismic approach, and it's  
2 intended to provide the confidence that a plant that maybe would have  
3 at least one way to cope with this larger earthquake, while they do the  
4 longer-term evaluations that they need to do with the seismic PRA or  
5 what have you.

6                   So the licensees right now are scheduled to submit  
7 their plan for the expedited approach by the end of this year, and then if  
8 modifications to these systems are necessary, they would be making  
9 those between the end of 2014 and 2016, with the one caveat that if  
10 there's something that needs an outage to implement, some of the  
11 modifications, that may go out to one outage past end the 2016 to  
12 implement that.

13                   Then similarly, the western U.S. plants will have to deal  
14 with the same kind of issue. They're just on a track that is a little further  
15 out, because they didn't have the advantage of having the information,  
16 and they had to go develop that seismic information on their own. So  
17 we should be getting their reports in March of 2015.

18                   Next slide. For the flooding hazards reevaluations,  
19 you may remember that we broke those up into three separate groups,  
20 about a third of the plants in each group, and we called that Category 1,  
21 2 and 3. They were to provide those in March of 2013, then March of  
22 2014 and March of 2015. So we're in the middle of that process right  
23 now.

24                   So the first assessments on the Category 1 plants or  
25 the first year plants, we've been working through those, and we've  
26 issued the first one, and we plan to have the bulk of those issued by the

1 end of October of this year, for most of the Category 1 plants.

2 As far as Category 2, 11 of the Category 2 plants  
3 submitted a request for an extension to their schedule, to provide their  
4 flood hazard reevaluation reports to us. That was based mainly on  
5 issues with upstream dams. Because we brought up the issue of  
6 upstream dam failures, and the new analysis had to be performed on  
7 what is the impact of a dam failure on the watershed or the river or the  
8 reservoir, wherever the plant is located.

9 That's going to take a little more time to get those done.  
10 So we have that in process right now, and those are being done by the  
11 U.S. Army Corps of Engineers or TVA, of course, is doing theirs or I  
12 think one or two licensees are doing their own analysis. But those are  
13 very complicated analyses that have to be done, and they're working on  
14 those now.

15 Then currently, we're looking at the interim actions that  
16 licensees have provided us, where they have done their reevaluated  
17 flood hazards and they may exceed their current design basis. So  
18 we're looking through those, and then we'll document the findings on  
19 that, to assure that the interim actions they have in place are adequate.

20 So next slide, please. To touch just briefly on the  
21 rulemakings that are ongoing, I'll start with the combined rulemaking,  
22 and we appreciate the Commission did approve the staff's request to  
23 combine both the station blackout and mitigating strategies rule with the  
24 severe accident management guidelines rulemaking that we were  
25 working on.

26 So I think that's going to be helpful and it has some

1 efficiencies there. That also picks up a part of the emergency  
2 response capabilities issues, and in particular, things like the planning  
3 for the multi-unit events and a prolonged station blackout, such as  
4 doing personnel and staffing, dose assessment capabilities, protective  
5 equipment, command and control structure, radiation monitoring and  
6 even public education.

7 All this feeds into the rulemaking that we're working on  
8 now. So I think that's -- when that gets done, that will be a good benefit  
9 to the lessons learned.

10 So right now the plan is to have the proposed rule to  
11 the Commission by December of this year, in 2014, and then of course  
12 the final rule is still on schedule to be done by the end of 2016. So I  
13 think that will be a great benefit.

14 Moving to the filtration strategies and confinement  
15 order, we've been engaging with the industry and the public to develop  
16 the regulatory basis for that rulemaking, sorry, and that would prescribe  
17 some performance-based requirements to prevent the release of  
18 significant amounts of radioactive material from containment after a  
19 severe accident sequence, and this is for the boiling water reactors that  
20 have Mark I and Mark II containments. So there was an extension  
21 request that we submitted to the Commission, and if that gets  
22 approved, the draft reg basis is on schedule to be completed in  
23 December of this year, with the final reg basis would be done by  
24 September of 2015.

25 The proposed rule would come to the Commission  
26 then in December of next year, and the final rule would be due to the

1 Commission in March of 2017. That's the current schedule that we  
2 hope that the Commission approves for that.

3 Next slide, please. So I want to touch just briefly on  
4 the other tiers, the Tier 2 and Tier 3 activities, and I guess if you recall,  
5 the Tier 2 recommendations that we put out were those that we couldn't  
6 initiate at the time of the -- when we came up with the lessons learned,  
7 because of things like it needed further technical assessment or  
8 alignment or perhaps they were dependent on some of the Tier 1  
9 issues, or just the availability of the critical skill sets.

10 The folks that we had were working on the Tier 1  
11 activities that we thought were very significant and important. So we  
12 had to move these down to the Tier 2's. I guess the good news to talk  
13 to you about on that is that as part of our Tier 1 efforts, we've moved  
14 several of the Tier 2 activities up into Tier 1.

15 The enhanced spent fuel makeup capability and  
16 enhanced emergency preparedness were both added to the  
17 emergency -- the mitigating strategies order. So those are being  
18 addressed in that and in the subsequent rulemaking.

19 In addition, the licensees have already established the  
20 multi-unit dose assessment capabilities, and they sent us a letter to that  
21 effect, and we'll be going out to inspect, to make sure that they have  
22 that capability in place at their plants.

23 As far as the reevaluation of the other external  
24 hazards, part of that is being addressed through our mitigating  
25 strategies effort. Not only are we looking at seismic and flooding  
26 events, but it's also taking into account temperature extremes, whether

1 it be extreme heat or extreme cold or icing conditions that could cause a  
2 problem, or even high winds or missiles, tornado-driven or  
3 hurricane-driven missiles.

4 So several of the other external hazards are being  
5 addressed as part of our mitigating strategies. At the end of this  
6 process, of course, we'll look to see what other types of external  
7 hazards should we be looking into, and we'll pick those up as we get the  
8 resources, as we finish up some of the Tier 1 activities.

9 So with that, let's go to the next slide, please. As far  
10 as the Tier 3 activities go, I'm not going to touch on those, talk about  
11 those in great length. You know, the Tier 3's were those that either  
12 again, similar to Tier 2 activities, they were going to need the resolution  
13 of the Tier 1's or the insights that we get from the Tier 1 activities, before  
14 we could take those up, or perhaps they needed research.

15 There's some forms of research that have to be done,  
16 or we're waiting on studies, either on other studies, maybe international  
17 studies or Japan is doing some work or even other federal agencies or  
18 other bodies. So those are going to take some time to deal with.

19 The only ones I would mention out of the Tier 3, there  
20 would be two that I'd bring up for you today, would be of course the  
21 expedited transfer of spent fuel. We moved that up and treated that as  
22 a Tier 1 activity, so that it would inform the Commission as they were  
23 looking to the waste confidence issues. So we have given that to the  
24 Commission and you've already disposed of that one, and gave us the  
25 response back on that.

26 The other one I would mention is the issue of hydrogen

1 control, because it gets a lot of interest. A lot of people talk about that  
2 and why is that maybe not a Tier 1 activity. I guess I would tell you that  
3 we thought about this early on, and there were many Steering  
4 Committee meetings where we had discussions, when we were trying  
5 to come up with the prioritization of how we were going to do all the  
6 different issues.

7 One of those was should hydrogen control be a  
8 stand-alone issue? At the time, because we were developing the Tier  
9 1 orders and the requests for information and other things, the Steering  
10 Committee decided that well, there may be hydrogen control issues that  
11 need to be looked at, but we're addressing several of those already in  
12 some of the Tier 1 activities.

13 So let's go forward and get those done, and then see  
14 what else might need to be done. So you know, of course the  
15 mitigating strategies order, the thing there is if I protect the containment,  
16 protect the core and keep it cool, then there's less likelihood of  
17 over-pressurizing the containment in the first place and having the  
18 hydrogen release.

19 The severe accident capable vents that we're installing  
20 now is another way to ensure that you could depressurize the reactor,  
21 so that you don't have an overpressure condition. The reason we  
22 thought of it that way was when you look back at what happened at  
23 Fukushima, they believe and we believe right now that Unit 1  
24 exploded because they stretched the drywell head bolts because of the  
25 overpressure condition, and hydrogen got into the upper part of the  
26 reactor building and caused the explosion.



1                   If you look at Units 3 -- well 4 wasn't operating at the  
2 time. But if you look at Unit 3, that explosion happened even lower in  
3 the reactor building, not just up on the refueling floor and above. So  
4 there is some thought currently that maybe some of the penetration  
5 seals had leaked because of the overpressure condition, and hydrogen  
6 had got out through some of the seals that caused hydrogen to collect  
7 in a lower area of the plant.

8                   So again, if we can prevent the overpressure condition,  
9 of course, that's the best thing to control the hydrogen. Then the other  
10 thing I would say in the mitigating strategies order, as far as looking at  
11 the hydrogen control, for the smaller PWR containments, the ice  
12 condenser plants, as well as the Mark III BWRs, part of the mitigating  
13 strategies order is having them repower the hydrogen igniters with  
14 power after you have a loss of power, if you have this complete loss of  
15 power.

16                   So again, there's another area where we're addressing  
17 some of the hydrogen control issues. So again, that was the thought  
18 we had, and that's why it stands as a Tier 3 activity right now. Not that  
19 we won't look at it, but we want to get some of these other things  
20 implemented first, and then we'll fall back on that.

21                   So with that, I'll go to the last -- my last slide, about  
22 consistency with the international community. Again, we've worked  
23 diligently with our international counterparts ever since the event  
24 happened in Japan, not only with the Japanese but other international  
25 counterparts, either in bilateral discussions or multilateral interactions  
26 that we've had.

1                   Certainly, we want to thank the ASN for coming today  
2                   and their involvement in this meeting, for sharing their progress with us.  
3                   We have a very good relationship with our French counterpart, and  
4                   we've interacted with them as well as the other EU countries, to  
5                   understand their stress tests and how they were performed and how  
6                   they've implemented those in several of the countries in Europe.

7                   I believe that overall, our activities here at the NRC are  
8                   consistent with those being conducted in Europe as well as the other  
9                   countries that have nuclear power programs. For instance, we have a  
10                  very active role in the Convention on Nuclear Safety, and of course you  
11                  know there's a diplomatic conference coming up to talk about potential  
12                  changes to the convention itself that we're involved in.

13                  Even with the Nuclear Energy Agency, as far as if you  
14                  think about through international research activities that we're involved  
15                  in with the Committee on the Safety of Nuclear Installations, as well as  
16                  we were part of the working group at the Committee on Nuclear  
17                  Regulatory Activities, that did a lessons learned activity with the  
18                  Fukushima activity.

19                  So you know, we are involved internationally. I guess  
20                  I think it's important to note that we believe that all the high priority  
21                  lessons learned that are being addressed in the international  
22                  community are consistent with where we are in the Tier 1 activities that  
23                  are currently being implemented in here.

24                  While the approaches that different countries take may  
25                  be different on the lessons learned, we think that we've identified the  
26                  same things, and we expect to get the same outcome of the initiatives

1 that we have underway, that would result in a similar benefit to reactor  
2 safety worldwide. So with that, I'll turn it over to Cindy, and she'll talk to  
3 us about the inspections.

4 MS. PEDERSON: Good afternoon Chairman,  
5 Commissioners. As you know, the regions play a key role in the  
6 follow-up to the post-Fukushima actions. Our inspectors are the  
7 agency's eyes and ears for verifying plant safety and plant readiness.  
8 We have been and we will continue to do inspections in these areas,  
9 including those for the new requirements to come.

10 This boots on the ground oversight is important to  
11 ensuring that the licensees meet our regulatory requirements, and to  
12 maintain their plant readiness. Regional involvement also facilitates  
13 our effective and efficient communication with our stakeholders. We  
14 often are the first ones that they seek out to get updates on plant  
15 improvements and plant status.

16 Our continued involvement in post-Fukushima  
17 oversight allows us to provide this timely, up to date information to  
18 these stakeholders. Since March 2011, our inspectors have  
19 completed four different Temporary Instruction inspections. These are  
20 on immediate response to the accident, severe accident management  
21 guidelines, flooding walkdowns and seismic walkdowns.

22 In addition, there is one in progress regarding interim  
23 actions, relationship to flooding reevaluations. I'd highlight one of  
24 those Temporary Instructions, and that's the flooding walkdown  
25 instruction. We identified a number of significant findings from that  
26 particular Temporary Instruction, which I will highlight in a minute.

1                   The photos on the first slide that I have, I did just want  
2 to take a moment to point out, these are pictures of our inspectors out in  
3 the field doing their safety-focused work. At the lower left, you'll see  
4 one of our inspectors, Karla Stoedter, who's examining a Prairie Island  
5 diesel generator, obviously one of the pieces of equipment that must  
6 maintain its operability in these external event environments.

7                   In the photo in the right is Paul Zurawski, actually  
8 measuring one of the flood barriers that is newly-installed at the  
9 Monticello plant. These are examples of direct eyes-on inspection.

10                  Next slide, please. A number of additional inspections  
11 have been completed at all of the operating sites. At most, the results  
12 resulted in compliance or findings of lower safety significance or green.  
13 However, there were some notable examples to the contrary. I'd like  
14 to highlight several flooding issues that clearly show the value added by  
15 our inspectors.

16                  These findings are based on current licensing basis  
17 and not on the reanalyzed flood levels. I'll also note I won't be talking  
18 about the complete list of findings. On the left in the photos, you will  
19 see before and after photos of flood barriers at Point Beach.

20                  Here, NRC inspectors identified that the licensee failed  
21 to have adequate procedures to prescribe how to protect safety-related  
22 equipment in the turbine building and circulating water building. These  
23 procedures did not appropriately prescribe the installation of barriers,  
24 so that the gaps that you see on the top left were eliminated, and did not  
25 provide for equipment to put barriers in front of things such as doors.  
26 This finding was categorized as low to moderate safety significance or

1 white.

2 Of particular note at Point Beach, when we did the  
3 supplemental inspection earlier in this year to follow up on that white  
4 finding, the inspectors identified that the licensees' corrective actions  
5 introduced unrecognized hazards, creating a new problem.

6 The barriers that were installed to prevent the problem  
7 that you see in that photograph actually created a new problem, which  
8 blocked natural drainage paths credited for flood relief, and rendered  
9 those paths non-functional.

10 In other words, the licensee created a new problem by  
11 trying to address the first problem, an example of losing the big picture  
12 oversight of flooding strategies.

13 The photos on the right are at Monticello, where the  
14 NRC inspectors identified the licensee could not implement their  
15 strategy within the 12 days credited in their design basis. The  
16 procedures directed that the site build a ring levy similar to what you  
17 see in those photos, should a flood be expected.

18 Now as determined by our inspectors, that overall  
19 process of flood preparations would actually take more on the order of  
20 26 days, significantly beyond the 12 days in their design basis. In  
21 addition, the viability of their mitigative strategies was hindered by the  
22 lack of detailed procedures and the lack of pre-staged equipment.

23 This finding was characterized as yellow, an issue of  
24 substantial safety significance. The photos that you do see up there  
25 are the flood walls that they were installing, such that if they do  
26 experience a flood, they won't have to install them at that point.

1                   Next slide, please. Photos on the left are before and  
2 after photos at Ginna, where NRC inspectors identified that the licensee  
3 did not identify the need to seal certain cable penetrations during a  
4 change to their probable maximum flood height, or implement thorough  
5 corrective actions in a timely way, when inspectors identified problems  
6 with the rigor of the licensee's reviews.

7                   This could have resulted in the loss of key electrical  
8 equipment and a station blackout due to inadequate drainage capacity  
9 or poorly sealed cable penetrations. This resulted also in a white  
10 finding, a finding of low to moderate safety significance.

11                   Upper right is Watts Bar, and you see an example  
12 there of a flood barrier that was installed as corrective actions in Unit 1,  
13 where NRC identified that the licensee was not able to implement their  
14 flooding strategy, especially in the short time frames necessary for  
15 essential raw cooling water pump room.

16                   The licensee was able to demonstrate timely  
17 implementation of its abnormal instructions, to reconfigure and realign  
18 for flood mitigation. The current design basis was to be 27 hours;  
19 however, demonstrations showed on the order of 39 hours. This issue  
20 was also categorized as yellow, an issue of substantial safety  
21 significance.

22                   In the lower right is a photograph at Sequoyah of  
23 degraded conduit seals. Here, the NRC inspector has identified  
24 inadequate sealing of penetrations into the essential raw cooling water  
25 building.

26                   Flooding of this building would have resulted in

1 submerging of service water equipment relied on during the design  
2 basis event, which would have compromised the functionality of the  
3 diesel generators. This was also categorized as white, a finding of low  
4 to moderate safety significance.

5 The licensees that I have discussed have taken  
6 actions to correct these deficiencies, and I also will note that these and  
7 other examples have been shared through our operating experience  
8 communications.

9 Next slide, please. As you can see, the additional  
10 inspections since the Fukushima accident have enhanced safety by  
11 identifying multiple significant findings. In the future, regional and  
12 resident inspectors will continue to be in the field to follow up on the  
13 orders that are in progress, and as you heard earlier, those will be  
14 completed after the safety evaluations are issued by NRR.

15 The inspections will be completed using a new  
16 Temporary Instruction. The areas to be inspected include mitigating  
17 strategies, spent fuel pool instrumentation, emergency staffing and  
18 communications. In the future, severe hardened capable vents will be  
19 added.

20 This Temporary Instruction has been drafted and has  
21 been recently discussed at a public meeting on July 2nd. Training of  
22 our inspectors is planned for early 2015, with those inspections planned  
23 to be completed by June of 2019. The exception to that time line is  
24 Watts Bar, which has the earlier compliance date for the  
25 post-Fukushima orders, and that will receive its inspection yet this fall.

26 That Temporary Instruction will be used as a pilot

1 there. We will then incorporate lessons learned from that while we  
2 proceed with the rest of the fleet, which will be targeted for next  
3 summer. Also some licensees are currently doing modifications to the  
4 plant to prepare for full implementation of the post-Fukushima orders.

5 Therefore, as part of our baseline inspections, we were  
6 taking opportunities to inspect modifications that could have an impact  
7 on current safety systems. And as always, we are looking for ways to  
8 be more efficient. In this regard, NRR and the regions are working  
9 together to use our inspection resources as wisely as possible.

10 We'll be looking for opportunities to substitute  
11 order-related inspections for baseline inspection requirements, in areas  
12 that are similar to the Temporary Instruction. For example, inspectors  
13 will be able to use the new Temporary Instruction for required baseline  
14 samples in areas such as flooding and adverse weather protection.

15 Also looking several years down the road, the regions  
16 will be working with NRR to identify what aspects of the order should be  
17 incorporated into our ongoing baseline inspection program. At this  
18 time, I'd like to turn it back to Mike.

19 MR. JOHNSON: Thanks, Cindy. I want to just  
20 acknowledge that we're a little bit over time. So for the sake of time,  
21 I'm going to skip past the last two slides, which would have done two  
22 things.

23 One is to thank the academies for their effort, to  
24 acknowledge that effort and to commit that we will do a detailed review  
25 of that effort. We've not yet done that but we will, and we'll consider  
26 that in terms of as we move forward, things that we might do in addition



1 to what we're already planning.

2 Then the last is a summary slide that reemphasizes the  
3 points that we've made in the presentation. So with that, that ends the  
4 staff's presentation. We're ready to take your questions.

5 CHAIRMAN MACFARLANE: Great. Thank you  
6 very much. I'm going to turn it over to Commissioner Magwood.

7 COMMISSIONER MAGWOOD: Thank you,  
8 Chairman, and thank all of you for your presentations today, and more  
9 importantly for all the work that's been going on for the last three years.  
10 I appreciate it. The relatively detailed overview you were able to give  
11 this morning, to give anyone listening a pretty clear impression that  
12 there's been an awful lot of work that's been going on in the last few  
13 years.

14 And quite successful work, I think, which has  
15 enhanced safety significantly and given plants a lot more resilience  
16 against extreme events. I do look forward to, I suppose, put it that way  
17 -- we the Commission look forward to, you know, your views on the  
18 National Academy report. I think the report has some interesting  
19 aspects.

20 I don't agree with absolutely everything that's in the  
21 report, but I think in the aggregate, it's a very, very good piece of work,  
22 and there is certainly a lot to talk about. I'm going to use most of my  
23 time to give you a chance to respond to a few things.

24 One, an item that the Academy did bring up, and I'm  
25 just curious to see if you had any thoughts about this initially, is this  
26 issue of the digital, the logic affected the operation of the isolation

1 condensers at Fukushima. Was this an issue that the staff had heard  
2 about before, or is this news to you as well?

3 MR. SKEEN: Yeah thanks for that, Commissioner.  
4 Yeah. I listened to that with interest this morning as well, and that's --  
5 we had heard some issues about design early on, but that wasn't our  
6 impression at the end of the latest information that we had.

7 So we definitely want to look at that part of the report,  
8 and go back and look at some of the other reports that we've looked at,  
9 and probably also talk with our regulatory colleagues, NRA in Japan  
10 and maybe even go back and pulse TEPCO, to understand what that  
11 issue is there, because we had a little bit different understanding of how  
12 that went.

13 COMMISSIONER MAGWOOD: Okay, I appreciate  
14 that. If staff could bring up Slide 19 from David Lochbaum's  
15 presentation. I did want to spend some time on a few of these issues,  
16 and give you a chance to react to it. See how long it takes him to bring  
17 that up. Sometimes you forget you're on TV when you're talking here.

18 There we are. No, I'm sorry 19 from UCS report.  
19 Okay. While they're bringing that up, one item that he spent some time  
20 on was this -- was the issue about the high pressure water capability, to  
21 add water to pressure vessels that had not been depressurized.

22 This is something we really haven't had a lot of  
23 conversation with the staff about yet, and as I've gone around to visit  
24 various plant sites, I have seen that most of the pumps are relatively low  
25 pressure pumps, and not necessarily designed to pump water into a  
26 vessel that's at a high pressure level.

1 I did see, however, at the now National Response  
2 Center, is that they do have some of the larger pumps. But those  
3 would not be brought to bear quickly. So can give us some thoughts  
4 about where we are with that?

5 MR. DAVIS: Yeah. First I'd like to say that I think  
6 what Dave was getting to in his overall presentation was that we need  
7 to have a strategy that we think is credible and reliable, and with that,  
8 we wholeheartedly agree with him. A lot of the questions that he was  
9 raising were questions that either we had or still have for a lot of the  
10 facilities.

11 The fact that they're using the reactor core isolation  
12 cooling system is high pressure injection, right. So as part of Phase I,  
13 they're allowed to use their installed equipment, until they can make it to  
14 a point where they have -- they can bring to bear either the portable  
15 onsite or the offsite equipment.

16 But the questions that he's having about, you know,  
17 would this be reliable, is it going to go the way we hope, we take that  
18 very seriously, and that's one of the things we're looking at. The fact  
19 that our interim staff evaluation is out there and said that we find that  
20 that particular strategy looks to be reasonable, as long as a whole  
21 bunch of other questions and a whole bunch of other analysis satisfies  
22 it, then that may turn out to be the right way.

23 But we're a long ways from there, right? We have in  
24 Pilgrim specifically, I think there is about two dozen open or  
25 confirmatory items that we still have to look at, and go through and  
26 make sure that we believe that it actually would be a credible strategy

1 that could be done.

2 COMMISSIONER MAGWOOD: I'm just trying to  
3 remember. Isn't it true that at the Fukushima site, that RCIC actually  
4 was lost early in that accident, and was not available?

5 MS. UHLE: No. Thanks. Let's see. On Unit 1,  
6 the isolation condenser was not available. I think as we just heard  
7 today, that it was not working. Unit 1, RCIC operated for quite a while,  
8 and then HPCS, high pressure core spray, sorry, acronyms. I know  
9 what it does; just couldn't remember the words, okay.

10 And actually -- so Unit 2 was the last to have a melt.  
11 So it went 3-1/2 days and had turbine-driven systems available. Unit  
12 3, RCIC lasted, I think, for over a day, and then their HPCS, high  
13 pressure core spray, failed before Unit 2's did. But the core, excuse  
14 me, the turbine-driven systems that are supporting the high pressure  
15 systems in both Units 2 and 3 did work for a substantial period of time.

16 COMMISSIONER MAGWOOD: Okay. So really the  
17 exception to the rule of installed equipment operating was really the  
18 isolation condensers in Unit 1. That is the exception.

19 MR. JOHNSON: Yeah, I just wanted to -- it goes  
20 without saying, but I want to just say it anyway. So these strategies  
21 that deal with Phase I, installed plant equipment, Phase II, portable  
22 equipment and then this indefinite capability, we really do anticipate,  
23 expect that they will be holistic.

24 So if a licensee's relying on some installed plant  
25 capability to get them to Phase II, we're going to make sure that that  
26 works. So we're not going to have a question at the end of the day

1 about whether this series of strategies in fact meets the requirements of  
2 the order.

3 COMMISSIONER MAGWOOD: No, appreciate that.  
4 That's a good comment. Now one thing that occurs to me is that  
5 because the orders were written specifically to deal with situations to  
6 prevent core damage, they are not necessarily written to deal with what  
7 happens if you have core damage, right?

8 That's where I think the other -- the rulemaking comes  
9 in, the filtering and containment strategies rulemaking. Now do you  
10 have any early thoughts for what the interplay will be between those  
11 two, and how FLEX, for example, might perhaps need to be modified, to  
12 deal with whatever comes out of the back end of that?

13 I recognize we're still way in the future, but just give me  
14 some of your thoughts about that.

15 MR. SKEEN: Yeah, let me start. So you're right.  
16 The mitigating strategies order, as it stands, is pre-core damage  
17 equipment. As we're working through, and I know some of the  
18 rulemakers are here, and they might be the better ones to talk about  
19 this in the detail.

20 But as they're working through the rulemaking, on what  
21 that's going to entail with the severe accident management guidelines,  
22 they don't call it FLEX but FLEX-like equipment or something like that is  
23 how they're referring to it right now in the public meetings that they've  
24 been having, to say similar kind of strategies would be brought to bear  
25 once core damage has occurred.

26 So the rulemaking would capture that, because you're

1 going to have to have SAMGs in place, severe accident management  
2 guidelines, that will be able to get you through this event, right? So I  
3 guess I would start with that. I don't know if any of the rulemakers want  
4 to weigh in with where they are.

5 But from the meetings I've seen, that's the thinking, is  
6 that you would apply these same types of strategies after core damage,  
7 as we're doing right now, requiring in the order.

8 COMMISSIONER MAGWOOD: I think Jennifer  
9 wanted to weigh in.

10 MS. UHLE: Thanks, Dave. I would just add to what  
11 Dave indicated, by the idea of providing water injection. That's been  
12 added to the vent order. So Phase I is the severe accident capable  
13 wet well vent, and then there's the Phase II, that looks at whether or not  
14 a drywell vent needs to be installed.

15 At this stage, we do recognize the importance of  
16 getting water into the containment, not only to prevent containment liner  
17 melt-through, but also to control the conditions in the containment, so  
18 that one, it allows for less of a severe condition that would be on the  
19 vents.

20 So with that water injection there, that would have be  
21 brought to bear under severe accident conditions, that is going to  
22 provide a next, an additional capability under the severe accident  
23 conditions.

24 COMMISSIONER MAGWOOD: Okay. This is  
25 helpful. One last thing. You heard the conversation I had with Joe  
26 Klinger about the coordination with the states, and as we're reviewing

1 these plans, are we also talking to our state colleagues, to make sure  
2 that there's been some kind of coordination on their side?

3 Because as he points out, there's no state role in  
4 coordinating this. How do you know you can actually get everything  
5 together and have these plans implemented?

6 MR. DAVIS: And it's an excellent point, and in fact it's  
7 one of the things that we've been focusing on, is the coordination  
8 hand-off between these types of things. It's easy to think about FedEx  
9 being the particular entity that would deliver some of the stuff, that yes,  
10 they do this for a living every day.

11 But it's really the coordination between the state  
12 boundaries, with the people that have to get it to the site or to the  
13 staging area and then to the site and so on. There's a lot of  
14 coordination, and you would imagine, under these types of situations,  
15 it's probably a regional devastated area.

16 So it's not as simple as saying I have one little problem  
17 that I have to deal with. So it's been one of our major issues that we're  
18 looking at, yes.

19 COMMISSIONER MAGWOOD: And what's our  
20 approach to really wrestle with that?

21 MR. DAVIS: Right now, we've been interfacing with a  
22 lot of the folks, to under what their understanding is of their roles, and  
23 then also with SAFER, the organization that's handling the regional  
24 response centers, what their -- how they think the role is going between  
25 the licensee, between the Ops Center for SAFER and both for the plant,  
26 and then how do they reach out, right?

1                   So you know, they have us as a resource. They have  
2 INPO as a resource, and we're looking at those connections to make  
3 sure that they're sufficient, I guess I would say. There's a number of  
4 other issues related to that, right, getting fuel to the site for the refueling  
5 strategy. There's a number of things that we're still evaluating, to  
6 make sure that these plans sound good. Let's make sure they really  
7 can be implemented.

8                   COMMISSIONER MAGWOOD: Okay, all right.

9                   MR. JOHNSON: Commissioner, I did notice that Jim  
10 Wiggins is in the room. I was almost going to wave him up, would  
11 hope to flush him up to the podium. But I'll just talk, and if I say  
12 something, maybe he'll come up and correct me.

13                   But there is an entire area of, of course, the lessons  
14 learned, that are focused on strengthening emergency preparedness.  
15 So of course that folds in, for example, the role of the state and locals,  
16 both from an emergency preparedness perspective, but by necessity in  
17 terms of whatever they would need to do, to be able to exercise, for  
18 example, the strategies that help support their role in those particular  
19 strategies.

20                   So I know that's a high level conceptual answer, the  
21 details could be given by the staff if they were available. But we are  
22 working and aware of, trying to resolve those issues.

23                   COMMISSIONER MAGWOOD: And I appreciate  
24 that. It seems to me that while admitting that the same partners are  
25 involved, this is a little bit outside the emergency preparedness space.  
26 So it's a new topic. So it probably would be somewhat complicated.



1 But just in closing, I just wanted to thank Dave Skeen for the work he's  
2 done over the last several years on this.

3 He's been, as you said, sort of the face, as unattractive  
4 as that might be, of the effort --

5 (Laughter.)

6 COMMISSIONER MAGWOOD: And has really  
7 provided tremendous leadership, both here in the agency and really, as  
8 he's been participating in this internationally. So I'd like to thank him  
9 for that. I also wanted to thank you, Mike, for -- because I recall that  
10 when Marty left, he sort of dumped this in your lap, when it was sort of  
11 half-baked, and you had to bring it to reality.

12 So your leadership in watching this, over-watching this  
13 has been very valuable. So appreciate that, and with that, Chairman, I  
14 yield back. Thank you.

15 CHAIRMAN MACFARLANE: Okay. Commissioner  
16 Ostendorff.

17 COMMISSIONER OSTENDORFF: Thank you,  
18 Chairman. Thank you all for your presentations. I will pick up where  
19 Commissioner Magwood left off, Mike, in thanking you for your  
20 leadership of this. Truly, it's not a marathon. It's probably a 50-mile  
21 race, and I think nose to grindstone, perseverance, patience,  
22 willingness to step back and make course corrections where  
23 appropriate.

24 Those are all things I've seen you and your team do,  
25 and I think those are very important. So I'm going to start out with  
26 maybe just a couple of comments for a few of you, and then I'll get into

1 some questions.

2 First is in the category of communications. I think it's  
3 been important to highlight Mike, what you and the Steering Committee  
4 and JLD have done. I think the communication with the Commission  
5 have been outstanding, and I've always felt like you've kept us informed  
6 about what's going on and why, and where there have been changes.  
7 So I want to thank you for that.

8 And I'll turn now to Jennifer on communications, the  
9 same thing. I look at your Slides 8 and 9, the progress in Tier 1  
10 activities, that provides granularity and specificity of what's been done  
11 so far, and we've not always seen this type of a presentation from some  
12 of our external stakeholders.

13 So I encourage us to continue to provide this  
14 specificity, as I know you are, as to tell the American public and  
15 Congress what we're doing as a regulator, because sometimes this  
16 progress gets glossed over or not correctly characterized.

17 Finally on communications, Cindy what you and the  
18 regions are doing, I think, is very important. I think your slides where  
19 you're showing specific examples of regional inspectors, resident  
20 inspectors, etcetera, going out and finding issues at plants and talking  
21 about them, but also communicating to the American public what we're  
22 doing as a safety regulator. So I appreciate what y'all have done and  
23 will continue to do in that area.

24 Jack, I wanted to go to a question for you, and I think  
25 this cuts across things that you and Dave have said. I believe there's --  
26 if I interpret the slides correctly and the comments, there's been 63

1 interim evaluations of the implementation for the mitigating strategies  
2 order.

3 Overall, are you satisfied with the progress being made  
4 by individual licensees in this area? I'm trying to get maybe just some  
5 qualitative assessment by you and your team, as to how that's going,  
6 because some of the mitigating strategies orders are the heart and soul  
7 of what we're doing here as an agency.

8 MR. DAVIS: Yeah, that's a good question. It's been  
9 a continuous process, and we're continuing to learn, both the licensee  
10 and ourselves, as we were going through this effort to come up with  
11 what the strategies are. Licensees themselves would identify and say  
12 well, I was going to go down this path, but I realize now that's not the  
13 best path, and I'm going to go this path.

14 Likewise, we've questioned them throughout this  
15 process, of asking very hard questions. Dave brought up the issue  
16 about Pilgrim specifically, when he said debris removal equipment.  
17 That was one of our questions. In fact Pilgrim, if you read the next  
18 paragraph down in our ISE, says that they're going to have two sets of  
19 redundant equipment for debris removal.

20 So it's been a continuous and evolving process, and  
21 we've learned from it. I think by the time we got to the 63 ISEs, we feel  
22 comfortable that the plans that have been proposed to us, again if  
23 implemented as described, and I keep saying that word very carefully,  
24 that they provide a reasonable path to success to meet the order.

25 COMMISSIONER OSTENDORFF: So let me bore  
26 down on this just a bit, and I appreciate your caveat about "if

1 implemented as described." That's so critical, but do you feel like  
2 we're going to end up with a set of mitigating strategies, order  
3 implementation plans that have some uniformity, some coherence, that  
4 we don't have a bunch of one ofs, this plant does it this way, this plant  
5 does it that way? I mean are we going to have some overall  
6 consistency?

7 MR. DAVIS: Yes. I think the industry has done very  
8 well with that, from a lessons learned standpoint, that the connections,  
9 the types of equipment are all standardized as much as possible.  
10 There's a few -- obviously they're not all perfectly consistent, right.  
11 There's a few different pieces of equipment that are needed for specific  
12 situations. But for the most part, the majority of them are all very  
13 consistent.

14 The approaches that they're using, whether it's a P or  
15 whether it's a B, the strategies that they're using for feed and bleed if  
16 you will, are all about the same.

17 COMMISSIONER OSTENDORFF: Okay.

18 MR. DAVIS: So and I think that's good, because  
19 again, if you remember, the plants, they have portable equipment on  
20 site. If they need to use additional equipment, their buddies up the  
21 street, if you will, can provide that same equipment, even before getting  
22 equipment from the regional response centers.

23 So the same consistent training, the same types of  
24 procedures, the same type of load training are all similar.

25 COMMISSIONER OSTENDORFF: Okay. I think  
26 this is a question for Dave, but it may be Jack as well, so I'll just throw it

1 out there. This is in the filtering strategies rulemaking progress. I  
2 know you mentioned the extension request and so forth.

3 Let's put that aside just for a moment. Are we on a  
4 reasonable track, as far as getting the information we need from  
5 industry, to pursue this rulemaking? Whoever wants to take that it's  
6 fine.

7 MR. SKEEN: You mean for the filtration rulemaking  
8 itself?

9 COMMISSIONER OSTENDORFF: Yes.

10 MR. SKEEN: Yeah. I think there were some issues  
11 early on, but I think those have been resolved, and we are getting the  
12 information that we need to get the rulemaking done.

13 COMMISSIONER OSTENDORFF: Okay. Dave, I  
14 want to stay with you. On Slide 15, your second bullet, you talk about  
15 the template for the expedited seismic approach submittals.

16 Going back to almost three years ago, when we had  
17 the North Anna earthquake, with the cumulative absolute velocity and  
18 the calculations of margin, would I expect this expedited approach to  
19 have some commentary or some methodology to discuss margin, if you  
20 do have a seismic event at a given plant? Or how is margin -- is  
21 margin going to be addressed or not?

22 MR. SKEEN: Yeah. I may have to get the tech staff  
23 involved in this one. But the thinking is that they would have a strategy  
24 in place, and by using the template, we get a consistent everybody's  
25 doing it the same way, so that it makes it easier for us to review.

26 Plus they're not giving us a lot of information that we

1 don't need, that they're getting us the right information that we can help  
2 make our decision. I don't know if Scott -- if Scott's here. Scott  
3 Flanders is the --

4 COMMISSIONER OSTENDORFF: And maybe I'm  
5 not asking the question as focused just on the template, but more  
6 broadly. How is the group looking at margin for existing plant  
7 structures?

8 MR. FLANDERS: This is Scott Flanders, Director of  
9 the Division of Site Safety and Environmental Analysis. The expedited  
10 approach and the purpose for the expedited approach is to do exactly  
11 that.

12 It's looking at a review level earthquake that's two  
13 times its current design basis, and determining whether or not the plant  
14 has a success path to cope with an event that could be as much as two  
15 times the design basis earthquake level. So that's a primary part of the  
16 process for the expedited approach.

17 COMMISSIONER OSTENDORFF: Okay. Thanks  
18 Scott, appreciate it. Lastly for Mr. Skeen, I add my thanks to that of  
19 Mike Johnson and Commissioner Magwood. You have truly been the  
20 face of the efforts here, and I think your contributions and leadership  
21 quite frankly are at a very historic time for this agency. I emphasize the  
22 word "historic."

23 So we're all grateful for what you have done. I want to  
24 give you the opportunity, in the two minutes remaining, are there any  
25 big takeaways you have from your experience, that you think is  
26 important for this regulator, as a body, for us to capture and take -- and

1 memorialize going forward from the Fukushima experience?

2 MR. SKEEN: Yeah. I don't know if I have any great  
3 words of wisdom. I would say that I think early on, the wisdom of  
4 having the Near Term Task Force go off and take a quick look, to try to  
5 see what could be done. The fact that we put a Steering Committee in  
6 place then, again to review what that group did a quick and dirty look in  
7 just a couple of months and gave something back to the Commission.

8 Then you had a broader body of senior regulators look  
9 at it within the agency, to say how can we do some of these things?  
10 What's the right answer? We did change some of the  
11 recommendations from where they were. But it was to lay out a better  
12 plan for how could you go forward on this.

13 So I think the process that we used is probably  
14 something we need to look at, if we run into something like this again,  
15 that that would be something that would be worthwhile to look at. So  
16 other than that yeah, I think just the fact that I guess cooperation we had  
17 from all of our stakeholders, the industry folks as well as some of the  
18 NGOs that are very interested in these issues.

19 Once you go beyond the design basis of where we're  
20 very comfortable in regulating, it's very difficult to make changes. So I  
21 think the communications that have taken place and all of the  
22 deliberations we've had internally, the Commission's had internally, has  
23 helped move this forward. So I have nothing but good things to say  
24 about how this process is going.

25 COMMISSIONER OSTENDORFF: Thank you, and  
26 thank you again, Dave, for your service. Thank you, Chairman.

1                   CHAIRMAN MACFARLANE:   Okay, thanks.  So I'll  
2                   add my thanks to everybody else, Dave, and just, you know, I've  
3                   learned a lot from you, and I am sure I'll continue to learn a lot from you.  
4                   I'm sure they'll never really let you go, too.  So I don't really think that  
5                   you're free.

6                   But anyway, he's laughing, because he knows it's true.  
7                   But I know that you've also had a great team, and I do want to  
8                   acknowledge Rob Taylor, who's given you great support, and all the  
9                   rest of your team.

10                  MR. SKEEN:  Yeah.  Clearly, I always say what  
11                  makes the NRC the great place that it is the people that we have here,  
12                  right.  So yeah, anyone could have come in and did what I did with the  
13                  people that we had involved in this, and I'm sure they're going to serve  
14                  Jack just the same way.  He'll pick up right where I've left off and it will  
15                  be a bumpless transfer as we move forward.

16                  CHAIRMAN MACFARLANE:  Right.  No, I think it  
17                  already is, it already is.  That's been my experience so -- and I  
18                  appreciate all the interactions that I've had with you Jack, and I know  
19                  I'm going to learn a lot from you too.  So I'm looking forward to it.

20                  I also want to note that although we are actually an  
21                  agency of a bunch of pointy-headed nerds, we are actually, I can tell  
22                  from you guys sitting right here, that we are fashion-forward, and Jack  
23                  and Mike are displaying a new tie knot that, you know, we're setting a  
24                  trend for the world, and I am so proud of you guys for doing that, okay.  
25                  We are not just a bunch of pointy-headed nerds.

26                  (Laughter.)



1 MR. DAVIS: I couldn't get Dave to do it.

2 MR. SKEEN: They convinced me not to wear my  
3 overalls on the last day of work.

4 CHAIRMAN MACFARLANE: We have another  
5 discussion about West Virginia later Dave, but anyway. All right. So  
6 let me ask a few questions. You know, Commissioner Magwood  
7 asked the question about what the National Academy folks talked about  
8 with the Unit 1, and one thing they noted, looking at Unit 1's situation,  
9 was that it was really important, it should be a high priority to make sure  
10 the DC batteries are protected.

11 I just want to understand from you whether you think  
12 we are doing enough there, or whether we need to do more.

13 MR. DAVIS: That's in mitigation strategies, and it's  
14 definitely a -- you're making a very good point, that ensuring that the  
15 batteries are operational is extremely important to us. So it's a big part  
16 of the strategy, as you know, and then reenergizing the chargers, to  
17 keep those batteries functional.

18 CHAIRMAN MACFARLANE: Right, and you know,  
19 I'd just note some of the plants I recall going to, the batteries are, you  
20 know, maybe going to be the below design basis flood, and so what's  
21 the plan there?

22 MR. DAVIS: Yeah. There's no denying that as  
23 Scott's organization comes back through and looks at the reevaluated  
24 flood hazards, if those numbers are higher, then that has to be fed back  
25 into the mitigation strategies, and then we would relook at that to say  
26 would your strategy still be viable, given that new number?

1                   So it's for right now, they've looked at it from their  
2 design basis standpoint, design basis flood. But they all know that  
3 that's something that they're going to have to look at going forward.

4                   CHAIRMAN MACFARLANE: Okay.

5                   MR. JOHNSON: Chairman, can I just add also, and  
6 it goes back to the point I made earlier. One of the things that we took  
7 away from our visit to Fukushima was when we went to the Daini unit, in  
8 addition to it being a difference in leadership, I guess, is how it's been  
9 described, there was also a difference in the way the installed  
10 equipment was able to perform at that plant.

11                   So that goes back to the point that I made about we  
12 really want to make sure that the installed equipment that the licensee  
13 is relying on is capable of performing, to get them to Phase II. So we're  
14 going to look at the Academy's report, to understand it, to understand if  
15 there's something in addition that we haven't done that we need to do.  
16 We're going to start with that, and then use that to inform where we go.

17                   CHAIRMAN MACFARLANE: Okay. So sticking on  
18 some of those points, Tier 3 activities, I know Dave, you talked a fair bit  
19 about hydrogen control. The Academy talked about how important it  
20 was. You know, I think it's important that we don't lose focus on that,  
21 that that is a really important Tier 3 issue to get to.

22                   What are other countries doing in regards to hydrogen  
23 control? Are they doing other things, something different?

24                   MR. SKEEN: Yeah. I think -- yeah. I don't have a  
25 good answer for you on what everybody else is doing. We have been  
26 through the Convention on Nuclear Safety. We had a whole meeting,

1 an extraordinary meeting on what the lessons learned were. But some  
2 countries are putting in hydrogen recombiners. Others are putting in  
3 extra igniters or power supplies for their igniters to do that.

4 We have not gone down that path yet, to see if that's  
5 something we need to require here in the United States. Again, I think  
6 we want to get through with the Tier 1 activities first, and see how much  
7 does that buy you, and is there more that needs to be done, such as  
8 maybe looking at hydrogen recombiners again.

9 CHAIRMAN MACFARLANE: So another Tier 3  
10 activity that is near and dear to my heart is the periodic review of  
11 seismic hazards.

12 MR. SKEEN: Yeah. That's 2.2.

13 CHAIRMAN MACFARLANE: I never remember  
14 which one it is, 2.2 to 2.3.

15 MR. SKEEN: Yeah. It's Recommendation 2.2, right.  
16 One was to do the walkdowns; one was to go ahead and do the  
17 reevaluations, and then the third piece was that you should periodically  
18 go back and look at those. We haven't lost that. Again, the thinking  
19 was we would get through with the reevaluations the first time and see  
20 where we are, and then you would look at how often does this  
21 information get updated.

22 Does the USGS do studies? Does the National  
23 Weather Service do studies that tell you there might be a difference in  
24 flooding or what's going on? So that's something we'll have to look at,  
25 and we would go through a rulemaking process that would tell us, you  
26 know, can we make a case to require that in regulation or not.

1 MS. UHLE: And if I could add a bit there, we were  
2 looking at that under Generic Issue 199 before Fukushima, and one of,  
3 you know, the issues that comes up is well, there's new information that  
4 comes before us and comes before the licensee all the time, and in our  
5 regulatory structure, we have to understand the safety significance of  
6 that information, and the safety significance, of course, has to be  
7 enough that would make us take action.

8 So one thing that does have to be looked at, and was  
9 being looked at under the Generic Issue 199 work, is to come up with a  
10 way to -- without going through the process of a full seismic PRA,  
11 understand or at least get somewhat of an understanding of what that  
12 safety significance is given the change.

13 We have made -- I would say we have further  
14 advances on that in seismic, because we do have the probabilistic  
15 approaches on the flooding side that will for us is more difficult, and we  
16 have the flooding work ahead of us to continue.

17 CHAIRMAN MACFARLANE: Right, Yeah. It's  
18 important to not lose sight of that issue, and frankly, I don't think you  
19 really need to wait to decide whether it's essential or not. You can  
20 parallel process that. It's not going to take that much thought, I don't  
21 think. So I don't think that needs a whole lot of resources or anything,  
22 and I think the Academy has also spoken to that issue. So you'll want  
23 to be thinking about that as well.

24 Cindy, so I want to hear more about the interactions  
25 that the regions are having with headquarters, in developing the new  
26 rules that we're talking about here and the guidance, and whether you

1 guys, you know, whether you think an adequate regional perspective is  
2 being fed into this? Because clearly, it's really important.

3 MS. PEDERSON: A couple of things. There are  
4 regional representatives on the Steering Committee. So at one level,  
5 we certainly have that interaction there as well. But on some of the  
6 more detailed issues, we do have our staff participating with NRR.  
7 Just as an example, in the audits that are coming up and ongoing, for  
8 example in our region we have our resident inspectors that are  
9 participating on those.

10 I see that as a real win-win. I think NRR benefits from  
11 the content knowledge that our inspectors have regarding the plant,  
12 integrated operations and so forth, and our inspectors are certainly  
13 learning more about the strategies at the sites they're inspecting. So  
14 we have a lot of interaction on a lot of different issues. So I think it's  
15 going well.

16 CHAIRMAN MACFARLANE: Yeah. Where can we  
17 do more?

18 MS. PEDERSON: That's always a hard question.  
19 We always can do more. I think in where we are in our resources, and  
20 we're trying to be mindful of that. We don't have, for example, our  
21 inspection staff becoming license reviewers or rulemakers. We want  
22 to make sure we protect their focus on onsite safety.

23 So we do use them and I think we use them judiciously,  
24 to make sure that they're not distracted from operational safety, but the  
25 agency still learns and benefits from their insights.

26 CHAIRMAN MACFARLANE: Okay, good. All right.

1 I have a minute left. So the issue of drywell vents, so help me  
2 understand this a little bit more. You know, you talked about how the  
3 industry said well, you know, look at an addition of water. That's  
4 something we should be doing.

5 Isn't that being done in FLEX essentially? I mean do  
6 we have to really take a pause and do it all over again? Can't we just  
7 move on, and again, what are other countries that have boiling water  
8 reactors of these types, what have they done?

9 MS. UHLE: Well, in the case of the FLEX strategy,  
10 the FLEX or the mitigating strategies has really focused on before core  
11 damage, and it's doing what we can, what is necessary to prevent core  
12 damage.

13 The vent orders is providing that additional defense in  
14 depth, to say okay if we were wrong, then we still have the ability to  
15 control containment pressure, you know, through the vents and also  
16 look at releasing some hydrogen that's been generated. So that is the  
17 difference there, the core damage versus fuel core damage.

18 CHAIRMAN MACFARLANE: I know, but like during  
19 core damage and --

20 MS. UHLE: But during core --

21 CHAIRMAN MACFARLANE: It's essentially the  
22 same as pre-core damage, in terms of additional water.

23 MS. UHLE: Well it's -- I mean the SAMGs, the severe  
24 accident management guidelines that are also going to be incorporated  
25 in the station blackout mitigating strategy rule, that of course is going to  
26 provide the guidance to the operators, to take action to arrest whatever

1 core damage is going on in the core, using whatever they have  
2 available, okay.

3 So that's still going to be there. But again, the FLEX  
4 strategies were not -- the equipment is not necessarily designed to  
5 withstand the severe accident conditions. So that is why it's important  
6 to have the water injection added to the vent work that is going on.

7 We were going to do that always, but that was going to  
8 be under the rulemaking. The rulemaking, because of the technical  
9 basis development effort, has been protracted. That was delayed.  
10 So we're moving that now into the vent order, so that it gets done in the  
11 timely basis. That will have water injection provided during the -- after  
12 the core damage.

13 So it's making sure that there is the capability to one,  
14 access the locations where they would be moving portable equipment,  
15 to get the water into the drywell. So that's, in a nutshell, I think the  
16 difference. But Jack --

17 MR. DAVIS: May I add just one point. The focus  
18 was on the wet well vent first, because that provides you a lot of benefit.  
19 To design the drywell vent, they need to consider water management,  
20 because that would set the design parameters for the drywell vent.

21 By focusing first on the wet well vent, that buys them  
22 time, if you will, if you want to look at it that way, so they can then focus  
23 on okay, how do I need to do water management really? That's the  
24 real issue in throttling this, so that I can design my drywell vent  
25 correctly, or perhaps maybe you don't even need a drywell vent, right?

26 I mean it depends on how you do that process and, as

1 I said in my slides earlier, that they had proposed that maybe we look at  
2 that resequencing. We're looking at that right now, to figure out is that  
3 the right sequence and the right approach to this.

4 CHAIRMAN MACFARLANE: Okay. All right, thank  
5 you. Commissioner Svinicki.

6 COMMISSIONER SVINICKI: Well, I want to thank all  
7 of you for your presentations. You know, as close as most of us in this  
8 room are to this body of work, today's presentations and discussions  
9 are a reminder if we're struck by the tremendous advancements and  
10 progress, and just the volume of work that's been done, you know, so  
11 for us being so close to it, for us to be struck by it, I think, is really an  
12 acknowledgment of how far we've come and how much we've  
13 accomplished.

14 I agree with Commissioner Ostendorff, that I think that  
15 some of our critics, well they may have their own reasons for maybe not  
16 acknowledging that. But I do appreciate, I liked the chart with the -- it  
17 showed the progress bars, with the dots going across. I think that that  
18 may be a good communication tool for us to talk about.

19 While it may not be all the way to completion through  
20 implementation, but it gives an indicator of some of the progress.  
21 Maybe we were actually having some sidebar talk about that's a very --  
22 I think a very, better communication tool for that.

23 Dave Skeen, you know, I want to say that I appreciate  
24 all that you've done. I think that your contributions since the events in  
25 Japan, will really serve you well in the assignment that you're going to,  
26 and I think you'll be well-positioned for that.



1                   But I have to say, Jack, as I listen to Dave go through  
2 all of these milestones coming up, I thought you must be thinking he's  
3 getting out while the getting's good.

4                   MR. DAVIS: That's exactly what he's doing. But I'm  
5 going to know where he exists on the other floor.

6                   COMMISSIONER SVINICKI: That's true, but on a  
7 more serious note, Jack, your selection for something of this  
8 responsibility and profile is clearly a reflection of your management's  
9 confidence that they reside in your capabilities. So since they're  
10 people of good judgment, I'm sure that you'll step up and do well, and  
11 you'll have lots of opportunities to excel.

12                   Speaking of that, I think everyone's been a bit too easy  
13 on this panel. So you don't get a chance to swing for the fences if no  
14 one pitches you one fast own the middle. So Mr. Johnson, in  
15 responding to one of the six month status reports, our Commission  
16 directed the staff, it says "For activities transitioned back to line  
17 organizations, as well as future issues that may be evaluated, the staff  
18 should return to the full utilization of existing agency mechanisms, such  
19 as the Committee to Review Generic Requirements, as well as  
20 continuing to make full use of the expertise available, and the Advisory  
21 Committee on Reactor Safeguards in reviewing the staff's analyses,  
22 outcomes and recommended resolution of issues."

23                   So a two-part question. Has the staff returned to  
24 utilizing the Committee to Review Generic Requirements, and the  
25 second part of the question is that the staff also has direction "to seek  
26 detailed Commission guidance regarding the use of qualitative factors

1 in a notation vote paper."

2 So as the staff develops that notation vote paper on  
3 qualitative factors, is the staff or does the staff plan to engage the  
4 ACRS?

5 MR. JOHNSON: So let me start with the last one.  
6 With respect to qualitative factors, we've worked that product. We did  
7 engage the ACRS. That product -- I was just trying to think about.  
8 Yeah, it is with you. So we have --

9 COMMISSIONER SVINICKI: Or perhaps on its way  
10 to us, because it goes to a good friend Annette, and that is a way point  
11 on the way.

12 MR. JOHNSON: All right, so thanks Jennifer.

13 MS. UHLE: Actually, I did. I'm the one that said it's  
14 in the front of the Commission. So that's my fault, not Mike's.

15 MR. KOKAJKO: Lawrence Kokajko. It's not in front  
16 of the Commission.

17 (Laughter.)

18 MS. UHLE: Thanks.

19 COMMISSIONER SVINICKI: That's good, because  
20 the Commission didn't think it was in front of the Commission.

21 MR. KOKAJKO: It did -- it is -- we've had some  
22 additional comments. We're still -- we've gone back to some of the  
23 other offices that were affected, to get their re-concurrence again. It  
24 should -- hopefully, by the end of the day, it will be back to the EDO for  
25 their final review.

26 MR. JOHNSON: Yeah. I just want to just -- just on

1 that to add -- I'm sorry Lawrence. Were you finished?

2 MR. KOKAJKO: Yes sir.

3 MR. JOHNSON: Okay. I have seen the paper.  
4 I've seen a very smooth draft of it. I think it scratches the itch. In fact,  
5 I think I've talked about it maybe a little bit in some of the periodics I've  
6 had. So we will deliver a good product and we will make sure that we  
7 have engaged all of the appropriate stakeholders. So it's not with you  
8 yet. It's coming soon.

9 MS. UHLE: And I think it's because I've seen it about  
10 ten times, and providing some of those comments, that's maybe why I  
11 thought it was further along.

12 MR. JOHNSON: So I'm not going to answer. I'm  
13 going to allow the staff to answer the other detailed question about  
14 CRGR. But I do want to tell you that we have made every opportunity  
15 to reengage, through normal processes, as we move forward on issues,  
16 starting with about a year ago, when we looked at those individual  
17 actions that remained, to make a decision whether we still needed the  
18 Steering Committee, sort of a recognition that we need to get things in  
19 the line, use routine processes.

20 COMMISSIONER SVINICKI: So you're moving in  
21 that direction.

22 MR. JOHNSON: And so we are moving in that  
23 direction.

24 COMMISSIONER SVINICKI: I think the creation of  
25 the division is a little bit of a reflection of that as well, on moving away  
26 from the Directorate. The staff also does, again, it's been noted, the

1 communication with the Commission on status has been very good.  
2 You submit routine reports on the status of the items in the various tiers.

3 In the most recent of those reports, the staff noted  
4 regarding this new combined EP-related rulemaking, it said "The  
5 Steering Committee also agreed that the current draft SAMG  
6 requirements align with supporting a tentative backfit proposal, based  
7 on defense in depth justification for adequate protection."

8 Now I want to note that previously, in your most recent  
9 six month status report, the staff proposed in there -- this wasn't the  
10 Commission -- the staff had a proposed approach to the combined  
11 rulemaking, wherein you stated it was the staff's intention to bifurcate  
12 any issues in the combined rulemaking that did not satisfy 50.109.

13 So I guess the first part of the question is does the  
14 quote about supporting "a tentative backfit proposal based on defense  
15 in depth justification for adequate protection" mean that the staff is now  
16 departing from the previous statement about basically putting things  
17 through the backfit screening, and for those things that couldn't satisfy  
18 that, those would be bifurcated?

19 So if the Commission so chose, it could just excise  
20 those completely from the rulemaking, which I thought I supported that  
21 approach for that reason. Is it that the -- has the staff made a decision  
22 to recommend that the Commission waive backfit or deem this an  
23 adequate protection measure for that rulemaking? It would seem to  
24 me a little early in that rulemaking to be deciding that now.

25 MR. REED: Hi, Commissioner Svinicki. This is Tim  
26 Reed, the lead for that rulemaking, and currently there's no decision on

1 backfit at this time. We are in fact going to have a public meeting here  
2 in a couple of weeks we hope, and put that out there and get some  
3 stakeholder feedback on the issue.

4 You're correct, that we've tried to construct this rule in  
5 such a manner that if necessary, we could in fact extract SAMGs from  
6 that if necessary, if we can't support that what they -- in what is in fact a  
7 defense in depth current argument. That's what we have right now as  
8 far as backfit.

9 But nevertheless that is our philosophy in trying to do  
10 that, and we certainly do intend to follow the backfit rule. I mean that's  
11 been our position consistently so --

12 COMMISSIONER SVINICKI: Okay, all right. Thank  
13 you for that. I just needed to clarify. Sometimes when things are  
14 stated a bit differently, you don't know if people have abandoned the  
15 previous course or not.

16 MS. UHLE: If I can add to this -- that this is a one  
17 rulemaking effort. It will not necessarily be one rule. So that, I think,  
18 helps to describe how some of it can be adequate protection, some of it  
19 could be for redefining adequate protection. Some could be for cost  
20 beneficial reasons.

21 COMMISSIONER SVINICKI: Okay, thank you.  
22 Well, I look forward to that, and again, as you've acknowledged, it's a  
23 little bit early to be binning things right now. So Mr. Skeen, you talked  
24 about the flood hazard reevaluations.

25 Is it true -- well, you mentioned the fact that dam failure  
26 analyses for some locations is being conducted by or provided by the

1 U.S. Army Corps of Engineers. Is it true that some licensees then,  
2 because of concerns about critical infrastructure information, cannot  
3 see the basis upon which NRC will accept or reject their analyses?

4 How does staff square the fundamental fairness and  
5 due process concerns of rejecting something, on the basis that the  
6 regulated entity can't be provided with the basis for the rejection?

7 MR. SKEEN: Yeah, and again, we may have to get  
8 someone else up here to help answer this. But early on, when we  
9 went to the Corps of Engineers, to get them to help with this, because  
10 they know the watersheds better than anyone else. They're the ones  
11 that regulate the waterways, for the ones that they regulate.

12 So because they have the technical knowledge, we  
13 used -- asked them, basically contracted with them, to do the analyses  
14 for us. There was certain information, critical infrastructure  
15 information, that they said they would not share, could not share with  
16 the public. They would share with a sister federal agency, but that's as  
17 far as they were willing to go.

18 So that was how we constructed the plan then, was for  
19 the Corps to do the analysis, provide what the licensees do need to take  
20 the information out of their analysis, so that they can do the analysis  
21 that they need to do for their specific plant. We do the best we can in  
22 having the licensees early on, we have a couple of meetings with the  
23 Corps.

24 We have the licensees come in before the Corps does  
25 the analysis they're going to do, to talk about assumptions that will be  
26 made and how they will do the analysis. Then after the analysis is

1 performed, licensees can come back and ask questions about how did  
2 you get this or how did you get that.

3 So there's quite a bit of information we can share.  
4 There's a limited amount of information we cannot share, and so, you  
5 know, yes, I realize we're in a little bit different place here, with trying to  
6 do these dam failure analyses and what that means for a specific plant.

7 COMMISSIONER SVINICKI: And it sounds like at  
8 least you realize that we're navigating something that's complicated  
9 here.

10 MR. SKEEN: It's quite complicated.

11 COMMISSIONER SVINICKI: But I just have to say  
12 that, you know, it does matter to me. I think there's a fundamental right  
13 when the government, you know, rejects something, for somebody to  
14 be able to know the basis to challenge it adequately.

15 To obscure that, and I acknowledge the practical  
16 realities here on critical infrastructure information. Our colleagues at  
17 FERC have been having some interesting times about what should be  
18 out in the public and what shouldn't.

19 MR. SKEEN: Yes.

20 COMMISSIONER SVINICKI: But that being said, it's  
21 going to get difficult when, you know, the core tenet of the regulated  
22 community or citizen being able to challenge what the government  
23 says, and there needs to be some ability to do that.

24 MR. SKEEN: Yeah. We understand that. I  
25 understand.

26 COMMISSIONER SVINICKI: Okay, thank you. And

1 I'm over my time, but I love hearing from Scott Flanders. So but he  
2 doesn't have to say anything.

3 (Laughter.)

4 COMMISSIONER SVINICKI: I'm just a big fan of his  
5 work, and the precision with which he goes about things. So I'll just  
6 say hey, it's really good to see you Scott. Thank you for coming to the  
7 microphone.

8 MR. FLANDERS: Dave answered the question  
9 perfectly.

10 CHAIRMAN MACFARLANE: All right. Well, if that  
11 is all the questions we have, then I will close this meeting now that it is  
12 afternoon, and thank you all very much for the discussion, for your  
13 presentations. Thank the earlier panel as well. I think it was a very  
14 productive morning and afternoon. So we will now leave this  
15 refrigerator. We are adjourned.

16 (Whereupon, the above-entitled matter went off the  
17 record at 1:07 p.m.)

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