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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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FUKUSHIMA SUBCOMMITTEE

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TUESDAY, AUGUST 16, 2011

The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B1, 11545 Rockville Pike, at 8:30 a.m., Said Abdel-Khalik, Chairman, presiding.

SUBCOMMITTEE MEMBERS PRESENT:

SAID ABDEL-KHALIK, Chairman

J. SAM ARMIJO

SANJOY BANERJEE

DENNIS C. BLEY

CHARLES H. BROWN, JR.

MICHAEL CORRADINI \*

HAROLD B. RAY

JOY REMPE

MICHAEL T. RYAN

WILLIAM J. SHACK

JOHN W. STETKAR

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CONSULTANTS TO THE SUBCOMMITTEE PRESENT:

MARIO V. BONACA

NRC STAFF PRESENT:

EDWIN HACKETT, Designated Federal Official

JACK GROBE

GARY HOLAHAN

AMY CUBBAGE

NATHAN SANFILIPPO

DANIEL DORMAN

ALSO PRESENT:

PAUL GUNTER, Beyond Nuclear

\* Present via telephone

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

8:28 a.m.

CHAIR ABDEL-KHALIK: The meeting will come to order.

This is a meeting of the Fukushima Subcommittee of the Advisory Committee on Reactor Safeguards. I'm Said Abdel-Khalik, Chairman of the Subcommittee.

ACRS members in attendance are Charles Brown, Dennis Bley, William Shack, Sam Armijo, John Stetkar, Joy Rempe, Sanjoy Banerjee and Harold Ray. Mike Corradini will be participating by phone.

Our consultant, Mario Bonaca is also present. Dr. Edwin Hackett is the Designated Federal Official for this meeting.

The Subcommittee will review information regarding the events at the Fukushima site in Japan. We will hear a presentation from the NRC Near-Term Task Force on their report entitled "Recommendations for Enhancing Reactor Safety in the 21st Century." This report was published on July 12th of this year and is available on the NRC website.

We have received a request from Mr. Paul Gunter to provide all comments related to the subject matter of the meeting. Mr. Gunter will be given time

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1 to provide his comments following the scheduled  
2 presentations and Committee discussions.

3 The entire meeting will be open to the  
4 public.

5 The Subcommittee will gather information,  
6 analyze issues and facts, and formulate proposed  
7 positions and actions as appropriate for deliberation  
8 by the full Committee.

9 The rules for participation in today's  
10 meeting have been announced as part of the notice of  
11 this meeting previously published in the Federal  
12 Register.

13 There is a phone bridge line for members  
14 of the public. To preclude interruption of the  
15 meeting, the phone will be placed in a listen-only  
16 mode during the presentations and Committee  
17 discussion.

18 A transcript of the meeting is being kept  
19 and will be made available as stated in the Federal  
20 Register notice. Therefore, we request that  
21 participants in this meeting use the microphones  
22 located throughout the meeting room when addressing  
23 the Subcommittee. The participants should first  
24 identify themselves and speak with sufficient clarity  
25 and volume so that they may be readily heard.

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1           We will now proceed with the meeting and  
2 I call on Mr. Jack Grobe of the Near-Term Task Force  
3 to begin.

4           MR. GROBE: Thank you very much. I'd  
5 first like to thank the gentleman that designed the  
6 ventilation system in this room for putting this very  
7 large air conditioning duct right above the witness  
8 table here.

9           (Laughter.)

10          My name is Jack Grobe. I'm the Deputy  
11 Director of the Office of Nuclear Reactor Regulation  
12 and I was one of the Task Force members.

13          Shortly after the Fukushima event, the  
14 President requested and the Commission directed that  
15 a review be conducted of the activities that occurred  
16 in Japan at the Fukushima Daiichi Nuclear Power Plant  
17 and identify actions that the NRC might take in  
18 response to that.

19          The Commission directed that it be a  
20 systematic and methodical review of NRC requirements  
21 and processes, and make additional recommendations for  
22 enhancing safety and enhancing NRC regulatory  
23 processes and systems.

24          The Task Force appreciates that the  
25 accident involving a nuclear power plant that results

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1 in core damage and uncontrolled release of radioactive  
2 materials even with no health consequences is  
3 inherently unacceptable. The Task Force also  
4 recognizes that it's likely that in the United States  
5 we'll have more than 100 operating reactors for many  
6 decades to come. The Task Force developed its  
7 recommendations in full recognition of this  
8 environment.

9 Next slide, please.

10 The Task Force was led by Dr. Charles  
11 Miller. We had been looking for him in glasses and a  
12 nose and mustache in the audience. Charlie is not  
13 here. He retired shortly after the Task Force. He  
14 delayed his retirement to lead this Task Force. So  
15 he's left us with the opportunity to present the  
16 results of the report.

17 The additional members of the Task Force  
18 are Amy Cubbage on the far left, my far left. Amy is  
19 a team leader in the Office of New Reactors. On my  
20 immediate left is Dan Dorman. Dan is the Deputy  
21 Director of our Office of Nuclear Materials Safety and  
22 Safeguards. On my immediate right is Gary Holahan.  
23 Gary is the Deputy Director of the Office of New  
24 Reactors. And on his right, on my far right is Nathan  
25 Sanfilippo. Nathan is an executive assistant in the

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1 Office of the Executive Director.

2 Next slide, please.

3 The Task Force concluded that there is no  
4 imminent risk to the continued safe operation of  
5 nuclear plants in the United States and continuing  
6 licensing activities by the Nuclear Regulatory  
7 Commission.

8 CHAIR ABDEL-KHALIK: Let me just stop you  
9 at this point, if I may.

10 MR. GROBE: At Slide 3.

11 (Laughter.)

12 CHAIR ABDEL-KHALIK: Slide 3.

13 (Laughter.)

14 CHAIR ABDEL-KHALIK: The exact quote from  
15 your report is that "a sequence of events like the  
16 Fukushima accident is unlikely to occur in the United  
17 States and some appropriate mitigation measures have  
18 been implemented reducing the likelihood of core  
19 damage and radiological releases." You go on to  
20 conclude, "With that conclusion, continued operation  
21 and continued licensing activities do not pose an  
22 imminent risk to public health and safety."

23 If that is the case, what quote,  
24 appropriate mitigation measures are you referring to  
25 in this specific statement that led to your

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1 conclusion?

2 MR. GROBE: Thank you. Let me take a  
3 crack at that and then ask my fellow Task Force  
4 members to help me with that.

5 First, there were two comments in that  
6 statement. One is that it's unlikely to occur. The  
7 plants in the United States were licensed under the  
8 regulatory infrastructure that involved design basis  
9 accidents. Those design basis accidents included  
10 external events and each plant was sited and licensed  
11 considering the potential external events that could  
12 occur.

13 The specific event that caused the  
14 greatest challenge at the Fukushima Daiichi plant was  
15 a large tsunami. The plants in the United States are  
16 not subjected to the possibility of a large tsunami  
17 similar to what happened at Daiichi. The only  
18 subduction zone and earthquake area in the United  
19 States is off the northeast -- excuse me, the  
20 northwest coast and there are no plants on the  
21 coastline in the northwest of the United States.

22 So the flooding events that could occur in  
23 the United States and other -- what we refer to as  
24 cliff-edge external events, are more slow developing.  
25 That contributed to that conclusion.

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1 In addition, the mitigation measures that  
2 we were speaking to there are what are commonly  
3 referred to as the B.5.b actions. These are the  
4 actions that were taken following the events of 9/11  
5 here in the United States. And they provide an  
6 additional level of mitigation capability, that may be  
7 of assistance in the event of a significant accident  
8 similar to Fukushima.

9 CHAIR ABDEL-KHALIK: So the answer to my  
10 question is that these appropriate mitigation measures  
11 referred to in that specific statement?

12 MR. GROBE: Yes.

13 CHAIR ABDEL-KHALIK: Referred to the B.5.b  
14 measures?

15 MR. GROBE: That's correct.

16 CHAIR ABDEL-KHALIK: Is that correct?  
17 Is there anything to add to that?

18 MR. HOLAHAN: They also refer to the use  
19 of existing equipment under the Severe Accident  
20 Management Guidelines that have been in place since  
21 the late 1990s.

22 CHAIR ABDEL-KHALIK: Okay. If that is the  
23 case, with the results of the temporary inspections  
24 performed post-Fukushima negate that statement?

25 MR. GROBE: No, absolutely not. I think

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1 the results of the temporary inspections that were  
2 performed found that there were no fundamental gaps in  
3 the areas that the inspections addressed. I think  
4 you're specifically referring to the inspection of the  
5 severe accident mitigation guidelines.

6 What it found, the inspections disclosed  
7 though were that there was a broad diversity in the  
8 approach that the licensees took in training,  
9 maintaining those procedures, exercising those  
10 procedures over the years. And part of that goes into  
11 a recommendation that Gary Holahan is going to present  
12 in a few moments, has to do with the fact that the  
13 severe accident management guidelines were voluntary  
14 actions on the part of the industry and not regulated.  
15 As a consequence of that, they're not inspected.

16 Voluntary initiatives are not typically  
17 inspected by the NRC staff. They're not part of the  
18 reactor oversight process. And they were implemented  
19 inconsistently, but there were no identification of  
20 fundamental problems with the severe accident  
21 management guidelines.

22 MEMBER ARMIJO: So there was no breakdown  
23 as far as you could see. There were instances where  
24 they weren't followed as they should have been, but --

25 MR. GROBE: No. I wouldn't say they

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1 weren't followed. As far as the updating of the  
2 procedures, some were updated on a very regular basis,  
3 some less frequently. As far as training, some were  
4 trained and exercised on a regular basis, some less  
5 frequently. So it was simply a matter of consistency  
6 of the maintenance and training for the severe  
7 accident management guidelines.

8 MEMBER ARMIJO: Just as a follow up, to  
9 your knowledge, did the Japanese have anything  
10 equivalent to our B.5.b regulations or capabilities?

11 MR. GROBE: We shared the information that  
12 was developed following 9/11 by our Office of Research  
13 and Nuclear Reactor Regulation with quite a number of  
14 our international partners including Japan.

15 We're not aware of whether Japan  
16 implemented those procedures.

17 MEMBER ARMIJO: Okay, so you just don't  
18 know?

19 MR. GROBE: Yes.

20 MEMBER ARMIJO: Okay.

21 CHAIR ABDEL-KHALIK: Now back to the B.5.b  
22 measures, I guess we were told in one of our  
23 presentations that there were roughly 1200 non-  
24 compliances that have been discovered as a result of  
25 industry initiatives.

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1                   Is that consistent with your statement or  
2 consistent with your assessment?

3                   MR. GROBE: I'm not sure where that number  
4 came from.

5                   MS. CUBBAGE: Are you speaking  
6 specifically to the results of the temporary  
7 instruction on mitigated measures?

8                   MR. GROBE: And the associated industry --

9                   MS. CUBBAGE: Well, since that time there  
10 was a bulletin that was issued and the licensees have  
11 all confirmed now that they are in compliance with the  
12 B.5.b requirements and any information that came out  
13 of the Temporary Instruction would have been handled  
14 through the compliance process. So it's our  
15 expectation that those corrective actions would be  
16 taken.

17                   MR. SANFILIPPO: And with a number that  
18 large, I wouldn't be surprised if that came out of the  
19 INPO IER that was issued. So a lot of those actions  
20 were, of course, self identified by the industry and  
21 many of which were likely addressed even before our  
22 Temporary Instructions went to look at the sites. But  
23 we don't have any specific insight into that, those  
24 other than generic categories of where those types of  
25 findings fell.

1 CHAIR ABDEL-KHALIK: I'm just trying to  
2 establish that these two statements are linked.

3 MS. CUBBAGE: And I think a key point in  
4 the phrase that you quoted is imminent risk. So we're  
5 looking at the potential for the frequency of the  
6 initiating event and the capability of existing  
7 mitigation measures which may not be completely where  
8 the Task Force would like to see in the future, but  
9 that the combination of the initiating event and the  
10 existing mitigation measures today don't pose an  
11 imminent risk.

12 MR. GROBE: Thanks for focusing on that,  
13 Amy. It's very important to understand those words.  
14 Those are regulatory vernacular. If at any time the  
15 Task Force identified something which was an imminent  
16 risk to the health and safety of the public in the  
17 United States, it was our responsibility to bring that  
18 promptly to the attention of the Commission and the  
19 executives in the Agency. And if there's an imminent  
20 risk, we would expect that there would be immediate  
21 action on the part of the Agency whether that is to  
22 shut down facilities or modify issue orders modifying  
23 facilities.

24 We concluded there was no need for  
25 immediate action of that nature. Notwithstanding, we

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1 made 12 over-arching recommendations and we're  
2 prepared to get into those details.

3 CHAIR ABDEL-KHALIK: Okay. John?

4 MEMBER STETKAR: I'll wait.

5 MEMBER REMPE: I guess I have a question  
6 about what made you decide on the particular 12 over-  
7 arching recommendations and for example, there's one  
8 recommendation about instrumentation in the spent fuel  
9 pool, but I didn't see a recommendation about any sort  
10 of enhancement for instrumentation related to the  
11 reactor vessel, water level, temperature, etcetera.  
12 And I note that that is a recommendation in the  
13 ministerial report prepared by the Japanese. And I  
14 just wondered what was the decision process.

15 MR. GROBE: Let me share a little bit  
16 about how we developed our recommendations and then  
17 Gary is itching to get into the technical details.  
18 The Commission directed that we not engage extensively  
19 in stakeholder outreach during the course of the  
20 development of our recommendations. And that was  
21 simply a recognition of the challenge associated with  
22 performing this review over a very short period of  
23 time.

24 But during the course of the development  
25 of the recommendations, we spent hundreds of hours

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1 with scores of NRC staff. And we did interact with  
2 some external individuals including folks from FEMA  
3 and other organizations and developed through a  
4 brainstorming process, probably over a hundred -- I  
5 don't know what the exact number is, specific  
6 recommendations that we then called down to the 34  
7 that are included in the report in 12 over-arching  
8 areas.

9 Did you want to specifically talk about  
10 reactor instrumentation?

11 MR. HOLAHAN: Yes, what I wanted to  
12 indicate is it was the difference in the  
13 instrumentation available in the reactor as opposed to  
14 what's available in the spent fuel pool. After Three  
15 Mile Island, there was a requirement put in place for  
16 instrumentation in reactor vessel called 1.C.1 or  
17 instrumentation for inadequate core cooling. And  
18 different reactors have different variations, but they  
19 either have level instrumentation or temperature  
20 instrumentation.

21 So there's more instrumentation available  
22 for the -- when the fuel is in the reactor than in the  
23 spent fuel pool. We saw that limited instrumentation  
24 in spent fuel pool which generally is a level  
25 instrument in an overflow system. It simply tells

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1 that the level is low, but no other instrument, no  
2 other indications.

3 MEMBER REMPE: But can I hammer on that a  
4 little more though? They recalibrated sensors in  
5 Japan. The temperature that they're using for the  
6 vessel, they indicated way beyond our operating range,  
7 and so wouldn't -- how would that -- isn't that a need  
8 and how would that recommendation be implemented or  
9 how would that need be addressed? I didn't see a  
10 recommendation in the report.

11 MR. HOLAHAN: The decalibration of BWR  
12 instruments is a pretty well known phenomena with  
13 pressure and temperature and other phenomena. And  
14 those are considered in the accident procedures of  
15 those reactors. So it's not like there's no  
16 information.

17 There is information if you can interpret  
18 it properly and that was addressed quite a long time  
19 ago.

20 MEMBER CORRADINI: May I ask a question?

21 CHAIR ABDEL-KHALIK: Yes, Mike.

22 MEMBER CORRADINI: I guess I want to get  
23 back to imminent risk. I don't remember which --

24 CHAIR ABDEL-KHALIK: Mike, get a little  
25 closer to your mic. You're fading out.

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1 MEMBER CORRADINI: Is this better?

2 CHAIR ABDEL-KHALIK: A little bit.

3 MEMBER CORRADINI: How is this?

4 CHAIR ABDEL-KHALIK: Go ahead, Mike.

5 MEMBER CORRADINI: Okay, so there was a  
6 point made about imminent risk and you used regulatory  
7 vernacular, so let's translate it into risk regulatory  
8 vernacular.

9 The way I interpret the words are that  
10 there's no existing risk. That needs to be addressed.  
11 So that implies to me that if -- what if. Because you  
12 said there was no tsunami hazard to existing cause in  
13 the United States. So from a natural disaster  
14 standpoint, the way I interpret it is there is no  
15 existing risk. But if such a risk were challenging  
16 the plants, then there are improvements in the  
17 regulatory structure. And all the subsequent rules  
18 and orders you're suggesting would flow from there.

19 So is there a time scale that goes with  
20 imminent risk that is being inferred here? I'm trying  
21 to understand does imminent mean a year? Does  
22 imminent mean years? Does it mean months? And the  
23 reason I ask that question is because a number of the  
24 rules and orders which we're going to get into roll  
25 over over long periods of time, longer than just weeks

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1 or months.

2 MR. GROBE: Right. If there were an  
3 imminent risk to the public health and safety from the  
4 operation of any of the plants under our regulatory  
5 purview that would require immediate action, not  
6 months or years, but immediate.

7 MEMBER CORRADINI: Okay, but then so  
8 turning that around, that applies to really all the  
9 rules and orders which the Task Force is recommending  
10 is to improve the current situation since there is no  
11 existing risk?

12 MR. GROBE: I'm a little uncomfortable  
13 with the no existing risk. In fact, we're going to  
14 get into that in some detail, I believe when we talk  
15 about the regulatory framework. Go ahead.

16 MR. HOLAHAN: I would say the concept of  
17 risk inherently --

18 (Laughter.)

19 -- is a judgement of whether that risk is  
20 quite small, whether that risk is intolerably high.

21 MEMBER CORRADINI: Well, that's why I'm  
22 trying to translate imminent risk so that I understand  
23 where the Task Force is coming from so that what I  
24 interpreted meaning that there's no imminent risk,  
25 that means although there is risk, it's small enough,

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1 it's tolerable. There's adequate protection. So what  
2 I'm trying to understand is the time scale of reason  
3 that adequate protection may become inadequate in the  
4 future or is it --

5 MR. HOLAHAN: Yes.

6 MEMBER CORRADINI: So can you help us?

7 MR. HOLAHAN: Yes. I think that's exactly  
8 right. Risk involves exposure to hazard and the  
9 longer the period of time you're exposed to a hazard,  
10 the more undesirable the situation. So even though  
11 imminent risk doesn't have a specific period of time  
12 associated with it, I would say fairly that we were  
13 thinking of not days or months, but years. I mean  
14 we're talking about largely external events or  
15 unlikely events. So we're talking about today's  
16 exposure to such a small risk or perhaps even this  
17 year's exposure to it might be tolerable. But it  
18 might not be a situation which would be desirable for  
19 a long period of time for the numerous reactors in our  
20 country.

21 In fact, the report also talks about 100  
22 reactors for decades. So that's the other end of the  
23 time scale that we were thinking about.

24 MEMBER BANERJEE: Gary, may I ask you --  
25 Mike, can I interrupt you for a moment? I'm also

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1 trying to clarify this idea.

2           Would you say that given the history of  
3 tsunamis in Japan in the eyes of the NRC, would that  
4 have constituted an imminent risk? I'm just trying to  
5 relate it to some concrete event. This has nothing to  
6 do with Japan.

7           MR. HOLAHAN: I think what we know now of  
8 the tsunami --

9           MEMBER BANERJEE: We already knew about  
10 it, right?

11           MR. HOLAHAN: Even if before the tsunami,  
12 we've looked at the information. I think we would  
13 have judged that the tsunami of likelihood frequency  
14 would have been a hundred years or a few hundred years  
15 as opposed to 10,000 or more which would be more  
16 compatible with the design basis in the U.S.

17           And I think we probably wouldn't have  
18 considered it imminent risk, but we would have  
19 required them to deal with it in some deliberate  
20 fashion over months or years.

21           MR. GROBE: And in each of these over-  
22 arching recommendations, there's detailed specific  
23 steps. Some of those being prompt actions that can be  
24 implemented over a short period of time. And we can  
25 get into some of those details.

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1 The recommendations that included --

2 CHAIR ABDEL-KHALIK: We'll let you  
3 continue. I know that I started this process.

4 MEMBER STETKAR: Actually, Said, are you  
5 planning to get a little bit more into this notion of  
6 risk?

7 CHAIR ABDEL-KHALIK: Absolutely.

8 MEMBER STETKAR: Okay, then I'll wait.

9 MR. HOLAHAN: Yes, I think we're going to  
10 deal with it in the framework. We'll get our toes  
11 wet.

12 CHAIR ABDEL-KHALIK: Please continue.

13 MR. GROBE: The 12 over-arching  
14 recommendations, as I said, include implementation  
15 details in many of them. And we'll talk about those  
16 as we go through each recommendation. Six of the 12  
17 recommendations are actions for the industry. Four of  
18 the recommendations are actions for longer-term study  
19 areas where the Task Force did not feel we had  
20 sufficient information at this point in time to make  
21 a specific recommendation. And two of the  
22 recommendations are for staff action. They cover  
23 policy statements, rulemakings and orders, specific  
24 staff actions, as well as long-term evaluation.

25 Slide 4, please.

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1           The regulatory framework which Gary is  
2 going to get into in some detail includes the concept  
3 of safety goals and defense-in-depth enhanced through  
4 risk insights. The Task Force found that that  
5 framework is solid and should continue as the over-  
6 arching focus of our regulatory framework in the  
7 future. Notwithstanding, the Task Force found that  
8 the implementation of that framework has varied over  
9 the years and we have some recommendations for  
10 enhancing that regulatory framework.

11           The approach that the Task Force took was  
12 to focus on defense-in-depth, principally focusing on  
13 external events beyond design basis external events,  
14 as well as within the design basis external events.  
15 So that defense-in-depth philosophy involves the  
16 protection against natural phenomena, the mitigation  
17 of long-term Station Blackout and the consequences of  
18 natural phenomena as well as the preparedness for  
19 situations when the protection and mitigation is not  
20 effective.

21           We also focused on the NRC programs.  
22 We've spoken a little bit about the framework already,  
23 but we also focused on the reactor oversight process.  
24 So at this time, I'd like to turn it over to Gary to  
25 address Recommendation 1.

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1 MR. HOLAHAN: Thank you. Recommendation  
2 1 has to do with a recommendation to enhance the NRC  
3 framework for regulating beyond design basis events  
4 and severe accidents. And I'd like to say the  
5 presentation today we'll do as good as we can. But I  
6 think there's no substitute for actually reading the  
7 report.

8 We were pretty careful in crafting the  
9 words in the report and if we're a little fast and  
10 loose, today, I think we'll anchor ourselves with a  
11 report whenever we can.

12 The concept of the regulatory framework  
13 basically derives from the Task Force's observation  
14 that the design basis events are well established in  
15 the regulatory process and in fact, have been  
16 established for decades. But the treatment of  
17 accidents beyond the design basis is done in a  
18 somewhat less systematic way. And we saw this is an  
19 area that could be strengthened by dealing with it  
20 more systematically, by making it clear that it's part  
21 of the regulatory fabric, that events such as a  
22 tsunami beyond the design basis or a Station Blackout  
23 that lasts longer than eight hours, that these are  
24 things that the NRC would expect to be dealt with.

25 And we also found that thinking of this

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1 whole collection of possible events beyond the design  
2 basis event, it was an important category to be  
3 considered. So taking the Commission's direction for  
4 a systematic and methodical treatment, we decided not  
5 to simply look at Station Blackouts from flooding  
6 events which in a way would be analogous to what was  
7 done after September 11th. New requirements were put  
8 in place, largely to deal with aircraft impacts,  
9 fires, explosions, security events. But it dealt with  
10 one issue that was beyond the design basis.

11 And in the past, the NRC has dealt with  
12 ATWS and Station Blackout as beyond the design basis  
13 event. But it's never dealt with a full category of  
14 beyond design basis events. It could be this subject  
15 has been studied. It's closely related to the  
16 research activities for a technology-neutral  
17 regulatory framework.

18 The Task Force didn't speak to the details  
19 of how such regulations would be put forward. It  
20 acknowledged, but didn't quite adopt the technology-  
21 neutral regulatory framework. It could be a simpler  
22 approach, a frequency defined category.

23 Next slide.

24 What we saw was that such a change would  
25 be a significant change in the way the NRC regulates

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1 things that are currently beyond the design basis.  
2 And in order to do so, it would be important to have  
3 a Commission establish first at a conceptual level  
4 what it expected in such an area. And then such a  
5 framework which we called risk-informed defense-in-  
6 depth framework which means it would still acknowledge  
7 and be built on a defense-in-depth approach, but it  
8 would use risk insights to better define what ought to  
9 be in various levels of defense-in-depth, that the  
10 Commission policy statement, expressing its desire to  
11 extend regulatory requirements beyond the design basis  
12 to include that as part of its total framework as to  
13 what constitutes adequate protection, and then move on  
14 from a conceptual level to make the necessary changes  
15 in rulemaking and guidance documents that would be  
16 associated with that.

17           Could I have the next slide? Good. Thank  
18 you.

19           MEMBER ARMIJO: Before you go on, could  
20 you expand some more on extended design basis  
21 requirements? Just expand on what you're thinking  
22 there.

23           MR. HOLAHAN: Yes, as expressed in the  
24 report, we really mean beyond design basis, but we  
25 don't actually like the phrase beyond design basis.

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1 It has a few undesirable aspects to the phrase. For  
2 one thing, it's open ended. Once you go beyond the  
3 design basis, you never know when to stop because  
4 there's no limits. At least that phrase expresses no  
5 expectation.

6 MEMBER ARMIJO: You see it as a substitute  
7 for beyond design basis, not as an intermediate --

8 MR. HOLAHAN: Not intermediate, not at  
9 all.

10 MEMBER ARMIJO: Okay.

11 MR. HOLAHAN: It's actually, I would say  
12 it would be a subcategory of beyond design basis which  
13 ought to be regulators. So it's a regulated area of  
14 beyond design basis.

15 MEMBER ARMIJO: Okay.

16 MEMBER BROWN: So there would be some  
17 beyond design basis that you just say hey, the risk is  
18 so low, we don't do anything with it.

19 MR. HOLAHAN: Yes.

20 MEMBER SHACK: That's always the question  
21 here is how do you know when to stop? And your first  
22 bullet is the risk-informed.

23 MR. HOLAHAN: Yes.

24 MEMBER STETKAR: Don't you think you're  
25 going to bump into the safety goal policy as you try

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1 to -- I mean it would seem to me any extension of the  
2 current design basis is suddenly going to come up to  
3 that.

4 MR. HOLAHAN: I think it's fair to say  
5 within 90 days we bumped into it a few times.

6 (Laughter.)

7 MR. GROBE: I think we depended upon it in  
8 focusing and framing our thinking in this area.

9 MEMBER SHACK: Depended wouldn't be the  
10 word I'd use.

11 MR. HOLAHAN: It wouldn't be the word I'd  
12 use.

13 MR. GROBE: You know, the safety goals  
14 policy statement addresses defense-in-depth. It also  
15 addresses safety expectations both in a qualitative  
16 and then eventually we've created a quantitative  
17 measure that we can use on a daily basis and that's  
18  $10^{-4}$  Core Damage Frequency, addressing prevention and  
19 mitigation.

20 The concept of  $10^{-4}$  Core Damage Frequency  
21 can be utilized conceptually to interpret this  
22 extended design basis area that we should regulate and  
23 then other beyond design basis areas we would not  
24 regulate. This is recommendation --

25 MEMBER SHACK: Ten to the minus isn't the

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1 real safety goal. That's a problem.

2 MEMBER STETKAR: I wanted to ask, since  
3 you brought up  $10^{-4}$  and Core Damage Frequency, there  
4 are statements in your report that conclude that Core  
5 Damage Frequency, and I'll stay away from the word  
6 early, large, whatever you want to call it, release  
7 frequency, are adequate measures for the regulatory  
8 process and that you're not recommending extending  
9 this risk-informed framework out to include Level 3  
10 considerations which would extend it to include off-  
11 site consequences. I was curious about why you feel  
12 that way because obviously the events at Fukushima  
13 have indicated that the off-site consequences can be,  
14 should be taken into consideration.

15 MR. HOLAHAN: Certainly, and a Core Damage  
16 Frequency whether it's  $10^{-4}$  or whatever number you  
17 choose, certainly provides protection for land  
18 contamination and property damage.

19 MEMBER STETKAR: But the events at  
20 Fukushima and other things that we've seen in  
21 probabilistic risk-assessment studies have shown that  
22 there isn't necessarily a sequential, numerical  
23 reduction as you go from core damage to containment  
24 releases to off-site consequences, that there are some  
25 events that indeed those three areas are perhaps fully

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1 correlated and that you miss that notion of  
2 correlation when you say well, we predict against core  
3 damage, we'll protect against everything, because the  
4 conditional containment failure probability might be  
5 one and severe off-site consequences conditional  
6 probability might be one for somewhat lower frequency  
7 core damage events, but not minuscule frequency.  
8 That's the whole notion of this integrated risk -- and  
9 I was curious why you were stepping back from going  
10 all the way to kind of recommendation that this  
11 framework include level 3 considerations.

12 MR. HOLAHAN: Well, for one thing is that  
13 there were numerous complications associated with the  
14 Level 3 calculation. And I think the uncertainties go  
15 up quite a bit.

16 MEMBER STETKAR: But uncertainties are the  
17 whole name of the game. If we don't acknowledge the  
18 uncertainties and try to quantify what the  
19 uncertainties are, aren't we just hiding in the guise  
20 of well, the uncertainties are too large, so we don't  
21 want to deal with them?

22 MR. HOLAHAN: I think going back to the  
23 previous discussion, Core Damage Frequency sets a  
24 limit, right? So even if containment performance is  
25 not considered or the containment failure probability

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1 is one, you still have limited the land contamination  
2 or property damage by the core damage, by maintaining  
3 a low Core Damage Frequency. Right?

4 So the existing system focuses on public  
5 health and safety and it does those by looking at Core  
6 Damage Frequency and Large Early Release Frequency.  
7 And we know through other studies what the  
8 relationship is between large releases and health  
9 effects. I think the report actually acknowledges  
10 that you might want to do a Level 3 calculation once  
11 in a while to calibrate your regulatory process, but  
12 it's just too complicated an activity to be a useful  
13 regulatory tool.

14 MEMBER STETKAR: I think there's a notion  
15 that it's too complicated because people really  
16 haven't tried it. It's always too complicated until  
17 you've actually tried it. I know NUREG-1150 did it.  
18 But we were learning at the time. I'll just leave it  
19 that way --

20 MR. HOLAHAN: I will say at least our  
21 judgment was looking at 1150 and looking at SOARCA,  
22 the state-of-the-art study of reactor consequences, I  
23 mean they are case studies for how complicated and how  
24 long it takes to do such an analysis. Right.

25 Reactors use probabilistic risk assessment

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1 every day in making judgments about maintenance and  
2 other activities. I think a Level 3 study -- I don't  
3 see how it could be practically used on a day-to-day  
4 basis.

5 MEMBER BLEY: Well, not to keep this  
6 going, but I was a little put off by the way you folks  
7 address this. Put off is the wrong word. The  
8 argument didn't seem as solid as your arguments in  
9 other areas. In fact, following the things that led  
10 you this far make it hard for me to see why you pushed  
11 the Level 3 thing aside.

12 Now if you go back to a year or so after  
13 TMI when they came to vent the containment, in fact,  
14 a Level 3 model was running full time and guiding the  
15 people who were tracking the plume where to go and  
16 there are other areas where people have used Level 3  
17 models for real-time response to accidents.

18 So I think the argument that it's too  
19 complex to use in a realistic way when you can  
20 actually use some of them in a real-time mode just  
21 doesn't seem to hold up. But I don't want to pursue  
22 it much further than saying I don't quite agree with  
23 your argument in that area.

24 MEMBER CORRADINI: Gary, if I might ask a  
25 question, just to couple it back to a question about

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1 time scales. You gave a good answer, I think, at  
2 least what I understood about imminent risk. So let  
3 me put it in terms of Core Damage Frequency. If the  
4 Task Force sees Core Damage Frequency is an  
5 appropriate way to monitor risk, then I interpret no  
6 imminent risk to mean that as time marches on, the  
7 allowable Core Damage Frequency for currently  
8 operating reactors should be reduced.

9 MR. HOLAHAN: No. I don't follow your  
10 logic.

11 MEMBER CORRADINI: Well, as months turn  
12 into years and current operating plans continue to  
13 operate, then given the current level of how safety is  
14 maintained by systems and components, eventually the  
15 Core Damage Frequency if they continue to operate with  
16 the current design base imminent risk would start to  
17 be appearing which means that put it differently, you  
18 should reduce the core damage that requires Core  
19 Damage Frequency on these plants as time marches on.

20 MR. HOLAHAN: I'm afraid I don't follow  
21 your logic. I think the Core Damage Frequency stays  
22 the same. I think you might argue that if I really  
23 ran these reactors for a million years, I would  
24 actually have -- I could expect that a reactor would  
25 damage the core and I would agree with that statement.

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1                   MEMBER CORRADINI: That's exactly where  
2 I'm going. I guess I was kind of going back to Bill  
3 Shack's original question which is I think if there's  
4 no imminent risk now I understand your discussion and  
5 your explanation. And now we start talking about a  
6 change in regulatory framework. It seems to me either  
7 something is in the design basis or something is out  
8 of the design basis for any particular safety system  
9 or component.

10                   The design basis for a containment could  
11 be much more conservative, if you want to use that  
12 word, than the primary system or the fuel, but I at  
13 least need to know what I have to design for, so that  
14 if I'm talking about a Core Damage Frequency or early  
15 containment or early large rate material release, I  
16 might want to reduce those goals to lower values as  
17 the current plants continue to operate.

18                   MEMBER BLEY: Let me try something  
19 different because I, too, was uncomfortable with the  
20 imminent risk idea because to me in the common  
21 definition, imminent is something about to happen and  
22 risk is something about likelihood and consequences  
23 both.

24                   I scoured many dictionaries and the old  
25 Oxford English Dictionary has a definition that says

1 it's impending, threateningly, hanging over one's  
2 head. And the implication to me is that that means  
3 that the consequences have to be high enough that we  
4 really care about them and two, that the frequency,  
5 the likelihood has to be high enough that we can't  
6 live with it today.

7 Now to me, if things fit that category,  
8 you've got to do something. If the risk is lower,  
9 then these other arguments that Mike's making come  
10 into play.

11 We might not want to take those things  
12 that would happen over a 100-year period if we can do  
13 something about them and trying to address them in the  
14 longer term seems to make sense to me, but imminent  
15 really bothered me and I thought we were putting it  
16 off to some legal term, but I think there is a  
17 definition that really fits in with this risk idea.

18 CHAIR ABDEL-KHALIK: I think we ought to  
19 continue.

20 MR. HOLAHAN: Okay, let's continue. I  
21 think we'll come back to some of these ideas. I think  
22 we'll come back to these ideas.

23 In implementing such a framework, the Task  
24 Force identified two related topics that would need to  
25 be addressed. One is the Regulatory Analysis

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1 Guidelines which I think goes back to Dr. Shack's  
2 observation that the safety goals need to be dealt  
3 with and I --

4 CHAIR ABDEL-KHALIK: What do you mean  
5 dealt with?

6 MR. HOLAHAN: They're in the regulatory  
7 process, so they're included to be -- they should be  
8 used in a regulatory process. And I think the  
9 difficulty we found was that there is some  
10 incompatibility between the safety goals and a  
11 defense-in-depth concept. And they could be -- they  
12 could be merged by completely dealing with the  
13 uncertainties.

14 Actually, defense-in-depth is meant to  
15 cover uncertainties and things you don't know. But  
16 that the Regulatory Analysis Guidelines, as they're  
17 currently written, the current document, it emphasizes  
18 the numerical aspects of the safety goal probabilistic  
19 calculations and it doesn't address defense-in-depth  
20 to any substantive degree. And it doesn't provide  
21 guidance on how large uncertainties could be dealt  
22 with.

23 And I think you could either say well,  
24 let's be risk-based and be much more scrupulous in how  
25 we deal with uncertainties or you can say well, let's

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1 increase defense-in-depth and that will be part of our  
2 mechanism for dealing with the uncertainties.

3 But in any event, what we're saying is the  
4 current Regulatory Analysis Guidelines could and  
5 should be improved in their balancing of defense-in-  
6 depth and risk analysis.

7 CHAIR ABDEL-KHALIK: I think Gary, for  
8 something on the record, you clarified things that we  
9 can either go to a risk-based framework or rely on  
10 defense-in-depth to -- as a fall back against those  
11 large uncertainties that we're not willing to address.

12 There is a middle ground. There is a  
13 risk-informed framework where you actually quantify,  
14 identify and quantify those uncertainties and make a  
15 determination of whether you understand enough about  
16 a particular hazard or the risk from that hazard that  
17 you want to include explicit requirements for  
18 protection against that hazard within the licensing  
19 basis of a plant.

20 Or, whether the uncertainties are so broad  
21 that indeed you'd like to deal with the issue  
22 otherwise. But until you actually quantify those  
23 uncertainties, you don't know. So I'll propose that  
24 middle ground of that risk-informed process that  
25 doesn't go all the way to a fully risk-based licensing

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1 framework on one end of the spectrum, but indeed gives  
2 you more information to kind of muster your decision  
3 process.

4 MR. HOLAHAN: I think your comments are  
5 totally compatible with what the report is suggesting.  
6 The report is suggesting a balancing of these. It  
7 doesn't say exactly how to do it.

8 MEMBER STETKAR: That's right. And in  
9 fact, reading the report, I had much of a sense of  
10 that balanced approach. Just for the record of this  
11 meeting, I wanted to sort of clarify things.

12 MR. GROBE: The recommendations are  
13 intended to bring clarity to that exact point. The --  
14 we studied a variety of decisions that have been made  
15 over the '80s and '90s particularly focusing on beyond  
16 design basis events and found lack of clarity in how  
17 and why those decisions were made; and our  
18 recommendation and how they've been handled in a  
19 regulatory construct, whether they're requirements,  
20 regulations, imposed licensed conditions, or voluntary  
21 actions.

22 So our recommendation is we've spent some  
23 time putting clarity to that so that it's predictable  
24 and reliable, both for the public as well as for the  
25 industry.

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1 MR. HOLAHAN: I think we could come up  
2 with a number of ideas. We could put them in the  
3 report. You could say design basis events should be  
4  $10^{-4}$  per year. Extended design basis should be  $10^{-5}$ ,  
5 but I think there should be a whole lot more  
6 discussion of these topics before we settle on what  
7 they are.

8 MEMBER BROWN: What's relative to the  
9 balancing of the risk-informed defense-in-depth that  
10 you mentioned, was part of your all's concern thought  
11 process was that which way were you thinking? Were  
12 you thinking that this approach on risk-informed was  
13 moving us away from the defense-in-depth and you want  
14 to move backwards or we're too much in the defense-in-  
15 depth and want to go the other way? What constituted  
16 that framework in which you all were doing your  
17 thinking?

18 MR. HOLAHAN: Well, let me say it this  
19 way. We did do some historical looking, but back to  
20 the late 1960s to the present and I would say the  
21 original regulatory concepts were very deterministic,  
22 defense-in-depth concepts. And then I think through  
23 the '70s and '80s, they grew more to be risk-informed.  
24 But they never lost their defense-in-depth aspects.

25 So I think our observation is that risk

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1 insights have been used in a regulatory process, but  
2 not within a well-defined framework. So they tend to  
3 be used on a given case. So let's go study Station  
4 Blackout and let's see what the risks might be and how  
5 much we should do.

6 So I would say the shift has been from no  
7 risk analysis to some risk analysis. We're not  
8 suggesting go to all risk analysis. We're saying go  
9 to a more systematic and methodical and cohesive,  
10 coherent view as to how do use the risk insights to  
11 influence the design basis and the defense-in-depth  
12 aspects.

13 MEMBER BANERJEE: Even for the  
14 deterministic defense-in-depth approach, risk is  
15 implicit in the design of these barriers whether  
16 active or passive.

17 MR. HOLAHAN: Yes.

18 MEMBER BANERJEE: So in some way that  
19 judgment is made, whether on the basis of a formal  
20 risk analysis or not.

21 MR. HOLAHAN: In fact, when the original  
22 designers of the regulatory process in the late '60s  
23 and early '70s, whether general design criteria or  
24 other regulations they had in mind, you know,  
25 Anticipated Operational Occurrences are those things

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1 with the frequency associated with the life of a  
2 plant. Postulated accidents, maybe they don't have a  
3 specific frequency, but they are less likely, but at  
4 least reasonably expected.

5 But what we found is that you said those  
6 insights were written down. There is a regulatory  
7 guide that establishes what events should be within a  
8 design basis. That regulatory guide was written in  
9 1978 and has not been modified since. So all the risk  
10 analysis that's been done since the mid 1970s is not  
11 reflected in the choice of design basis events.

12 MEMBER RAY: Well, Gary, as somebody who  
13 wrote some of those SARs back that you're talking  
14 about, there's also was used a term called maximum  
15 credible. That of course is passe. We don't do that  
16 any more. But it's still something that when you get  
17 out in the public forum is going to be difficult to  
18 abandon.

19 And if you start talking about  $10^{-4}$ ,  $10^{-5}$   
20 as you have here. There's going to be a tremendous  
21 communication problem in the public forum.  
22 Presumably, you're thinking about that? It's not to  
23 detract from anything that's been advocated here, but  
24 to me, we can come to all the sophisticated  
25 understanding that we want, but we better figure out

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1 a way to communicate it to people who are not going to  
2 understand a probabilistic seismic hazard or tsunami  
3 hazard curve, you know. It's just not going to be  
4 easy to communicate and that's part of the challenge,  
5 I think, that has to be accepted.

6 If we're not going to use maximum credible  
7 and I don't like using it myself, you better find  
8 some other way of saying the same thing.

9 MEMBER BROWN: I'd like to just make a  
10 comment along that line if I could because --

11 MR. HOLAHAN: I accept your articulation  
12 of the problem and I don't have a solution to it.

13 MEMBER RAY: The key problem --

14 CHAIR ABDEL-KHALIK: I'd like to move on.

15 MEMBER RAY: I know we've got to move on.

16 CHAIR ABDEL-KHALIK: It's been roughly 55  
17 minutes since we started and we are on Recommendation  
18 1. So we need to move on.

19 MEMBER BROWN: Along that, I just want to  
20 make one observation on Harold's point, just what's  
21 come to me since I've been on the Committee and  
22 listening and seeing what's going on is that  
23 consequences -- and what's gone on in the past --  
24 consequences, it seems of incidents, accidents,  
25 whatever you want to call them in the nuclear world

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1 almost can't be considered in the same light as  
2 consequences of say airplane crashes or refinery  
3 blowing up and doing things. They're just different.

4 People seem to accept or the public seems  
5 to accept some consequences and loss of life, oil rigs  
6 burning up, exploding, whatever, and you keep on doing  
7 them. But in the nuclear world, consequences of  
8 contamination, spread of contamination over large  
9 areas, just doesn't -- even in the circumstances where  
10 none occurred. Take TMI, for instance, virtually  
11 none. It was just a tremendous stop. They just don't  
12 accept it.

13 Harold's point is valid. Somehow, you've  
14 got to be able to get this from a public standpoint,  
15 if we're going to continue to go down the path we're  
16 going. So too much risk, whatever, when you start  
17 telling somebody the chance of people dying are 1  
18 times  $10^{-4}$  -- I'll stop right there. I apologize.

19 CHAIR ABDEL-KHALIK: John.

20 MEMBER STETKAR: I'll let Gary get to his  
21 second bullet before I ask --

22 (Laughter.)

23 MR. HOLAHAN: I will make one additional  
24 point on the Recommendation 1 and we'll move on. The  
25 report suggests that if the Commission were to adopt

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1 this concept of a risk-informed defense-in-depth  
2 framework that it ought to look back at the IPE and  
3 IPEEE activities and see whether the insights and the  
4 recommended actions that were developed back then  
5 would fit in this framework.

6 After the Individual Plant Examinations  
7 and those for external events, many activities were  
8 undertaken by the utilities. I think the report says  
9 about 500 among all the utilities. None of those were  
10 regulatory requirements. So the suggestion is if you  
11 develop such a new regulatory framework, you ought to  
12 look back at those as the potential area where  
13 requirements might be found.

14 MEMBER STETKAR: Now I'll say, in my  
15 opinion, it's probably worthwhile taking a quick look  
16 at those studies for insights, but I certainly  
17 wouldn't rely on that as much fundamental information  
18 base for a variety of reasons. Number one, there was  
19 wide variability in the quality of those studies.  
20 They were all performed, regardless of their scope and  
21 level of detail, they were all performed before there  
22 were any kind of standards published about how to do  
23 risk assessment.

24 Many of them were semi-qualitative, semi-  
25 quantitative studies. A large fraction of them did

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1 not explicitly look at the risk from fires, explicitly  
2 look at the risks from seismic events in an integrated  
3 quantitative fashion and the purpose of those studies  
4 were for the plants to very quickly with a fairly  
5 modest, the utilities might argue about the term  
6 modest, but with a fairly modest allocation of  
7 resources identify any features of the design where  
8 they had in the sense of imminent large  
9 vulnerabilities. So they were looking for those large  
10 rocks that stood way above the surface that they  
11 needed to address.

12 And in that sense, they responded to all  
13 of those, so I'm not sure looking at for further  
14 insights from those studies, given their limitations,  
15 is necessarily a very productive effort going forward.

16 MR. HOLAHAN: I'd like to react to just  
17 one thing you said which was that the utilities  
18 reacted to everything they found. Well, I think part  
19 of what the Task Force has learned is how the  
20 utilities react to these things and how they preserve  
21 and maintain their protections in these areas is not  
22 quite the same when it's not a regulatory requirement.

23 MEMBER STETKAR: Point well taken.

24 MR. GROBE: Before we turn over to Amy to  
25 talk about protected recommendations, I just wanted to

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1 -- I heard some words, new regulatory framework. We  
2 weren't recommending a new regulatory framework. We  
3 were recommending some enhanced considerations of  
4 balancing defense-in-depth and risk for beyond design  
5 basis to allow more predictability and clarity in how  
6 the Agency addresses those.

7 So I would say enhancing the current  
8 regulatory framework, the Task Force found that the  
9 regulatory framework and the underpinnings for that  
10 framework that we have today is solid and sound and  
11 recommend that that continue to be the underpinnings  
12 going forward.

13 Amy?

14 MS. CUBBAGE: Thanks. Okay, I'm going to  
15 discuss our recommendations in the area of protection  
16 from design basis external events. As we've discussed  
17 here this morning already, one of the key insights  
18 from the Fukushima accident is that plants should be  
19 protected against the appropriate design basis hazards  
20 and arguably the plants at Fukushima were not  
21 protected adequately for the tsunami that occurred.

22 We have three detailed recommendations in  
23 this area and I'll go over each --

24 MEMBER ARMIJO: Amy, let me just on this  
25 one, why did you stop with seismic and flooding and

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1 not just go across the board and say hurricanes,  
2 tornadoes, blizzards? Extreme environments, yes.

3 MS. CUBBAGE: We were looking for specific  
4 events that both had the capability to cause the  
5 widespread common cause failures as occurred at  
6 Fukushima, also areas where there has been significant  
7 increases in the state of knowledge and the state of  
8 analysis methods. There have been, for example, with  
9 tornadoes, there have been updated studies done in  
10 those areas and they did not reveal any new  
11 vulnerabilities for the existing plants.

12 So we wanted to focus on the areas where  
13 we felt there was the most change since the time of  
14 licensing for these plants.

15 MEMBER ARMIJO: We're subject to  
16 hurricanes, severe massive hurricanes which lead to  
17 flooding which can take out infrastructure over huge  
18 areas. I just wondered why limit the update?

19 MS. CUBBAGE: Well, with regard to  
20 flooding, this does encompass the flooding source from  
21 hurricanes, both storm surge and the precipitation  
22 events. So we were looking for are there any other  
23 aspects of a hurricane that would challenge the plant  
24 and we looked at the wind from the hurricane would be  
25 bounded by the tornadoes that had ben analyzed,

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1 etcetera.

2 MEMBER ARMIJO: So that's buried in the  
3 flooding analysis?

4 MS. CUBBAGE: Right.

5 MEMBER ARMIJO: Okay.

6 MS. CUBBAGE: The storm surge and  
7 precipitation event.

8 MEMBER BANERJEE: If there is truly  
9 warming trend in the globe, how can you predict or  
10 even come to grips with what might happen 30 years  
11 from now, 50 years from now?

12 MS. CUBBAGE: Ten years. Yeah. You're  
13 getting to my next slide.

14 (Laughter.)

15 Okay, so the first recommendation was to  
16 order licensees to reevaluate and update their seismic  
17 design basis and flooding hazards. And we're  
18 requesting that this be done using current NRC  
19 requirements and guidance. So you all have been  
20 involved in many ESPs and COL reviews over the past  
21 few years. So we're looking, recommending that the  
22 existing plants be evaluated against the same  
23 standards.

24 MEMBER SHACK: So this is Reg Guide 1.208  
25 for everybody.

1 MS. CUBBAGE: Right.

2 MEMBER SHACK: Okay, so that's a backfit,  
3 backfit.

4 MS. CUBBAGE: And the point would be here  
5 that this wasn't looked at comprehensively for the  
6 operating plants since they received their  
7 construction permits which, in general, was 40 years  
8 ago.

9 So there have been studies, and John set  
10 me up good here with IPEE, etcetera, through the years  
11 that have looked at specific vulnerabilities. But  
12 there wasn't a comprehensive analysis and upgrading of  
13 the plant design basis and protection.

14 MR. GROBE: I think it's important to talk  
15 a little bit about backfit, because backfit involves  
16 multiple characteristics. Most commonly, the one we  
17 think about is cost beneficial backfit. That's not  
18 what the Task Force was thinking. Utilizing the  
19 regulatory framework which Gary clearly articulated,  
20 the Task Force concluded that this is an adequate  
21 protection activity and that's for the Commission to  
22 judge and to establish policy in that area. But the  
23 Task Force concluded that under the backfit rule,  
24 there's a provision for backfits for adequate  
25 protection.

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1                   MEMBER SHACK:  There's been an order, I  
2 view, as a thing of months.  Recommendation 1, I  
3 suspect is going to be years.  And so you're going to  
4 have to deal with this in a -- to be a very short  
5 term.

6                   MR. GROBE:  Analysis may take years and  
7 any necessary modifications could take several years  
8 beyond that.  And for that reason, Amy is going to get  
9 into the short-term recommendations --

10                  CHAIR ABDEL-KHALIK:  I'm just trying to  
11 decipher what you just said.  Are you anticipating the  
12 time frame for orders, number one and two, to be  
13 years.  is that what you said?

14                  MS. CUBBAGE:  From the recommendation  
15 perspective, we don't know what the Commission will  
16 ultimately decide, but from a recommendation  
17 perspective orders being issued in a matter of months,  
18 but the implementation would take up -- could take  
19 years to do the analysis and then eventually upgrade  
20 plants if needed.

21                  CHAIR ABDEL-KHALIK:  Part of the order  
22 also includes upgrading plant design as necessary to  
23 protect against the updated hazards.

24                  MS. CUBBAGE:  That won't happen in months.

25                  CHAIR ABDEL-KHALIK:  That's what I'm

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1 trying to clarify.

2 MR. GROBE: The Commission has two  
3 opportunities to establish new requirements and only  
4 two. It's orders or rulemaking. And in many of these  
5 areas where the Task Force concluded that there is a  
6 need for a lasting regulation, we recommend in  
7 addition to some prompt action, prompt meaning it's  
8 initiated promptly, you also initiate promptly  
9 rulemaking which would come to fruition in two or  
10 three years, unless it's 50.46(a) when it's two or  
11 three decades.

12 So in each of these over-arching  
13 recommendations, there's orders which would be  
14 initiated promptly and may take a short term to  
15 complete if it's an interim action or a longer term to  
16 complete if it's a more lasting action. In  
17 appropriate areas, followed up by rulemaking to  
18 specifically codify that in the regulations or in some  
19 cases the conclusion, our conclusion was there is not  
20 a need for a rulemaking, that simply issuing the order  
21 is sufficient.

22 Amy, why don't you go on with this.

23 MEMBER SHACK: Just one more. Your  
24 flooding stuff is still 1.59 Rev 2 which is --  
25 although it's more than any of the other analyses for

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1 most of the plants is still 1977. It's a long time  
2 ago.

3 MS. CUBBAGE: Right.

4 MEMBER SHACK: You're supposed to be  
5 working on one.

6 MS. CUBBAGE: Yes.

7 MEMBER SHACK: But do you know whether  
8 that's still a probable maximum flood kind of  
9 deterministic thing or is it a probabilistic National  
10 Research Council kind of thing?

11 MS. CUBBAGE: It's still early in the  
12 development, but I believe it's still going to be a  
13 probable maximum. But the bottom line is that we've  
14 concluded that what's being done for the reactors, the  
15 new reactor reviews today using the current regulatory  
16 guidance would be sufficient basis to use 40 existing  
17 plants to reevaluate against.

18 MEMBER STETKAR: Amy, let me put you on  
19 the spot. I was going to ask it earlier when we were  
20 talking about imminent risk and relative risk, but I  
21 decided to wait until the word seismic showed up.

22 There's a statement in the report and the  
23 reason I ask this is I want to try to understand how  
24 this statement or the notion of this statement may  
25 have affected your thought process. I don't want to

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1 focus on specific numbers, but I'll quote a statement  
2 out of the report. It says "Typically, a margin of 2  
3 exists above Safe Shutdown Earthquake. This is to say  
4 plant equipment failures are unlikely unless seismic  
5 loads are about twice the design basis SSE loads.  
6 Such loads generally correspond to an earthquake's  
7 frequency five to ten times less likely than the  
8 design basis SSE."

9 So I was wondering what is the basis for  
10 that statement. That's presented as a statement of  
11 fact. I looked at seismic hazard curves for a number  
12 of sites and the typical SSE accelerations are in the  
13 .25 to .35. So if you double that, you're up about .5  
14 to .7G.

15 If you look at the seismic hazard curves  
16 you're in a relatively flat area of the seismic hazard  
17 curves. There are reductions in the frequency, but  
18 they tend to be on the order of a bout a factor of 2  
19 to 3, not 5 to 10 for a factor of 2 increase in peak  
20 ground acceleration.

21 So I'm curious, does this pervasive notion  
22 that we have very large margin, factor of 2, and I  
23 don't know what that factor of 2, whether that's on a  
24 HCLPF basis -- for the reporter, that's high  
25 confidence low probability of failure -- HCLPF. HCLPF

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1 basis as the plant level fragility. Is it a median  
2 capacity?

3 This notion of well, we have very large  
4 margin for very, very rare events. Is that indeed  
5 supported by the information that we have available?  
6 And sort of what's the technical underpinning of that  
7 statement that's simply presented a statement of fact?

8 MR. HOLAHAN: I think it is and I think  
9 it's generally consistent with what the -- not only  
10 the IPEEEs were identifying, but in the new reactor  
11 design reviews, you specifically look at Safe Shutdown  
12 Earthquake and HCLPF levels and sometimes it's a  
13 factor of 2 and sometimes it's 1.67. And my  
14 recollection is we found almost consistently that they  
15 didn't require plant modification sin order to show  
16 that the fragility levels --

17 MS. CUBBAGE: I think the section of the  
18 report you're talking about is with regard to  
19 protection of the Station Blackout equipment for  
20 beyond --

21 MEMBER STETKAR: It's actually Section  
22 4.2.1.

23 MS. CUBBAGE: Right. And I think the  
24 point in that area was we were looking for the cliff-  
25 edge and where you have a slightly higher frequency of

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1 an event, but with much greater consequence. So with  
2 the flooding, if you have a quote unquote dry site  
3 where you have -- your flood is at X level and your  
4 protection is at that same level and then you have a  
5 flood of slightly higher frequency and then you're  
6 going to inundate the site, we didn't see that same  
7 effect with the seismic events where you could have a  
8 slightly higher frequency earthquake and have a really  
9 --

10 MEMBER STETKAR: I certainly agree with  
11 that. I was just curious about --

12 MS. CUBBAGE: That's the philosophy --

13 MEMBER STETKAR: The numerics as they're  
14 presented.

15 MS. CUBBAGE: The numerics weren't a  
16 strong factor in the conclusion.

17 MEMBER STETKAR: Okay. I hope not.

18 MS. CUBBAGE: Okay, so moving on here,  
19 coming back to Dr. Banerjee's question about what's  
20 going to happen in the future. And so we're  
21 recommending a rulemaking such that licensees would be  
22 required to confirm their seismic and flooding hazards  
23 every ten years. This isn't necessarily go back and  
24 redo everything, but if there's new information that  
25 has come to light that would call into question the

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1 seismic and flooding protection -- is that a question  
2 -- okay. That was basically the thought on that.

3 MEMBER STETKAR: I'll follow up now on  
4 Sam's question. Why only seismic and flooding? We've  
5 learned a heck of a lot about fire analysis, for  
6 example, over the last 10 to 15 years, both the  
7 frequency of fires, the modeling of fires in both a  
8 deterministic and probabilistic sense. That has not  
9 been factored in -- it will be for plants that have  
10 opted to transition to the risk-informed fire  
11 protection program which is about half the fleet. It  
12 will not be factored in explicitly to the other half  
13 of the fleet.

14 MS. CUBBAGE: You raise an excellent  
15 point. In writing this report, we tried to stay very  
16 focused on the insights from the Fukushima events.  
17 There were a lot of issues out there that could be  
18 addressed through other regulatory processes and  
19 programs. And through the years, if new information  
20 comes out in say ten years with regard to fire hazards  
21 or tornado hazards, this recommendation doesn't  
22 preclude the staff from pursuing those through the  
23 appropriate regulatory avenues.

24 MEMBER SHACK: But in a holistic sense of  
25 what did we learn or what are we learning from

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1 Fukushima or those types of events, if the rulemaking  
2 focuses only on seismic and flooding, we are now being  
3 reactionary to the specific Fukushima event and not  
4 scaling back --

5 MR. HOLAHAN: I think you make a good  
6 point, but this isn't where it belongs. If you follow  
7 Recommendation 1, if you adopt the framework and if  
8 you follow through on the associated rulemakings, you  
9 could probably convince yourself that requiring all  
10 the plants to do 805 would make sense in that context.

11 MEMBER BLEY: The one thing I'd like to  
12 point out on that that troubles me is that's coherent,  
13 but if it should be decided not to do Recommendation  
14 1, but proceed with these orders, that context is  
15 lost.

16 MEMBER STETKAR: So for example, the  
17 Commission decides that Recommendation 1 requires  
18 further study over the next decade and yet they  
19 proceed to make approvals or acceptance of these  
20 individual recommendations and decide that  
21 Recommendation 2 in specific rulemaking focused only  
22 on seismic and flooding is a good idea, we've lost --

23 MR. HOLAHAN: Perhaps the Committee would  
24 like to make a recommendation to the Commission on  
25 that point.

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1 (Laughter.)

2 MS. CUBBAGE: And with regard to  
3 seismically-induced fires, we do have a recommendation  
4 that the long-term evaluation take additional  
5 consideration there.

6 But moving back to my last detailed  
7 recommendation on design basis protection, we have an  
8 order for interim action that we're recommending that  
9 licensees perform walkdowns to identify seismic and  
10 flooding vulnerabilities and to address those. So  
11 that's a near-term action that would bridge the gap  
12 until the other order could be implemented.

13 MR. GROBE: I just think it's important to  
14 keep in mind that this was a 4-month long, 90-day  
15 study and it was intended to focus on the Fukushima  
16 lessons learned and we broadened in a number of areas  
17 from that, but tried to keep focused on the Fukushima  
18 lessons learned and to move the ball down the field.

19 MEMBER STETKAR: One of the -- there are  
20 statements in the report -- Mike, stop breathing.

21 (Laughter.)

22 I lost my train of thought.

23 MEMBER CORRADINI: Can I take a breath  
24 now?

25 (Laughter.)

1                   MEMBER STETKAR: The notion is that some  
2 of the early section of the report talked about the  
3 historical growth of where we are in the regulatory  
4 process and how individual issues as they have arisen  
5 have been addressed with very focused reactions, if  
6 you will, in terms of the Commission.

7                   And part of my concern is that we don't  
8 necessarily in this particular activity continue to  
9 foster that. In other words, just because Fukushima  
10 was seismic and flooding, we now use that information  
11 to focus changes to the regulatory process or for  
12 specific recommendations only on those issues. Are we  
13 still fostering that issue-specific reactionary type  
14 of response?

15                  MR. HOLAHAN: This is entirely consistent  
16 with what the Task Force felt. In fact, originally,  
17 Recommendation 1 was in the back of the report. It  
18 was -- because that's where we looked at NRC programs.  
19 It was just one more of the NRC programs.

20                  And having looked at the report and its  
21 structure a few times, we realized that the framework  
22 concepts make sense if you understand the framework  
23 concept, you understand the other recommendations  
24 better. They make more sense. So we actually moved  
25 it up front and that's why it's disconnected from the

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1 other NRC programs in the report.

2 CHAIR ABDEL-KHALIK: The concern is time  
3 frames. The first recommendation will likely take a  
4 lot longer to implement than any of the other  
5 recommendations and therefore there's internal  
6 inconsistency.

7 MR. GROBE: I'm not sure about that. Go  
8 ahead, Gary.

9 MR. HOLAHAN: Yes, yes, of course. In my  
10 mind I reconcile those by thinking that if the  
11 Commission would accept conceptually that it wants to  
12 work on Recommendation 1, that it could then move  
13 forward on the other recommendations anticipating what  
14 direction its going.

15 You don't actually wait for the  
16 Recommendation 1 to settle, but the other  
17 recommendations are initiated with an understanding  
18 that yes, I generally do want to do more and more  
19 consistent regulation beyond the design basis. And  
20 maybe the Commission that Recommendation 1 would be  
21 done sort of in pieces.

22 I had a very high conceptual level, yes.  
23 I'm comfortable with the idea of doing more and more  
24 consistent regulation beyond the design basis. How it  
25 is to be done, I'll work out over a three-year policy

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1 statement and a two-year rulemaking, but in the mean  
2 time acknowledging that I want to put the NRC's  
3 footprint on this area. I can move forward in the  
4 other recommendations. So to me, they're not  
5 incompatible, but they do require a subtlety.

6 MR. GROBE: I think it's the Task Force's  
7 view that all of these actions should be started now  
8 and they will take a variety of times to complete.  
9 There are some, what we would consider interim  
10 actions. It should be accomplished at the plants in  
11 fairly short time frame.

12 But the policy statement could be  
13 developed over a period, as Gary said, a couple of  
14 years and that would be concurrent with these other  
15 specific technical activities taking place at the  
16 plants and once the policy statement is established,  
17 and a rulemaking potentially is put in place,  
18 additional actions could be precipitated from that  
19 beyond these specific actions.

20 I think we're up to Recommendation 4.

21 MS. CUBBAGE: I had glossed over that one.

22 MR. DORMAN: The existing guidance for  
23 Station Blackout focuses on the off-site power  
24 supplies' exposure to high winds and heavy snows. And  
25 it focuses on the onsite power supplies from the

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1 standpoint of reliability.

2 It does not look at a common-mode failure  
3 to the on-site and off-site power supplies. It looks  
4 at the potential for recovering off-site power within  
5 a period of two hours and factors that into the  
6 consideration for the coping. And results in, for all  
7 of the existing plants, a coping capability of four to  
8 eight hours for a Station Blackout.

9 From an operating experience standpoint,  
10 that has worked well for us. We've had one Station  
11 Blackout event in the U.S. fleet that lasted less than  
12 one hour. It resulted from a crane being backed into  
13 switchgear. But the experience of Fukushima involving  
14 an earthquake and tsunami that caused a common-cause  
15 failure not only to the off-site supply and the on-  
16 site supply but also the on-site distribution system,  
17 which was flooded, and essentially put the Fukushima  
18 Daiichi plant into a state of essentially  
19 unrecoverable Station Blackout.

20 And so we have a recommendation for  
21 strengthening the coping for prolonged Station  
22 Blackout events. And we developed a strategy, if we  
23 go to the next slide, that is a three-phase strategy  
24 that is ultimately looking to get resources from off-  
25 site that will provide the cooling functions for the

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1 reactor and the spent fuel pools and maintaining the  
2 containment function for essentially a sustained  
3 period of undefined duration using those off-site  
4 resources.

5 CHAIR ABDEL-KHALIK: Why such specificity?  
6 Why not a performance-based rule?

7 MR. DORMAN: I think ultimately, if I get  
8 down into the details, I think you'll see some of the  
9 performance-based concepts that we had in here. And  
10 we put a couple of specific time frames on there that  
11 were reflective of our thought of what were reasonable  
12 time frames.

13 And we have a full expectation that if the  
14 Commission does choose to proceed to a rulemaking on  
15 this, that all of that will be fully vetted in the  
16 rulemaking process. And could potentially end up  
17 either with a specificity like this or with a more  
18 general performance-based rule.

19 MEMBER BLEY: Well, let me follow that up  
20 just a little because that concerned me as well.  
21 Seventy-two hours, I assumed you came up with as a  
22 period in which off-site resources could be brought to  
23 bear. And it certainly seems to me that that's highly  
24 variable, depending on where the site is around the  
25 country.

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1           And, you know, anchoring it more to that  
2           kind of a performance base is just -- it makes a lot  
3           more sense to me than having everybody meet the worst  
4           case when the worst case doesn't apply to them at all.

5           MR. DORMAN: Sure. When we talk about the  
6           preplanned off-site resources, we talk about  
7           preplanned, pre-stage resources, including  
8           considerations of the transportation mode to get them  
9           there, including potential degradation of the  
10          transportation infrastructure as a result of the event  
11          that caused the Station Blackout.

12          And so we envisioned something that was  
13          regionally located. It might be available to support  
14          multiple different facilities although you'd have to  
15          consider whether that same initiating event that  
16          blacked out one facility might also black out another  
17          facility that are both relying on the same equipment.

18          But in our thought process, we were  
19          thinking that that equipment could be provided to the  
20          site within 24 to 48 hours with some reasonable  
21          margin. That's how we came into the 72-hour time  
22          frame to get that equipment to the site, installed,  
23          and providing the cooling functions.

24          So certainly if you had a site that could  
25          demonstrate that they had the preplanned, pre-stage

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1 resources available and could be installed in 12  
2 hours, you could discuss a more performance based,  
3 less extended coping period.

4 Similarly, if you have -- when we looked  
5 at the extended coping, we were looking at on-site  
6 resources, perhaps not -- perhaps the portable  
7 equipment. So we were thinking specifically of the  
8 B5b equipment that was put in place after 9/11. And  
9 if you could demonstrate the ability for the operators  
10 to get that equipment in place and functioning within  
11 say two hours, then maybe eight hours would be an  
12 excessive time.

13 So you could go to a performance based.  
14 But our thought process in looking at -- was really  
15 focused on a minimum coping and an extended coping and  
16 bringing in the off-site resources. So that's how we  
17 built that three phase.

18 And the focus of that minimum coping time  
19 is providing the time for the operators with minimal  
20 operator actions because we want the operators focused  
21 first on getting either on-site or off-site power  
22 back. But if they find themselves in a Fukushima-type  
23 event where that's clearly not going to happen in this  
24 time frame, that they would then be focusing their  
25 efforts on getting that portable equipment in place

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1 and getting the extended coping function up and  
2 running so that you can then focus on getting the off-  
3 site resources in.

4 MEMBER STETKAR: And I agree with Dennis  
5 and Said about the performance-based requirement for  
6 the specific times. But I want to understand the  
7 notion of the initial coping period that's listed as  
8 eight hours here. It says permanently installed  
9 equipment.

10 In your notion of that, would that include  
11 credit, for example, for Station Blackout diesels that  
12 people have installed? Or would it not include credit  
13 for the Station Blackout diesels? In other words, are  
14 you looking at primarily eight hour dc-operated  
15 equipment? No ac power?

16 MR. DORMAN: I think we could --

17 MEMBER STETKAR: And that's a very  
18 important distinction because I've seen many people  
19 say well, I can cope with a Station Blackout, which is  
20 traditionally called loss of all ac power, because I  
21 can start my Station Blackout diesel in one hour, by  
22 definition, and therefore I can cope with a Station  
23 Blackout for eight hours because my diesel is running  
24 for seven hours. That to me is not loss of all ac  
25 power.

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1 MR. DORMAN: Right. Right. And  
2 particularly one of the elements of the Fukushima  
3 event is that the switchgear associated with the  
4 distribution of on-site ac power was all flooded out  
5 and shorted out. So I think one of the things that  
6 would have to be explored in any such rulemaking and  
7 guidance development is is that acceptable? Or does  
8 that Station Blackout diesel need to provide the  
9 appropriate loads through an independent switchgear  
10 that's also in an elevated location about any flooding  
11 event.

12 MEMBER STETKAR: But the notion, if I hear  
13 you, is that that eight hours could include credit for  
14 the Station Blackout diesel.

15 MR. DORMAN: I could see it including that  
16 because what we're starting with is the off-site power  
17 and the on-site power. That's the starting point of  
18 the --

19 MEMBER STETKAR: The Station Blackout?  
20 Diesel is not on-site power?

21 MR. DORMAN: Station Blackout is defined  
22 as the design basis diesel generators. That's how it  
23 is defined in the rule. So if you had a separate  
24 electrical distribution to the necessary loads, I  
25 think that would be --

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1                   MEMBER STETKAR: But if the seismic event  
2 destroyed that separate distribution, we still have no  
3 ac power.

4                   MR. DORMAN: And those are all aspects  
5 that warrant development in the rulemaking, yes.

6                   MEMBER STETKAR: Well, that was what I was  
7 trying to understand what the basic concept of that  
8 initial coping period --

9                   MR. DORMAN: Yes.

10                  MEMBER STETKAR: -- not specifics of  
11 individual designs or where the switchgear is located  
12 -- is that initial coping period meant to deal with a  
13 situation where there is no alternating current  
14 available in the plant. From any possible source  
15 whatsoever.

16                  MS. CUBBAGE: Generally speaking, the  
17 current requirement -- I mean the alternate ac, which  
18 you're talking about a Station Blackout diesel is not  
19 protected from site design basis seismic events.

20                  MEMBER STETKAR: That's correct. But I'm  
21 --

22                  MS. CUBBAGE: So that's why the intent of  
23 the report was ac-independent. But I think what we're  
24 saying is that through the rulemaking process if some  
25 proposal was an alternate, that that would have to be

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1 considered.

2 MEMBER STETKAR: Okay.

3 MS. CUBBAGE: It would have to be fully  
4 protected -- both the source, the distribution, and  
5 the systems that supply it would have to be fully  
6 protected from seismic events and beyond design basis  
7 flooding events.

8 MR. DORMAN: I know this also goes to the  
9 issue you raised earlier about the seismic margin. As  
10 we're into the -- what we were referring to as the  
11 extended design basis. And so when we look at this --  
12 this alternate -- this coping capability, when we  
13 looked at the seismic margin, we said it's not a cliff  
14 edge on the seismic. But on the flood, it potentially  
15 is a cliff edge, depending on where the equipment is  
16 located and the flooding margins.

17 But -- so in the recommendations, we talk  
18 about putting the coping capability equipment one  
19 plant level above the design flood to ensure that it  
20 is not taken out by the extended basis flood; whereas,  
21 with the extended basis seismic, we were looking at  
22 the existing seismic capacity margins of equipment to  
23 provide some of that.

24 MEMBER STETKAR: Just putting it higher in  
25 the plant makes it more susceptible to seismic damage

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1 but that's a different issue.

2 MEMBER BLEY: Did you have time in your  
3 short 90 days to look at the history of the ability to  
4 deliver major equipment to sites of extreme  
5 environmental events?

6 MR. DORMAN: No.

7 MEMBER BLEY: You need to do that.  
8 There's a lot of experience there. And we can learn  
9 a lot from that.

10 MR. DORMAN: Sure.

11 MEMBER BLEY: Okay.

12 MEMBER BROWN: Just to be contrary, I like  
13 performance-based stuff as well as everybody else.  
14 But in the limit, you can view a performance-based  
15 could predict that zero time is just fine for a coping  
16 circumstance. Let me finish my thought.

17 There have been several circumstances over  
18 the last 30 or 40 years where we had large regional  
19 blackouts of all electricity throughout the entire  
20 Northeast region or several other regions. They could  
21 have occurred during a circumstance where you had a  
22 tornado slip through and you have that coincidence,  
23 that nexus hit the plant, took it out, took down the  
24 entire region, and damaged what looked like a  
25 reasonable infrastructure. And you had difficulty

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1 time.

2 So, you know, some minimum time, to me, as  
3 the result of a performance study had to -- personal  
4 opinion obviously, because the limit is zero in these  
5 circumstances. So, you know, whether you pick eight  
6 or four or whatever and say well, gee, we've got all  
7 these roads coming in, we've got all this stage  
8 equipment that can get there and it's only two hours  
9 away, and we've got multiple sources on site, we've  
10 already seen circumstances where multiple sources  
11 didn't solve the problem.

12 And you've got the circumstance where you  
13 can't get off-site power, you can envision that just  
14 based on the normal power system. Forget the nuclear  
15 aspects of it. So while I'm as much in favor of  
16 performance-based standards as anybody else, you have  
17 to be very, very careful when you start doing that.

18 There ought to be some -- my position is  
19 that you have to have some minimum whether -- now we  
20 can argue 72, 64, or 48 --

21 MR. GROBE: As has been articulate, this  
22 is largely a performance-based --

23 MEMBER BROWN: But I just wanted to  
24 provide a counterpoint to this performance-based, risk  
25 --

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1 MR. GROBE: As Dan articulated, this is a  
2 largely performance-based expectation with these time  
3 frames. And I think one of the things to make sure we  
4 keep in mind is that these types of events are highly  
5 unpredictable. And that was the basis for the eight  
6 hours with minimal operator actions, normal operator  
7 actions, 72 hours for extended coping, giving you  
8 enough time to get off-site resources brought to bear.

9 MEMBER BROWN: Okay. I made my  
10 contrariness --

11 MR. DORMAN: And an interim action in this  
12 area, one of the insights from the temporary  
13 instruction, looking at the B5b equipment, the B5b  
14 equipment, because it was intended for fires and  
15 explosions, was stored in locations where it would be  
16 away from the fire and explosion. But it was not  
17 necessarily considered for earthquakes and fires.

18 And so we recommend that they be required  
19 to do reasonable protection from natural phenomenon.  
20 By this we mean don't go out and build a new building.  
21 But as a near-term action, if you can move it up a  
22 hill and put it into a warehouse that's a high-up  
23 location, protected from flood, that they do that.

24 Also, the basis for the B5b equipment, the  
25 capacity of it, is based on a single-unit event. And

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1 we recommend that they be required to enhance that to  
2 address multi-unit events.

3 CHAIR ABDEL-KHALIK: Big picture question.  
4 If the Station Blackout capabilities are indeed  
5 strengthened to be able to provide or maintain core  
6 cooling and spent fuel pool cooling, as you suggest,  
7 and maintain RCS and containment integrity, would that  
8 make your other recommendations somewhat -- or many of  
9 your other recommendations somewhat less urgent.

10 MR. DORMAN: I think it goes back to the  
11 framework. As we look at balancing the layers of  
12 protection and mitigation and emergency preparedness  
13 and a balance application of a defense-in-depth  
14 philosophy, we see these as an integrated set within  
15 that framework.

16 MEMBER ARMIJO: But as far as priority,  
17 this Recommendation 4 is the heart of the action is  
18 the way I see it. You know if you really were  
19 successful implementing Recommendation 4 protecting  
20 the plants, all this other stuff --

21 MR. HOLAHAN: But if you are really  
22 successful at implementing recommendation two, you  
23 wouldn't have the flood or the seismic activity. It  
24 is a defense-in-depth concept. It says strong  
25 prevention, strong communication, strong preparedness.

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1 It does them all.

2 MR. DORMAN: Right.

3 MEMBER ARMIJO: Now everyone will have  
4 their favorites.

5 CONSULTANT BONACA: Why is eight hours and  
6 72 hours extended coping adequate? I mean are you  
7 doing all that is possible with the current equipment,  
8 et cetera? Or are we trying to do everything that has  
9 to be done? Which may not be the same thing. I mean  
10 I'm looking at eight hours and 72 hours extended  
11 coping. It is nothing new except some of the times  
12 have been extended.

13 MR. DORMAN: Right. I think the eight  
14 hours is very similar to the existing requirement. If  
15 you look at -- I think it is the first bullet under  
16 the recommendation talks about the functions that we  
17 would propose to be required as expanded to include  
18 the spent fuel pool cooling and avoiding loss of  
19 coolant accidents. We were thinking in particular of  
20 the reactor coolant pump seal failures.

21 So there is a scope of the requirement  
22 that we would propose be a little bit broader than the  
23 existing coping requirement. But the basic function  
24 is very similar for the eight hour.

25 The 72 hour is bringing to bear a broader

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1 set of equipment that will give you a greater capacity  
2 of duration until you get the off-site resources  
3 delivered to the site. That's the ultimate goal of  
4 this recommendation is to get the off-site resources  
5 delivered to the site to provide a sustained cooling  
6 capacity until the normal infrastructure can be  
7 restored to the site.

8 MR. GROBE: I'd like to move on if we're  
9 ready to three completely commonsensical and no-  
10 discussion-necessary additional recommendations.  
11 They're much more focused. They're not nearly as  
12 broad and systemic as the recommendations you've heard  
13 so far.

14 The first is Recommendation 5, a  
15 recommendation to require a reliable hardened vent  
16 designs for BWRs with Mark I and II containment  
17 designs. Currently, the situation in the United  
18 States is that following some studies that indicated  
19 some vulnerabilities on Mark I containment designs,  
20 all of the licensees operating Mark I containment  
21 designs voluntarily put in what is referred to as a  
22 hardened vent.

23 There were no requirements associated with  
24 this hardened vent. So as a result of that, the vent  
25 designs have a great deal of variability associated

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1 with how they were implemented. So if you go to the  
2 next slide, the task force looked at the actions that  
3 the Commission had taken in the past years regarding  
4 this issue of vulnerability of BWR containment designs  
5 and concluded that there is a great deal of similarity  
6 between the Mark I and Mark II designs regarding the  
7 volume of containment.

8 And as a result of that, the  
9 recommendation addresses both Mark I and Mark II  
10 designs. That the industry would be engaged to  
11 assisted in the clarification of design objectives and  
12 performance objectives for these Mark I and Mark II  
13 hardened vents.

14 The focus would be on a stronger emphasis  
15 on ease of reliability on passive designs in lieu of  
16 active designs where multiple valves have to be opened  
17 and closed. So ease of opening and closing the vent  
18 would be a characteristic.

19 MEMBER ARMIJO: Jack, before you go, the  
20 word require reliable hardened vent, does that imply  
21 that the task force believes the current hardened  
22 vents in U.S. Mark Is are unreliable? Or they haven't  
23 been demonstrated to be reliable?

24 MR. GROBE: Well, I have a great deal of  
25 difficulty dealing with binary concepts.

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1 (Laughter.)

2 MR. GROBE: No, we have not concluded that  
3 they are not reliable. What we have concluded is  
4 there is a great deal of variability in how they were  
5 designed. It might be illustrative to focus on  
6 Fukushima and then one BWR that we looked at in  
7 detail.

8 At Fukushima, there was a requirement of  
9 operation of a valve to admit air to two air-operated  
10 valves that were in series to open. And that would  
11 begin the venting process. But another motor-operated  
12 valve had to be opened. So you're talking four  
13 separate valves that had to operate in a Station  
14 Blackout scenario.

15 That was a very difficult thing to  
16 accomplish. And, in fact, it appears that the  
17 operators never were successful in venting containment  
18 in any of the units at Fukushima.

19 MEMBER ARMIJO: Yes, in the U.S. plants,  
20 is there any testing of the hardened vents that has  
21 been done or is done to demonstrate that they will  
22 work?

23 MR. GROBE: There is no required testing.

24 MEMBER ARMIJO: There's no required -- do  
25 you know of any testing --

1 MR. GROBE: For voluntary initiatives, as  
2 a consequence, they're not -- they don't show up in  
3 the technical specifications. There's no required  
4 surveillance requirements. They're not necessarily  
5 incorporated into the ASME in-service test program.

6 MS. CUBBAGE: I might add if they were  
7 tested voluntarily, they would probably be tested  
8 against their current design requirements, which would  
9 assume they had power. So we're looking at a scenario  
10 under a Station Blackout where you don't have the  
11 normal --

12 MEMBER ARMIJO: Right, right.

13 MS. CUBBAGE: -- capability. So we want  
14 to make sure that they would be able to be opened without  
15 power.

16 MEMBER ARMIJO: So this reliable under  
17 conditions that are not part of the design basis.

18 MS. CUBBAGE: Not currently part of the --

19 MEMBER ARMIJO: Design.

20 MS. CUBBAGE: -- design of the systems  
21 that are in place.

22 MR. GROBE: And we did look at one  
23 specific plant design here in the United States. It  
24 was a Mark I containment design. And there was one  
25 valve that was within a foot of the torus. There was

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1 two other valves that were in auxiliary buildings, one  
2 in the turbine building, that were high in the  
3 overhead without easy access to them.

4 In a Station Blackout and flooding  
5 situation that was similar to Fukushima, the one valve  
6 in the torus area would be flooded. It would be  
7 underwater. So it becomes very difficult to operate  
8 manually. And the other two would require the  
9 installation of scaffolding and ladders and things of  
10 that nature.

11 So that's the type of design that is  
12 effective. I mean the system would work under normal  
13 circumstances. But in the beyond design basis  
14 circumstances that Fukushima experienced, there would  
15 be challenges similar to what was experienced at  
16 Fukushima.

17 MEMBER ARMIJO: In the very short time you  
18 had to look at it, did you identify a best practice  
19 design that had features that you thought would be --

20 MR. GROBE: When the original designs were  
21 put in place, there was a "best practice" identified.  
22 Our recommendation is that be revisited and in  
23 conjunction with the staff and the industry, develop  
24 a clear set of expectations for the design of these.  
25 And that they be required to be implemented.

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1 John?

2 MEMBER STETKAR: Some of the members of  
3 the task force have their favorite designs.

4 (Laughter.)

5 MR. GROBE: One of the -- I'm looking at  
6 a completely passive system.

7 MEMBER STETKAR: Well, I was hopeful until  
8 you just said that. Have you looked at -- I'm not as  
9 familiar with level three-type risk assessments of  
10 BWRs as I am Pressurized Water Reactors. I have  
11 looked at purely passive vent designs for large, dry  
12 PWR containments.

13 And conclusions from a level three risk  
14 assessment is that a purely passive design, rupture  
15 discs, may not be the most risk-averse design.  
16 Because when the rupture disc, it goes when it wants  
17 to go. You may protect the containment from over  
18 pressure. But off-site releases may not be best  
19 managed in that design compared to a design where you  
20 can indeed have some control over the venting,  
21 provided that the operators can control the venting.

22 So that's, in a sense, Jack, you  
23 mentioned, you know, revisiting the design basis and  
24 looking at a more integrated --

25 MS. CUBBAGE: Well, if you look -- we are

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1 talking about closing, capability to close as well,  
2 number one.

3 MEMBER STETKAR: Yes, well, this is  
4 control thing.

5 MS. CUBBAGE: Number two, is is a  
6 prevention of containment over pressure before you've  
7 had core damage is the intent.

8 MEMBER STETKAR: But when a rupture disc  
9 is opened and you can't isolate it --

10 MS. CUBBAGE: Well, that's -- the key is  
11 that the performance objectives would have the  
12 capability to reclose. And also with the BWR with the  
13 scrubbed release, it may propose a different scenario  
14 than what you're describing.

15 MEMBER STETKAR: BWR may be different than  
16 mine but whenever I hear that purely passive design,  
17 I think well, it's fine. We'll put in a rupture disc  
18 and everything else can fail and the rupture disc will  
19 open and we're protected.

20 MR. GROBE: Let's continue. If we go to  
21 the next slide, with respect to other containment  
22 designs, Mark IIIs, isolation condensers, and large  
23 dry containments, the task force recommended that this  
24 be evaluated and studied.

25 Next slide. Recommendation 6 contained

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1 hydrogen control. The conclusion from the task force  
2 is that we really don't understand the lessons from  
3 Fukushima with sufficient clarity to make a specific  
4 recommendation on hydrogen control.

5 It's still not clear how the hydrogen got  
6 from the containment, the drywell and wetwell into the  
7 reactor building. It's certainly not clear how the  
8 hydrogen got from some location into Unit 4, whether  
9 that was a cross-connect between Unit 3 or if  
10 combustible gases were generated or released somehow  
11 within Unit 4.

12 So the recommendation is that this issue  
13 be studied as more information is gained from  
14 Fukushima and recommendations be made in the future if  
15 it is deemed appropriate.

16 CHAIR ABDEL-KHALIK: But let me just  
17 expand on that a little bit. Is this really the only  
18 issue that we don't fully understand from Fukushima?

19 MR. GROBE: Oh, absolutely not.

20 CHAIR ABDEL-KHALIK: Okay. So you  
21 acknowledge from the very beginning that, you know,  
22 your report is based on limited information from  
23 Fukushima and, therefore, one can say that all the  
24 recommendations in your report, including this one,  
25 and all the recommendations in the reports issued by

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1 other groups that did similar studies, are really  
2 addressing things that became self-evident.

3 MR. GROBE: Yes.

4 CHAIR ABDEL-KHALIK: So where are you  
5 recommending that, you know, meaning the NRC, should  
6 be proactive in collecting information so that you can  
7 actually capture all the lessons to be captured from  
8 Fukushima?

9 MR. GROBE: That's already been a  
10 recommendation or an expectation of the Commission.  
11 The Department of Energy is taking the lead. And  
12 we're collaborating with them on detailed study.

13 The government of Japan just chartered a  
14 thorough study group for Fukushima to develop the more  
15 detailed sequences of events and equipment performance  
16 and seismic performance. So that is already in place.  
17 So it didn't need to be a recommendation of this task  
18 force.

19 CHAIR ABDEL-KHALIK: Okay.

20 MS. CUBBAGE: Our -- yes, I believe that  
21 is discussed somewhere in the report. The continuing  
22 review is going to be covered by our long-term  
23 evaluation. But these are specific areas where we are  
24 recommending that there be long-term evaluation.

25 MR. DORMAN: Yes, it's at the end of

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1 Chapter 2. In our brief summary of what we did have  
2 on the sequence of events, we emphasized the need to  
3 maintain awareness and develop further insights in the  
4 long-term follow up. So it was broadly put but it was  
5 there.

6 CHAIR ABDEL-KHALIK: All right.

7 MEMBER REMPE: So there is a proactive  
8 recommendation that individuals from the NRC should  
9 perhaps start identifying some key data with respect  
10 to components that may have failed or data with  
11 respect to understanding how the progression occurred?

12 MR. GROBE: Yes. That's not a  
13 recommendation of our task force.

14 MEMBER REMPE: But I think it is  
15 important.

16 MS. CUBBAGE: But it is somewhere and it  
17 is included in the initial tasking of the staff for a  
18 short-term review or near-term review and the longer-  
19 term review. And that is inherent in the objectives  
20 of the longer-term review. We alluded to it at the  
21 end of Section 2 of the report. And then we've  
22 identified some specific topics we recommend. But the  
23 responsibility for overall looking at the additional  
24 insights is being tasked.

25 MR. HOLAHAN: It is also acknowledged in

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1 the discussion on international cooperation.

2 MEMBER REMPE: It is acknowledged we  
3 should receive the information given us. But I  
4 haven't seen what about let's start being a bit more  
5 proactive in requesting some key parts.

6 MR. HOLAHAN: Participate I thought was  
7 the word.

8 MEMBER REMPE: Okay.

9 MEMBER CORRADINI: So may I ask a question  
10 at this point? It may have been asked and I missed it  
11 but the cooperation between the various agencies, does  
12 it normally include INPO? Because what I've seen from  
13 various discussions is that a lot of the sequences are  
14 not the same in some of the details. And a lot of the  
15 details really matter, particularly now you have been  
16 speaking about hydrogen control.

17 MR. GROBE: The -- I believe, and honestly  
18 I apologize for not having this clearly in mind. But  
19 I believe there is in the process the development of  
20 a Memorandum of Understanding between the NRC and the  
21 Department of Energy. Former Commissioner Lyons -- I  
22 don't know what his current title is or I would refer  
23 to him in that --

24 PARTICIPANT: Assistant Secretary.

25 MR. GROBE: -- Assistant Secretary Lyons,

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1 thank you -- has committed substantial resources to  
2 this effort. And NRR was working on a Memorandum of  
3 Agreement between the two agencies on how we would  
4 collaborate in that regard.

5 I don't know what consideration is going  
6 to be incorporated into that as far as collaboration  
7 with the industry. But that would certainly be a  
8 consideration that would be incorporated into that  
9 work effort.

10 MEMBER CORRADINI: The reason I'm bringing  
11 it up at this moment is because I think hydrogen  
12 control or at least worrying about hydrogen behavior,  
13 it really depends on the details of what might have  
14 occurred there. And as we, the Committee, has heard  
15 in our meetings, there are different interpretation of  
16 those details.

17 And I think before one goes off and does  
18 simulations of this or that, we've got to get clear as  
19 to what we think are the boundary conditions or  
20 initial conditions so that we can get what I would  
21 think are a reasonable set of conclusions. And  
22 understand the uncertainty in those conclusions.

23 MR. GROBE: And that was our  
24 recommendation.

25 Okay. Our Recommendation 7 deals with the



1 spent fuel pool. Could you go to the next slide  
2 please?

3 I think it is clear that the understanding  
4 of the conditions in the spent fuel pools and the  
5 condition of the fuel in the spent fuel pools was a  
6 significant distraction throughout the early event.  
7 It was not at all clear whether the spent fuel was  
8 continuing to be cooled.

9 And for that reason, we made two  
10 recommendations. Typically the spent fuel pool makeup  
11 and cooling systems in the United States are not  
12 safety-related systems. Loss of cooling in the spent  
13 fuel pool was expected to be a very slow-evolving,  
14 non-design basis accident situation. So the  
15 requirements for those systems are less stringent than  
16 they are for other systems addressing design basis  
17 accidents.

18 For this reason, we focused in two areas.  
19 One, as Gary mentioned earlier, is the limited amount  
20 of instrumentation to provide the operators knowledge  
21 of what the condition of the spent fuel pool is.  
22 We're recommending that safety-grade instrumentation  
23 be provided on water level temperature and radiation  
24 levels around the spent fuel pool. And in addition to  
25 that -- if we could go the next slide -- somebody is

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1 good -- we recommended that safety grade electrical  
2 power be provided to the spent fuel pool makeup  
3 system.

4 And the principle focus of this  
5 recommendation is if you focus on safety-grade  
6 electrical power, then it would be incorporated into  
7 the concepts of the Station Blackout approach as well.

8 And that tech specs be updated to require  
9 one train of emergency electrical power to be provided  
10 to the instrumentation and the makeup.

11 MEMBER ARMIJO: Jack?

12 MEMBER STETKAR: I've got a couple of  
13 questions. The term safety-related appears many times  
14 on these slides. The first question is if the  
15 Japanese had safety-related instrumentation and  
16 satisfied all of these requirements, would they have  
17 been able to better monitor the spent fuel pools or  
18 not?

19 MR. GROBE: Well, the fact of the matter  
20 is that the Japanese did not adequately protect  
21 against reasonably anticipatable seismic and tsunami  
22 -- related tsunami events and resulted in a complete  
23 Station Blackout.

24 MEMBER STETKAR: Okay. You didn't answer  
25 the question yet.

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1 MR. GROBE: The instrumentation, both from  
2 the protective concepts that Amy addressed, the  
3 Station Blackout concepts that Dan addressed, would be  
4 available under this framework of recommendations to  
5 provide key information to the operators such that  
6 they would not be distracted by spent fuel pool  
7 concerns.

8 MEMBER STETKAR: This comes back to my --  
9 let me follow up on the second thing, then you guys  
10 can jump in.

11 This goes back to my definition of what is  
12 a Station Blackout because right now a Station  
13 Blackout is a licensing artificial term. If I define  
14 a Station Blackout as no ac power, no alternating  
15 current power, my notion of what I provide and how I  
16 provide it is different than if I define it as loss of  
17 only the power from my design basis licensing basis ac  
18 supplies.

19 And in the sense that I go back to Dan's  
20 question about what defines that initial coping  
21 period, that eight hours, if I can take credit for  
22 non-safety-related Station Blackout diesel generators  
23 for that coping period, why does this instrumentation  
24 need to be safety related?

25 MR. GROBE: The approach that we

1 recommended was that a safety grade instrumentation be  
2 provided to assure a higher level of reliability and  
3 quality assurance that goes along with the  
4 classification of safety grade so that the  
5 instrumentation would have that pedigree that is  
6 inherent in the classification of safety grade.

7 It invokes procedural controls, testing,  
8 it invokes a whole spectrum of quality assurance  
9 expectations. And that was the focus.

10 MS. CUBBAGE: It also invokes design basis  
11 protection from external hazards.

12 MEMBER BLEY: Let me follow up on John's  
13 question just a little bit. In some things I've read,  
14 I saw that the guys in the power plant were able to  
15 hook up some local power supplies to instrumentation  
16 and read some of the instruments in the plant.

17 If they had the kind of instruments you  
18 are recommending, would they have been able to do that  
19 from accessible areas?

20 MR. GROBE: Certainly. Will all the other  
21 questions be as easy as that one?

22 MEMBER BLEY: Well, let me give you one.

23 MR. HOLAHAN: The intent is that it  
24 wouldn't require any additional hook up.

25 MEMBER BLEY: That's right.

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1 MR. HOLAHAN: That these readouts would be  
2 available in the control room.

3 MR. GROBE: Yes. But if you had a beyond  
4 -- an extended design basis phenomenon occur and you  
5 were in a difficult situation, that would certainly be  
6 the case.

7 MEMBER ARMIJO: Jack, I want to take issue  
8 with your report, page 54. You write -- the task  
9 force writes the presence of releases at multiple  
10 units and spent fuel pools at Fukushima has  
11 highlighted the need for the ability to project doses  
12 from releases at multiple units.

13 As far as I've read, there were really no  
14 significant releases from the spent fuel pools.

15 MR. GROBE: this is really getting into an  
16 area that Nathan is going to talk about in a few  
17 minutes. And it goes fundamentally to the concept of  
18 how we approach emergency planning. And it has very  
19 broad ramifications regarding emergency planning.

20 And I think I'll let Nathan take that on  
21 when he gets there.

22 MEMBER ARMIJO: But well I just want to  
23 take issue because some people will read this and  
24 conclude that there were releases of concern.

25 MR. GROBE: Yes, I apologize. That was

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1 not the intention of that statement.

2 MEMBER ARMIJO: And, you know, my  
3 observations were, at least early in the event,  
4 particularly the Unit 4 explosion, you know, where  
5 else could hydrogen come from except the pool, and it  
6 turned out that wasn't the case at all.

7 And the others pools apparently were in  
8 pretty good shape. And they still are in pretty good  
9 shape. There was some distraction but the Japanese  
10 focused on the cores, which -- or the principle place  
11 to focus on.

12 So a lot of things you are recommending  
13 for the spent fuel pools are good things to do. I'm  
14 not arguing necessarily with that. But the  
15 implication that they were an imminent risk or they  
16 were contributor to radiation dosage to the public is  
17 just wrong.

18 MR. GROBE: I think that is an accurate  
19 statement. It is important to keep in mind that the  
20 design of spent fuel management at Fukushima is very  
21 different than what we have here at the United States.  
22 They, in fact, have a separate water pool in a  
23 separate facility where fuel is transferred to. And  
24 I don't remember the exact numbers of assemblies but  
25 there were very few fuel assemblies in the Unit 1, 2,

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1 and 3 spent fuel pools, on the order of 100 to 500  
2 assemblies as contrasted with our spent fuel pools  
3 which have between 2 and 5,000 assemblies.

4 So the heat loads are very different.  
5 Unit 4 was completely offloaded so it had a fresh core  
6 in the spent fuel pool, relatively fresh -- three  
7 months old.

8 MR. DORMAN: I think your point is well  
9 taken. The best current knowledge is that there were  
10 not significant releases from the pools at Fukushima.

11 MEMBER ARMIJO: Right. And that was the  
12 point. Whether we need to do something more in the  
13 U.S. because of the way we operate, of course that's  
14 a different issue. But it is not based on releases.

15 MR. GROBE: The final aspect of  
16 Recommendation 7 is on the screen now and it addresses  
17 specifically the challenges that were faced at  
18 Fukushima and they could be faced here with getting  
19 water into the spent fuel pools. And those challenges  
20 continue today.

21 I think we'll all recall the photographs  
22 of trying to drop water from helicopters into the  
23 spent fuel pools. Not an easy thing to do as  
24 evidenced by what we observed.

25 This recommendation is for a very simple

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1 piping system to be installed with access at ground or  
2 at grade level outside the building, seismically  
3 qualified to be able to provide spray into the spent  
4 fuel pool. And it is simply a recommendation to ease  
5 the ability to get water into the spent fuel pool if  
6 you find yourself in a beyond the design basis --  
7 excuse me, beyond the extended design basis scenario  
8 of not being able to operate the spent fuel pool  
9 makeup and cooling systems.

10 MEMBER ARMIJO: Jack, why spray as opposed  
11 to just flooding the pool?

12 MR. GROBE: The -- in actuality, it takes  
13 very little water if you spray it to be able to cool  
14 the fuel. So this was intended to be the simplest  
15 means of cooling the fuel. So you need a very low  
16 flow rate if you're going to spray the water over the  
17 spent fuel.

18 MR. DORMAN: And I think there was also a  
19 discussion around the range of potential scenarios for  
20 pools. If you had a scenario that involved leakage  
21 from the pool, spray would still be sufficient to cool  
22 the pool but you would be losing the inventory, where  
23 in a flood scenario, you are just pumping out the  
24 leak.

25 MR. GROBE: Again, these are far beyond

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1 design basis scenarios.

2 And finally, the final slide on  
3 Recommendation 7 is that these be incorporated into  
4 the regulations through a rulemaking process. Several  
5 recommendations deal with emergency planning. I'm  
6 sorry, Gary, the SAMGs.

7 MR. HOLAHAN: This recommendation has to  
8 do with strengthening and integrating on-site  
9 emergency response capability. The emergency  
10 procedures, which are currently required for accident  
11 mitigation, the severe accident management guidelines,  
12 which are a voluntary industry initiative put in place  
13 actually after Three Mile Island, although it took  
14 about 20 years to put them in place.

15 And the severe -- excuse me, the extensive  
16 damage mitigation guidelines and we try to use this  
17 terminology consistently because we're always calling  
18 it B5b instead of their current reference. So we call  
19 them Extensive Damage Mitigation Guidelines. And they  
20 are associated with the Regulation 50.54(hh).

21 Now each of these obviously developed over  
22 a different period of time for a different purpose.  
23 The Emergency Operating Procedures are the original  
24 requirement included in operator licensing, included  
25 in the plant licensing.

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1           Severe Accident Management Guidelines are  
2 voluntary. The EDMGs are required although they are  
3 not included in the operator licensing process.

4           And we saw also not only does each of  
5 these three elements address issues a little  
6 differently, the command and control structure  
7 changes. So it is clear that emergency operating  
8 procedures are implemented by operators in the control  
9 room under the supervision of a shift supervisor.

10           Severe Accident Management Guidelines are  
11 basically developed in the Technical Support Center  
12 that is outside the control room during an accident.  
13 And then instructions basically sent to the operators  
14 on implementing whatever those guidelines called for  
15 and whether it is in the control room or other areas  
16 of the plant. Those command and control decisions  
17 would be made in the Technical Support Center.

18           The EDMGs could be -- could really be done  
19 in a number of places, depending upon the timing.  
20 They could be initiated originally in the control  
21 room. They could be outside the control room in the  
22 Technical Support Center. Remember the EDMGs are  
23 meant to deal with terrorist-type activities with  
24 fires and explosions. And they also deal with a kind  
25 of a distributed decisionmaking. That is individuals

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1 are trained to make decisions if the command and  
2 control structure in the plant is damaged or  
3 interfered with in some way.

4 So we see there are really two elements  
5 here. One is the regulatory treatment of these three  
6 elements of on-site emergency response are different.  
7 And we think it will be -- it would make sense to pull  
8 them together and integrate them more consistently.

9 The command and control could be  
10 simplified. And we saw that command and control was  
11 a problem in Fukushima. There was some difficulty in  
12 the level at which decisions have to be made and where  
13 approvals have to come from.

14 CHAIR ABDEL-KHALIK: Now I am trying to  
15 reconcile the first two aspects of this, which is to  
16 integrate the EOPs, the SAMGs, and the EDMGs versus  
17 clarification of the command and control. By  
18 integrating these three sets, which would work under  
19 different conditions -- the SAMGs are presumably  
20 implemented when the EOPs are no longer applicable or  
21 can be implemented, et cetera. Does that mean that  
22 you are recommending that this sort of integrated set  
23 of guidances, the command and control for that always  
24 remains in the control room?

25 MR. HOLAHAN: No, no, no.

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1 CHAIR ABDEL-KHALIK: So what --

2 MR. HOLAHAN: And, in fact, by  
3 "integrate," we don't mean that all three should be  
4 made into one simple thing. I think they still are  
5 three different things, but they should be made to  
6 work together more smoothly and more consistently.

7 So I think if this recommendation were  
8 accepted, it would still be emergency operating  
9 procedures and severe accident guidelines and EDMGs.  
10 They would still exist. They wouldn't become one  
11 thing.

12 CHAIR ABDEL-KHALIK: Well, that is what I  
13 am trying to understand, the meaning of the word  
14 "integrate." You are just trying to clarify the  
15 interfaces between these three sets?

16 MR. HOLAHAN: More than just the  
17 interfaces. So, for example --

18 MEMBER CORRADINI: I have to admit I am  
19 downstairs there, where it says "Verizon Air arrival."

20 (Laughter.)

21 CHAIR ABDEL-KHALIK: Mike?

22 MS. CUBBAGE: Mike? Mute.

23 CHAIR ABDEL-KHALIK: You are releasing  
24 personally identifiable information.

25 (Laughter.)

1 MS. CUBBAGE: Maybe if we walk through an  
2 example. I mean, for the EOPs, you are going to stay  
3 in them and keep trying to get the existing plant  
4 equipment functional until you get to the exit point  
5 of your core melt is imminent. And then, all of a  
6 sudden, you are going to transfer over into the TSC.  
7 And it would be more appropriate, it seems, that  
8 people would be working on strategies to get prepared  
9 to mitigate an accident before you progressed to that  
10 point.

11 CHAIR ABDEL-KHALIK: I don't think you  
12 exit the functional restoration guidelines part of  
13 EOPs until you restore the critical safety functions.  
14 So I am trying to understand --

15 MR. HOLAHAN: Or until you are directed to  
16 do something different based on priorities, based on  
17 direction coming from the severe accident management  
18 guideline effort.

19 MEMBER BLEY: You have brought up two  
20 things. And the "integration" word I would like to  
21 hear more about because, as I read it, I was thinking  
22 that the SAMGs become more procedure-like. Right now  
23 there is a mix of brainstorming and guidance and ways  
24 to communicate with vendors and how to work things  
25 out. And I am hoping you are not trying to move away

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1 from that.

2 The other one is something that has come  
3 up and I've heard different utilities express  
4 differently. And that is, does the Technical Support  
5 Center in the plant -- and it sounds like this is what  
6 you are recommending -- at some point actually take  
7 control and is giving commands to the operators in the  
8 plant?

9 I don't think you have a requirement for  
10 licensing the people in the Technical Support Center.  
11 I am not sure about that. But you could correct me,  
12 then. Taking the ownership of the plant away from the  
13 plant is something most plants I've talked to won't  
14 do. They'll take advice. This is set up to provide  
15 advice.

16 So two things: a little more on the  
17 integration and a little bit more on are you directing  
18 new approaches to command and control.

19 MR. SANFILIPPO: Yes. I can speak a  
20 little bit to the second item as far as what Amy and  
21 I both had the opportunity to go out to a couple of  
22 plants and talk with operators and observe how they  
23 would do it.

24 Typically I think what we found  
25 generically with respect to implementation of SAMGs in

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1 the TSC, at some point typically the entry criteria  
2 for SAMGs is core exit thermocouples are greater than  
3 1,200 degrees. That is when they would exit their  
4 EOPs, enter their SAMGs.

5 The site I was at, that triggered the SCA  
6 would leave the control room and go to the TSC. The  
7 Emergency Director and the TSC would begin to gather  
8 their technical experts in the TSC on the SAMGs and  
9 severe accidents and go through, walk through those  
10 SAMGs and determine what appropriate plant actions to  
11 take.

12 They would write up a handwritten, you  
13 know, that they are just guidelines. So they would  
14 write up a handwritten or typed-up procedural list of  
15 "Okay. We want the operators to open this valve,  
16 start these things, attempt" this and that. They  
17 would then pass that to the control room, at which  
18 time the shift management in the control room and the  
19 operators would review it and implement it.

20 A lot of what I heard at least at the site  
21 I was at was that, "Well, the operators are  
22 necessarily very routinely trained on SAMGs  
23 specifically. The people that are more in detail  
24 trained on them are the technical support in the TSC  
25 that really understand the nuts and bolts of the

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1 SAMGs; whereas, the operators don't have as much --  
2 they're not a regulatory requirement. So it's not  
3 required training.

4 And the operators would then take what the  
5 TSC developed and determine whether or not they felt  
6 it was appropriate or not. But given that they didn't  
7 have the level of training that the people that were  
8 developing the guidelines indicated that they would  
9 tend to defer to, what those people were recommending  
10 that they would do.

11 MEMBER BLEY: So I want to get this  
12 straight because this doesn't sound like what I have  
13 seen. You are saying the SAMGs actually have entrance  
14 criteria and you exit the licensed functional response  
15 guidelines that are instigated?

16 MS. CUBBAGE: I can tell you what I  
17 observed. And it's similar to what Nathan is  
18 describing. We interviewed a number of operators and  
19 TSC staff.

20 The operators were familiar with the  
21 concept of transferring authority to the TSC and when  
22 you get to the entry point of the SAMGs. And that was  
23 about the extent of their familiarity other than  
24 perhaps some initial training, where they had some  
25 general familiarization.

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1           And then it wasn't until I got to about  
2           the eighth person that we interviewed that we had more  
3           detailed familiarity with actually implementing SAMGs  
4           based on their training. And that is a person who is  
5           not a current licensed operator that will be a person  
6           in the TSC.

7           Command and control would go to the TSC.  
8           And then the TSC would direct actions through an  
9           operating support center or the control room depending  
10          on whether they're control or matchings or actions  
11          that needed to be taken outside of the control room.

12          MEMBER BLEY: And NRC is fine with this  
13          idea of exiting the procedures and functional response  
14          guidelines and giving control of the plant to somebody  
15          who is familiar with the --

16          MS. CUBBAGE: I think you can read the  
17          report.

18          MEMBER BLEY: -- voluntarily developed  
19          guidelines and not licensing --

20          MR. SANFILIPPO: The operators would still  
21          be the ones making the manipulation --

22          MEMBER BLEY: But am I correct that they  
23          are under somebody else and having to do what they  
24          say?

25          MR. SANFILIPPO: If they agree with it.

1 MR. HOLAHAN: Let's go back a step.

2 MR. SANFILIPPO: That's the nuance.

3 MEMBER BLEY: I am getting pretty  
4 disturbed with this.

5 MR. HOLAHAN: I think you are pointing out  
6 exactly the point, which is exactly who is in charge  
7 and what authority they have to do what ought to be  
8 established ahead of time and report, though, during  
9 the event.

10 MS. CUBBAGE: Right.

11 MEMBER BLEY: And this seems pretty  
12 immediate to me. This doesn't sound like something we  
13 ought to wait two years to --

14 MEMBER RAY: Well, it is not going to be  
15 easy to do, though, Dennis. The point is that we'll  
16 do it if we agree with it. And we'll probably agree  
17 with it. Nuance is going to require some more --

18 MR. SANFILIPPO: And one of the concepts  
19 we explored a little bit in our report was the idea  
20 that if the TSC is so fundamental in this  
21 decision-making, perhaps one concept for longer-term  
22 evaluation was that we mentioned should the Emergency  
23 Director or people in the TSC who hold a current  
24 license. Most of them were previously licensed but --

25 MEMBER RAY: Don't count on that.

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1 MR. SANFILIPPO: It all depends.

2 MEMBER STETKAR: Well, just be careful,  
3 though. Holding a current license does not  
4 necessarily mean that you understand how the nuclear  
5 power plant operates today. There are some people who  
6 are on paper cold-licensed and still have had very  
7 little sense of how that machine works because they  
8 don't serve on the watch.

9 MR. GROBE: I think this dialogue has just  
10 pointed out exactly what we are recommending, and that  
11 is that thinking be applied to how these procedures  
12 would work in tandem with each other, how the command  
13 and controls would be exercised.

14 And then also, as Gary mentioned earlier,  
15 by making the SAMGs a requirement and integrating  
16 these in the fashion that we have talked about, they  
17 become part of the required training programs. And  
18 you end up with a much more robust infrastructure for  
19 procedural control in severe accidents.

20 MEMBER BLEY: In principle, that sounds  
21 nice. I mean, the SAMGs are there to take care of the  
22 things that we weren't expecting we haven't thought  
23 about. That's why they aren't in procedures.

24 MR. SANFILIPPO: Yes.

25 MEMBER BLEY: So if we make those part of

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1 the training program and we train on these, now we are  
2 training on specific things that probably ought to get  
3 rolled into the procedures.

4 MR. DORMAN: One of the things we talked  
5 about in this context is the difference in the mindset  
6 of the operator under the EOPs who is working on the  
7 how to fix the problem versus the responder in the  
8 severe accident management guidelines who is more in  
9 a mode of what if this breaks or that breaks and what  
10 do we bring to bear is more of a --

11 MEMBER BLEY: These are for people in the  
12 plant.

13 MR. DORMAN: And so one of the things that  
14 we have in the evaluation, kind of getting ahead of  
15 Nathan's discussion, is whether the licensees'  
16 Emergency Directors in the TSC should not necessarily  
17 be a current reactor operator license, but maybe there  
18 should be some qualification in the thought process of  
19 severe accident management guidelines.

20 So it may be a different set of skills  
21 that you are looking for that are perhaps not  
22 exercising the command and control, but understand the  
23 thought process that then is providing the advice to  
24 the operator.

25 But I think this is why it comes under one

1 of our longer-term review items, because it is  
2 obviously a very complex issue and needs to be fully  
3 developed.

4 MEMBER RAY: Yes. I mean, you can't just  
5 think about what happens when we are doing exercise  
6 and everybody knows it is going to happen. You have  
7 got to think about Christmas Eve and all that kind of  
8 stuff and having people that meet the qualifications  
9 and on and on and on. It is a bigger deal than we are  
10 making it sound like, I think.

11 CONSULTANT BONACA: Yes. What you are  
12 describing right now doesn't give me any confidence  
13 that if it comes today to go from the EOPs to the  
14 SAMGs and so on, that we will be successful because it  
15 is not clear who is in charge.

16 It is not clear who is being trained and  
17 who is responsible for all this portion, particularly  
18 training. If somebody is supposed to be training and  
19 he is given responsibility, he is going to think about  
20 what he would do. So since -- it is a very pretty  
21 urgent step.

22 MR. GROBE: I think our inspection results  
23 demonstrated that all of the SAMGs exist in all  
24 plants, and they have been trained. And there are  
25 varying levels of maintenance of those procedures and

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1 maintenance of the qualification and confidence  
2 levels.

3 So we didn't see this as an imminent  
4 concern, but it was one of the activities that we  
5 recommended for an order on slide 25. We have gone  
6 beyond that, though, here.

7 MR. HOLAHAN: Yes. Okay.

8 MEMBER STETKAR: Gary, just a quick one.  
9 Did you look at -- in a sense, the SAMGs are  
10 relatively broad. The EDMGs are focused on a very  
11 specific type of presumed threat, as are some of the  
12 other procedures. For example, fire response  
13 procedures are focused on design basis-type fire  
14 events and the guidance for responding to those is  
15 implemented accordingly.

16 Did you look at that broader context of  
17 how have the procedures evolved in the same sense of  
18 reactions to specific concerns and in this integration  
19 strategy, which, admittedly, requires quite a bit of  
20 thought? Did you look at those other issues --

21 MR. HOLAHAN: You know, we have --

22 MEMBER STETKAR: -- internal flooding  
23 response procedures, internal fire response  
24 procedures, EDMGs for terrorist-type attacks?

25 MR. HOLAHAN: I would say we did not look

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1 at things like --

2 MEMBER STETKAR: Okay.

3 MR. HOLAHAN: -- specific fire procedures.  
4 We looked at a higher level at --

5 MEMBER STETKAR: I mean, at that higher  
6 level, in principle, all of that would -- if you are  
7 talking about some sort of integrated --

8 MR. HOLAHAN: It's an interesting through.  
9 We did not get into that, no.

10 MEMBER STETKAR: Okay. Thanks.

11 MR. SANFILIPPO: And throughout the review  
12 and even now, we have heard tangentially what the  
13 industry has started to do in addressing a lot of  
14 these things. In this area, I believe we had heard  
15 that they had contracted or were going to contract  
16 with EPRI to do this integration of procedures. I  
17 believe that may already be underway.

18 I don't know what the bounds of that is.  
19 That's just what I have heard.

20 MEMBER BLEY: I guess saying it here  
21 doesn't help much, but you need to remember why we got  
22 a TSC in the first place. And it wasn't to have a new  
23 command and control center. It was to get all those  
24 extra people out of the plant.

25 And we need to remember what the SAMGs

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1 were for. And they weren't to drive the plant. They  
2 were to help you figure out weird situations so that  
3 you could provide advice to the people in the plant.

4 I've talked to people in plants, too. And  
5 I can't say that I differed from what you have said.  
6 It's a different story wherever you go.

7 MR. HOLAHAN: Okay. Let's move on.

8 MEMBER BLEY: Yes.

9 MS. CUBBAGE: The next one?

10 CHAIR ABDEL-KHALIK: I just want to point  
11 out that we really don't have time for a break. So we  
12 will continue until we end.

13 MR. HOLAHAN: This recommendation is just  
14 a follow-on associated with the other one for doing  
15 more realistic hands-on training associated with  
16 SAMGs, EDMGs. It's not a different idea. It's just  
17 an implementation.

18 MR. SANFILIPPO: All right. The next  
19 several recommendations focus on the third layer of  
20 our defense-in-depth approach or the final layer,  
21 which is emergency preparedness, recommendations 9,  
22 10, and 11.

23 The first recommendation, 9, is stated  
24 simply here in that the events of Fukushima really  
25 highlighted two unique aspects of what would be a

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1 challenge to emergency planning that were not  
2 previously considered in the level of detail that we  
3 described in the report.

4 Those two scenarios, of course, as we have  
5 been talking about, are prolonged station blackout and  
6 how that would affect emergency planning as well as  
7 how multi-unit events affect emergency planning since  
8 typically our EP has approached planning from a  
9 one-accident, a one-unit per site at a time approach.

10 CHAIR ABDEL-KHALIK: Would you expand this  
11 statement to say events that involve threats to both  
12 the core and the spent fuel pools --

13 MR. SANFILIPPO: That's a fair statement  
14 as well. And certainly there is much less, as we  
15 mentioned earlier, as far as there aren't EOPs for the  
16 spent fuel pool. There aren't as many emergency-type  
17 procedures for spent fuel pool emergencies. So if  
18 they don't exist, they clearly haven't been as  
19 well-practiced.

20 CHAIR ABDEL-KHALIK: But that's part of  
21 what one would have to do to modify the EOP so that  
22 people would know the status of the spent fuel pools  
23 during the execution of the EOP.

24 MR. SANFILIPPO: Right. And, in fact, one  
25 of the things we learned that the industry already

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1 started down the road of doing was putting at least  
2 some up front warning statements in the EOPs that  
3 mentioned "Keep track of what the spent fuel pool is  
4 doing" because they are silent on that currently.

5 So I will just get into the details of  
6 recommendation 9, basically broke this into the two  
7 different types of events: prolonged station blackout  
8 and multi-unit events.

9 For multi-unit events, there are a number  
10 of different areas that we're recommending rulemaking,  
11 to initiate rulemaking to explore. The first would be  
12 in the area of personnel and staffing, whether the  
13 licensees have the adequate personnel available and  
14 the staffing available on site or being able to  
15 respond to the site to accommodate a multi-unit event  
16 response.

17 Along those lines would be the equipment  
18 and facilities. If you are responding to a multi-unit  
19 event, you have enough people to respond as well as  
20 the equipment for all of those people, the size of the  
21 facilities. The facilities were, of course, sized  
22 typically for a one-unit emergency and those types of  
23 areas.

24 Another that was mentioned earlier is the  
25 dose assessment capability, whether licensees have a

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1 plan or capability of modeling multiple releases at  
2 the same time, whether it be from two units, whether  
3 it be from a unit in a spent fuel pool and how they  
4 integrate those, those dose projections.

5 And then, of course, training and  
6 exercises goes along with this. Once you have the  
7 infrastructure in place, how is it trained and  
8 exercised?

9 So those are the nuances with respect to  
10 multi-unit events. With respect to prolonged station  
11 blackout and emergency preparedness, similar things.  
12 Certainly equipment and facilities have to be capable  
13 of either surviving with the requisite power, whether  
14 that be AC or DC or more passive components.

15 The communications capability during a  
16 prolonged station blackout would need to be considered  
17 with respect to certainly communications means, not  
18 only whether those communications means need power,  
19 like cell phone batteries dying, et cetera, but has  
20 the initiating event caused infrastructure damage that  
21 has destroyed either land lines, wireless towers, et  
22 cetera? So there are a lot of nuances within  
23 communication that would require redundant diverse  
24 means.

25 Another item is the capability of the

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1 NRC's Emergency Response Data System that each plant  
2 has that typically transmits data to the NRC during an  
3 accident and whether or not that would have power,  
4 backup power, during a prolonged station blackout and  
5 whether the plants would be able to continue to send  
6 that data to the NRC and to the local state  
7 decision-makers as well. And then, of course, the  
8 training and exercises go along with these topics.

9 So with respect to the rulemaking  
10 activities, there is a recognition that, as with the  
11 EP rule that is just about final that took many years  
12 and a lot of stakeholder interaction, these  
13 rulemakings would be no different. Anything in the EP  
14 sense certainly requires a lot of stakeholder  
15 interaction from all angles: states, locals, FEMA  
16 federal partners, and the public.

17 With recognition, of course, that  
18 developing these specific rules would take some time,  
19 -- next slide, please -- we go and recommend a number  
20 of orders in these areas in the interim until the more  
21 details can be fleshed out through rulemaking.

22 MEMBER STETKAR: Nathan, let me ask you a  
23 question. I don't know what is the most appropriate  
24 time, but there was a comment in the report, section  
25 4.3.2. It says, "As ordered by the proposed EP rule,

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1 the scenarios described in NUREG/CR-7002 provide a  
2 basis for licensees to develop comprehensive set of  
3 evacuation time estimates, ETEs. Performing  
4 additional time estimates for natural disasters with  
5 unpredictable damage will offer no corresponding  
6 benefit to licensee personnel in providing appropriate  
7 protection action recommendations." And it goes on.  
8 ACRS commented on that in our letter to the staff in  
9 January of this year.

10 I am just curious why having the  
11 information available to off-site planning people  
12 regarding routes, potential vulnerabilities of those  
13 routes, potential vulnerabilities of infrastructure  
14 failures under severe external events, not just seismic  
15 events, hurricanes, flooding, high winds, why that  
16 information is not useful for the emergency planning  
17 process.

18 I recognize the arguments that emergency  
19 planners must react to the existing situation at the  
20 moment and what damage has occurred and what other  
21 things are happening in the surrounding area, but it's  
22 not clear to me why having that other information  
23 available from people having looked at a broader range  
24 of scenarios than the -- I can't recall. I think  
25 there are 8 or 10 stylized scenarios in the current

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1 rule.

2 Why is that not a useful exercise?

3 MR. SANFILIPPO: Yes. I would say, in my  
4 experience, or at least with relation to what you're  
5 saying, I would say identifying those vulnerabilities  
6 and creating some contingency planning around those  
7 would be very valuable.

8 With respect to how valuable developing  
9 evacuation time estimates would be with respect to  
10 those vulnerabilities I think is a little bit more of  
11 a challenge or less necessary in that, of course, like  
12 the report states, the rationale being that, well,  
13 it's -- you don't know what the end damage state is  
14 going to be. So how do you adequately predict?

15 I think that there is more value in  
16 identifying the vulnerabilities and planning around  
17 them, rather than trying to estimate the time --

18 MEMBER STETKAR: That's true, but if I am  
19 an off-site emergency decision-maker and I have some  
20 information saying that people have done these studies  
21 and I look to see, well, structures are still intact;  
22 however, the bridges are out. And given the fact that  
23 bridges are out, people have estimated that evacuation  
24 times are going to be 12 hours, it certainly becomes  
25 very clear that shelter-in-place decisions are more

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1 appropriate than to try to initiate an evacuation.

2 MR. SANFILIPPO: Yes. And I can't --

3 MEMBER STETKAR: That's the type of  
4 information, that pre-evaluation of those times.

5 MR. SANFILIPPO: I can't speak for all of  
6 the interaction that was done with the EP folks in  
7 developing the revised rulemaking. My guess would be  
8 the line between what we require versus what is  
9 off-site responsibilities, et cetera. And, you know,  
10 quite often in my -- I spent a number of years working  
11 in the EP area at the NRC. And, you know, local  
12 decision-makers often like the most flexibility and  
13 often like to expand upon how they are ready for  
14 contingencies in different areas.

15 I am not sure what that response from the  
16 state and locals was with respect to whatever they  
17 desired additional or whether they would -- since they  
18 would be the users of these evacuation time estimates,  
19 what level of desire they have for those additional.

20 So, unfortunately, I can't speak to that  
21 in much more detail now, but it is an interesting  
22 issue and one that ties to what we are talking about  
23 in recommendation four with also how not only are you  
24 evacuating people but how are you getting not only  
25 response personnel to the site but equipment to the

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1 site. Not everyone is going away from the site, too.

2 So certainly the recognition that people  
3 needing to come to the site in equipment may not be  
4 able to use roads and whatnot. And there are a lot of  
5 challenges in that regard.

6 MEMBER STETKAR: Okay. Thanks.

7 MR. SANFILIPPO: Next slide, please.

8 MEMBER ARMIJO: Before you leave that, the  
9 requirement to complete the modernization --

10 MR. SANFILIPPO: Right.

11 MEMBER ARMIJO: -- of this ERDS system, is  
12 that an ongoing activity or would this be a new  
13 initiative?

14 MR. SANFILIPPO: This is an activity that  
15 NSIR has undertaken over the past several years to  
16 modernize the ERDS infrastructure to upgrade from the  
17 previous dial-up modems to using internet protocol.  
18 And licensees are voluntarily making this transition  
19 as of present.

20 One thing that we found, as we noted in  
21 this report, that justified this recommendation was  
22 that the current structure only allows the NRC to  
23 receive about five, I believe, five or six modem  
24 dial-in transmissions at one time. So the maximum  
25 amount of data we could get from plants that haven't

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1 modernized to the new system would be five or six. So  
2 in the event of, say, a regional blackout, where we  
3 would be trying to get data from more than five or six  
4 units and if those were units that hadn't transitioned  
5 yet, we may not be able to get data concurrently from  
6 all of them. So that was kind of the basis behind  
7 this.

8 Now, NSIR had laid out a desired  
9 completion date, I believe, of June 2012 to have all  
10 of the plants upgraded to the new modernization. Not  
11 all plants have agreed to that time frame yet. This  
12 was a recommendation that we push a little more  
13 strongly to encourage that modernization to ensure  
14 that if there were some sort of regional event and the  
15 plants in that region had not all upgraded to the  
16 modern protocol, then we would still be able to get  
17 data concurrently. So that's kind of the genesis  
18 behind that.

19 MEMBER BROWN: One of the advantages of  
20 dial-up modems -- I hate to go back to blacksmith  
21 technology in this world, but with station blackout,  
22 total loss of power, all of your internet protocols  
23 and all of your communications go zip; whereas, the  
24 standard land line gets power. If the cable is there,  
25 the power is there because it comes in off site.

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1           It just reminds me of the circumstances  
2 where my son, who had transferred to all internet  
3 everything for his communications, phone, internet,  
4 blah blah, the whole works, ended up calling me on the  
5 dying breath of his cell phone. He said, "Can you  
6 make a phone call for me?" because he was out of power  
7 and didn't have a backup generator.

8           So dial-up and backup backup is not all  
9 that -- while the dial-up modem speed is not all that  
10 good, you can communicate and you can get vital data.  
11 And the power is there.

12           MEMBER STETKAR: Except that my land line  
13 telephone mostly doesn't work during severe  
14 thunderstorms and high winds.

15           MEMBER BROWN: I will contrast that in 46  
16 --

17           MEMBER STETKAR: In 46 years in this area,  
18 I have never lost my land line ever. I just got a  
19 good wire or whatever.

20           MR. SANFILIPPO: It was an interesting  
21 piece of this ERDS modernization effort that NSIR  
22 launched a number of years ago. And they explored  
23 what would be the appropriate transmission method,  
24 whether it be a wired method, a wireless method, et  
25 cetera. They ultimately agreed upon using internet

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1 protocol and a wired method.

2 They did briefly explore using satellite  
3 transmission, which, like Jack just said, does segue  
4 to recommendation 10, which are the EP topics we  
5 recommend for longer-term evaluation with respect to  
6 multi-unit events and prolonged station blackout.

7 And the last bullet on this slide is the  
8 ERDs system, taking a look at a number of items within  
9 the ERDs system for addressing these types of events,  
10 one of which being whether there should be either a  
11 redundant or a different communication, alternate  
12 communication method, such as satellite, that would  
13 not require any lines at all and how that would be  
14 powered.

15 So that is one aspect of this longer-term  
16 evaluation of ERDs, including whether the current set  
17 of data that the licensees submit via ERDs is still  
18 with a sufficient set of data that NRC responders and  
19 others want to receive from the site, whether there  
20 would be additional data sets as the system is  
21 modernized.

22 And then the third item for ERDs,  
23 longer-term evaluation, would be whether ERDs should  
24 transmit continuously to the NRC. Right now the  
25 requirement is that at an alert declaration or higher,

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1 licensees are required to essentially flip a switch to  
2 begin transmission of data to the NRC. Of course,  
3 that requires operator action and procedure and  
4 whatnot.

5 And the one thing to evaluate that we  
6 identified for longer term would be whether there is  
7 value in just continuously transmitting data so that  
8 no operator action is required.

9 Of course, the NRC during a non-emergency  
10 situation doesn't need that data and doesn't need to  
11 store it for longevity, certainly during an emergency.  
12 And when ERDs data comes in, currently we record it  
13 and archive it and whatnot.

14 Those were just some of the items we  
15 identified for longer-term ERDs evaluation. A couple  
16 of the other areas for longer-term evaluation is  
17 protective equipment for emergency responders,  
18 particularly for multi-unit events, whether the amount  
19 and type of equipment is the type that is necessary.

20 That will also be informed a lot by what  
21 we learn from the response at Fukushima and what  
22 equipment they found that they needed or didn't need  
23 or needed more of. Obviously they had many more units  
24 than we have at a site in the U.S., one more unit, I  
25 suppose, than some sites.

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1 MEMBER STETKAR: One more unit than we  
2 currently have.

3 MR. SANFILIPPO: Than we currently have.  
4 Correct.

5 The next area being "Decision-maker  
6 qualifications," this was the area that we talked  
7 about earlier with respect to whether there should be  
8 some sort of more formal licensing process for  
9 responders in the TSC, whether it be an operator  
10 license or something more like what we discussed as  
11 being a severe accident manager license.

12 MEMBER STETKAR: You're not talking about  
13 here decision-makers as being off-site local  
14 infrastructure decision-makers?

15 MR. SANFILIPPO: No. We're talking about  
16 licensee decision-makers. Right.

17 And the third area being the command and  
18 control structure, as we have discussed; and then  
19 ERDs, which I mentioned earlier.

20 Next slide, please. Additionally,  
21 recommendation 11 goes on to a number of other  
22 longer-term evaluation topics for emergency  
23 preparedness. These were areas, though, that did not  
24 have specifically to do with multi-unit events or put  
25 on station blackout. They were due to other insights

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1 we gained from the events.

2 Those, the first one being off-site  
3 emergency response, as a lot of these items, we  
4 mentioned a little bit earlier as far as how you would  
5 get off-site response equipment to the site. A lot of  
6 times, you know, these licensees are required to have  
7 agreements with local firefighting, medical support,  
8 et cetera, during a large-scale natural disaster.  
9 That firefighting and medical support is going to be  
10 called into the community for a number of needs, not  
11 just a nuclear power plant. So there will obviously  
12 be some competing priorities.

13 So this long-term evaluation is to better  
14 think about what might be an appropriate strategy for  
15 ensuring that both the surrounding community gets the  
16 response resources that they need as well as the power  
17 plant gets what they need.

18 A second item is in EP decision-making.  
19 This has to do with some of the items that are  
20 currently identified in our requirements and licensee  
21 emergency plans, such as the concepts of recovery and  
22 reentry, post-accident or post-emergency how you  
23 recover areas of the plant, how you return from  
24 evacuations.

25 Areas like that that have largely been and

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1 are still more ad hoc processes that have a sort of a  
2 general framework in our regulations and with other  
3 federal agencies, like the EPA and others, this  
4 long-term evaluation topic is suggesting that we do a  
5 little more thinking in those areas with our federal  
6 partners and state and locals to think a little bit  
7 more about how those would actually take place in an  
8 emergency based upon what we're learning certainly  
9 from real world experience in Japan.

10 The third area is radiation monitoring.  
11 Another area that was a significant challenge from a  
12 response standpoint, emergency preparedness standpoint  
13 during and after the events of Fukushima was getting  
14 consistent and reliable radiation readings, both on  
15 and off site.

16 One approach and less typically is to send  
17 out teams from -- both the state would send out teams  
18 and the licensee would send out monitoring teams to  
19 predetermined locations and set up portable monitors.  
20 Those, of course, would have their own power supply  
21 and whatnot.

22 Another approach that we suggested for  
23 long-term evaluation is more permanent monitoring, not  
24 only from the sort of ease and not needing to send out  
25 teams to dispatch and gather that data but from the

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1 aspect of a public confidence aspect in that,  
2 particularly in Europe, there are a lot of countries  
3 that have radiation monitoring throughout their  
4 countries and have the readings available online or in  
5 various public forms that is basically real-time  
6 radiation monitoring. And that might be of benefit in  
7 the U.S.

8 So this was just an area for long-term  
9 evaluation with our other federal, state, and local  
10 partners to explore that area.

11 And then our final long-term  
12 recommendation had to do with public education, not  
13 only on the areas of radiation safety but also the use  
14 of potassium iodide. Certainly even in the U.S.,  
15 following the events at Fukushima, there are a lot of  
16 different people on TV and in other places giving out  
17 a lot of different information, some of it accurate  
18 and some of it not.

19 Of course, we really can't control that  
20 aspect of the media or response, but this  
21 recommendation was particularly targeted to the areas  
22 around all of the nuclear power plants and doing a  
23 more targeted public education effort, not only to the  
24 public but to local decision-makers, local elected  
25 officials, et cetera, so that they are a little more

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1 well-versed in nuclear emergency response than they be  
2 currently.

3 So this would certainly be also an effort  
4 with FEMA, federal, state, local partners. Certainly  
5 with respect to KI, HHS, and one medical community and  
6 just being a much more specifically targeted education  
7 campaign, it goes far beyond just the NRC's  
8 responsibility.

9 MEMBER RYAN: Are you involved with the  
10 U.S. Public Health Service Bureau of Rad Health on  
11 this?

12 MR. SANFILIPPO: As the task force, we  
13 didn't involve ourselves with any other federal  
14 agencies --

15 MEMBER RYAN: Right. Yes.

16 MR. SANFILIPPO: -- other than FEMA.

17 Now, the folks in NSIR who would be  
18 working to carry this out would likely be interacting  
19 with all of those folks.

20 MEMBER RYAN: The Bureau of Rad Health has  
21 been involved in this area for a long time from the  
22 weapons testing days. KI was an issue then, still is  
23 now for them.

24 MR. SANFILIPPO: Right. And, you know,  
25 certainly a lot of the items about KI that came out

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1 following the accident and recommendations of whether  
2 or not to take it and sort of run on KI in the  
3 pharmacies in California specifically, you know,  
4 certainly adds to the confusion and miscommunication  
5 with regards to KI and what it can be used well for  
6 and what it is of no value for. So that's just the  
7 area that's certainly an undertaking --

8 MEMBER RYAN: If one could take iodine  
9 instead of potassium iodide, that would be a bad day.

10 (Laughter.)

11 MEMBER RYAN: The state governments tend  
12 to be very focused on these kinds of details in  
13 concert, particularly in the agreement states, you  
14 know, where they have material licensing in that  
15 state. So maybe that is an avenue to think about.

16 MR. SANFILIPPO: You mentioned the states  
17 as well. We have already begun a number of outreach  
18 opportunities to our state, not only our NRC state  
19 liaisons but also the government-appointed  
20 representatives from every state.

21 Marty Virgilio and I did a teleconference  
22 that was hosted by the National Governors Association  
23 and had begun the outreach to the states on not only  
24 what our report says but ultimately, of course, what  
25 the Commission may choose to do with the

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1 recommendations.

2 MEMBER RYAN: But they may have to  
3 implement because they will be --

4 MR. SANFILIPPO: Absolutely. We don't  
5 want to leave them out of figuring out how to best  
6 implement.

7 MEMBER RYAN: Thank you.

8 MR. GROBE: Which gets to our final  
9 recommendation, which focused on our inspection  
10 programs. There were two aspects of recommendation  
11 12. One of them concerned training for our  
12 inspectors, particularly our resident inspectors.

13 Because the severe accident management  
14 guidelines are a voluntary initiative on the part of  
15 the licensees, they are not incorporated into our  
16 inspection program. What that translates to is that  
17 they are not trained to our inspectors. And our  
18 recommendation is that our inspectors receive training  
19 on the severe accident management guidelines.

20 In addition, similar to the regulatory  
21 analysis guidelines, we find in the regulatory  
22 analysis guidelines a strong focus on risk analysis  
23 and not a strong focus on defense-in-depth.

24 We raised an issue for the annual review  
25 program for the reactor oversight process that happens

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1 every spring, that the thinking be branded during that  
2 annual review to look at the effectiveness of the  
3 inspection program incorporation of concepts of  
4 defense-in-depth.

5 Currently the inspection procedures are  
6 focused strongly on sample selection based on risk  
7 importance. And it is simply a question in our report  
8 whether or not there is an appropriate balancing  
9 between risk focus in defense-in-depth and how we  
10 select the particular items that we focus our  
11 inspection attention on.

12 CHAIR ABDEL-KHALIK: Now, the  
13 post-Fukushima inspections that were done showed  
14 noncompliances with 5.B, which point to some  
15 deficiencies in your triennial fire inspection, where  
16 these are presumably done, albeit on a sampling basis.

17 Are you recommending that that sort of an  
18 extent of cause, extent of conditions assessment be  
19 done to see if other oversight activities may be  
20 equally deficient or perfunctory?

21 MR. GROBE: I think our inspection showed  
22 a deficiency in the licensees' implementation of the  
23 regulations. What we are suggesting is that we  
24 examine our inspection programs and ensure that there  
25 has been an appropriate balance, not any particular

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1 identification of deficiencies in the inspection  
2 programs but just ensure there is an appropriate  
3 balance between risk focus and defense-in-depth focus.

4 CHAIR ABDEL-KHALIK: I understand that  
5 these deficiencies are licensees' problems, but isn't  
6 assurance of compliance your job one?

7 MR. GROBE: Actually, safety is job one.  
8 We are beginning to sound like a Ford commercial.

9 (Laughter.)

10 MR. GROBE: The challenge for the reactor  
11 oversight program is how to target the limited  
12 resources we have, which are substantial resources,  
13 but they're always limited in our inspection programs  
14 to ensure that we're targeting those resources  
15 appropriately to get the best safety benefit for the  
16 expenditure of those inspection resources.

17 And the inspection program includes  
18 everything from daily activities to activities that  
19 only occur once every three years. It includes the  
20 emphasis on utilizing risk insights in selecting  
21 specific samples for inspection activities.

22 And the focus of our recommendation here  
23 is that we step back and ensure that we have an  
24 appropriate balance in our inspection program between  
25 risk and defense-in-depth.

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1 CHAIR ABDEL-KHALIK: Okay. Let me just  
2 ask you a big picture question. When you read the  
3 report, you have 12 recommended orders. And, as  
4 expected, each one of these orders starts with the  
5 phrase "Order licensees to" X, Y, Z.

6 Is there anything in your bailiwick that  
7 requires you to immediately address something?

8 MR. GROBE: You mean as far as the NRC  
9 staff?

10 CHAIR ABDEL-KHALIK: Correct.

11 MR. GROBE: We did not find any systemic  
12 flaw in the regulatory programs that requires  
13 immediate action on the part of the staff. I'm not  
14 sure I'm answering your question.

15 CHAIR ABDEL-KHALIK: You are answering my  
16 question, but I am not sure that based on that answer  
17 that you have actually done the critical assessment to  
18 determine whether or not there is any activity in your  
19 bailiwick that would require immediate attention.

20 MR. HOLAHAN: You could argue that the  
21 lack of information about severe accident management  
22 guidelines and EDMGs is what led the staff to go out  
23 and immediately seek that information. So in a sense,  
24 those were immediate actions.

25 CHAIR ABDEL-KHALIK: You wouldn't consider

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1 the adequacy of inspections to be an immediate action  
2 for you.

3 MR. GROBE: We did not conclude that our  
4 inspection programs were inadequate.

5 MS. CUBBAGE: With regard to immediate  
6 action, we requested the SAMG it be done to get  
7 additional information independent of the task force  
8 action, there was the bulletin that was issued. There  
9 were some immediate regulatory --

10 MR. GROBE: What I mean by immediate  
11 actions go beyond seeking information. They go  
12 addressing any identifying deficiencies.

13 MS. CUBBAGE: We looked, and we didn't  
14 find anything that we felt needed immediate action on  
15 the part of the staff.

16 MR. SANFILIPPO: I mean, there is the one  
17 section of the report that speaks to information  
18 assets and gathering where we didn't write specific  
19 recommendation in the same terms of recommendation of  
20 the others.

21 I believe it's section, what, 5.2,  
22 "Management of NRC Records and Information," where we  
23 identified some of the challenges that we had in  
24 identifying information and added a couple of  
25 suggestions of how the NRC staff enhanced that for the

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1 future.

2 CHAIR ABDEL-KHALIK: I am asking my  
3 question because this is essentially a self-assessment  
4 to some extent. And I am just curious as to whether  
5 that self-assessment is intellectually honest.

6 MR. SANFILIPPO: And our NRC program's  
7 chapter only really spoke to the inspection program.  
8 But throughout the course of the months -- and we  
9 interviewed staff in operating experience, operator  
10 licensing, you know, human factors-type issues, a lot  
11 of other areas and programs within the agency that we  
12 didn't have any conclusions or recommendations on. So  
13 some of that that we did evaluate we didn't  
14 specifically call out in the report that we did take  
15 a look at.

16 CHAIR ABDEL-KHALIK: Gary?

17 MR. HOLAHAN: I am not sure that I quite  
18 follow your differentiation between recommendations  
19 associated with the industry doing something and  
20 recommendations associated with the NRC --

21 CHAIR ABDEL-KHALIK: No. I --

22 MR. HOLAHAN: -- because, really, they are  
23 both linked, right?

24 MS. CUBBAGE: Right.

25 MR. HOLAHAN: Each recommendation that the

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1 industry should do something is a recommendation that  
2 the Commission should now act on something it hadn't  
3 done before.

4 CHAIR ABDEL-KHALIK: Right. The  
5 differentiation comes from the timing. When you say,  
6 "Order licensees to" do something, it implies a  
7 certain immediate response requirement. And I am  
8 wondering if there is something of equal immediacy  
9 that you have to do on your part other than those.

10 MS. CUBBAGE: Maybe an example would be in  
11 the past where voluntary initiatives have been  
12 accepted in various areas. And so to correct that, we  
13 have orders to implement things that maybe were  
14 previously voluntary or to make those requirements.  
15 So that may be an area of weakness that we identify,  
16 reliance on voluntary initiatives in certain areas.

17 CHAIR ABDEL-KHALIK: Thank you.

18 MR. GROBE: To be clear, the activities  
19 described as activities that should be controlled  
20 through the issuance of orders, some of those would be  
21 prompt actions. Some of them would be actions that  
22 would take years to implement.

23 So I don't think there should be a  
24 connotation associated with the issuance of orders,  
25 that each of those orders connotes an immediacy with

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1 the necessary that have to be accomplished.

2 CHAIR ABDEL-KHALIK: Immediate resolution.

3 MR. GROBE: Not immediate resolution but  
4 prompt initiation of the action.

5 CHAIR ABDEL-KHALIK: Thank you.

6 MR. SANFILIPPO: The orders being the tool  
7 -- as Jack mentioned before, you can either order or  
8 conduct rulemaking and orders being the only real tool  
9 prior to rulemaking.

10 MR. HOLAHAN: I think this all goes back  
11 to where we started, right? Is that after 90 days the  
12 task force really did comfortable that the continued  
13 operation of the operating plants and continued  
14 licensing was something that made sense?

15 There are a lot of requirements in place.  
16 And there is quite a lot of oversight. And the  
17 Committee has certainly checked on everything the  
18 staff has been doing all of these years.

19 And that system is working. It's not  
20 perfect. It could be, should be improved, but it can  
21 work in the meantime.

22 CHAIR ABDEL-KHALIK: Now, given the time  
23 and the need for allowing time for public comment, let  
24 me just go quickly and see if there are any additional  
25 questions from the members to the task force members.

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1                   CONSULTANT BONACA: I would make one  
2 comment that repeats what somebody else has said  
3 before. It was relating to slide number 2.  
4 Essentially, you know, when you look at it again, that  
5 slide implies a level of understanding of external  
6 events outside of seismic and flooding that really is  
7 not supportable.

8                   You are not sure yet. And you said that  
9 work would be done to identify -- events should be  
10 dealt with. Is there any way that this could be  
11 included in your recommendation?

12                   MR. HOLAHAN: This is a recommendation  
13 that was the result of our discussions with dozens of  
14 NRC staff experts. In fact, the experts who are  
15 looking at seismic and flooding and wind and fire and  
16 all external events who are doing it routinely for the  
17 new reactor designs.

18                   So we felt well informed at selecting  
19 seismic and flooding as the areas where there is the  
20 greatest potential for differences between what is now  
21 a state-of-the-art and how the operating plants are  
22 out in the field.

23                   CONSULTANT BONACA: Okay. You know, you  
24 left a message before in your presentation that says,  
25 "If we have time, we will see, is there anything else

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1 out there?" And the question is you are telling me  
2 now the need is enough to proceed the way I  
3 recommended.

4 MS. CUBBAGE: Yes. I think the question  
5 did come up with 4 in regard to the 10-year re-look.  
6 And so what we are recommending is based on the  
7 experience and the evolution over time, particularly  
8 with seismic and flooding, that we recognize the need  
9 to take another look in ten years to see if the  
10 seismic hazards have changed, if new information has  
11 become available.

12 But that doesn't negate the capability of  
13 the staff to evaluate new information that may come up  
14 in another area and take appropriate action should it  
15 need be.

16 CHAIR ABDEL-KHALIK: Let's just go  
17 quickly. Are there any additional questions? We will  
18 get another shot at this during the full Committee  
19 meeting. And we can talk later about the focus of the  
20 presentation at the full Committee meeting.

21 Any additional questions?

22 MEMBER STETKAR: The only thing I want,  
23 this sort of amplifies on something I brought up  
24 earlier and something Mario just mentioned. But it's  
25 more focused on sort of your thought process and

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1 recognize you are under a 90-day time frame and it is  
2 a really heroic effort, what you did.

3 Did you have a chance to step back and  
4 sort of question yourselves to see whether you were  
5 being trapped into this issue-specific focus --

6 MS. CUBBAGE: Actually, we started more  
7 broadly.

8 MEMBER STETKAR: -- that you sort of at a  
9 higher level in some sense criticized the agency's  
10 historical development or processes? Did you have a  
11 sense of --

12 MS. CUBBAGE: It started broadly and had  
13 a long list of different types of external events, for  
14 example, that we were considering. And then we went  
15 through a logical process to settle on what we have  
16 recommended. So it wasn't that we started with --

17 MEMBER STETKAR: Well, starting, but at  
18 the end, did you step back and say --

19 MS. CUBBAGE: Did.

20 MEMBER STETKAR: -- did we somehow get  
21 trapped into that tunnel vision?

22 MS. CUBBAGE: I personally did take that  
23 step back, yes.

24 MEMBER STETKAR: Okay. That helps.

25 Thanks.

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1 MR. GROBE: We have to recognize this was  
2 a Fukushima lessons learned task force. So we did not  
3 focus broadly at all characteristics of the NRC  
4 programs and examine them.

5 And some of the recommendations, quite  
6 frankly, were not included in the report because they  
7 weren't directly reflected to the Fukushima task  
8 force. They were other issues that we are aware of as  
9 executives of the agency and decided that wasn't  
10 appropriate for this report.

11 Specifically in the area of station  
12 blackout and 50.54(hh)(2), the B.5.b stuff, I think we  
13 specifically recognized the narrow focus of those and  
14 recommended that that focus be more broadly applied to  
15 not address only a specific set of circumstances but,  
16 as best we can, address a concept and provide  
17 sufficient flexibility in how you address that concept  
18 to anticipate things that we don't know.

19 MEMBER SHACK: Recommendation 1 is  
20 certainly broad enough.

21 MEMBER STETKAR: Again, I am thinking more  
22 in the sense of if recommendation 1 is put off for  
23 years or decades, does the rest of the report, the  
24 other 11, focus --

25 MR. HOLAHAN: I think the report tries to

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1 strike a balance between being kind of philosophical  
2 in areas, but in a lot of areas, it is quite  
3 practical.

4 MEMBER STETKAR: Yes.

5 MR. HOLAHAN: The idea of choosing 8 72  
6 hours for station blackout is very simple, very  
7 practical. You could talk about it. And you  
8 understand what you mean.

9 MEMBER STETKAR: Right.

10 MR. HOLAHAN: If you say, "sufficient time  
11 to allow people to" do this and that, you could do  
12 sophisticated analyses and eventually decide you could  
13 do a probabilistic analysis. What is the likelihood  
14 of having this flood and this many inches?

15 There are a number of places in the report  
16 where we go in the direction of simplification. The  
17 idea of sticking with core damage frequency and large  
18 release versus a level III analysis is not because it  
19 isn't intellectually interesting to go all the way to  
20 a maximum amount of analysis, but it is a  
21 simplification.

22 The use of IPEs and IPEEE results, when  
23 you could start over again and redo all those  
24 analyses, I think there is a simple and practical  
25 aspect of things that we wanted to lay something on

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1 the table that could be implemented in a reasonable  
2 period of time that wasn't just study, study, study.

3 MR. GROBE: I think it is important to  
4 recognize that if you don't accept the fundamental  
5 tenets in recommendation 1, the other recommendations  
6 become much more complex and difficult to put in  
7 place.

8 MEMBER STETKAR: Thank you.

9 MEMBER ARMIJO: I would just like to make  
10 a comment. First of all, in case we never get around  
11 to saying it, I personally thought the report was  
12 outstanding. I did have a quibble on the spent fuel  
13 pool. We talked about that. But I think people  
14 should read the dedication to this report. I thought  
15 it was very well put.

16 MEMBER STETKAR: Mike?

17 MS. CUBBAGE: Mike?

18 MEMBER STETKAR: Mike, is that you?

19 MS. CUBBAGE: Mute.

20 MEMBER STETKAR: Mute.

21 MEMBER CORRADINI: I wanted to make a  
22 comment, but I see Sam started.

23 MEMBER ARMIJO: Yes. I started, but  
24 somebody else is talking on the phone. But I'll  
25 continue.

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1 I just want to quote from your report  
2 about the recognition that you gave to the workers at  
3 the power plants at Fukushima and the outcome. "They  
4 undertook great efforts to obtain power and cooling to  
5 prevent the unthinkable from occurring. The outcome,  
6 no fatalities and the expectation of no significant  
7 radiological health effects, is attributed to their  
8 efforts, their valor, and their resolve. It is our  
9 strong desire and our goal to take the necessary steps  
10 to assure that the result of our labors will help  
11 prevent the need for repetition of theirs." I think  
12 that is an outstanding --

13 MR. GROBE: I think the recommendations --  
14 many of us are more passionate on specific  
15 recommendations than others, but each of the  
16 recommendations had unanimous support from all of the  
17 task force members.

18 I think with respect to the dedication, we  
19 are all very passionate about the words in that  
20 dedication.

21 CHAIR ABDEL-KHALIK: Mike, is there a  
22 comment you would like to make?

23 MEMBER CORRADINI: Well, Sam echoed my  
24 first point, which was I think the task force did an  
25 absolutely excellent job given their time frame and

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1 their other restrictions.

2 I did want to ask about timing for the  
3 task force, which is now finished, and how they're  
4 going to transition into things in terms of the  
5 commissioners' suggestions on carrying forward.

6 That is the five members of the task force  
7 or six that are now still in front of you all, are  
8 they going to be an interim group that advises the  
9 staff in terms of how these things will be prioritized  
10 and discussed moving forward? What is the transition?  
11 I am trying to understand that because it is kind of  
12 critical at this point for me to understand what you  
13 have recommended and then how staff is going to carry  
14 this forward.

15 MR. GROBE: Yes, let me just address that  
16 briefly because we don't yet have direction from the  
17 Commission. There is a lot of information available  
18 from the commissioners. We have each of their  
19 separate votes.

20 There have been several drafts of the  
21 staff requirements memorandum. And from those  
22 activities, I can share with you that I expect in a  
23 very short period of time that the staff will be  
24 providing to the Commission the structure before the  
25 activities going forward.

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1           And it would address the staff in the  
2 near-term task force, what their involvement in that  
3 structure might be and then in a longer time frame but  
4 still very short a prioritization and path forward for  
5 addressing stakeholder engagement and specific actions  
6 that the Commission should consider.

7           So I expect within the next week or so to  
8 see a staff requirements memorandum. And then things  
9 will move pretty quickly after that.

10           MEMBER CORRADINI: Okay. Thank you very  
11 much. The reason that I ask in that regard is that I  
12 think it is very important that from the public  
13 standpoint, they understand that things are moving in  
14 some understandable manner and that as we try to  
15 properly communicate this, ACRS will always put in  
16 their two cents or ten cents or whatever you think it  
17 is worth.

18           I think it is important that the public  
19 understand how you are going to proceed from step to  
20 step. And I think you guys have done an excellent job  
21 and now have what I will say is the initial experience  
22 on how all of these things knit together. So you have  
23 got to be properly accessed going forward.

24           MR. HOLAHAN: I think this is particularly  
25 important when we talk about the full Committee

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1 meeting of the ACRS because I think some Commission  
2 direction is likely to be available before the full  
3 Committee meeting.

4 CHAIR ABDEL-KHALIK: Right.

5 MR. HOLAHAN: And I think it will shape  
6 what the issues are for that meeting. Are we focused  
7 on the report or are we focused on the steps to move  
8 forward or what combination?

9 CHAIR ABDEL-KHALIK: The prioritization I  
10 think would be more appropriate at that time if ACRS  
11 were to provide feedback in a very short order.

12 MR. GROBE: That may be a different group  
13 of people.

14 MR. SANFILIPPO: The current approach  
15 would not be to engage us as the task force. I mean,  
16 certainly any of us in our normal positions that we  
17 have gone back to may be involved, but it wouldn't be  
18 as a body; that is, the five of us.

19 CHAIR ABDEL-KHALIK: Well, the timing is  
20 relatively quick here because we were talking about  
21 the September full Committee meeting. And, therefore,  
22 we need to engage as to what the focus of that  
23 presentation should be.

24 Again, on behalf of the Committee, I would  
25 like to thank you for your outstanding service and a

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1 truly informative presentation. Thank you very much.

2 MR. GROBE: Thank you.

3 CHAIR ABDEL-KHALIK: At this time I would  
4 like to open the meeting for public comments. And I  
5 would like to call on Mr. Paul Gunter.

6 PUBLIC COMMENT PERIOD

7 MR. GUNTER: Thank you. My name is Paul  
8 Gunter. I am Director of the Reactor Oversight  
9 Project for Beyond Nuclear. We are in Takoma Park,  
10 Maryland.

11 In April, April 13th, 2011, Beyond Nuclear  
12 submitted a 2.206 petition for emergency enforcement  
13 action. And I won't go into great detail with that,  
14 but it did look at two issues that are topical with  
15 the recommendations from the task force. And those  
16 are recommendation 5 and recommendation 7.

17 Recommendation 5 goes to the whole idea of  
18 the reliable vent. And it is our concern, as  
19 expressed in this petition, that we really need to go  
20 to a much more fundamental level with regard to the  
21 whole idea that there are general design criteria and  
22 that specifically in the draft GDC-10 from 1967, it  
23 basically establishes that containment is a vital part  
24 of defense-in-depth.

25 And then that is further clarified in

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1 GD-16, which goes on to say that containment should be  
2 essentially -- no. It says, "shall be essentially  
3 leak-tight."

4 So we go this issue now of what Fukushima  
5 has demonstrated. And I think the point is actually  
6 missed in the task force recommendation to pick up the  
7 topic with a more reliable vent.

8 I think that, further, minimally, we have  
9 to look at this whole issue of compliance with the  
10 general design criteria, which is what we are seeking  
11 as members of the interested and concerned public,  
12 that we need to see a much more fundamental address of  
13 compliance and to the licensing agreement, and more  
14 particularly to the Mark I licensing agreements.

15 I mean, what we have seen and what we  
16 continue to hear is that the containment is too small  
17 and that now defense-in-depth has been compromised  
18 with this Direct Torus Vent System, which is now  
19 demonstrated to have failed 100 percent with the  
20 Fukushima event.

21 Now, more basically the concern is that as  
22 the task force recommendation moves forward for a  
23 reliable vent system, by order, it really, you know,  
24 compounds our problem because this original DTVS, as  
25 installed under generic letter 86-16, was done so by

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1 this voluntary initiative under 10 CFR 50.59, which  
2 completely evaded independent review.

3 The Japanese then, as I understand it,  
4 took generic letter and then applied it to Fukushima,  
5 which it is now demonstrated to have failed.

6 So the implementation process of this  
7 experiment now demonstrated to have failed originally  
8 evaded independent review and public due process,  
9 which would have given us a real fair assessment and  
10 would have provided independent expert review,  
11 disclosure and would have taken down the proprietary  
12 barrier that we see now basically obscuring the issues  
13 of this DTVS as installed on these Mark I's.

14 I mean, I have looked at what is available  
15 in the Public Document Room for the Mark I's, and it's  
16 scant. The bulk of the material is held back as  
17 priority as to how these things were installed and  
18 more obscured by the fact that they are not inspected.  
19 So the disclosure is simply not there.

20 Now, the recommendation, as it picks up,  
21 not with the containment issue but with the vent,  
22 moves to an order, which doesn't relieve our concern  
23 that this whole experiment just moves to another level  
24 but does not provide the public a level of confidence  
25 through independent review, through disclosure,

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1 through removal of that proprietary veil, and let us  
2 look at what is really out there in our communities.

3 So that is one concern. We also have  
4 concerns that this whole idea of how the wetwell will  
5 scrub out the radiological impact, that needs an  
6 independent review as well. We would see that if we  
7 were provided with our due process. But as it is  
8 moving now, our concerns are not alleviated.

9 And then the second and final concern is  
10 with regard to recommendation 7. As it stands, to  
11 just focus in very narrowly, the recommendation  
12 provides for backup power to spent fuel makeup water.  
13 Our petition, what we have requested as emergency  
14 enforcement action again is more fundamental that the  
15 dedicated E1 power system go to spent fuel pool  
16 cooling, not makeup.

17 We, frankly, do not understand why the  
18 dedicated backup power system, the safety-related  
19 power system, doesn't immediately address the boiling,  
20 the boil-off, the evaporation, the condensation, and  
21 the unintended consequences that this is going to  
22 raise, perhaps for reactor operations.

23 So, again, we don't really understand why  
24 the task force recommendation goes to what we see as  
25 a fallback and not the more immediate issue of

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1 preventing the boil-off. So I really appreciate you  
2 taking the time to hear from interested public.

3 And I think that, by the way, the petition  
4 that we filed on April 13th now has over 5,000  
5 co-petitioners. I apologize to Mr. Siva Lingam, who  
6 is our Petition Manager, who has gotten all of this  
7 email, but I think that what it represents is that  
8 there is significant public interest in this interest  
9 and the follow-on. So thank you.

10 CHAIR ABDEL-KHALIK: Thank you.

11 Are there any other members of the public  
12 in attendance now who would like to make presentations  
13 or offer comments?

14 (No response.)

15 CHAIR ABDEL-KHALIK: I know that there may  
16 be some members of the public who are participating  
17 through the phone bridge line. If we can open the  
18 phone bridge line and see if there is anyone who would  
19 like to make a comment? Is the bridge line open? If  
20 there is someone on the bridge line, please  
21 acknowledge that you are indeed connected so that we  
22 can hear you.

23 MEMBER STETKAR: Basically, if there is  
24 anyone out there, just say something so that we know  
25 the bridge line is open.

1 PARTICIPANT: I am here, but I don't have  
2 anything to say.

3 MEMBER STETKAR: Thank you. That is  
4 really important feedback.

5 CHAIR ABDEL-KHALIK: Right. So let me ask  
6 the question. Is there any member of the public on  
7 the phone line who would like to make a comment?

8 (No response.)

9 CHAIR ABDEL-KHALIK: Hearing none, I  
10 believe that this is the last item on our agenda.  
11 Once again, thank you for your presentation and for  
12 your service to this agency. The meeting is  
13 adjourned.

14 (Whereupon, the foregoing matter was  
15 concluded at 11:44 a.m.)

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# Near-Term Task Force Presentation

**Advisory Committee for Reactor Safeguards  
Subcommittee**

August 16, 2011

# NRC Near-Term Task Force

- Leader
  - Dr. Charles Miller
- Members
  - Amy Cubbage
  - Dan Dorman
  - Jack Grobe
  - Gary Holahan
  - Nathan Sanfilippo

# Summary of Recommendations

- 12 overarching recommendations
- Detailed recommendations support implementation
  - Policy Statement
  - Rulemakings
  - Orders
  - Staff actions
  - Long-term evaluation

## Focus Areas

- Regulatory framework
- Defense-in-depth philosophy
  - Protection from natural phenomena
  - Mitigation for long-term station blackout (SBO)
  - Emergency preparedness (EP)
- NRC programs

# Recommendation 1

Enhance NRC framework for  
regulating beyond design basis  
events and severe accidents

## Recommendation 1 Details

- Commission policy statement
  - Risk-informed defense-in-depth framework
  - Extended design-basis requirements
  - Adequate protection
- Rulemaking
  - Implement proposed framework



## Recommendation 1 Details (Cont'd)

- Modify NRC's Regulatory Analysis Guidelines
  - More effectively implement defense-in-depth
- Staff evaluate insights from risk studies
  - Individual Plant Evaluation (IPE)
  - Individual Plant Evaluation External Events (IPEEE)
  - Identify potential generic regulations and plant-specific requirements

## Recommendation 2

Update seismic and flooding analysis  
and protect plants from these events

## Recommendation 2 Details

- Order licensees to reevaluate seismic and flooding hazards at their sites
  - Use current NRC requirements and guidance
  - Upgrade plant design, as necessary, to protect against the updated hazards

## Recommendation 2 Details (Cont'd)

- Rulemaking
  - require confirmation of seismic and flooding hazards every 10 years
- Order for Interim action
  - licensees perform seismic and flood protection walkdowns
  - identify and address plant-specific vulnerabilities

## Recommendation 3

### Long Term Evaluation Topic:

Evaluate potential enhancements to prevent or mitigate seismically induced fires and internal floods

## Recommendation 4

**Strengthen coping for prolonged station blackout events**

## Recommendation 4 Details

- Rulemaking
  - Require minimum coping time of 8 hours
    - Permanently installed equipment
    - Minimal operator actions
  - Require 72-hour extended coping
    - Portable equipment may be used
    - Reasonable operator actions
  - Require preplanned offsite resources
    - Uninterrupted safety functions

## Recommendation 4 Details (Cont'd)

- Order for interim action
  - Availability of existing mitigation equipment
    - Require reasonable protection from natural phenomena
    - Require capacity for multiunit events



## **Recommendation 5**

**Require reliable hardened vent designs in BWRs with Mark I and Mark II containments**

## Recommendation 5 Details

- Order licensees to include a reliable hardened vent in BWR Mark I and Mark II containments.
  - Include performance objectives to ensure reliable operation
  - Ease of opening and closing during prolonged SBO conditions

## **Recommendation 5 Details (Cont'd)**

### **Long Term Evaluation Topic:**

Reevaluate the need for hardened vents for other containment designs.

## Recommendation 6

### Long Term Evaluation Topic:

Identify insights about hydrogen control and mitigation inside containment or in other buildings

## Recommendation 7

**Enhance spent fuel pool instrumentation  
and makeup capability**

## Recommendation 7 Details

Order licensees to provide safety-related instrumentation to monitor key spent fuel pool parameters from control room

- Water level
- Temperature
- Area radiation levels

## Recommendation 7 Details (Cont'd)

- Order licensees to:
  - Provide safety-related ac electrical power for the spent fuel pool makeup system
  - Revise Technical Specifications
    - One train of onsite emergency electrical power operable
      - Spent fuel pool makeup and instrumentation
      - All modes of operation and defueled

## Recommendation 7 Details (Cont'd)

- Order licensees to have seismically qualified means to spray water into the spent fuel pools
  - easily accessible connection to supply the water at grade from outside the building



## Recommendation 7 Details (Cont'd)

- Rulemaking
  - Spent Fuel pool Instrumentation
  - Spent Fuel makeup power supply
  - Spent Fuel pool spray capability

## Recommendation 8

Strengthen and integrate onsite emergency response capabilities

- Emergency Operating Procedures (EOPs)
- Severe Accident Management Guidelines (SAMGs)
- Extensive Damage Mitigation Guidelines (EDMGs)

## Recommendation 8 Details

- Order licensees to modify the EOP technical guidelines
  - Include EOPs, SAMGs, and EDMGs in an integrated manner
  - Specify clear command and control strategies for their implementation
  - Stipulate appropriate qualification and training for decisionmakers
  - Include in revised EOP guidelines in Technical Specifications

## Recommendation 8 Details (Cont'd)

- Rulemaking
  - Require more realistic, hands-on training and exercises for SAMGs and EDMGs
    - Operators and emergency responders
    - Emergency coordinators
    - Emergency directors

## Recommendation 9

Require that facility emergency plans address prolonged SBO and multiunit events

## Recommendation 9 Details

- Rulemaking
  - Require emergency preparedness (EP) enhancements for prolonged SBO and multiunit events in the following areas:
    - Communications capability
    - ERDS capability
    - Training and exercises
    - Equipment and facilities

## Recommendation 9 Details (Cont'd)

- Order for interim action:
  - Require licensees to address EP for prolonged SBO and multiunit events
    - Staffing
    - Multiunit dose assessment
    - Power for communications equipment
    - Enhance facilities and equipment
  - Require licensees complete modernization of Emergency Response Data System (ERDs)

# Recommendation 10

## Long-Term Evaluation Topic:

Additional EP topics related to multiunit events and prolonged SBO

- Protective equipment for emergency responders
- Decisionmaker qualifications
- Command and control
- Emergency Response Data System (ERDs)



# Recommendation 11

## Long-Term Evaluation Topic:

### Additional emergency preparedness issues

- Offsite emergency response
- EP decisionmaking
- Radiation monitoring
- Public education on radiation safety and use of potassium iodide (KI)

## Recommendation 12

Strengthen regulatory oversight of licensee safety performance (ROP) by focusing more attention on defense-in-depth requirements