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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

+ + + + +

FUKUSHIMA SUBCOMMITTEE

+ + + + +

PRELIMINARY PLANS FOR DISPOSITION OF NEAR-TERM TASK

FORCE TIER 3 RECOMMENDATIONS AS WELL AS HARDENED AND

FILTERED VENTS

+ + + + +

WEDNESDAY

MAY 23, 2012

+ + + + +

ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear  
Regulatory Commission, Two White Flint North, Room T2B1,  
11545 Rockville Pike, at 8:30 a.m., Stephen P. Schultz,  
Chairman, presiding.

SUBCOMMITTEE MEMBERS PRESENT:

STEPHEN P. SCHULTZ, Chair

J. SAM ARMIJO

SANJOY BANERJEE

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1 DENNIS C. BLEY  
2 MICHAEL CORRADINI  
3 HAROLD B. RAY  
4 JOY REMPE  
5 MICHAEL T. RYAN  
6 WILLIAM J. SHACK  
7 JOHN D. SIEBER  
8 GORDON R. SKILLMAN  
9 JOHN W. STETKAR

10 NRC STAFF PRESENT:

11 ANTONIO DIAS, Designated Federal Official  
12 JOHN MONNINGER  
13 BRETT TITUS  
14 ALLEN NOTAFRANCESCO  
15 WILLIAM RULAND  
16 KEVIN WILLIAMS  
17 TRISH MILLIGAN  
18 BARRY MILLER  
19 JOHN LUBINSKI  
20 DEREK WIDMAYER  
21 JOSEPH GIITTER  
22 TRAVIS TATE  
23 BOB BEALL  
24 DON HELTON  
25 KATHY GIBSON

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RICHARD LEE

MICHAEL CASE

RUSSELL SYDNOR

DAVID RAHN

STEVE JONES

ALSO PRESENT:

VIJAY NALEKANI

BOB LEYSE (via telephone)

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3 225

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

8:32 a.m.

1  
2  
3 CHAIRMAN SCHULTZ: This meeting will now  
4 come to order. We're coming back into session. This  
5 is the second day for the meeting of the Advisory  
6 Committee on Reactor Safeguards' Subcommittee on  
7 Fukushima.

8 I am Stephen Schultz, chairman of the  
9 subcommittee. Members in attendance this morning  
10 include Sanjoy Banerjee, Dennis Bley, Harold Ray, Joy  
11 Rempe, Michael Ryan, Bill Shack, Jack Sieber, Dick  
12 Skillman, John Stetkar, and we expect Michael Corradini  
13 and Sam Armijo to join us later.

14 As of yesterday, the purpose of today's  
15 meeting is to receive a briefing and hold discussions  
16 with NRC staff on the plans for implementation of the  
17 Near-Term Task Force Tier 3 recommendations.

18 The subcommittee will gather information,  
19 analyze relevant issues and facts and formulate proposed  
20 positions and actions as appropriate for deliberation  
21 by the full committee. Antonio Dias is the designated  
22 federal official for the meeting.

23 The rules for participation in today's  
24 meeting have been announced as part of the notice of  
25 this meeting previously published in the Federal

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1 Register on May 15th, 2012.

2 A transcript of the meeting is being kept  
3 and will be made available as stated I the Federal  
4 Register notice.

5 It is requested that speakers first  
6 identify themselves and speak with sufficient clarity  
7 and volume so that they may be readily heard.

8 Due to the many different topics that will  
9 be covered during this day's meeting, we're planning  
10 to allow public comments to be provided at the end of  
11 each Tier 3 topic. This will allow the comments to be  
12 heard by the staff who are present and/or making the  
13 presentations.

14 We've received no written comments or  
15 requests for time to make oral statement from members  
16 of the public regarding today's meeting. But as I  
17 mentioned, we'll have opportunity for public comments  
18 throughout the day.

19 We'll now proceed with the meeting. I'll  
20 call on John Monninger from the Japan Lessons Learned  
21 Directorate, to open the presentations this morning.

22 MR. MONNINGER: Thank you, Dr. Schultz.

23 My name is John Monninger. I'm the  
24 associate director from the Japan Lessons Learned  
25 Directorate within the Office of Nuclear Reactor

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1 Regulation.

2 We're going to continue on from our  
3 discussions from yesterday. And prior to that, I just  
4 want to say thank you very much for the very informative,  
5 engaging discussions yesterday and we look forward to  
6 more discussions today.

7 We do have a couple of action items from  
8 yesterday that we are following up on and we will get  
9 back to you on that information.

10 We're going to cover multiple topics today.

11 The first one being hydrogen control and generation.

12 We'll cover the collection of emergency planning  
13 issues, potential revisions to the Reactor Oversight  
14 Process to incorporate the new defense in depth posture,  
15 training on severe accident management guidelines.

16 Another topic will be the notion of transfer  
17 of spent fuel from the pools to dry cask storage. And  
18 I believe the last topic to be covered today will be  
19 improved instrumentation for reactors and containments  
20 following a severe accident.

21 But our first presentation today will be  
22 delivered by Brett Titus of the Division of Safety  
23 Systems within the Office of Nuclear Reactor  
24 Regulations.

25 I'll turn it over to Brett.

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1 MR. TITUS: Thanks, John.

2 Good morning, members of the subcommittee.

3 John did a good job of laying the foundation yesterday  
4 for our purposes for being here. And I also attended  
5 the 5.1 and 5.2 discussions. So, I'm familiar with some  
6 of the topics that you wish to have addressed here at  
7 the hydrogen briefing.

8 First and foremost to remind you of what  
9 Recommendation Number 6 entails, the Near-Term Task  
10 Force recommended that the staff investigate any  
11 insights that could be gained from the events of  
12 Fukushima as a comprehensive look into hydrogen, how  
13 it's generated, possibilities for where it's  
14 transported, how it could be distributed, and finally  
15 the potential for combustion.

16 I know that the ACRS had several  
17 recommendations associated with hydrogen in general,  
18 and we'll try to address those as we go through.

19 One of them was primarily that not just the  
20 containment is of an area of interest, but also adjacent  
21 buildings. Reactor buildings and in some other  
22 different containment types, there are auxiliary  
23 buildings. So, our scope includes both primary  
24 containment and adjacent structures.

25 This was originally categorized as a Tier

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1 3 activity primarily due to the information that we had  
2 to gather before we could make some sort of decision.

3 And as you can see on the slide, the commission also  
4 agreed with that particular prioritization.

5 As John mentioned yesterday, there are some  
6 overlaps or interdependencies which are associated with  
7 hydrogen. Specifically, some of those are Tier 1  
8 activities such as the hardened vents as Recommendation  
9 5, and also from Statio Blackout.

10 So, there are prevention and mitigation  
11 components that may play into our ultimate decision  
12 associated with hydrogen and how we move forward from  
13 there.

14 So, the Agency will be in close coordination  
15 with the other technical teams that are dealing with  
16 Recommendations 4 and 5, and we'll see how their  
17 particular path has an impact or dictates where our path  
18 may go as well.

19 In general, the scientific community is  
20 pretty familiar with hydrogen and its potential for  
21 combustion. There has been a lot of research done not  
22 only within the nuclear industry, but just in the  
23 scientific community in general.

24 Some of the specific data points that we  
25 have within the nuclear industry pertains back to Three

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1 Mile Island and the lessons learned there and the  
2 different impacts that it had on our regulatory  
3 structure, but there are also other studies in generic  
4 safety issues which have been investigated over the  
5 years which have informed where we are today.

6 The regulation which specifically deals  
7 with combustible gas control is 10 CFR 50.44. It was  
8 recently revised in 2003 as part of a risk-informed  
9 initiative. And during that revision, there were  
10 certain requirements that were eliminated.  
11 Specifically, the need for hydrogen recombiners and  
12 monitoring rules of both oxygen and hydrogen in certain  
13 areas of the plants. And those reductions were  
14 associated with their calculated risk-significance.

15 Some other deterministic values that were  
16 maintained for different containment types are listed  
17 below in the second bullet.

18 Let's go to the next slide, actually. This  
19 is a pictorial representation of how 10 CFR 50.44 works.

20 Essentially there are three bins with different  
21 containment types. Mark Is and IIs, and you see the  
22 parenthetical number there is the number of U.S.  
23 operating units that have essentially that containment  
24 type. They are required to be inerted.

25 Moving over to Mark III and ice condensers,

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1 there's 13 in the U.S. The requirements for those are  
2 that the hydrogen control systems are capable of  
3 handling 75 percent of the metal-water reaction between  
4 the fuel and the coolant.

5 And finally the large dries and  
6 sub-atmospheric containments of which there are  
7 approximately 60. They have no active systems as  
8 dictated by the rule. And that's due to their large  
9 volume and strength to accommodate hydrogen threat  
10 without compromising the integrity of the containment.

11 MEMBER SHACK: In the resolution of GSI-189,  
12 did everybody end up voluntarily putting in backup power  
13 systems for the igniters in the Mark IIIs in the  
14 condensers?

15 MR. TITUS: That is my understanding of the  
16 resolution of GSI-189.

17 MEMBER SHACK: Okay.

18 MR. TITUS: It was a voluntary action.

19 MEMBER SHACK: But, I mean, everybody did  
20 it.

21 MR. TITUS: All Mark -

22 MEMBER SHACK: All Mark IIIs -

23 MR. TITUS: And ice condensers.

24 MEMBER SHACK: -- and ice condensers.

25 MR. TITUS: Correct. Correct.

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1 MEMBER BANERJEE: What sort of backup power  
2 was that?

3 MR. TITUS: Dc power, if I'm not mistaken.  
4 Batteries.

5 MEMBER BANERJEE: But was it local, or it  
6 was coming from a single source of batteries?

7 MR. TITUS: I can't speak to each of the  
8 individual ones that were - as far as a plant-specific  
9 -

10 MEMBER SHACK: We can ask Grand Gulf  
11 tomorrow.

12 (Laughter.)

13 MEMBER BANERJEE: I think that's an  
14 interesting point, though.

15 MEMBER SIEBER: I had heard some of them were  
16 local.

17 MR. TITUS: I think that the designs do vary.  
18 That would be my level of knowledge on that.

19 MEMBER SIEBER: My understanding of the  
20 reason why they eliminated hydrogen recombiners was that  
21 they were so slow in dissipating hydrogen that their  
22 value as an accident preventer was very low; is that  
23 correct?

24 MR. MONNINGER: They were generally put in  
25 there for radiolysis for the long-term hydrogen

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1 generation as opposed to -

2 MEMBER SIEBER: It would take a day or  
3 multi-days in order to get the hydrogen content down.

4 And so to prevent explosions, that was not practical.

5 I have another question. At Fukushima, did  
6 they have hardened vents?

7 MR. MONNINGER: It's our understanding they  
8 had hardened vents, and they had problems operating  
9 them.

10 MEMBER SIEBER: Okay.

11 MR. MONNINGER: You know, one of the issues,  
12 you know, the Japanese of course will be the best source  
13 of information, but it's our understanding that they  
14 did have a ruptured disc. And the ruptured disc was  
15 set at approximately two times design pressure.

16 And they had, you know, significant  
17 problems getting various valves open in order to have  
18 that pressure experienced up against the rupture disc.

19 MEMBER SIEBER: What was the design pressure  
20 of the vent itself? Do you know that?

21 MR. MONNINGER: I -

22 MEMBER SIEBER: Is it the same as the  
23 containment design pressure, or -

24 MR. MONNINGER: Well, generally the  
25 containment design pressure for the boilers is, you

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1 know, either somewhere between 45 and 60 is the design  
2 pressure. But then you vent - a lot of times you'll  
3 vent above design pressure and below Service Level C.

4 So, there is significant margin above  
5 design and below some -

6 MEMBER SIEBER: I would presume that the vent  
7 structural design would match that of containment.

8 MR. MONNINGER: Right.

9 MEMBER SIEBER: If it were my plant, that's  
10 what I would do.

11 MR. MONNINGER: Right.

12 MEMBER SIEBER: But I get the feeling that  
13 that wasn't the case in this.

14 MR. MONNINGER: Yeah, I think the general  
15 thought is that it would have been designed that way.

16 And if you look at our ISG for 5.1, it would require  
17 the hardened vent line to be designed consistent with  
18 the containment design standard.

19 MEMBER SIEBER: Is that the case in the  
20 United States?

21 MR. MONNINGER: Within the U.S., yes.

22 MEMBER SIEBER: Okay.

23 MR. MONNINGER: Yeah.

24 MEMBER SIEBER: And so, we would not expect  
25 the vent to fail before the containment failed.

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1 MR. MONNINGER: Yes, that's correct.

2 MEMBER SIEBER: So, that system would  
3 maintain operability as long as you could physically  
4 open it.

5 MR. MONNINGER: Within the EOPs for boilers  
6 at least, the venting pressure is dictated by something  
7 called the PCPL, the primary containment pressure limit,  
8 and it's the lowest of four various parameters.

9 Some of them look at the design pressures  
10 of the containment, one of them looks at the  
11 back-pressure on the SRV, but I forget what the other  
12 two particular parameters. So, it's dictated by the  
13 lowest of four parameters within the EOPs.

14 MEMBER SIEBER: Now, you may prevent an  
15 explosion, but you may not prevent deflagration; is that  
16 correct? In the vent itself?

17 MR. MONNINGER: Um -

18 MEMBER SIEBER: And that's obviously less  
19 severe.

20 MEMBER BANERJEE: Well, you have to define  
21 - detonation is when the flame velocity gets up to the  
22 sound speed.

23 MEMBER SIEBER: Right.

24 MEMBER BANERJEE: And deflagration is when  
25 it's below. So, you need a detonation run to get it

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1 up to a detonation.

2 MEMBER SIEBER: But the shock impact only  
3 comes with that detonation. Deflagration gives you  
4 less heat input and some pressure faults, but not the  
5 shock impact that detonation does.

6 MR. MONNINGER: And just a thought out there  
7 and I barely recall this, I think, from the ABWR, we  
8 had the ruptured disc, and then I believe another disc  
9 in the airspace or the volume between the two might have  
10 been inerted.

11 But, you know, if a rupture - if the venting  
12 pressure is 45 or 60 or 70 pounds be whatever it is,  
13 and if the constituents coming out are, you know, a  
14 mixture of steam, hydrogen and nitrogen, essentially  
15 no oxygen, it would seem within a very quick time frame  
16 you're going to push out whatever, you know.

17 I think it would be hard to believe that,  
18 you know, a vent being relieved at 45 pounds is going  
19 to have some type of good mixing with some residual  
20 oxygen within a pipe length of whatever. It would seem  
21 to be a very quick sweeping out.

22 You know, the sap would be a much larger  
23 volume, of course. But the actual pipe diameter and  
24 length and the forcing function, you know, my personal  
25 thoughts would be it would be difficult to see some type

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1 of combustion.

2 MEMBER BANERJEE: But it just depends on how  
3 turbulent it is. You could get mixing, you know. What  
4 you're saying is displacement would happen like a  
5 plugged flow, but it just depends on how - the devil  
6 is in the details there.

7 MR. MONNINGER: I mean, and when you look  
8 at the criteria we had or the Owner's Group had developed  
9 for the Generic Letter 89-16, one of the parameters  
10 within that criteria was to ensure that there are no  
11 means for ignition within the pathway.

12 And so, that was for the old Generic Letter  
13 and the staff is still looking at the potential for  
14 additional design parameters for the reliable hardened  
15 vents that were required in March for severe accidents,  
16 conditions which would -

17 MEMBER BANERJEE: But the jet coming out,  
18 there are a beautiful set of experiments that Ciba Geigy  
19 did with two connected compartments with a pipe in  
20 between.

21 You get extremely strong deflagrations and  
22 possibly detonations in the second chamber, because the  
23 jet coming out makes it extremely turbulent.

24 MR. MONNINGER: But wouldn't that be more  
25 within the stack than within the actual pipe?

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1 MEMBER BANERJEE: Well, it depends, yes.  
2 What can happen though is the flame can profligate  
3 through the pipe, and then there can be a very strong  
4 deflagration.

5 Looking at these buildings, it looked more  
6 like a deflagration wave than a detonation wave, but  
7 it's hard to know.

8 MR. MONNINGER: I mean, it won't profligate  
9 backwards because there's no oxygen to support it.

10 MEMBER BANERJEE: Right, right.

11 MR. MONNINGER: So, it would be a  
12 forwards-type profligation, but it would seem like any  
13 type of potential mixing would be within the stack as  
14 opposed to -

15 MEMBER BANERJEE: I'm sorry, you're talking  
16 about the stack. You're not -

17 MR. MONNINGER: I'm talking about the pipe.

18 MEMBER BANERJEE: I was talking about the  
19 reactor building in this, yeah, which is -

20 MR. MONNINGER: Yeah. I mean, if you're  
21 ferking (phonetic) through the upper drywell head.

22 MEMBER BANERJEE: Yeah.

23 MEMBER BLEY: I've heard it claimed or  
24 mentioned that even if you vent if the atmosphere inside  
25 containment is still hydrogen, that because of the

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1 characteristics of hydrogen leakage through various  
2 connections into the reactor building is very likely  
3 where at that point it's going to mix with air, and that  
4 venting might not be the solution that eliminates the  
5 chance of a hydrogen problem.

6 I don't see that in the slides or the  
7 discussion here. Are you thinking about that?

8 MR. MONNINGER: I think, yeah, it will  
9 eventually be discussed.

10 MEMBER BLEY: Oh, okay. I'll be happy to  
11 wait. I just tried to look ahead and see if it was  
12 coming. I didn't see it.

13 MR. TITUS: Yeah, once we get into the  
14 details of the plan - and admittedly the plan, the  
15 proposed plan right now is at a relatively high level,  
16 but you'll see that there will be a number of discussions  
17 that are tied to other recommendations and to  
18 stakeholder input and to, et cetera, members of the  
19 public's input.

20 So, within the plan, that level of detail  
21 might not be expressed, but we can discuss it here.

22 MEMBER BLEY: Okay.

23 MEMBER REMPE: In your slides you have under  
24 the Mark III and Ice Condenser box, use acceptable  
25 accident sequences.

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1           Could you define what you mean by  
2 "acceptable accident sequences"?

3           MR. MONNINGER: I believe it's - sorry about  
4 that. Let me turn this off.

5           I believe it's referenced within the rule.

6           And we'd have to probably go back to the Reg Guide to  
7 see what the - I know we have Allen here, Notafrancesco,  
8 from the Office of Research.

9           MR.       NOTAFRANCESCO:       Yes,       Allen  
10 Notafrancesco, Office of Research.

11           The acceptable accident sequence will be  
12 based on the risk profile at the time. When Grand Gulf  
13 was evaluated, we looked at different sequences like  
14 a small steamline break or an SRV. So, we would look  
15 at different sequences to try to maximize hydrogen and  
16 get it into different compartments to evaluate the  
17 consequences in the wet well and drywell.

18           MEMBER REMPE: So, it's something that gives  
19 you some sort of - a certain amount of - you have to  
20 have some sort of ignition or, I mean -

21           MR. NOTAFRANCESCO: Well, they're igniters  
22 in the Mark IIIs and ice condensers. So, you credit  
23 them.

24           MEMBER REMPE: So, it's something based on  
25 a higher frequency? I guess I just am wondering what

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1 the definition is.

2 MR. NOTAFRANCESCO: We look at the risk  
3 profile. We give it a risk profile for the particular  
4 plant. If there's an ice condenser, a Mark III. And  
5 then we do a severe accident analysis and see where the  
6 hydrogen is going and activate the igniters and see the  
7 burning consequences.

8 MEMBER REMPE: I guess I'm just wondering  
9 what makes it acceptable versus unacceptable, is what  
10 I - I'm kind of confused on that.

11 MR. NOTAFRANCESCO: Well, nobody is trying  
12 to diminish not going to 75 percent. That won't make  
13 our day. We want to see 75 percent -

14 MEMBER REMPE: Okay.

15 MR. NOTAFRANCESCO: -- at the limit.

16 MEMBER REMPE: Okay.

17 MR. NOTAFRANCESCO: They may say, well, this  
18 is a recoverable degraded core. So, they only create  
19 25 percent. That's not going to wash it at the time.

20 MEMBER REMPE: Okay.

21 MR. NOTAFRANCESCO: So, we would  
22 unmechanistically produce to 75 percent metal-water  
23 reaction.

24 MEMBER REMPE: Okay.

25 MR. NOTAFRANCESCO: Okay.

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1 MEMBER STETKAR: John, before we go ahead,  
2 I'd like to get something clarified only for the record.

3 I thought I heard you say that plants would initiate  
4 venting according to their emergency operating  
5 procedures.

6 I don't think that venting is in the  
7 emergency operating procedures.

8 MR. MONNINGER: You know, it's within SAMGs.

9 And I do believe it is within the - at least within  
10 the EPGs. And there are actually - or my information  
11 is dated, but there is actually provisions for early  
12 venting, I think. If you lost - if you lost indications  
13 of hydrogen even with the BWRs -

14 MEMBER STETKAR: You'd be looking at a set  
15 of SAMGs for a BWR right now.

16 MR. MONNINGER: But not the SAMGs. The  
17 EOPs. Go back to -

18 MEMBER STETKAR: Looking at a set of SAMGs  
19 for a BWR right now.

20 MR. MONNINGER: Yeah. And if you go to  
21 primary containment pressure control -

22 MEMBER STETKAR: I don't have the EOPs for  
23 that plant. That's right.

24 MR. MONNINGER: You do, or don't?

25 MEMBER STETKAR: Pardon?

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1 MR. MONNINGER: Do, or don't?

2 MEMBER STETKAR: I do not have the EOPs for  
3 that plant. The only reason I bring this up is that  
4 the Committee has made some recommendations about  
5 integration of SAMGs, EOPs, all of those things.

6 MR. MONNINGER: Right.

7 MEMBER STETKAR: And I wanted to make sure  
8 that we're all on the same page of who would be making  
9 the decisions to vent and under what conditions.

10 MR. MONNINGER: Yeah.

11 MEMBER STETKAR: These particular SAMGs  
12 focus on chemistry measurements of hydrogen and oxygen  
13 concentrations.

14 MR. MONNINGER: Right, right, right.

15 MEMBER STETKAR: Which take some time and  
16 -

17 MR. MONNINGER: So, you know, I used to be  
18 within the Containment Systems and Severe Accident  
19 Branch, but that was ten years ago. So, again my  
20 information is dated, but with that the primary - you  
21 go through your flow paths. And you got for the  
22 containment pressure control - Bill's going to talk.

23 MR. RULAND: We'll supply that information  
24 to you. We'll get the answer.

25 MEMBER STETKAR: Thanks, Bill.

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1 MR. RULAND: We'll get the answer for you.

2 MR. MONNINGER: I mean, there's initiation  
3 limits for the sprays and all that kind of stuff in there.

4 MEMBER BLEY: Well, that part we know. It's  
5 a specific thing about venting we weren't sure about.

6 MR. MONNINGER: Okay.

7 MR. TITUS: So moving along, the technical  
8 team associated with Recommendation 6 essentially has  
9 a number of key questions that we believe should be  
10 answered by the staff.

11 And I'll let you read through these, but  
12 I just want to maybe categorize these or summarize them  
13 in a statement of what information is there that is new  
14 that would change our thinking on our established  
15 positions of hydrogen?

16 And as you go through the different  
17 questions that's essentially summed up in Number 1, but  
18 we have a certain understanding of where hydrogen is  
19 - or I should say when it's generated, where does it  
20 go, how much is generated, what happens next. And we're  
21 looking for essentially disparities between our current  
22 position and the information that we may gain coming  
23 out of Fukushima.

24 MEMBER BANERJEE: What do you mean by Bullet  
25 3 exactly?

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1 MR. TITUS: Bullet 3, are there important  
2 gaps in our understanding of the threat from hydrogen  
3 gas?

4 So, essentially the staff has a position  
5 that says hydrogen is a threat when it gets to certain  
6 concentrations or if it makes it to a certain area.  
7 And based on where we are today, the information that  
8 we gain from the Fukushima incident, do we need to  
9 reassess that? Is there a gap between what we  
10 understand today and the demonstrated or data point -

11 MEMBER BANERJEE: Can you give me sort of  
12 an example of what this might be?

13 MR. TITUS: An example of an important gap?

14 MEMBER BANERJEE: Yeah.

15 MR. MONNINGER: You know, I think one would  
16 be, you know, we'd have to go through it, but say for  
17 example when we go into it and what information we learn  
18 from Fukushima, we do or not, you know, is it more than  
19 75 percent equivalent metal-water reaction?

20 You can go over a hundred percent if you  
21 include all the zirc in-vessel and if you start taking  
22 ex-vessel core-concrete interaction hydrogen  
23 production from that, you know.

24 What information do we learn from the  
25 accident, and what does that do to our understanding

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1 of the safety and the impacts?

2 MEMBER BANERJEE: Well, that has to do with  
3 the quantity of -

4 MR. MONNINGER: It could be the quantity or,  
5 you know, what was our considerations with regard to  
6 the potential for migration from the primary containment  
7 to the reactor buildings?

8 You can go into some of the old PRAs, the  
9 risk assessments, whatever, and it talks about, you  
10 know, the migration of it from the primary containment  
11 to the secondary containment, but was our real thought  
12 or understanding that the buildings would be destroyed?  
13 And what does that do to accident recovery?

14 MEMBER BANERJEE: So migration, it's not a  
15 gap in our understanding of - it's like will it leak  
16 through these various connections and things like that?  
17 Is that what you're saying?

18 I'm trying to understand is there a  
19 fundamental lack of understanding in the behavior of  
20 hydrogen, or is it sort of an outcome of some applied  
21 problem like a leak through a seal or something like  
22 that?

23 MR. RULAND: If we knew what those gaps were  
24 today, we wouldn't have to say is there an important  
25 gap.

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1 MEMBER BANERJEE: Right.

2 MR. RULAND: Right. So, this is - if you  
3 think about it, this is a completeness. Is there if  
4 we go back when we look at the staff, the status of what  
5 we learned from Fukushima, is there something based on  
6 the previous assumptions we made that we need to  
7 fundamentally rethink it?

8 For instance, if you had the leak tightness  
9 of the vent, the packing for the valves that - for the  
10 hardened vent, is there something about those - the  
11 packing that's going to cause us to have a problem and  
12 reach a point where we have an explosive mixture in a  
13 reactor building?

14 It's something we really didn't evaluate.  
15 At this point, we don't know what the information was  
16 from Fukushima.

17 So, this is really a placeholder to say is  
18 there anything else we need to evaluate?

19 MEMBER BANERJEE: And do you think you'll  
20 get information from Fukushima?

21 MR. RULAND: Don't know. Don't know at this  
22 stage.

23 MEMBER REMPE: So, there's a lot of  
24 information that's been mentioned, seals leaking,  
25 core-concrete interaction, and you're saying you don't

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1 know. And it just seems like again being a bit more  
2 proactive about it, a utility might want to just go in  
3 and clean up those reactors because it costs less money.

4 MR. RULAND: That's correct.

5 MEMBER REMPE: And if the U.S. wants to know,  
6 it seems like we need to be a little more proactive,  
7 identify what we need and start lobbying for something  
8 to occur to get that information.

9 MR. MONNINGER: And we did go back to the  
10 Recommendation 2f. And it talks about those  
11 information gaps, the data collection from the  
12 facilities and the need for some type of integrative  
13 program. And the Commission paper talks about the  
14 Office of Research taking the lead to assess that issue.

15 So, it's not currently part of one of the  
16 Near-Term Task Force's, you know, 12 plus additional  
17 recommendations, but it is being pursued by the Office  
18 of Research.

19 MEMBER REMPE: Again, how actively and  
20 proactively it's being done and you've said this is  
21 regulatory space, but here I see a regulatory need to  
22 push research to make sure it gets done.

23 MR. MONNINGER: Yeah, and then - and it's  
24 a good discussion. And one of the things you'll see  
25 in the back of Brett's evaluation, you know, and if you

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1 go back to the TMI days and that kind of stuff, I mean,  
2 a lot of the information, it was five, ten years plus  
3 when the real information comes out.

4 MEMBER REMPE: But planning ahead -

5 MR. MONNINGER: Planning to -

6 MEMBER REMPE: -- helps.

7 MR. MONNINGER: -- get that, right.

8 MEMBER REMPE: Yeah, because sometimes some  
9 folks who were involved in the TMI stuff say, well, we  
10 ran out of money at the end of the show here.

11 MR. MONNINGER: That's right.

12 MEMBER REMPE: If we thought ahead, we might  
13 have -

14 MR. MONNINGER: Right.

15 MEMBER REMPE: -- planned it a little bit  
16 better.

17 MR. MONNINGER: So, I think there's that  
18 pathway, the need to plan ahead and do the research  
19 program, et cetera, but there's also the need to  
20 determine within the short term do we need to do anything  
21 on hydrogen?

22 We can reopen hydrogen in eight years or  
23 ten years down the road or so. But the notion is between  
24 time zero and the Commission's goal of five years, we're  
25 going to tackle this issue. And we'll tackle it based

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1 on whatever information we get from Fukushima, the  
2 forensic study, you know, analysis, et cetera.

3 But if we don't have the information, it  
4 won't be within this initial consideration of hydrogen.

5 MEMBER BANERJEE: I guess my question was  
6 based on what you know right now -

7 MR. MONNINGER: Yeah.

8 MEMBER BANERJEE: -- have you already  
9 identified something? Either new information  
10 regarding hydrogen, or some important gaps.

11 Just say right now. Forget what happened  
12 ten -

13 MR. MONNINGER: It would have to be a  
14 collective staff assessment, of course.

15 MEMBER BANERJEE: Have you done that?

16 MR. MONNINGER: We've had discussions. I  
17 mean, the manner in which hydrogen is formed, no, we  
18 think the basics are there. The timing from core  
19 uncovering to, you know, et cetera, we believe it's  
20 consistent with our understanding of the timing.

21 The amounts produced be it in-vessel or  
22 ex-vessel, we think it's consistent with our  
23 understanding, but we haven't gone in there. A lot of  
24 that is based on the work that research in Sandia is  
25 doing with the MELCOR forensics assessment, you know.

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1           So, those parts I don't believe we have  
2 identified any gaps. I think some of the potential  
3 concerns are -- is the leakage and the migration and  
4 the impact on other buildings, but the -

5           MEMBER BANERJEE: Observationally, what do  
6 you have? You have some pressures, perhaps?

7           MR. MONNINGER: In primary containment, or  
8 in reactor -

9           MEMBER BANERJEE: No, no, where do you have  
10 it?

11          MR. MONNINGER: There are - the data from  
12 Japan and that they're plugging it into the MELCOR, the  
13 MAAP code, et cetera, there are data points. There's  
14 not a continuous stream of data points and pressure  
15 temperature levels, et cetera.

16          I don't recall any hydrogen actual  
17 concentration data points, I'm looking at Allen to shake  
18 his head left or right, but we do have data points for  
19 pressure. And they've gone back in and they've tried  
20 to recreate those accidents using the MELCOR code and  
21 the Peach Bottom of the SOARCA deck and modifying that  
22 for a Fukushima, you know, Dai-ichi Unit 1 accident to  
23 see if they can reproduce the traces. But there's not  
24 tons of data out there at all.

25          MEMBER REMPE: And, in fact, they do need

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1 to make certain assumptions about when holes occur -

2 MR. MONNINGER: Right.

3 MEMBER REMPE: -- to match the data.

4 MR. MONNINGER: To match the data.

5 MEMBER REMPE: And there's uncertainty  
6 with the data because -

7 MR. MONNINGER: Right, right.

8 MEMBER REMPE: -- one of the sensors were  
9 beyond their operating limit.

10 MR. MONNINGER: Right, uh-huh, right.

11 MEMBER SIEBER: Do we know even whether the  
12 detonation or deflagration occurred in the vent, or just  
13 in the reactor building through various leaks all over  
14 the place where concentrations might have occurred?

15 MR. MONNINGER: I think the general  
16 understanding is that concentrations built up within  
17 the reactor building through the head lifting through  
18 the burping of the upper drywell head. Either that or  
19 someplace lower, but -

20 MEMBER SIEBER: Well, nothing is leak tight.

21 MR. MONNINGER: Right, right.

22 MEMBER SIEBER: So, the question is how long  
23 does it take to build up a concentration that will  
24 spontaneously ignite? I don't think you need an  
25 ignition source with hydrogen.

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1 MR. MONNINGER: Right.

2 MEMBER SIEBER: That's my understanding.  
3 In hydrogen fires that I've seen, that maybe it was  
4 static electricity that, you know, generator going in  
5 would ignite or a cylinder that ignites doesn't seem  
6 to have an ignition source.

7 MEMBER BANERJEE: So, based on the  
8 observations, because all you have are a few pressure  
9 traces and maybe a few photographs of this building  
10 falling apart, is there anything else that you have at  
11 the moment?

12 MR. MONNINGER: I mean, we have the, you  
13 know, that's from - we have a significant body of  
14 historical knowledge of hydrogen and we're trying to  
15 see how that matches with it.

16 But in terms of -

17 MEMBER BANERJEE: But at Fukushima.

18 MR. MONNINGER: Of Fukushima, you know, they  
19 - we don't have information from them taking off the  
20 shield plug that shows that the upper drywell head  
21 lifted. No, we don't have that.

22 We don't have information of measurements,  
23 you know, the downcomers. No, we don't have any of that  
24 information.

25 MEMBER SIEBER: Did they have any vacuum

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1 breakers anyplace?

2 MR. MONNINGER: So, I haven't looked at their  
3 designs. But since they are Mark Is, I would assume  
4 they need at least two sets of vacuum breakers.

5 MEMBER SIEBER: Right.

6 MR. MONNINGER: They need a vacuum breaker  
7 from the wet well airspace back to the drywell. And  
8 you need a vacuum breaker from the reactor building back  
9 to the suppression pool. That's the basic BWR.

10 MEMBER SIEBER: Well, that would lead me to  
11 conclude that there's two potential leak paths.

12 MR. MONNINGER: Or it could be any of the  
13 penetrations or the equipment hatches.

14 MEMBER SIEBER: Right.

15 MR. MONNINGER: There's -

16 MEMBER SIEBER: Could be, but I don't expect  
17 it for the equipment hatch or an airlock door to have  
18 any kind of gross leak to have had a detonation inside  
19 preceding -

20 MR. MONNINGER: But the pathway for the  
21 leakage.

22 MEMBER SIEBER: Yeah, but it takes a long  
23 time. If you maintain the equipment properly, it takes  
24 a long time to build up the concentration.

25 MEMBER BANERJEE: Didn't the buildings fail

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1 in the same way?

2 MR. MONNINGER: Meaning -

3 MEMBER BANERJEE: And when you look at the  
4 vents -

5 MR. NOTAFRANCESCO: Is this on? This is  
6 Allen Notafrancesco, Research.

7 MEMBER BANERJEE: Sorry?

8 CHAIRMAN SCHULTZ: You'll need to step right  
9 up to the mic.

10 MR. NOTAFRANCESCO: It's Allen  
11 Notafrancesco, Research.

12 The issue of - let's deal with this. We  
13 don't think there's going to be any unique issues on  
14 gaps of hydrogen behavior. I think we've got a good  
15 handle on that.

16 I think you have significant amounts of  
17 hydrogen in volumes. It doesn't take much of an  
18 ignition source to spark it off. There's been work on  
19 Unit 1 and 3 to try to understand if it's a deflagration  
20 or a detonation.

21 You have to understand these reactor  
22 buildings are not leak tight and they're not all  
23 containments. So, the strength is weak. So, it  
24 wouldn't take much overpressure to break the reactor  
25 building.

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1           Some speculate Unit 1 explosion was a  
2 deflagration based on looking at photographs and  
3 velocities. Unit 3, likely detonation.

4           And also interesting enough, Unit 2 did not  
5 explode. Because Unit 1 when it exploded, it opened  
6 up a blowout panel. So, there was flow through that  
7 panel which negated destruction of Unit 2, which gives  
8 us some, you know, assurance of what happened.

9           MEMBER SIEBER: That's interesting.

10          MEMBER BANERJEE: Okay. So, no gaps  
11 apparently in our understanding.

12          MR. NOTAFRANCESCO: We don't see the  
13 fundamental hydrogen behavior. I think we know if you  
14 have enough hydrogen, it's going to burn and do something  
15 nasty. Whether if it's a strong deflagration or a  
16 detonation, it's going to overpressurize a weak vessel.

17          MEMBER BANERJEE: Well, I would say the  
18 second remark you made is interesting. It's very hard  
19 to detonate in a large volume.

20          MEMBER SIEBER: Right.

21          MEMBER BANERJEE: So, if it was truly a  
22 detonation, you better find out how it happened, because  
23 it's very unusual that it can happen.

24          You get a very strong deflagration where  
25 the flame speed can get up, but mechanisms to have a

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1 true detonation in what we call truly unconfined clouds,  
2 are not apparent to me.

3 MR. NOTAFRANCESCO: Well, Unit 3, like I say,  
4 speculation based on CFD that it was a detonation.

5 MEMBER BANERJEE: What CFD? How can a CFD  
6 do a detonation?

7 MR. NOTAFRANCESCO: CFD concentrations.  
8 What they're looking at is - you're right. In an open  
9 space, it's difficult to have a detonation, but remember  
10 part of the reactor is ruined. So, there's the  
11 possibility of a DDT, okay.

12 MEMBER BANERJEE: So, there's partial  
13 confinement.

14 MR. NOTAFRANCESCO: Right. Half their  
15 reactor building is ruins. It's the refueling bay which  
16 is open.

17 MEMBER BANERJEE: Okay. So, I'm really  
18 trying to understand was that something that you didn't  
19 expect happening here?

20 MR. TITUS: That's what I would say that the  
21 intent of this is to identify anomalies exactly like  
22 that which we say -

23 MEMBER BANERJEE: Based on what you already  
24 know, have you seen something? That's really what I'm  
25 after.

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1 MR. MONNINGER: I don't think anyone  
2 expected the reactor buildings to explode in the manner  
3 in which they did on TV.

4 (Laughter.)

5 MR. MONNINGER: I mean, I do think that's  
6 pretty -

7 MEMBER BANERJEE: But, I mean, in  
8 retrospect, is there some aspect coming out of it that  
9 was unusual, not within your body of knowledge because  
10 of scale or whatever?

11 MR. MONNINGER: Yeah, I think right now we're  
12 just putting together the fundamental plans and we  
13 haven't work them at all. I mean, there is essentially  
14 - we have them for our resource, but there's essentially  
15 no resources for any of the plans.

16 So, right now these are the fundamental  
17 questions we're trying to answer and we're putting a  
18 plan together to address them, but, you know, we really  
19 haven't done any of the work.

20 And I think the notion is hydrogen is such  
21 a significant issue that we wanted to try to touch on  
22 all the various steps - not the steps. All the various  
23 mechanisms to, you know, refresh yourself and refresh  
24 the public, how is hydrogen generated, the amounts, the  
25 timings, et cetera, and walk through it. And the intent

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1 was if we see something new out there, we'll have to  
2 address that.

3 Maybe it will be regulatory action or not,  
4 but at the end of this effort we want to have an  
5 articulated technical basis document that is  
6 self-contained that marches people through hydrogen and  
7 why we concluded action is needed, or action is not.

8 MEMBER BANERJEE: What's the schedule for  
9 completion of that?

10 MR. MONNINGER: Right now the schedules are  
11 still under development. And what we have tried to  
12 focus our stakeholders on, including the ACRS, is are  
13 we addressing the right issues as opposed to the  
14 particular schedules.

15 The Commission has - well, they set a goal  
16 of - the exact wording from the SRM is they - we'd have  
17 to go to the SRM for the exact wording, but there's a  
18 general rule everything should be done within five  
19 years.

20 So, we're looking to see what can be done  
21 within five years, and is there basis for any of these  
22 particular issues to extend then beyond five years?  
23 And if so, we would notify the Commission of that in  
24 the July paper.

25 MEMBER BANERJEE: Are you going to brief us

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1 about the technical aspects of this at some point?

2 MR. MONNINGER: When we have them, yeah.

3 MEMBER BANERJEE: That's what I'm asking.

4 MR. MONNINGER: Yeah, yeah.

5 MEMBER BANERJEE: When do you expect to have  
6 them?

7 MR. MONNINGER: I would -

8 MEMBER BANERJEE: Five years?

9 MR. MONNINGER: The notion of the Commission  
10 is, you know, regulatory fixes/changes are done and in  
11 place within five years. So, you know, until we engage  
12 them with our plans, that's sort of the marker out there.

13 I would expect for every single one of these  
14 issues, the filter vents, the seismically-induced fires  
15 and floods will be through you guys on each and every  
16 one of those issues. Providing our assessment, our  
17 analysis and our recommendation go, or no go, I think  
18 that's part of our normal process to do that.

19 MEMBER BANERJEE: I was just looking for  
20 timing.

21 MR. MONNINGER: You won't get an answer.

22 MEMBER BANERJEE: I can see that.

23 (Laughter.)

24 MR. MONNINGER: Not being smart, we do have  
25 schedules developed, but we have to make sure we have

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1 the appropriate plan and overlay the schedules on each  
2 other and resources. And we'll inform the Commission  
3 of our recommendations on the schedules in the July  
4 paper, and you won't get anything prior to that on the  
5 schedule.

6 MEMBER BANERJEE: July is fine.

7 MR. MONNINGER: Yeah.

8 CHAIRMAN SCHULTZ: I'm sorry, go ahead.

9 MEMBER BANERJEE: Somebody in Research is  
10 looking at these problems, right?

11 MR. MONNINGER: Yeah, Richard Lee, Allen,  
12 it's a team. We have NRO on it, NRR. So, it's an agency  
13 team working on this.

14 MR. NOTAFRANCESCO: Just to add to what he  
15 said, we're actively engaged in the forensics of  
16 Fukushima doing the analysis with our codes and trying  
17 to understand the situation much great, but I just want  
18 to add one thing.

19 We shouldn't get bogged down with the issue  
20 of DDT versus deflagration here. I think the regulatory  
21 history has been to reduce the concentrations in a  
22 volume, period, and not a hammering over how severe it's  
23 going to be when concentrations get high.

24 That's why igniters are put in Mark IIIs  
25 and ice condensers, is to eliminate the possibility of

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1 a random ignition at high concentrations and deal with  
2 DDTs.

3 MEMBER BANERJEE: Jack just said that  
4 they're not particularly effective. Is that true?

5 MR. MONNINGER: Igniters?

6 (Simultaneous speaking.)

7 MEMBER BANERJEE: Oh, it was recombiners.

8 MR. MONNINGER: Well, the thermal - the old  
9 thermal recombiners.

10 MR. NOTAFRANCESCO: Well, the recombiners  
11 in the sense of - the current plants I'm not aware of  
12 having thermal recombiners. Those are PARs, passive  
13 autocatalytic recombiners.

14 So, I don't know the basis to not - unless  
15 you really - they're supposed to recombine small amounts  
16 like a thermal recombiner, there is some issues that  
17 it could be an ignition source.

18 My response to this is so what? So, it will  
19 burn at a high concentration, but it will be low enough  
20 not to have an extreme dynamic load.

21 MEMBER BANERJEE: So, currently the igniters  
22 that you have that you were alluding to, are things that  
23 would produce sparks?

24 MR. NOTAFRANCESCO: They're globe plugs, and  
25 there could be 50 to 90 in a plant distributed to make

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1 sure there isn't an extreme volumetric buildup of  
2 hydrogen before it's deflagrated.

3 MEMBER BANERJEE: Okay.

4 MR. MONNINGER: And it's very focused on the  
5 placement of the igniters, too. Very deliberate  
6 placement.

7 MR. NOTAFRANCESCO: Yeah, placement,  
8 including the different rooms, like I say, not to isolate  
9 rooms not to have it. It's distributed through the  
10 containment.

11 MEMBER BANERJEE: Okay.

12 MEMBER REMPE: You know, you've mentioned  
13 that you're actively involved in the forensic analysis  
14 and it would be good to have someone from Research come  
15 and brief our subcommittee on the progress made in the  
16 forensic analysis just so we become aware of the status  
17 of that work a bit more.

18 MR. NOTAFRANCESCO: Okay.

19 MEMBER STETKAR: Kind of following up on  
20 that, and maybe you know, maybe you don't know, do we  
21 know whether the Japanese have sent any cameras or robots  
22 into the corner rooms in the reactor building, you know,  
23 down below to see if there's any evidence that - on Unit  
24 3 in particular whether the explosion originated down  
25 there, you know, HPCI, RCIC rooms, RHR rooms which are

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1 typically down lower?

2 MR. MONNINGER: There's been quite a few.

3 So, you got within the containment, and then the reactor  
4 building. And -

5 MEMBER STETKAR: Well, in the corner of the  
6 building in particular, yeah.

7 MR. MONNINGER: Yeah, and there's been  
8 videos, et cetera, out there and -

9 MEMBER REMPE: We have seen it too, though,  
10 right?

11 MR. MONNINGER: Yeah, and a lot of the places  
12 -

13 MEMBER STETKAR: I was just thinking about,  
14 you know, it's compartmentalization and detonation -

15 MEMBER REMPE: Yeah.

16 MR. MONNINGER: Yeah, I think some of the  
17 areas that they expected to find things, they didn't  
18 find things.

19 MEMBER REMPE: But it was Unit 2 that -

20 MR. MONNINGER: Yeah. I mean, you saw some  
21 insulation displaced, but you didn't see -

22 MEMBER STETKAR: No, in particular in Unit  
23 3 though where the, you know, the dramatic destruction  
24 occurred.

25 MR. MONNINGER: Right.

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1 MEMBER STETKAR: Whether there's any  
2 evidence whether it initiated down low, or whether it  
3 was up high in the building.

4 MR. MONNINGER: I'm not sure. Allen, do you  
5 know?

6 MR. NOTAFRANCESCO: I don't think we know  
7 the answer to that question. I think what the word about  
8 now is when they put water in the reactor vessel or the  
9 containment, it's leaking out. And outside somehow  
10 there's penetration leakage. There's water outside the  
11 torus region, for example, which is not good.

12 MEMBER STETKAR: Okay. Thanks.

13 CHAIRMAN SCHULTZ: Just before you leave  
14 this slide, Brett, I'm going back to the comment you  
15 made earlier, John, number one, that you were going  
16 through Numbers 3, 4 and 5, indicated you weren't going  
17 to put a schedule to that at this point in time, but  
18 can I take it that the order is as expected on Item 3,  
19 NRR will be working with Research to determine whether  
20 there are important gaps in the understanding, in Item  
21 4 we're looking for possibility that we have conflicts  
22 with current technical basis and this gets into the  
23 meetings that are going to be held with stakeholders,  
24 and that Four and Five would be at least well in hand  
25 in terms of the interaction with Research and the

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1 understanding with stakeholders before we would get to  
2 the point where we're looking at new regulatory action  
3 recommendations if necessary?

4 MR. TITUS: I'm sorry, that's actually an  
5 excellent segue into the next slide. Because as we  
6 start to deal with the tasks which answer these different  
7 questions, certain offices have the lead and other  
8 offices have just essentially a secondary role or a  
9 complementary role.

10 CHAIRMAN SCHULTZ: If you can cover that,  
11 I would appreciate it.

12 MR. TITUS: We will walk right through those.

13 CHAIRMAN SCHULTZ: Thank you.

14 MR. TITUS: So, that was well-timed.

15 MR. MONNINGER: And it's not just Research.  
16 It's also the Office of New Reactors as well.

17 CHAIRMAN SCHULTZ: Right.

18 MR. TITUS: So, the technical team  
19 associated with Recommendation 6 is essentially set up  
20 for tasks to help answer those questions. The first  
21 of which actually addresses the ACRS Recommendation 1E  
22 and 2B associated with meeting with stakeholders.

23 So, first and foremost the Office of NRR  
24 actually has the lead on this and we will be complemented  
25 or supplemented by our Research and NRO counterparts.

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1 But as you can see here, the first task is to conduct  
2 stakeholder meetings for all existing containment  
3 types, see what kind of insights and what kind of  
4 information that they would like to bring to the table  
5 so that we can essentially flesh this issue out.

6 And as you work through the different  
7 bullets on this slide, I think specifically if I might  
8 read just off of the ACRS recommendation, we are focusing  
9 on near-term actions for additional hydrogen control  
10 mitigation measures in reactor buildings that's  
11 contained for Mark I and IIs, and also for other  
12 containment types in this particular task.

13 So, we are receptive, obviously, to your  
14 recommendations and this is one of the ways that we're  
15 attempting to fulfill them.

16 MEMBER BLEY: So, Bullet 2 doesn't just mean  
17 beef up the buildings. It could mean get the hydrogen  
18 out.

19 MR. TITUS: Yeah, it could be. And that's  
20 what - it relates back to our interdependency or overlap,  
21 I guess, point about the different recommendations and  
22 how they will impact this one.

23 So, if certain people come to the table and  
24 say this is a way we can eliminate hydrogen or control  
25 it or move it safely or something to that extent, that

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1 will come up at these stakeholder meetings.

2 MEMBER BLEY: So, back to what I asked in  
3 the beginning. Is this the area where you'll make sure  
4 people look at all pathways that could exist to move  
5 the hydrogen from containment into the reactor building?

6 MR. TITUS: This would be one piece of that  
7 puzzle. If you see the next two to three slides, we  
8 talk about hydrogen sources -

9 MEMBER BLEY: Okay.

10 MR. TITUS: -- the timing and migration  
11 pathways. That's actually Task 3.

12 So, this will be a forum where we discuss  
13 those things, but the report associated with the outcome  
14 is actually Task 3.

15 MEMBER BLEY: Okay.

16 MR. TITUS: So, moving on to Task 2  
17 essentially, this particular task will be led by the  
18 Office of Research with supplementary and complementary  
19 support by NRR and NRO.

20 So, I think this pertains more to the data  
21 collection and any particular discrepancies that we  
22 might identify between what we expect and what we  
23 actually find. So, specifically this task deals with  
24 sources and timing of hydrogen generation.

25 And as John said, you know, we have our

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1 existing knowledge base, and then we're looking for  
2 discrepancies or areas where we may have some gaps.

3 MEMBER BLEY: If we go back to the TMI  
4 accident, it was a lot of years, I think more than five,  
5 before we knew all of what went on inside that core.

6 For your first bullet up there, do we have  
7 any idea when we're going to get information at the  
8 detailed enough level to know if our models are  
9 predicting things correctly especially with respect to  
10 the hydrogen generation?

11 MR. TITUS: Yeah, exactly. You brought up  
12 a good point with TMI. 50.44, the rule that we're  
13 dealing with, was actually revised as a result of TMI.

14 And it was not revised until 1985, approximately six  
15 years after the accident.

16 And that was dealing here on domestic soil  
17 where we were in charge of certain things and -

18 MEMBER SIEBER: Excess -

19 MR. TITUS: Exactly. And then the level of  
20 devastation of the region comparably with Fukushima,  
21 obviously those factors extrapolate a longer time frame.

22 The purpose of these tasks is to -

23 MEMBER BLEY: So, having this all done and  
24 wrapped up in five years is pretty optimistic.

25 MR. MONNINGER: I think it depends. It

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1 depends upon whether we're going to say we're going to  
2 wait until the building is torn apart until they have  
3 very conclusive evidence, or if we're just going to go  
4 on the existing reports and studies out there.

5 MEMBER REMPE: But the existing studies,  
6 they have to assume holes in the vessel. And then they  
7 talk about sometimes it depressurized that caused the  
8 steam to condense, and then they had the hydrogen  
9 explosion.

10 So, a lot of it's input assumptions in  
11 saying you're going to match the data or knowledge base.

12 Again, I think it would be good for the Committee to  
13 hear about the status of the forensic assessments to  
14 understand some of the uncertainty in what this whole  
15 process is at this time.

16 MR. TITUS: And that might be one of the steps  
17 that after we complete this particular part which deals  
18 with Task 2, there might be an opportunity for us to  
19 come back depending on what the outcome is.

20 MEMBER SIEBER: I would hope that the  
21 schedule doesn't force us into superficial examination  
22 of the issues here, because it seems to me like it will  
23 take some time to do all this to understand it  
24 completely.

25 And if the end result is a rulemaking, that

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1 means you only have three years to do the research.  
2 And that sounds to me, like a huge challenge for the  
3 staff.

4 MR. MONNINGER: And with regard to, you know,  
5 the schedule and information and best available  
6 information, conclusive information, I mean, if you look  
7 at - the event occurred in March 2011 and the Agency  
8 and the Near-Term Task Force made a conclusion in July  
9 within the report that they didn't see anything, you  
10 know, significantly different and that they supported  
11 the continued operation of all plants, you know.

12 In a similar manner, we can go the next step  
13 and to look in more detail based on information we have  
14 available to us and any calculations we may be able to  
15 do within the next five years and that may lead us this  
16 pathway or this, but that doesn't necessarily stop us  
17 from all the information that may come out in eight,  
18 ten, 12 years to reopening the issue.

19 So, the question is -

20 MEMBER BLEY: But your particular task on  
21 Bullet 2 kind of hinges on that. We've got all the  
22 guesses now that might be right.

23 MR. MONNINGER: And if, you know, we'll just  
24 have to see how good that information is. And if the  
25 information is good enough that it leads us to action,

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1 we'll recommend that and the people can critique us  
2 however they want. Or if we don't believe information  
3 is good enough, we could propose deferral at that time.

4 But the notion is, you know, we want to put  
5 together a plan and work it. And if it's unsupportable,  
6 we'll address that at that time.

7 MEMBER SIEBER: And so, you see this as  
8 multiple schedule or decision-making as we go along.

9 And I sort of agree that that's the way it ought to  
10 be, because you can't be so thorough that we will - none  
11 of us will live long enough to see the answer, and we  
12 can't be so rapid that we get the wrong answer and be  
13 the wrong thing.

14 I think there is, you know, it's going to  
15 be a challenge for everyone to keep on schedule to make  
16 sure that they have the right amounts of stuff and to  
17 make good decisions.

18 MEMBER SKILLMAN: A very important piece of  
19 the TMI experience that I'm well aware of is the  
20 competition between the data gatherers and the data  
21 interpreters, and then those who would write the  
22 reports.

23 Not everybody was aligned. There were  
24 multiple organizations involved and I think it would  
25 be fair to say that each camp had its own theory on what

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1 happened.

2 And so, I think one of the challenges will  
3 be to harness the collection of information and find  
4 a way to mediate consensus.

5 MEMBER SIEBER: I agree.

6 MEMBER SKILLMAN: We had real difficulty  
7 pulling information out of TMI real-time, because in  
8 many cases we would say, golly, look what we found.  
9 And then the message was time out, we've got to figure  
10 out what this means.

11 And then there would be one group that says,  
12 well, if you interpret it this way, this is what  
13 happened. Another group goes, no, that's not what  
14 happened, this is what happened.

15 MEMBER SIEBER: Right.

16 MEMBER SKILLMAN: So, I think there are  
17 some administrative challenges in terms of  
18 organization, data collection, data interpretation, and  
19 finally communication of what the results mean.

20 So, I just offer that might be something  
21 you may want to consider as you think about schedule.

22 And I do agree it's going to be a generously long time  
23 before we really have some sense out of this.

24 You're right. It took us until after the  
25 quick look five years later to finally discover what

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1 really happened in the reactor vessel. And then all  
2 of a sudden at TMI-2 we could begin to say, ah, now we  
3 understand the cascade of events and how we got here.

4 It took years to do that.

5 MR. MONNINGER: And then if you're saying  
6 the five years just to get the data, then you've got  
7 to run that data through the regulatory process. And  
8 many of you are familiar with what it takes to get a  
9 regulatory change in place.

10 MEMBER SKILLMAN: And a lot of this depends  
11 upon which organizations are involved, who's being paid  
12 to do what, where the incentives are. So, there are  
13 some administrative challenges that have to do with  
14 pulling the data, interpreting the data, writing the  
15 reports and then putting that data out there.

16 MR. RULAND: Dick, if I could - I could just  
17 roger what you said. I mean, we've been dealing with  
18 the Steering Committee and the very questions that you  
19 posed about, you know, how long you wait, you got to  
20 make a decision, we have the Commission's basic  
21 direction about timing.

22 So, your words are exactly on target. It's  
23 something we're going to have to deal with.

24 MEMBER SKILLMAN: Thank you, Bill. Thank  
25 you.

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1 MR. TITUS: Keeping that kind of same  
2 foundation, Task 3 associated with this recommendation  
3 is to look at migration release pathways and what we  
4 think happened.

5 And as we've mentioned a number of times,  
6 there are certain models out there, and we're going to  
7 have to use reasonable assumptions and best estimates  
8 to try to - I don't know - I guess enhance our  
9 understanding of any discrepancies that we see.

10 And so, I think essentially the overarching  
11 principle you see going through each of these tasks is,  
12 what is our current knowledge base? What was the  
13 scientific information that supported that? Do we have  
14 anything new that would cause us to rethink or to  
15 reestablish? And then you'll see that the final fourth  
16 task is, what do we do with that information? Is it  
17 significant enough to necessitate regulatory action,  
18 or do we need to formulate a more long-term plan, you  
19 know, et cetera. There are some decision points along  
20 the way.

21 MEMBER BLEY: One of our members who isn't  
22 here, argues that you can't analyze this way. Hydrogen  
23 moves through places you don't expect it to move and  
24 that studying what's happened in various places or doing  
25 more experiments will almost invariably lead you to

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1 having to deal with hydrogen in places you don't want  
2 it rather than being able to say it won't be there, which  
3 is an argument for having some kind of hydrogen control  
4 equipment out there.

5 I don't see experimentation on here, which  
6 makes me worry about that in the position he's raised  
7 a little bit.

8 MR. MONNINGER: You know, and to a certain  
9 extent I think the team has struggled with this and  
10 they're trying to balance the notion of venting.

11 If venting is successful, if venting is very  
12 well-controlled and you have a high level of faith in  
13 venting such that your venting is moving from your  
14 containment, to the stack, to the environment and that  
15 the venting pressure is controlled in such a manner that  
16 you don't challenge the seals, to what extent does that  
17 address this potential issue of hydrogen within the  
18 reactor building or the auxiliary building, or do you  
19 still have to address the residual uncertainty there?

20 MEMBER BLEY: And that kind of hinges on  
21 whether you really need a driving head to get through  
22 the seals or just migration of hydrogen through them  
23 can occur with no driving head. And without experiment,  
24 I'm not sure you get enough confidence to deal with that.

25 It's not an area I'm expert in. I just have

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1 heard people talk about it enough it makes me worry.

2 It's hard to contain hydrogen.

3 CHAIRMAN SCHULTZ: Brett, is Research the  
4 lead here as well?

5 MR. TITUS: For Task Number 3, Research is  
6 the lead and with the other offices supporting them.

7 MEMBER BLEY: There's no experiments in your  
8 package, though, right?

9 MR. MONNINGER: I don't - and Allen could  
10 speak up, but I would think -

11 MR. NOTAFRANCESCO: I just want to add to  
12 the concern. I think this is one of the things we  
13 confront the utilities about. If venting is going to  
14 carry away a hundred percent of the hydrogen or 95  
15 percent, is there a potential that it will leak through  
16 a valve based on a delta-P, or there's a possibility  
17 of monitoring the compartments within the reactor  
18 building and we'll get a concentration, and then just  
19 open up a blowout panel and let it drift out at two  
20 percent concentration.

21 These are my ideas. Obviously we're going  
22 to confront the industry on what their take is, but the  
23 bottom line is I don't think this is that complicated  
24 with all these unknowns.

25 I think if you're aware of the Peach Bottom

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1 SOARCA work, I mean, those calculations also show the  
2 reactor building being destroyed. And based on similar  
3 potential leak paths due to overpressurization,  
4 reliable venting will reduce somewhat the back-pressure  
5 going through the valves and the containment.

6 MEMBER BLEY: I guess the issues is the  
7 somewhat, and is that enough? And it can show up in  
8 lots of places in that reactor building.

9 MR. MONNINGER: And I think that's, you know,  
10 because I think the Europeans have considered PARS  
11 within the reactor buildings, there's igniters,  
12 there's, you know, can you restart the normal HVAC  
13 system, there's, you know, take out blowout panels.  
14 Do you do nothing, or do you work on improve seals?

15 I think it would - based on our experiences,  
16 I remember with the hydrogen igniter placements with  
17 the AP-600, it can be a very difficult, technical  
18 challenge for the spacing of igniters to come up with  
19 a good, solid regulatory conclusion.

20 And the notion that the compartment - Allen  
21 mentioned the compartmentalization of the reactor  
22 building. Yeah, the spent fuel pool is relatively open.

23 But when you get below that, all these rooms all over  
24 the place and doorways and ductworks, et cetera, you  
25 know, you can propose to put igniters or PARs, but then

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1 someone has to come up with a technical justification  
2 that says they address your issue and is that doable  
3 or not, or do you focus on reliable venting and go after  
4 the seals, improvements I seals, to somehow try to  
5 prevent it from coming out, you know, what's the -

6 MR. NOTAFRANCESCO: Well, to extend that,  
7 we would look at the transport and the distribution  
8 within the reactor building to see the ease of migration  
9 in the lower compartments through the reactor building  
10 and to see if it does pocket somewhere. I mean, that's  
11 part of the evaluation.

12 MEMBER REMPE: But that hasn't been done in  
13 SOARCA or even this forensic analysis. There's not been  
14 a detailed sensitivity, nodalization study in a reactor  
15 building to look at the effects of compartmentalization.

16 MR. NOTAFRANCESCO: No, because one needs  
17 a lot of detail design information. Until we get it  
18 from Fukushima, it's difficult. But when you confront  
19 the utilities, we'll put them on the spot to give us  
20 more details on their design.

21 MR. TITUS: So, the fourth task being  
22 proposed by the team to deal with Recommendation 6 is  
23 essentially to take all the information that we gained  
24 in Tasks 1 through 3 and to essentially come up with  
25 a conclusion based on the data that we uncover, the

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1 assumptions that we make, the conversations that we've  
2 had with the industry, et cetera. So, to make a holistic  
3 decision, I guess, on whether or not regulatory action  
4 is needed.

5 And so, that's our fourth and final task  
6 and obviously timing has been a question. But as you  
7 look at our challenges on the next slide, we recognize  
8 that verifiable information might not be available for  
9 a long time based on our experience with TMI and some  
10 other, I guess, activities. So, that's one of the  
11 challenges that we have.

12 Another thing we have to look at is the  
13 number of resources that have been dedicated and the  
14 number of people on the staff that are going to be pulled  
15 in different directions.

16 Once again this is a Tier 3 activity. A  
17 lot of the same staff you see working on Tier 1 activities  
18 are the same experts that we have for this.

19 MEMBER BLEY: Brett, I notice you don't have  
20 a schedule up here. Of the four tasks, can you tell  
21 us where you are and anything about what the schedule  
22 looks like, or have you even got one at this point?

23 MR. TITUS: Well, we do have some preliminary  
24 information that we have discussed within the group as  
25 to what would be an appropriate time frame. I don't

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1 know if I want to go on record as laying them out -

2 MEMBER BLEY: Okay.

3 MR. TITUS: - especially after John said  
4 we weren't going to get any.

5 MEMBER BLEY: You're going to be done in five  
6 years, okay.

7 MR. TITUS: Exactly.

8 MR. MONNINGER: And our focus is to make sure  
9 we're addressing the right issues, we consider the areas  
10 making sure we have the right plan first, and then  
11 secondary to us would be the schedule and the resources.

12 And, you know, we would hopefully get support from the  
13 Commission on whatever schedule and resources -

14 MEMBER BLEY: You're still in the planning  
15 stage.

16 MR. MONNINGER: We're still in the planning  
17 stage.

18 MEMBER BLEY: Have you had any meetings with  
19 industry yet?

20 MR. MONNINGER: We do what we call the Tier  
21 3 meetings, which is industry and interest groups and  
22 public, public, public.

23 And in general, a lot of these Tier 3 issues,  
24 my perception is there are groups that say we fully  
25 support the recommendation and get on with it. Then

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1 there's other groups that say the most bang for the buck  
2 is Tier 1, we're very much strapped. These Tier 3 items  
3 are secondary or tertiary, et cetera, and should be  
4 pushed out.

5 But in terms of solid recommendations on  
6 our plan's activities, I think we're getting little to  
7 no comments. It's we strongly support it, or we don't  
8 want you to really be looking in this area.

9 MEMBER BLEY: My understanding of the Tier  
10 1, 2 and 3 wasn't that these are tertiary issues, but  
11 that these were things you couldn't get to right away.

12 MR. MONNINGER: Right, right. Yeah, and the  
13 staff identified the three categories, Tier 1, Tier 2,  
14 Tier 3, and it didn't necessarily say Tier 1 is the  
15 highest priority and Tier 3 is the lowest. It said Tier  
16 1 are those activities that the staff should do without  
17 undue delay, but you should do all these areas, but some  
18 of the areas like this it's study, you know.

19 The recommendation from the Task Force was  
20 not take regulatory action, it was study this issue.

21 So, there wasn't even a notion as to the significance  
22 of the issue in terms of safety or risk.

23 So, that's probably 50 percent of the issues  
24 within Category 3 or study the issue to determine the  
25 significance and whether anything should occur.

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1           So, with that, no level of safety  
2 significance has really been placed on them.

3           MR. TITUS: And I think yesterday the topic  
4 came up about perhaps taking too many reactionary - I  
5 think something to that effect like being too hasty.

6           50.44 in particular in 1981 right after TMI,  
7 the amendment came out to put in hydrogen recombiners.

8           And so, that activity happened and then roughly 2000  
9 time frame it was determined to be non-risk-significant  
10 and the same rule was amended.

11           So, we'd like to try to learn our lesson  
12 and make the right decisions. But I just include the  
13 challenges slide to talk about some of the things that  
14 are on the periphery of this particular issue.

15           Dealing with meetings in general, I think  
16 John has already mentioned that we've had public  
17 meetings and the feedback has been, I guess, on a certain  
18 spectrum. We've had some feedback in the area of  
19 hydrogen in particular, but a lot of the feedback is  
20 overlap, I think, from venting and from other  
21 activities.

22           So, I guess essentially if I could just  
23 capture the idea behind this proposed plan just to walk  
24 through it like any other safety evaluation that the  
25 staff performs, the regulatory position is this: It's

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1 supported by scientific data that says that the licensee  
2 in general, or in this particular case the information  
3 that we learned from Japan says X. And our conclusion,  
4 therefore, is Y.

5 So, that's kind of the overarching proposed  
6 plan. And each one of those four activities will have  
7 a report that, in my opinion, will follow some similar  
8 structure or format.

9 CHAIRMAN SCHULTZ: Before we go to public  
10 comments, are there any additional comments or questions  
11 from the Committee? Go around the table quickly.

12 Yes, Dick.

13 MEMBER SKILLMAN: I appreciated John's word  
14 picture. When we were in the discussion about what's  
15 new, is there new information, this image of three  
16 buildings blowing up is kind of - that will be iconic,  
17 I think, for all of us for our careers having seen that.

18 And I think that at least sets in my mind,  
19 the basis for saying what's new, something happened here  
20 that we really don't understand. So, I appreciate that  
21 word picture. Thank you.

22 MR. MONNINGER: It will be the TMI cooling  
23 towers. That's what the general public thinks.

24 MEMBER SKILLMAN: Well, for me TMI is the  
25 barrel that's collapsed inside the building -

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1 (Laughter.)

2 MEMBER SKILLMAN: - because that is a  
3 hydrogen event. But as you well point out for this  
4 situation, the tops of those buildings being blown in  
5 the air is what's new. Boy, that's new. That's scary.

6 So, thank you.

7 CHAIRMAN SCHULTZ: I'd like to open the  
8 discussion for public comment first from the room. Are  
9 there any comments from the public here?

10 Please come to the microphone if you'd like  
11 to make a comment, and state your name.

12 MR. NALEKANI: I'm Vijay Nalekani from  
13 Nuclear Energy Institute. Just one point I wanted to  
14 make is that if we look at the INPO timeline on the  
15 accident and a lot of other data, the Japanese operators  
16 waited until twice the design pressure of the  
17 containment.

18 So, if you wait for - if you allow something  
19 to overpressure 200 percent, you're going to create  
20 pathways that were not designed to be pathways. If you  
21 put 64 psi in a tire that's only designed for 32 psi,  
22 you're going to have either leak paths or you're going  
23 to blow up the tire.

24 So, there are pressure issue, there are  
25 cultural issue, there are lot of issues that prevented

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1 the Japanese from venting elevated to twice the design  
2 pressure. And I think that needs to be factored in when  
3 people discuss pathways and leak paths and that sort  
4 of thing. Thank you.

5 CHAIRMAN SCHULTZ: Thank you. Other  
6 comments from the room?

7 (No response.)

8 CHAIRMAN SCHULTZ: Public comments from  
9 the phone? If there are any, please state your name  
10 and make your comment.

11 (No response.)

12 CHAIRMAN SCHULTZ: Hearing none, I want to  
13 thank the staff -

14 MR. LEYSE: Bob Leyse. Can you hear me?

15 CHAIRMAN SCHULTZ: Yes, Bob.

16 MR. LEYSE: Okay.

17 CHAIRMAN SCHULTZ: Would you like -

18 MR. LEYSE: Bob Leyse. Are you on?

19 CHAIRMAN SCHULTZ: Yes, you're on, Bob.

20 MR. LEYSE: Okay. I commented briefly  
21 yesterday about pocket change testing and I'm not  
22 talking about the cost, but the size of the test  
23 apparatus that led to Appendix K. So, here we are.

24 I mentioned Sandia yesterday and it really  
25 angered me when I found out about that testing not until

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1 this past - last December. But I heard the word "MELCOR"  
2 mentioned once or twice today, and that's probably just  
3 as well.

4 But I want to quickly say that at Sandia  
5 they're using 49 rod bundles of zircaloy-clad heaters,  
6 full length, in order to get a MELCOR code that will  
7 handle a fire of an element in air only. And there's  
8 a fortune being spent on that.

9 So, going through some of the slides, we  
10 heard the word "gaps." And I put the word "gaps" and  
11 "regulation" together, and where is any kind of  
12 calibration for MELCOR on our large multi-rod bundles  
13 such as being done for that rather stupid test on burning  
14 a bundle in air?

15 I mean, you know, we're spending a lot of  
16 money on that giving it's apparently some priority.  
17 We've done nothing comparable to that to verify MELCOR  
18 or any other code, or for that matter going on a code,  
19 but to get the performance of multi-rod assemblies under  
20 LOCA conditions. So, what does it take to get those  
21 programs aligned and get a good multi-rod test going?

22 The Germans in general have done enough work  
23 to show that single-rod testing is not applicable to  
24 trying to get a calibrated code or response to a  
25 multi-rod assembly.

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1 Well, I guess Fukushima is a multi-rod  
2 assembly, but I expect that the hydrogen generation at  
3 Fukushima began well below 2200 degrees Fahrenheit and  
4 with regard to actions that could be going on.

5 ARM 50.93 was given a high priority a couple  
6 years ago, but not much is going on. So, let's get  
7 with the fundamentals. You don't really have a good  
8 calibration for MELCOR not comparable to the kind of  
9 work you're doing at Sandia which may or may not lead  
10 to a better MELCOR, but you do need multi-rod assemblies  
11 under LOCA conditions, and not these pocket-sized tests.

12 So, in order to get a handle on when the  
13 hydrogen is generated, you have to go to a multi-rod  
14 assembly and not try to pull it out of these simple tests.

15 So, I guess I can leave it there. I'll just  
16 finally say, you know, we're focused on Fukushima. If  
17 you stop and think about it, Fukushima was not a  
18 fast-moving accident. Think of what would happen if  
19 you had a large-break LOCA.

20 Nobody thinks it will happen, but  
21 presumably we're licensed on the basis that we could  
22 handle it. The fact is there is no basis that says we  
23 can handle a fast-moving LOCA. So, we'll leave it  
24 there.

25 CHAIRMAN SCHULTZ: Thank you, Bob.

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1 MR. LEYSE: Multi-rod assembly testing is  
2 required and under LOCA conditions, not spending the  
3 resources on an air-only combustion of a 49-rod bundle  
4 at Sandia.

5 It's surprising, you know. We claim to  
6 have an open government, but these programs get going  
7 without really any public participation. How in the  
8 world did that Sandia work ever get going without really  
9 any documented ACRS review that I can see anywhere?

10 The money could certainly have been what  
11 we need to do, the multi-rod testing. I don't see it  
12 in the program today, but maybe somewhere along the line  
13 in this Fukushima work they'll get to going on getting  
14 this kind of work in the U.S.

15 Sorry to ramble so much, but that's what  
16 happens when you get to be - when you come out  
17 extemporaneously. I guess it's better when I have a  
18 time limit posted by a chairman.

19 (Laughter.)

20 CHAIRMAN SCHULTZ: You got it.

21 MR. LEYSE: In order to get back to it, you've  
22 got to do multi-rod assembly under LOCA conditions and  
23 get it into the regulations. The ARM 50.93, I'm not  
24 advertising it, but it's a guide.

25 So, thank you for your time.

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1 CHAIRMAN SCHULTZ: We have your comments on  
2 the record, Bob, and we have members of the staff here  
3 that have heard them to take them into consideration.

4 Thank you for your comments.

5 MR. LEYSE: Thank you.

6 CHAIRMAN SCHULTZ: Other comments from the  
7 phone line?

8 (No response.)

9 CHAIRMAN SCHULTZ: With that, we'll recess  
10 until 10 past 10:00.

11 (Whereupon, the above-entitled matter went  
12 off the record at 9:53 a.m. and resumed at 10:09 a.m.)

13 CHAIRMAN SCHULTZ: We'll call the meeting  
14 back into session. The next presentation is to be made  
15 by Kevin Williams on the EP NTF recommendations, Tier  
16 2 and 3 implementation.

17 Kevin, Welcome to the presentations this  
18 morning.

19 MR. WILLIAMS: Thank you. Thank you for  
20 having me.

21 I am the branch chief in Nuclear Security  
22 and Incident Response in the area of emergency  
23 preparedness focusing on new reactor licensing review.

24 I've been assigned the task of leading our efforts in  
25 terms of emergency preparedness for Tier 1, Tier 2 and

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1 Tier 3 activities.

2 And so, our efforts right now have been  
3 focused on the Tier 1 aspects of Recommendation 9.3 of  
4 staffing and communications. We continue to focus on  
5 that, and just most recently we issued two 50.54(f)  
6 letters requesting information regarding staffing and  
7 communications. And we're in the midst of reviewing  
8 the licensee's responses to those efforts.

9 MEMBER RAY: Let me interrupt with an early  
10 question.

11 MR. WILLIAMS: Yes.

12 MEMBER RAY: Emergency planning includes  
13 severe accident management insofar as it involves the  
14 management chain.

15 Is that a correct statement?

16 MR. WILLIAMS: We have a - yes, that is a  
17 correct statement.

18 MEMBER RAY: Okay. Because I'm interested  
19 not so much in the offsite emergency planning  
20 activities, but in the actual engagement of the  
21 management chain in the severe accident decision-making  
22 that takes place.

23 MR. WILLIAMS: Yes.

24 MEMBER RAY: And that's included here?

25 MR. WILLIAMS: Yes. In my presentation, I

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1 will address -

2 MEMBER RAY: Okay.

3 MR. WILLIAMS: - the concern that the ACRS  
4 previously brought up in the letters that they submitted  
5 to the Committee.

6 MEMBER RAY: Yeah. Well, I was a motivator  
7 in part on that. So, that's why I'm interested in making  
8 sure I was focusing on the right thing.

9 MR. WILLIAMS: Yes, I full intend to address  
10 that.

11 MEMBER RAY: Okay.

12 MR. WILLIAMS: And hopefully to your  
13 satisfaction.

14 MEMBER RAY: Well, it says status, so we'll  
15 see.

16 MR. WILLIAMS: Yes. So, our priority is to  
17 focus on right now the Tier 1 aspect of 9.3, followed  
18 up by we just recently in the November time frame  
19 promulgated the revised Emergency Preparedness Rules.

20 And so, we're focusing on the implementation of those  
21 aspects of it, and now we're starting to focus our  
22 efforts on the Tier 2 and Tier 3 recommendations from  
23 the Near-Term Task Force report.

24 And we've incorporated into - our efforts  
25 right now are to focus on the July paper that's going

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1 to go to the Commission. And we took the remaining  
2 aspects that were Tier 2 and combined them with the Tier  
3 3 activities.

4 And specifically we focused on the  
5 remaining actions that were related from Recommendation  
6 9.3 which talked about the multi-unit dose assessment,  
7 the periodic training and exercises, and it has a nexus  
8 to ERDS as well. And then we focused on the remaining  
9 Tier 3 actions there.

10 Recommendation 9.1 and 9.2, I would like  
11 to get those together because our assumptions going into  
12 this, what we are focusing on, multi-unit event combined  
13 with the Station Blackout and impeded access. That's  
14 been our assumptions going along with it.

15 So, 9.1 focuses on the multi-unit piece of  
16 it, and 9.2 focuses on the Station Blackout piece, but  
17 they really focus on cross-cutting issues in terms of  
18 dose assessment, training and exercises and making sure  
19 you have the equipment. The only difference between  
20 those two are focusing on the ERDS capability.

21 And so, Recommendation 9.4 which is a Tier  
22 1 activity, and it's not on this slide, but I wanted  
23 to talk about Recommendation 9.4. And that was the  
24 transfer to the VPN, to get rid of the modem and transfer  
25 over to the VPN. It was initially a Tier 1 activity.

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1 We didn't focus on it because licensees were  
2 voluntarily going to that. And that's on schedule to  
3 be implemented by June 30th of this year.

4 So, if we don't get everybody on that, then  
5 we would issue an order for a 9.4. But we're going to  
6 take the aspects of what we get out of 9.4 and combine  
7 it with the remaining, I mean, Tier 3 and Tier 2  
8 activities.

9 Recommendation 10 has three parts to it,  
10 and one of it is to talk about protective equipment that  
11 is used by emergency responders. It also talks about  
12 command and control in terms of having the right people  
13 making the right decisions and how that factors into  
14 it. And I'm going to come back to that in a second,  
15 but I want to talk about all the recommendations here.

16 10.3 focuses on ERDS in terms of alternate  
17 methods to transmit it via like whether it has to be  
18 a satellite, determining if we have the right data set,  
19 or do we need additional data points, and whether ERDS  
20 should be transmitted continuously throughout the air  
21 with no operator action.

22 Recommendation 11 focuses on whether or not  
23 the resources that are there can effectively implement  
24 the licensee's plan in terms of whether you have the  
25 right staff to be able to obtain equipment which has

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1 a nexus or recommendation to - to Recommendation 4.2  
2 which talks about the equipment mitigating strategies  
3 that will be implemented.

4 11.2 talks about engaging FEMA so that we  
5 can make sure that we have the right to look at the  
6 decision-making framework, talk about recovery and  
7 reentry.

8 We also want to talk about whether or not  
9 we need to look at real-time rad monitors out there,  
10 and that would be working with DOE if we get to that  
11 point.

12 And then we also want to look at how do we  
13 educate the public, going out there talking about KI,  
14 talking about radiation safety, you know, things of that  
15 nature.

16 So, those are the recommendations that  
17 we're focusing on. And if I can come back to  
18 Recommendation 10.2, I believe the Committee focused  
19 on taking the aspects of command and control and moving  
20 it into Recommendation 8 which talks about emergency  
21 response strategies such as the SAMGs, the EOPs, AOPs.

22  
23 Just recently and actually right next door,  
24 there is a public meeting. They're talking about  
25 Recommendation 8. There is a person that works on my

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1 staff that's on there from Emergency Preparedness.  
2 It's being led by NRR.

3 But one of the things that they did is they  
4 have an Advanced Notice of Proposed Rulemaking now, and  
5 that gives you an opportunity to ask several questions.

6 And one of the things we did is we have a  
7 series of questions that talks about whether separate  
8 procedures should be developed for command control,  
9 should the command and control approach be standardized,  
10 and should the emergency drill and exercise program be  
11 revised such that it tests these types of capabilities?

12 We talk about the level of expertise that  
13 should be on an emergency response team. We also talk  
14 about training. And one of the specific questions talks  
15 about Recommendation 10.2.

16 And it says Recommendation 10.2 addresses  
17 command and control structure and qualification for  
18 licensee decision-makers for beyond design basis events  
19 and should this recommendation be addressed  
20 concurrently with Recommendation 8. That is one of the  
21 questions that Recommendation 8 is looking to address  
22 is the 10.2 aspects of it.

23 So, we're seeking public comment,  
24 stakeholder feedback in terms of how do we address the  
25 command and control structure.

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1 Consistent with that was the revised EP rule  
2 looked at the command and control structure and how do  
3 we do that. And we looked at our Statements of  
4 Consideration informing licensees to be familiar with  
5 the NIMS structure or the ICS, the Incident Command  
6 Structure, that's associated with that.

7 So, there's things that we're doing for  
8 implementation of the EP rule in terms of making sure  
9 that licensees are aware of those processes. And then  
10 we're also looking at what are we going to do in  
11 Recommendation 8, how do we combine that and we're  
12 looking for stakeholder feedback.

13 I'll stop right there just to see if you  
14 have a question or -

15 MEMBER RAY: No, what I'm listening for  
16 particularly is whether there's by this combination,  
17 there's a shift in the emphasis that I thought existed  
18 in 10.2 toward the traditional decision-making having  
19 to do with evacuation and protective actions off site  
20 and that sort of thing as distinct from actual decisions  
21 which ultimately I think in these circumstances do have  
22 to get made relative to implementing SAMGS as opposed  
23 to staying in the EOPs, whether to take action that will  
24 be irreversible in terms of mitigating a severe accident  
25 as opposed to continuing to try to deal with it within

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1 the EOP structure.

2 That kind of decision-making and where it's  
3 placed and who's qualified to make the decisions, I just  
4 would not want to see that diluted by its inclusion in  
5 the off-site emergency planning activities. That's  
6 what I'm -

7 MR. WILLIAMS: Yeah, and I believe  
8 Recommendation 8 which is - and we have a presence on  
9 there for Emergency Preparedness. We're looking at the  
10 revision to those procedures to address questions such  
11 as qualifications, do you have the right decision-maker,  
12 should they be SRO-qualified and who should be making  
13 those decisions?

14 MEMBER RAY: Right.

15 MR. WILLIAMS: And that's all filtering  
16 into that and we are looking to see stakeholder input  
17 such that when we revise those procedures and codify  
18 all of that, that that would be an expectation and  
19 carried over into the drill and exercise program, and  
20 also has an impact on the staffing. Do you have the  
21 right people in the right place and where these decisions  
22 are being made?

23 So, I think a lot of that's going to be  
24 incorporated into what we're going to - the rulemaking  
25 that's going to be done for Recommendation 8.

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1           MEMBER RAY: All right. Well, it just -  
2           that's what my interest is, is not losing that piece  
3           of it so that it - because it depending on the size of  
4           the organization and many, many other factors, it can  
5           have a significant affect. And, therefore, be hard to  
6           implement.

7           And I think it's going to take - at the end  
8           of the day, it's going to take some commitment to get  
9           it done, so to speak.

10          Now, I'm not prejudging what "it" is.

11          MR. WILLIAMS: Right.

12          MEMBER RAY: But what it turns out to be,  
13          it's not going to be easy to implement. And I just want  
14          to make sure that because of that it doesn't get pushed  
15          off and then forgotten about, because I think it's  
16          important.

17          MR. WILLIAMS: Yeah, I understood that and  
18          we made a real concerted effort to make sure that as  
19          we framed the questions were going out in the ANPR, that  
20          we addressed those types of issues because we recognize  
21          that there is some nexus to a lot of this to make sure  
22          that we can head that off a lot sooner than later.

23          MEMBER RAY: It's going to be hard to  
24          implement, is my point. And, therefore, we need to make  
25          sure that it gets the support that it needs, okay?

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1 MEMBER BLEY: The ANPR is already out?

2 MR. WILLIAMS: Yes.

3 MEMBER BLEY: I have not seen it yet.

4 MR. WILLIAMS: yes, the ANPR was issued, I  
5 want to say, April 30th.

6 MEMBER BLEY: Okay.

7 MR. WILLIAMS: And it was for a 60-day  
8 comment period which expires June 18th.

9 MEMBER STETKAR: We should probably see a  
10 copy of that if we -

11 MEMBER BLEY: Antonio said he'll go get it  
12 for us.

13 MR. DIAS: I'll get it and send it to all  
14 members.

15 MEMBER STETKAR: Kevin, I came in a little  
16 bit late. So, I missed the first two or three minutes  
17 of this discussion. So, forgive me if I'm repeating  
18 anything.

19 I share Harold's concerns about perhaps a  
20 source of confusion between emergency planning versus  
21 the event mitigation and response, the integration of  
22 EOPs, SAMGS, EDMGs. And in particular, one of the items  
23 that we raised in a couple of our - one of our letters  
24 - I guess two of our letters was in addition to that  
25 integration of the fire response procedures, which are

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1 yet another set of procedures that sort of dangle out  
2 there at the end and not necessarily at all plants been  
3 fully integrated with emergency response actions.

4 Do you happen to know whether the ANP since  
5 I haven't seen it, does that address the issue of fire  
6 response procedures also?

7 MR. WILLIAMS: That, I'm not - I don't  
8 believe it does. I don't know though.

9 MEMBER STETKAR: Okay.

10 MR. WILLIAMS: I can take that -

11 MEMBER STETKAR: Can you find out, please?

12 MR. WILLIAMS: Yes.

13 MEMBER STETKAR: Because I'm looking at  
14 something here as a response to us, which indicates that  
15 that particular ANP perhaps addresses our concerns about  
16 the integration of fire response procedures.

17 But not having seen the ANPR and only  
18 looking at something that I first saw this morning, I'm  
19 not quite sure whether all of that has been tied  
20 together.

21 And if it doesn't, I'd like to know where  
22 - we were originally led to believe that the integration  
23 of the fire response procedures might be pushed off to  
24 Tier 3. Haven't heard anything about that.

25 As I said, what I'm looking at this morning

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1 seems to indicate, no, it's been pushed up into this  
2 ANPR under Recommendation 8. But having not seen that,  
3 I don't know where it is.

4 MR. WILLIAMS: Okay. I take that as an  
5 action item.

6 CHAIRMAN SCHULTZ: There are at least two  
7 questions there.

8 (Laughter.)

9 MEMBER STETKAR: Is it in the ANPR?

10 MR. WILLIAMS: Right. And if not, where?

11 MEMBER STETKAR: And if not, where is it?  
12 did it get lost or ignored somewhere?

13 MR. WILLIAMS: Yeah, our focus has been more  
14 so on the aspects of command and control from an EP  
15 perspective, you know. Should it be in the Technical  
16 Support Center or the EOF or the control room, and what  
17 are the qualifications of those people?

18 So, I understand that and we can take care  
19 and get back to that.

20 MEMBER STETKAR: Thanks.

21 MR. WILLIAMS: Any more questions on that?

22 (No response.)

23 MR. WILLIAMS: Okay. So, in the federal  
24 papers that have gone up to the Commission in terms of  
25 what we're going to do for an emergency preparedness

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1 standpoint, and it's also going to look at a lot of things  
2 that we're doing in terms of engaging stakeholders,  
3 developing the 50.54f questions, responding to those,  
4 and they're now looking at, you know, what should we  
5 be doing? How are we going to address the Tier 3  
6 activities?

7 And so, the crux of what we're trying to  
8 do, or our focus, is more so on the paper that's coming  
9 up in July to address the remaining Tier 2, Tier 3  
10 activities taking into consideration any of the  
11 information that we gain out of the Tier 1 responses.

12 So, our proposal is to take the remaining  
13 activities that I outlined, you know, Recommendation  
14 9.1, 9.2, 9.3, you know, the aspects of 9.4, 10 and 11,  
15 and establishing an Advance Notice of Proposed Ruling.

16 And we're going to propose that in the  
17 paper, and it's going to address those other issues in  
18 terms of resources. We developed what we think it would  
19 take to do this, when we could start the work. And it  
20 will also address ERDS from a bigger, bigger picture  
21 standpoint.

22 MEMBER RAY: Is the first bullet up there,  
23 is it anything other than a - does it really represent  
24 a conclusion, or is it just what we always say because

25 -

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1 MR. WILLIAMS: What it does is it addresses  
2 the fact that if the question were to come up, you know,  
3 we were looking at the things that came out of the  
4 Near-Term Task Force, things that should be done without  
5 group delay.

6 Now, if you don't have the resources, if  
7 you're not going to start this until sometime later based  
8 on your budget -

9 MEMBER RAY: Right, but it doesn't represent  
10 the result of the work that's ongoing now.

11 MR. WILLIAMS: Only in terms of when we talk  
12 about the emergency planning zone basis. But what it  
13 looks like or it focuses on if you were going to ask  
14 me why does it take so long to do this.

15 And the thinking is the existing basis that  
16 we have out there, the structure, the regulations  
17 provide for adequate protection of public health and  
18 safety.

19 We recognize that there is enhancements to  
20 the program and we want - but because we believe that  
21 we're on solid ground, it will take a little more time  
22 to do these types of things. That's the only point of  
23 that first bullet.

24 MEMBER RAY: Okay, but it doesn't prejudice  
25 if we were to decide we need something more in this area

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1 of command and control. I was talking about -

2 MR. WILLIAMS: No.

3 MEMBER RAY: -- it doesn't say, well, we  
4 decided ahead of time we don't need that.

5 MR. WILLIAMS: Yeah, the only thing that I  
6 could speak to that is in the Statements of Consideration  
7 for the revised EP rule, the issue of command and control  
8 came up in terms of having licensees adopt the ICS or  
9 the NIMS structure that is required of state and local  
10 responders.

11 And what we didn't do in our EP rule, which  
12 I think speaks to your initial issue, is it's going to  
13 be very difficult to implement this. So, what we tried  
14 to focus on is licensees being familiar with the terms,  
15 you know, what the states and the locals would use, how  
16 to coordinate, how to effectively communicate across  
17 the organization to alleviate any confusion in terms  
18 of how we're responding, you know.

19 MEMBER RAY: I, you know, I've done this for  
20 many years and I don't have any concerns about protective  
21 action recommendations.

22 MR. WILLIAMS: Right.

23 MEMBER RAY: What I'm concerned about is the  
24 more the issue that we - that John and I talked about  
25 before, which is do you have to have a watchlist for

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1 senior management, for example. What qualifications  
2 do they need to have?

3 MR. WILLIAMS: None of this precludes us from  
4 going down that path.

5 MEMBER RAY: Okay, because that's the path  
6 that I'm more concerned about than I am the protective  
7 action recommendation implementation because I think  
8 we drill on that.

9 MR. WILLIAMS: Yes.

10 MEMBER RAY: People are familiar with it.  
11 It's the other thing that isn't given the attention  
12 that I think Fukushima indicates we should be giving  
13 it attention.

14 MR. WILLIAMS: And we have, yes, and we will.

15 MEMBER RAY: All right.

16 MR. WILLIAMS: So, for all the other Tier  
17 2 and Tier - the remaining Tier 2, Tier 3 action, all  
18 the slide says is that we intend to - or we are proposing  
19 to use an ANPR to determine whether or not we can  
20 establish a regulatory basis to undertake rulemaking.

21 And there were two other issues that were  
22 identified and communicated to the Commission as having  
23 a nexus to the -- to Fukushima. And that one of them  
24 was the Emergency Planning Zone, and the other one was  
25 the potassium iodide, the pre-staging of potassium

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1 iodide.

2           When we looked at the Emergency Planning  
3 Zone, we took an evaluation in terms of does our basis  
4 and everything that we do, the programming and the  
5 program itself, does it provide adequate protection,  
6 do the procedures put in place would allow for any  
7 additional expansion beyond the ten miles of what's  
8 going on.

9           And we looked at that and we believe that  
10 it does, but we want to take the opportunity -- when  
11 we say that we look at these long-term activities,  
12 there's activities that are going on in the area of  
13 research that we can, you know, they're going to study  
14 a certain site. And we want to take those  
15 characteristics, look at what things we can learn from  
16 that, and that's the Level 3 PRA that we're talking  
17 about, because we hadn't really looked at it from a  
18 multi-unit slant.

19           And so, what we're trying to do now is gather  
20 that information, look at it and see if it changes any  
21 of our - the basis of our conclusions.

22           We also received a petition for rulemaking  
23 that I think has about 37 co-sponsors that was just  
24 recently put out for public comment as well. And it  
25 has a 75-day comment period that they're looking at,

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1 and that's one of the bases of the EPZ.

2 So, we're looking at those things, we're  
3 coordinating our efforts with NRR, but we're going to  
4 do this outside of the NTTTF. So, it won't be included  
5 as a Tier 3 issue. It will be its own issue done with  
6 in-house resources that are already looking at those  
7 types of things.

8 The other issue is the potassium iodide.

9 And for us, it's been an ongoing thing. We have what  
10 I call a resident expert, Trish Milligan, you know, who  
11 works these issues. And we would like to - our proposal  
12 is to continue to look at the pre-staging of KI under  
13 our existing process.

14 We continue to engage the use of KI. We  
15 continue to look at the studies that have been done out  
16 there. And we're looking to - just like we did with  
17 Chernobyl. We took the time to gather the data, analyze  
18 the data and make any changes that we needed. And we  
19 would do the same - and our proposal is to do the same  
20 thing here. And again that would be outside of the Tier  
21 3 issue. It would be on our existing processes with  
22 existing staff resources under existing programs.

23 MEMBER RYAN: Kevin, is there any chance we  
24 will be able to reconstruct the fraction of the release  
25 that went out to sea and try and estimate what the total

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1 release from all the units was for iodide?

2 MR. WILLIAMS: I would defer that to Trish  
3 if you don't mind.

4 MEMBER RYAN: Okay.

5 MR. WILLIAMS: If you could just come to the  
6 mic, answer his question.

7 MS. MILLIGAN: Hi, Mike. Is it on? Is this  
8 on?

9 CHAIRMAN SCHULTZ: Yes, it is on.

10 MS. MILLIGAN: Do you want to repeat your  
11 question for me, please?

12 MEMBER RYAN: Sure. A huge part of the  
13 release, the release was out to sea. And so, what's  
14 deposited on the ground particularly that one small  
15 valley going to the northwest, is about all there is  
16 on the ground.

17 MS. MILLIGAN: That's correct.

18 MEMBER RYAN: Is there going to be any effort  
19 to try and reconstruct what would have been on the ground  
20 had the winds been favorable?

21 I'm thinking about, you know, in the context  
22 of a potassium iodide program. What would the magnitude  
23 of that be given the whole release was actually in play  
24 for the population of consideration?

25 I wonder if anybody's thought about that.

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1 MS. MILLIGAN: We thought about it, and I  
2 don't know what actions are being done. We've discussed  
3 it within the Interagency Working Group with Department  
4 of Energy, because they did a lot of -

5 MEMBER RYAN: Yeah, they did all the  
6 flyovers.

7 MS. MILLIGAN: Yeah.

8 MEMBER RYAN: And I've seen that data.

9 MS. MILLIGAN: So, we've been discussing it,  
10 but we have not - I don't know what the outcome of the  
11 resolution is at this point.

12 MEMBER RYAN: I think there's a real  
13 opportunity here because the data that they did collect,  
14 I think, was very good and well done.

15 So, if there's any way to reconstruct the  
16 release term and say, well, what if that was distributed  
17 in the same pattern that we see for what was on land,  
18 that would be an interesting exercise to me to think  
19 about what the magnitude of a potassium iodide -

20 MS. MILLIGAN: Sure, because we've looked  
21 at what that would be like if we put the plume in the  
22 central United States where it's surrounded by land.

23 MEMBER RYAN: I wouldn't be so - first, I'd  
24 be worried about getting it right for what it had  
25 represented in Japan particularly with regard to any

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1 recommendations to U.S. citizens in a foreign country.

2 And then second would be how would that  
3 further inform at least tabletop exercises or other  
4 kinds of estimate calculations for the power plant  
5 groups in the United States.

6 This is a four-unit site, and that's a  
7 relatively rare opportunity to have data that represents  
8 at least three of them being in play for the measurements  
9 of interest.

10 So, I would guess and I would hope the  
11 Committee would agree that a recommendation along those  
12 lines would be useful and helpful, but I just wanted  
13 to bring that up while we're all here today.

14 MS. MILLIGAN: Okay, yes.

15 MEMBER RYAN: Thanks, Trish.

16 MS. MILLIGAN: Thank you.

17 MEMBER ARMIJO: Before you leave, I don't  
18 know, do you know if the Japanese government actually  
19 recommended potassium iodide to their citizens beyond  
20 the ten-mile zone?

21 It's just a question of fact, but do you

22 -

23 MS. MILLIGAN: The -

24 MEMBER ARMIJO: Do you know what the did?

25 MS. MILLIGAN: Yeah, Trish Milligan, NSIR.

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1 The actual - they pre-distributed potassium iodide,  
2 but they did not as a government actually make the  
3 recommendation.

4 However, I am told that within some  
5 localities the - I guess that would be the mayor, the  
6 local government official, did take it upon themselves  
7 to make that recommendation, but it was not an official  
8 recommendation. They merely pre-distributed it at  
9 reception centers should they need to -

10 MEMBER ARMIJO: Within the ten-mile zone,  
11 did the Japanese government recommend potassium iodide  
12 since it would have exceeded the protective action  
13 guidelines?

14 MS. MILLIGAN: No, they did evacuation of  
15 the population away from the plant.

16 MEMBER ARMIJO: Okay. So, they handled that  
17 by evacuation.

18 MS. MILLIGAN: And then they immediately  
19 started monitoring the environment and made the prudent  
20 recommendations to interdict food and water and milk  
21 supplies.

22 MEMBER ARMIJO: Okay. Thank you.

23 MEMBER RYAN: Just one other point of  
24 information now that Dr. Armijo has brought up that  
25 potassium iodide distribution and so forth.

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1 I think it would be interesting to also  
2 include in this the fact that potassium iodide is not  
3 without a downside risk. There are 42 commonly used  
4 drugs that interact with potassium iodide.

5 MS. MILLIGAN: Correct.

6 MEMBER RYAN: At least. And many  
7 derivatives of other generic drugs that interact badly  
8 with individuals that take the potassium iodide.

9 So, I think that presented is an opportunity  
10 here to see if there is any data or information about  
11 adverse reactions to potassium iodide or anything else  
12 to help inform any further use of it in the United States  
13 or anywhere else for that matter.

14 So, I think there's a broader question here  
15 that needs to be developed a little bit further perhaps  
16 into a little bit more of a research question or two  
17 and move forward, so, I mean, down through the list.

18 MS. MILLIGAN: Okay.

19 MEMBER RYAN: Thanks, Trish.

20 MS. MILLIGAN: Thank you.

21 MR. WILLIAMS: So, that would actually - we  
22 did do some engagement with stakeholders at a public  
23 meeting just recently to talk about what we're doing  
24 here in terms of the next steps that we're going to take.

25 We did receive some comments and some

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1 feedback ranging from don't do anything in terms of what  
2 you're doing with your Tier 2/Tier 3, to focus more so  
3 on KI and things of this nature, but it's not anything  
4 that we haven't heard before and disposition  
5 appropriately and, I think, those same types of  
6 questions and comments that we heard from engagement  
7 of stakeholders.

8 So, that would conclude my comments. And  
9 I would open it up to any questions that you guys would  
10 have.

11 CHAIRMAN SCHULTZ: Thank you. Other  
12 questions from the Committee?

13 MEMBER RAY: None further.

14 CHAIRMAN SCHULTZ: Kevin, you might be  
15 leaving after your presentation?

16 MR. WILLIAMS: I don't have to.

17 (Laughter.)

18 CHAIRMAN SCHULTZ: Since we do have the time  
19 here now, I would like to ask for public comments in  
20 particular in relationship to what your presentation  
21 has covered.

22 So with that, I'll ask for any comments,  
23 other comments from within the room first.

24 (No response.)

25 CHAIRMAN SCHULTZ: Seeing none, are there

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1 any comments from members of the public on the telephone  
2 who would like to make comments? The line is now open  
3 for comments.

4 (No response.)

5 CHAIRMAN SCHULTZ: Hearing none, we're going  
6 to thank Kevin for his presentation for covering all  
7 of the material that you have today for us, and we'll  
8 have an opportunity to move on to the next presentation.

9 MR. WILLIAMS: Thank you for having me and  
10 affording me the opportunity to speak before you today.

11 CHAIRMAN SCHULTZ: Thank you.

12 (Off the record discussion.)

13 CHAIRMAN SCHULTZ: John, are you ready to  
14 transition to the next presentation? I know we're a  
15 bit early.

16 (Off the record discussion.)

17 MR. MONNINGER: So, we do have one additional  
18 manager coming. He should be here in about two or three  
19 minutes.

20 CHAIRMAN SCHULTZ: We'll hold at this point  
21 and we'll recess for a few minutes.

22 MR. MONNINGER: Okay.

23 (Whereupon, the above-entitled matter went  
24 off the record at 10:40 and resumed at 10:46 a.m.)

25 CHAIRMAN SCHULTZ: We're back in session.

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1 The next presentation will be related to the Reactor  
2 Oversight Process.

3 John, would you like to introduce the topic  
4 and the -

5 MR. MONNINGER: Yes, we have two  
6 individuals. John Lubinski, he's the deputy director  
7 of the division responsible for this. And then Barry  
8 Miller is the lead project manager.

9 In addition to that, there were some  
10 questions that Mr. Stetkar had and Dennis had had with  
11 regard to venting for the BWRs. So, I ran down what's  
12 called the EPGs, the General Electric Emergency  
13 Procedure Guidelines that form the basis.

14 So, we'll provide these documents to the  
15 Committee for information.

16 CHAIRMAN SCHULTZ: Okay, great. thank you.

17 MR. MONNINGER: Then we're ready to proceed.

18 Thank you.

19 MR. MILLER: Good morning. As John said,  
20 my name is Barry Miller. I'm the project manager in  
21 the Japan Lessons Learned Directorate for  
22 Recommendation 12.1.

23 Tim Kobetz who you see on the slide is the  
24 branch chief in the Reactor Inspection Branch and he  
25 couldn't be here today, but we have John to help me answer

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1 some questions and we'll go through it.

2 Okay. So, Recommendation 12.1 was the  
3 recommendation to strengthen the Reactor Oversight  
4 Process to more fully include defense-in-depth  
5 considerations.

6 Well, specifically the wording is  
7 recommended to expand the scope of the annual ROP  
8 self-assessment and biennial ROP realignment to more  
9 fully include defense-in-depth consideration.

10 Now, as John mentioned in his presentation  
11 yesterday without the flow chart, there's several  
12 different ways. Some are dependent on other  
13 recommendations, some can have an implementation plan  
14 now.

15 This is one of the recommendations that in  
16 the NTF report was explicitly stated and I think we  
17 continue to agree with that it's dependent on  
18 Recommendation 1.

19 Recommendation 1, as I'm sure you're aware,  
20 is the recommendation to establish a logical, systematic  
21 and coherent regulatory framework that balances  
22 defense-in-depth and risk considerations.

23 So, and this is an ongoing activity separate  
24 from - it's kind of separated out from all of the three  
25 tiers and given its own deliverable to be presented for

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1 options to be presented to the Commission in February  
2 of 2013.

3 MEMBER SKILLMAN: Before you go on, Barry.

4 MR. MILLER: Yes.

5 MEMBER SKILLMAN: I'm trying to understand  
6 your previous slide.

7 MR. MILLER: Okay.

8 MEMBER SKILLMAN: I remember when SALP was  
9 replaced with ROP. And the question I ask is whether  
10 or not 12.1 is focused specifically at the quarterly  
11 drills, the biennial exercise, the oversight by the NRC  
12 on the licensee's performance for drill behavior, drill  
13 outcome, manning the EOF, making the calls on time, or  
14 whether you're pointing at something different than that  
15 with this recommendation. So, I'm confused.

16 Can I ask you to clarify it, please?

17 MR. LUBINSKI: Sure, maybe if I can -

18 MR. MILLER: Sure.

19 MR. LUBINSKI: From the standpoint of  
20 drills, that's one aspect of the ROP. So, let me go  
21 back a little bit.

22 From an ROP, this is our - how do we do an  
23 integrated assessment of licensee performance? And  
24 that's what we're looking for under the ROP. We have  
25 our mid-cycle meetings, our end-of-cycle meetings to

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1 assess performance across all the cornerstones.

2 After we complete that assessment of all  
3 of the plant's performance, we then go back and do a  
4 self-assessment of the ROP itself. Was the ROP  
5 effective in assessing licensee performance?

6 And that's what we're referring to as the  
7 scope of the annual ROP self-assessment. Did our  
8 program which replaced the SALP program, is it effective  
9 at providing oversight of licensees, assessing their  
10 performance, and having appropriate actions from the  
11 standpoint of NRC and responding to that.

12 In expanding the biennial ROP realignment,  
13 that issue from the standpoint of where do we put our  
14 inspection resources, are we putting our inspection  
15 resources in the correct areas as far as baseline  
16 inspections versus other more specialized inspections  
17 such as fire protection, triennial inspections or the  
18 triennial CDBI inspections.

19 This recommendation the way we are looking  
20 at this, this recommendation would be after  
21 Recommendation 1 is completed. And when I say  
22 "completed," meaning the Commission makes a decision  
23 on where to go.

24 How do we change the ROP self-assessment  
25 process and the realignment to appropriately capture

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1 those changes and expectations?

2 Right now the ROP is based on the current  
3 regulatory structure, the current regulatory program.

4 If there is a major change with respect to the  
5 restructuring of that program, how is the ROP modified  
6 to handle that?

7 Now, I'm separating that, and I gave a  
8 little bit of a longer story, to what we do today. We  
9 are not going to stop what we're doing today in our annual  
10 self-assessment paper or our biennial realignment.

11 As we move forward in addressing the other  
12 lessons learned recommendations such as doing  
13 walkdowns, licensees are required to do walkdowns for  
14 flooding and seismic, and this is part of the Tier 1  
15 recommendations, we are still going to issue TIs the  
16 way we would under a normal process to follow up.

17 Any information we get as a lessons learned  
18 as a result of implementing that TI, we will look in  
19 our annual self-assessment of the ROP and say were we  
20 effective, was a TI the right way to go, should other  
21 changes take place?

22 When the rulemakings go forward, right now  
23 there's rulemaking from Station Blackout for hardened  
24 vents, for incorporating emergency procedures into  
25 operator licensing, EDMGS, with respect to those we're

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1 going to still follow our current process under the ROP  
2 of issuing TIs, incorporating it into our inspection  
3 plan, and then again do a self-assessment each time we  
4 look at this and say, based on these range of activities  
5 we had, do we need to modify the ROP to continue to  
6 strengthen it based on the current program? But that's  
7 totally separate from Recommendation 12.1. That will  
8 continue to take place.

9 After Recommendation 1 is complete, that's  
10 when we'll say does the ROP still have an adequate  
11 foundation to support the changes in Recommendation 1  
12 and how do we expand the scope of these two processes  
13 to account for that?

14 I don't know if that helps.

15 MEMBER SKILLMAN: It does. Thank you.  
16 Thank you.

17 MEMBER BLEY: On your next one -

18 MR. LUBINSKI: Next slide?

19 MEMBER BLEY: Uh-huh. I understand what you  
20 said after Recommendation 1 is moving us in some  
21 direction, you'll go back to make sure that the ROP is  
22 working with that.

23 MR. LUBINSKI: Yes.

24 MEMBER BLEY: However, this recommendation  
25 is dealing with defense-in-depth which you already

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1 consider, and I thought it was driving you to maybe  
2 strengthen the looking at defense-in-depth within the  
3 ROP as it currently exists.

4 So, I was a little confused to see this and  
5 maybe it's just my memory is weak on the tie between  
6 the two.

7 MR. LUBINSKI: I think when you look at the  
8 wording in the Near-Term Task Force report, it is a  
9 little bit confusing with respect to that.

10 However, we did work with members of the  
11 Task Force -

12 MEMBER BLEY: And this is the intent.

13 MR. LUBINSKI: -- and this is their intent.

14 MEMBER BLEY: Okay.

15 MR. LUBINSKI: Two of them were sitting on  
16 the Steering Committee meeting when we briefed this,  
17 and had this explanation as well that this was the real  
18 intent.

19 It was not that we were to go make changes  
20 to the ROP today to change the defense-in-depth.  
21 Instead, let's wait for the regulatory framework and  
22 then make the accompanying changes after that.

23 MEMBER BLEY: Okay. So, from this point  
24 forward, it would be telling us what you can do in the  
25 interim?

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1 MR. LUBINSKI: You mean in today?

2 MEMBER BLEY: Yeah.

3 MR. LUBINSKI: Probably not. What I'll tell  
4 you in the interim, in the interim what we'll be doing  
5 is we'll follow our current processes of still doing  
6 annual self-assessments of the ROP, factoring in all  
7 of the actions we're taking in response to Fukushima  
8 as I mentioned the examples, the walkdowns, the  
9 rulemakings, the TIs. And we will at the end of the  
10 year, do that same assessment to say based on performance  
11 are we focused in the right area, are our resources  
12 focused in the right area?

13 But we don't consider that a major change.

14 We consider that part of the process that's been  
15 developed for the ROP to have this continual  
16 self-assessment on an annual basis to determine whether  
17 changes are needed.

18 MEMBER BLEY: Okay.

19 MR. LUBINSKI: We report this out to the  
20 Commission and we actually next Friday, June 1st, have  
21 a Commission meeting where we report out the  
22 self-assessment that's performed, as well as the  
23 Industry Trends Program.

24 And as an example, next year I would expect  
25 some of the activities we take in response to the lessons

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1 learned to actually be discussed next year at that  
2 Commission meeting.

3 CHAIRMAN SCHULTZ: Okay. We'll move on.

4 MR. MILLER: So, the plan for moving forward  
5 on Recommendation 12.1 as of now, as I said, as John  
6 said, it doesn't have a lot of the detail on how we plan  
7 to change the ROP since we're not sure what will happen  
8 with Recommendation 1.

9 So, we'll continue to implement the ROP in  
10 accordance with the current policy, and then we'll  
11 consider potential changes to the self-assessment and  
12 realignment programs when the action plan for  
13 Recommendation 1 has been established.

14 So, that action plan should be contained  
15 within the SECY paper due to the Commission in February  
16 2013. And that will give us a better idea of, okay,  
17 where could this framework be going. And then before  
18 that framework is even put in place, we can prepare for  
19 what changes might need to be made so we can be right  
20 in step with that.

21 And -- oh, the last bullet, staff does not  
22 envision any challenges.

23 MEMBER SKILLMAN: And before you change that

24 -

25 MR. MILLER: Yes.

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1 MEMBER SKILLMAN: -- are there features of  
2 the current ROP or issues with the current ROP that  
3 warrant change regardless of Recommendation 1 that you  
4 should be pursuing?

5 MR. LUBINSKI: I'm sorry, could you repeat  
6 the question again?

7 MEMBER SKILLMAN: Yeah. The ROP is out  
8 there, all the licensees are marching along,  
9 Recommendation 1 comes out of NTTF.

10 MR. LUBINSKI: Right.

11 MEMBER SKILLMAN: One might say, hey,  
12 independent of NTTF Recommendation 1, there are a slew  
13 of changes that ought to be incorporated in ROP because  
14 it's time.

15 That's what I'm asking. Are there other  
16 changes that should be taken now independent of Task  
17 Force NTTF 1?

18 MR. LUBINSKI: Our self-assessment asks that  
19 question every year. And whether it's in response to  
20 Recommendation 1 or whether it's in response to the other  
21 lessons learned or whether it's in response to other  
22 issues.

23 As an example this year, one of the things  
24 we're implementing based on last year's self-assessment  
25 was a reintegration of security back into the action

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1 matrix.

2 After 9/11, security was taken out of the  
3 action matrix and we assessed the integrated performance  
4 across all the cornerstones except security, and then  
5 have security separate.

6 We, based on Commission direction, we went  
7 back last year and asked the question again, should we  
8 reintegrate it? One of the reasons it was not  
9 integrated before was withholding security information  
10 from the public.

11 We felt at this point we could still do that  
12 integration and withhold the information from the public  
13 that was security-related. So, one of the things that  
14 will be heard by the Commission next year was in our  
15 SECY paper that went up and it will be discussed next  
16 week is, we're going to implement that in July of this  
17 year. Halfway through the year where we reintegrate  
18 that cornerstone back into it. So, that's one area.

19 Looking at performance indicators, that was  
20 an issue that came up as well. Are our performance  
21 indicators at the right level? And specifically with  
22 respect to radiation protection.

23 And we've looked at that from the standpoint  
24 of issues we've had with groundwater protection, which  
25 was an industry initiative. Buried piping, which again

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1 is an industry initiative. No changes to NRC  
2 requirements.

3 What we ask in our question is, should we  
4 change our performance indicators based on that? So,  
5 that's one where we're looking at a lessons learned to  
6 say what changes should take place.

7 That, today, is still being discussed with  
8 the industry. We're having public meetings to seek  
9 feedback on where to go, and then the third one is in  
10 the safety-culture area.

11 Safety culture in the ROP is once a plant  
12 makes it into Column 4, we require a 95003 inspection,  
13 which requires them to perform their own independent  
14 safety culture.

15 Well, the industry has had efforts as well  
16 on safety culture, and what have we done to align those?

17 So, we've had public meetings to look at  
18 what do we consider the core attributes. They had a  
19 different set of attributes than we did. We are now  
20 coming to alignment on what we think many of those core  
21 attributes are.

22 If we get to full alignment on the  
23 terminology in the attributes, we would look at then  
24 modifying how we require licensees to do their safety  
25 culture assessments. So, that's three examples where

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1 we're not waiting to make changes to the program.

2           Would they have an impact on what's going  
3 on in the response to Fukushima? They may. When you  
4 start to look at off-site doses from a radiation  
5 protection standpoint if our PI were to change, from  
6 a safety culture standpoint, what we're looking at in  
7 the safety culture area we hope will be some improvements  
8 as well and that they would be implemented as things  
9 move forward in this area.

10           MEMBER SKILLMAN: Okay. Very helpful.

11           MR. LUBINSKI: I don't see other changes.

12           MEMBER SKILLMAN: Thank you. Thank you.

13           MR. MILLER: So, if I could add real quick,  
14 so I think, yeah, that, you know, the big picture  
15 structure as we continue to implement Tier 1 issues and  
16 any inspections or assessments associated with that,  
17 the ROP as it is today is set up to handle any changes  
18 necessary.

19           I think maybe the difference is if  
20 Recommendation 1 should come forth and recommend  
21 incorporating an extended beyond-design-basis aspect  
22 to the framework, then that could have impacts on perhaps  
23 the significance determination process aspect of the  
24 ROP where you will, you know, which takes into account  
25 risk considerations, you know.

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1           Beyond-design-basis would be, you know,  
2 low-right, high-consequence if you have to incorporate  
3 that into the ROP and you - how do you adequately assess  
4 those sorts of issues if they would normally just screen  
5 out from a risk perspective through the STP.

6           So, I think it's looking at those sort of  
7 considerations that could be changed potentially  
8 through Recommendation 1.

9           MEMBER SKILLMAN: Thank you.

10          MR. MILLER: So, communications. We'll  
11 have periodic stakeholder interactions during - the NRC  
12 has routine monthly meetings with NEI and the industry  
13 on the ROP. So, we're holding public meetings under  
14 the Tier 3 umbrella. But for this recommendation in  
15 particular, we can make sure we engage the industry and  
16 the public with these routine ROP meetings as well.

17          And then we can provide an update to the  
18 Commission on the status of where Recommendation 12.1  
19 is in the 2013 annual ROP self-assessment. As John  
20 said, every year the ROP self-assessment is submitted  
21 to the Commission in a Commission paper. So, we can  
22 provide updates through that vehicle as well.

23          CHAIRMAN SCHULTZ: What's the expected  
24 frequency of the public meetings, especially in the time  
25 frame between this fall and in 2013, public meeting

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1 frequency and where do you expect to hold them?

2 MR. MILLER: I'm not sure if we've completed  
3 figured that out yet. So far the meetings we held  
4 earlier this month were - we structured the meetings  
5 to go through all the Tier 3 items.

6 Going forward with 12.1 since this one is  
7 dependent on Recommendation 1, I would expect the public  
8 meetings to be less frequent until we get to  
9 Recommendation 1 being proposed to the Commission in  
10 February 2013.

11 So, I don't know. We haven't thought about  
12 that. I would expect if we have another round of general  
13 Tier - well, I shouldn't say "general," but a block of  
14 meetings that address all the Tier 3s, we would  
15 definitely discuss 12.1 at that point.

16 But any individual meetings specifically  
17 for 12.1 I think would probably be deferred until the  
18 following year when Recommendation 1 comes forward.

19 MR. LUBINSKI: And as part of the  
20 Recommendation 1 meetings, our points of contact will  
21 be attending those meetings as well because we're sure  
22 that this, the question of implementation of  
23 Recommendation 1, the ROP, the inspection aspects are  
24 going to come up.

25 So, we'll be able to not only answer

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1 questions, but be able to get feedback as far as those  
2 meetings. And that will help to inform us of when we  
3 should have more public meetings on those specific  
4 issues.

5 CHAIRMAN SCHULTZ: Yes, thank you.

6 MR. MILLER: Speaking of public meetings,  
7 we discussed 12.1 on May 7th and we heard crickets  
8 chirping after we finished. So, we didn't receive any  
9 questions or comments on this specific one.

10 And I think that's all we have.

11 CHAIRMAN SCHULTZ: Is there any more  
12 questions? Questions from the Committee?

13 MEMBER SHACK: Crickets are chirping here,  
14 too.

15 (Laughter.)

16 CHAIRMAN SCHULTZ: Hearing none from the  
17 Committee, I would like to open up the floor to comments  
18 from members of the public first within the room on this  
19 topic particularly.

20 Again, we will have an opportunity at the  
21 end of the day for other public comment related to the  
22 full discussion of Tier 3.

23 Is the line open, Antonio?

24 (Off the record discussion.)

25 CHAIRMAN SCHULTZ: Those members of the

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1 public on the telephone, we're going to open the line  
2 in just a moment. I'll let you know when that happens.

3 (Pause.)

4 CHAIRMAN SCHULTZ: I'll have a question.  
5 From what you've described, it does appear that what  
6 you've presented does provide a schedule associated with  
7 your expected review period 2013. And then the  
8 discussions to the Commission based upon the results  
9 of that review and of the reviews that will be performed  
10 at the end of 2013.

11 So, am I taking that right that you'll be  
12 expecting to have conclusions and recommendations early  
13 in 2014?

14 MR. LUBINSKI: I would say when you say  
15 "conclusions and recommendations," I think it would be  
16 more recommendations for the next steps and the action  
17 plan. And that would be in our self-assessment paper  
18 that's issued in the spring of '14.

19 CHAIRMAN SCHULTZ: All right.

20 MR. LUBINSKI: Which means the end of 2013  
21 we would be -

22 CHAIRMAN SCHULTZ: So, action plans moving  
23 forward with regard to this. So, there may be some  
24 interim actions before you then move into the  
25 traditional annual and biennial process.

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1 MR. LUBINSKI: There will definitely be  
2 interactions with the public.

3 MR. DIAS: There's no one there. Just  
4 announce that when you're open again -

5 CHAIRMAN SCHULTZ: That's fine. Well, we  
6 will have opportunities in the afternoon for public  
7 comments from the members of the public on the telephone.

8 So, we will have those opportunities following the  
9 first presentation in the afternoon.

10 Before we - I'm going to close this session,  
11 but I would like to bring one other item to the attention  
12 of the members of the Committee.

13 John and Barry, thank you very much for your  
14 presentation. Appreciate it very much.

15 MEMBER CORRADINI: Mr. Chairman, we're not  
16 allowed to do the next topic, or it's not possible, the  
17 afternoon topic?

18 CHAIRMAN SCHULTZ: No, we're not going to  
19 move to the next topic.

20 MEMBER CORRADINI: Okay.

21 CHAIRMAN SCHULTZ: I have an order from  
22 yesterday's meeting that is to say when we started the  
23 meeting in the morning yesterday, the first meeting that  
24 we held related to Fukushima, this was on the walkdowns  
25 of flooding and seismic, we introduced the discussion

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1 by saying the subcommittee did not have an intention  
2 to bring those issues to the full Committee for the  
3 purposes of developing - hearing a presentation at the  
4 full Committee meeting in June, and then preparing a  
5 letter, but that we would listen to the presentation.

6 At the end of the discussions, reopen that as necessary  
7 to see if the Committee felt a letter would be  
8 appropriate.

9 We had the interactions with the staff  
10 yesterday. It was a very active discussion between the  
11 Committee and the staff. We provided the staff with  
12 several comments. Some of which they discussed with  
13 us, their responses to immediately. And some that they  
14 certainly took under advisement in preparation of their  
15 work for the Commission.

16 (Telephonic interruption.)

17 CHAIRMAN SCHULTZ: I did want to open up to  
18 the subcommittee to discuss whether we would like to  
19 bring this to the full Committee in June.

20 MEMBER SKILLMAN; I would offer that I  
21 believe it's a work in process and that writing a letter  
22 is probably not the best use of our resources at this  
23 time.

24 So, my thought would be we should have a  
25 discussion, but not attempt to write a letter.

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1 CHAIRMAN SCHULTZ: We do have a letter to  
2 prepare on this meeting, on the Tier 3 topics, and we  
3 will have a presentation related to Tier 3 topics to  
4 the full Committee in June to prepare a letter.

5 MEMBER CORRADINI: Not to confuse all the  
6 letters, but I wasn't here for the morning one yesterday,  
7 but just on the second thing you just said, a letter  
8 strictly on filtered vents, or on the whole Tier 3?

9 CHAIRMAN SCHULTZ: All of the discussions  
10 we've had in -

11 MEMBER CORRADINI: Okay. A combined letter.

12 MEMBER STETKAR: Tier 3.

13 MEMBER CORRADINI: Thank you.

14 CHAIRMAN SCHULTZ: John, you had a comment?

15 MR. MONNINGER: This is John Monninger with  
16 the staff. So, you talked to your morning session on  
17 seismic and flooding, which is at Tier 1. The afternoon  
18 yesterday and today we've predominantly talked Tier 3  
19 issues, but we threw you the curveball of filtered vents  
20 and severe accident venting for Mark Is and Mark IIs,  
21 which is a Tier 1 issue.

22 What we would be interested in, the staff,  
23 of course is a letter. But our thoughts, though, or  
24 at this time our thoughts are you would potentially only  
25 be able to address the Tier 3 issues that you've heard

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1 about, and not the filtered vent and the hardened and  
2 the severe accident events for Mark Is and IIs, because  
3 we haven't given you a position yet.

4 Our intent is to work with Antonio and Ed  
5 and most likely have another ACRS subcommittee meeting  
6 where we're hopefully going to come in with a  
7 recommendation, a position on filtered vents and severe  
8 accident events for Mark Is and IIs in a subcommittee,  
9 and then a subsequent full Committee.

10 So, our thought would be even though we've  
11 worked a day and a half together, that you wouldn't  
12 potentially address the filtered vents and the hardened  
13 vents yet.

14 MEMBER CORRADINI: You don't even want some  
15 initial reactions?

16 MR. MONNINGER: Oh, you could - it would -  
17 yeah, I guess your reactions, et cetera, but we were  
18 looking for approval of the Tier 3 issues versus we don't  
19 believe you can get approval for the -

20 MEMBER CORRADINI: Understood.  
21 Understood.

22 MR. MONNINGER: So, yes, any comments you  
23 definitely had would be fair game.

24 MEMBER CORRADINI: Okay.

25 CHAIRMAN SCHULTZ: I hear it to be a matter

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1 of our focus.

2 MEMBER CORRADINI: Understood.

3 CHAIRMAN SCHULTZ: And we want to be sure  
4 that we address the presentations that we are hearing  
5 yesterday and today on the Tier 3 issues.

6 MEMBER CORRADINI: Minus -

7 CHAIRMAN SCHULTZ: Make sure that it's the  
8 primary focus if we have - be determined if we have  
9 additional comments related to the Tier 1 issue, we will  
10 make them.

11 MEMBER CORRADINI: And I trust you will  
12 filter them appropriately.

13 CHAIRMAN SCHULTZ: I'll work with the -

14 MEMBER CORRADINI: But don't vent them.

15 CHAIRMAN SCHULTZ: I'll work with the  
16 Committee.

17 MEMBER SKILLMAN: Steve, I'm confused. I  
18 thought you had - the question you asked, I thought,  
19 was what about yesterday morning.

20 CHAIRMAN SCHULTZ: That's correct.

21 MEMBER SKILLMAN: And that was really 2.1  
22 and 2.3.

23 CHAIRMAN SCHULTZ: And John was -

24 MEMBER STETKAR: Not 2.1. Only the  
25 walkdowns for seismic and flooding under 2.3.

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1 MEMBER SKILLMAN: Yes, okay.

2 MEMBER STETKAR: And those guidelines will  
3 be - we're currently on track to be accepted, if I can  
4 use that term, by the staff around the end of this month.

5 So, the question is, do we feel as a  
6 committee, we want to weigh in with a letter on the  
7 guidelines that we've seen and the discussion that we  
8 had yesterday morning?

9 CHAIRMAN SCHULTZ: And John Monninger was  
10 providing additional information related to both the  
11 morning session, as well as the first part of this  
12 meeting held yesterday afternoon.

13 Any other discussion?

14 MEMBER SHACK: Well, I mean, if we want to  
15 write a letter, we'd still be writing and presumably  
16 they're still working under their guidance.

17 MEMBER STETKAR: They're still working on  
18 the guidance, but the staff is - the problem is it would  
19 be another one of these after-the-fact letters. And  
20 it's, I think, you know, among the subcommittee do we  
21 feel there's anything of import to admittedly after the  
22 fact, but at least weigh in on any issues that we might  
23 feel is important enough?

24 MEMBER SHACK: But we don't really even know  
25 what those issues might be yet because we don't know

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1 what the -

2 MEMBER STETKAR: Because we haven't seen the  
3 final guidance.

4 MEMBER SHACK: That's right.

5 MEMBER STETKAR: It's a bit of a weighing  
6 in after the fact on something that was before the final  
7 -

8 CHAIRMAN SCHULTZ: I think it comes to how  
9 we feel about the interaction we had with the staff  
10 yesterday. Did we provide the comments we had to them  
11 appropriately? Did we feel that they responded to them?

12 MEMBER STETKAR: Well, and in fact we won't  
13 know how they responded because even something that we  
14 received yesterday is still subject to change within  
15 the next four or five days if they're shooting for a  
16 31 May - they're still gathering information themselves.

17 MR. WIDMAYER: If I could weigh in on  
18 flooding, they turned their - the NEI submitted the  
19 final, quote/unquote, guidance for staff endorsement  
20 already and I distributed that yesterday. I would not  
21 expect any changes in that.

22 The seismic people heard your input. I  
23 think that they will discuss those matters with NEI on  
24 Friday, but NEI is supposed to submit their final version  
25 of the guidance today.

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1           So, further discussion, but I'm not sure  
2 that anything will change at this point.

3           MEMBER STETKAR: So, for example, like on  
4 the flooding, we had some discussion about the process  
5 that they would use to evaluate the operator actions,  
6 the feasibility of operator actions.

7           You don't think that there's any chance that  
8 that could get filtered into the final-final version  
9 of the final preliminary draft guidelines.

10          MR. WIDMAYER: Frankly, no.

11          MEMBER STETKAR: Okay.

12          (Off the record comment.)

13          MR. WIDMAYER: And the staff negotiated with  
14 NEI extensively about the inclusion of operators in  
15 these walkdowns already. And of course NEI was reticent  
16 to include operators because they, you know, they want  
17 to have somebody who's not busy operating the plant  
18 conduct these walkdowns.

19          MEMBER STETKAR: Well, having done walkdowns  
20 and always been able to negotiate getting operators on  
21 their training week, for example, it's feasible if you  
22 give people enough warning.

23          CHAIRMAN SCHULTZ: or to use alternative  
24 operators with experience who are not on shift. They  
25 may be in training, they may be on staff and out of the

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1 Operations Department, but -

2 MR. WIDMAYER: Well, NEI's thinking about  
3 it was that there would be at least a two-day training  
4 course of this individual to have to attend. And then  
5 they would be involved in multiple walkdowns, you know,  
6 not just one, but multiple walkdowns.

7 And they're trying to do a hundred pieces  
8 of equipment. So, they don't want to invest an operator  
9 in that much time.

10 CHAIRMAN SCHULTZ: Hence the operational  
11 review.

12 Any other comments related to this?

13 MR. DIAS: It matches a little bit with what  
14 John Monninger was saying. On June 20th -

15 MEMBER STETKAR: We're still on the record,  
16 Antonio.

17 MR. DIAS: Okay. On June 20th there will  
18 be a subcommittee where the ACRS is going to hear the  
19 proposed ISGs for the three orders that were issued.

20 And one of them including is the reliable hardened vents  
21 fro Mark I and II. So, that's already scheduled for  
22 June 20th.

23 MEMBER STETKAR: Okay. Let's not confuse  
24 yet a third issue here. I just want to be focused on  
25 do we - does the subcommittee want to -

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1 MR. DIAS: Okay. Well, there was something  
2 - sorry, I jumped a little bit. Okay. We'll get back  
3 to that.

4 MEMBER STETKAR: Does the subcommittee feel  
5 that any of the things we discussed recognizing that  
6 very likely none of them will be folded into the guidance  
7 from what - at least the flooding guidance, if not the  
8 seismic guidance, do we want to weigh in on -

9 MR. WIDMAYER: I think some of the things  
10 in the seismic guidance might make its way, but probably  
11 not the operator consternation because of - they talked  
12 about that extensively already.

13 MEMBER STETKAR: I understand.

14 CHAIRMAN SCHULTZ: I'm not hearing any  
15 strong sentiment to move forward with a letter at this  
16 time.

17 MEMBER RAY: It's hard to find something in  
18 the context of walkdown guidance that would be -- would  
19 warrant a letter, in my opinion.

20 MEMBER SHACK: Well, but I think John's point  
21 on the guidance for the human actions, the operator  
22 actions, I think, is the one that strikes me as, you  
23 know, we've developed this. So, it would seem useful  
24 to use it.

25 MEMBER STETKAR: Well, in things like using

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1 risk-informed selection of -

2 MEMBER SHACK: Well, even that one seems to  
3 me as I wouldn't - I think the most important one is  
4 just -

5 MEMBER STETKAR: There were two or three  
6 things that I kind of made notes of that we discussed.

7 One was getting the operators involved - or a more  
8 strong focus on getting the operators involved in not  
9 only the walkdowns, but the section process.

10 One was perhaps using risk information to  
11 select that set of 100 and there is, I mean, you know,  
12 use the same things under the maintenance rule, for  
13 example. So, it's not a new concept that is being  
14 developed for this.

15 And the third was the, you know, if you're  
16 doing that, whatever they called it a something or other,  
17 you know, simulation, realistic simulation or whatever  
18 of those active flooding mitigation actions to at least  
19 use guidance that they have already, but there seems  
20 to be deafening silence.

21 MEMBER SHACK: Well, I mean, I think we could  
22 write the letter. I mean, it just seems to me in 2012  
23 we're not using risk to select the components to look  
24 at it, which I don't understand at all.

25 We're developing the guidance, I mean, even

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1 if it's not included, let's just fire it out so the next  
2 time that something like this comes up we've at least  
3 got a position.

4 So, I kind of like John's three issues as  
5 a letter. It just, again, it won't have any real impact  
6 on this particular one, but this sort of thing comes  
7 up again and again.

8 MEMBER STETKAR: It would be walkdowns under  
9 2.1, for example, almost - I don't want to say almost  
10 certainly, but very likely.

11 MR. WIDMAYER: The guidance will both be  
12 final for June, June full Committee. They can tell you  
13 what's in the final guidance, and then you can decide  
14 if you want to write a letter.

15 MEMBER STETKAR: Well, but, I mean, they  
16 would need to know that they need to come to the full  
17 Committee, and they're not planning to do that.

18 (Simultaneous speaking.)

19 MEMBER SHACK: I mean, I think certainly we  
20 should have them come.

21 MEMBER BLEY: I guess I agree with Bill the  
22 more I think about it. When we pass up the opportunity  
23 to get on the record with these things, you might think  
24 it's gone away, and it's not gone away.

25 CHAIRMAN SCHULTZ: So, what I'm hearing is

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1 a desire to invite the staff to the full Committee to  
2 discuss these three issues and how they have been  
3 incorporated, or not, in the guidance that is becoming  
4 final and flooding and seismic. Because I think by the  
5 June meeting, the seismic guidance will be in place.

6 Following that, we can determine whether  
7 we write a letter or not based on their discussion.

8 MEMBER STETKAR: But we ought to put it to  
9 a vote of whether or not -

10 CHAIRMAN SCHULTZ: So, that would be my  
11 proposal for a sense of the Committee by a vote.

12 Is there a second?

13 MEMBER SHACK: Second.

14 CHAIRMAN SCHULTZ: Those in favor of moving  
15 forward with the presentation at the full Committee?

16 (A show of hands.)

17 MEMBER RAY: There's no reason not to.

18 CHAIRMAN SCHULTZ: That's a majority of this  
19 subcommittee. We'll move forward to the full Committee  
20 with the presentation from the staff on that agenda.

21 MEMBER RAY: Yeah, I mean it may make it  
22 unnecessary to write a letter for presentation.

23 MEMBER STETKAR: That may very well be.

24 MEMBER RAY: I would still not write a letter  
25 even so, but that's just my opinion.

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1 MR. WIDMAYER: If the staff knows they're  
2 coming and I let them know what the three issues are,  
3 it might influence -

4 (Laughter.)

5 CHAIRMAN SCHULTZ: Well, we'll see what they  
6 have to say at the vote. With that, any other discussion  
7 related to this morning's activities before we break  
8 for lunch and we'll recess?

9 I would like to begin the meeting at one  
10 o'clock. I know there are other meetings during the  
11 recess, but please be here at one o'clock so we can start  
12 on time for the afternoon session.

13 (Whereupon, the above-entitled matter went  
14 off the record at 11:24 a.m. and resumed at 1:02 p.m.)

15

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

(1:02 p.m.)

CHAIRMAN SCHULTZ: Okay. We're ready to bring the session back to order following the lunchtime recess.

I'd like to first introduce again John Monninger who's going to provide us with some additional information from this morning, and then introduce the speakers.

MR. MONNINGER: Okay. Thank you, Dr. Schultz. My name is John Monninger from the NRR Japan Lessons Learned Directorate.

We're trying to track as much as possible the requests and close them out during the meeting to the best of our ability.

In the last presentation on EP, there was a question that came up with regard to fire-response procedures. And the staff went back to - the staff that was here went back to the rest of the Agency staff and they checked on it, and it's actually being addressed within Recommendation 8. And Recommendation 8 is the one for EOPs, SAMGs, et cetera.

But just to be clear, I don't want to say it's being fully addressed. How it's being addressed is we're going to issue - there is an ANPR that is being

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1 issued. And the ANPR has an explicit question in there  
2 regarding expanding the scope of it to include  
3 fire-response procedures. So, it's out there for  
4 public comment.

5 MEMBER STETKAR: So, at least the question  
6 is on the table and -

7 MR. MONNINGER: Yes.

8 MEMBER STETKAR: -- we'll see how that gets  
9 resolved in time.

10 CHAIRMAN SCHULTZ: Thank you, John.

11 MR. MONNINGER: That was the first topic.

12 The second topic there was a question with  
13 regards to what do the MVSSes look like, the  
14 multi-venturi scrubber system look like. And here's  
15 a picture of it from one of the - or at least one design  
16 of it from a plant in Switzerland.

17 And if you look on the right, you see at  
18 the bottom lower right the header in which the steam  
19 would come through, and then the various small piping  
20 and the - coming down around seven, eight o'clock or  
21 so. And then going up at the 12 o'clock. And they would  
22 then be essentially the venturi nozzles going up with  
23 multiple holes within these nozzles in which the steam  
24 would flow up and collapse and entrain water into it  
25 for a good mixing.

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1 So, that's sort of what they look like.

2 MEMBER STETKAR: for size of scale, those  
3 are human beings up there in coveralls, right?

4 MEMBER ARMIJO: Those are rags.

5 MR. MONNINGER: I don't know what they are.

6 MEMBER STETKAR: Maybe they're just -

7 MR. MONNINGER: Yeah, I don't believe it's  
8 - Antonio copied this from a colored on, and on that  
9 it did not have people, but I would estimate this is  
10 about maybe eight inches or so, the header line. And  
11 maybe quarter inch or so venturi nozzles piping there.  
12 It's all quarter to -

13 MEMBER BLEY: Little people.

14 MEMBER ARMIJO: It would be very little  
15 people. Although, those are big structures.

16 And the vent goes into this box which - what  
17 is that box?

18 MEMBER STETKAR: It's the outer - it's what  
19 Muhleburg calls their outer torus.

20 MEMBER ARMIJO: Yeah, I know the outer torus,  
21 but then the vent line goes from there to -

22 MR. MONNINGER: I think maybe that's a  
23 demister up there in the other building.

24 MEMBER ARMIJO: And then finally out the  
25 stack. That's interesting.

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1 CHAIRMAN SCHULTZ: The next presentation  
2 then is to provide information associated with the  
3 training as it pertains to the severe accident and severe  
4 accident management guidelines.

5 So, I'm turning it over to Joe or Travis.

6 MR. GIITTER: Well, I'll kick it off, and  
7 then I'm going to turn it over to Travis.

8 CHAIRMAN SCHULTZ: Thank you, Joe.

9 MR. GIITTER: Thank you. We appreciate the  
10 opportunity to come here and talk about what our current  
11 thinking is with regard to Tier 3 Recommendation 12.2.

12 AS I'm sure you've heard already, to a  
13 certain extent the full implementation of what we're  
14 going to do for 12.2 will depend somewhat on  
15 Recommendation Number 8 which looks at combining the  
16 EALs, SAMGs and EDMGs.

17 We looked at what we could do right now.

18 We realize that before you can really provide training  
19 on SAMGs, it's important to really understand severe  
20 accident phenomena.

21 And so, rather than wait for the  
22 implementation of NTF Recommendation 8, what we decided  
23 to do is to look at what we could do right now and what  
24 courses we have, and for creating opportunities we have  
25 now and look at who's getting that training and

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1 opportunities for extending that training to members  
2 of the NRC staff who may need that training who aren't  
3 currently getting it. And Travis will talk about that.

4 We also realize that there are still some  
5 lessons to be learned from the Fukushima accident. And  
6 as we learn in more detail some of those lessons, we've  
7 looked at how we're going to fold that into the existing  
8 training courses we have. And Travis will also get into  
9 some detail on those training courses.

10 So with that, I'll turn it over to Travis.

11 MR. TATE: Thanks, Joe.

12 Good afternoon. As Joe said, I'm Travis  
13 Tate. I'm chief of the Accident Dose Branch in the  
14 Division of Risk Assessment at NRR. And the topic of  
15 this presentation is to discuss the staff training on  
16 severe accident and severe accident management  
17 guidelines, or SAMGs.

18 The purpose is to kind of lay out our current  
19 thinking and plan for Near-Term Task Force  
20 Recommendation 12.2 by describing the existing current  
21 level of staff training on severe accidents, and also  
22 just to outline some of the future training enhancements  
23 that we have identified as we have taken a look at this.

24 Just as a quick background following a  
25 review of the insight from the Fukushima accident on

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1 the NRC's regulatory programs, the Near-Term Task Force  
2 provided recommendations to the Commission in a  
3 Near-Term Task Force report dated July 12th, 2011.  
4 That's SECY-11-0093.

5 The Commission approved those  
6 recommendations in its SRM dated August 19th, 2011.  
7 And also directed to staff to provide a prioritization  
8 for those recommendations by October 3rd, 2011.

9 On October 3rd, the staff issued  
10 SECY-11-0137 which provided its three-tier  
11 prioritization of those recommendations. And which  
12 again as Joe said, 12.2 was identified as a Tier 3 action  
13 because it was dependent upon the Recommendation 8  
14 outcome, which Recommendation 8 is one of the Tier 1  
15 actions.

16 Just to get a little bit into what is  
17 specifically within Recommendation 12.2, the Near-Term  
18 Task Force specifically recommended that the Commission  
19 direct the staff to enhance training on severe  
20 accidents, including training resident inspectors on  
21 severe accident management guidelines.

22 In Recommendation 8 that the 12.2 is  
23 dependent on, the Task Force recommended strengthening  
24 and integrating onsite emergency response capabilities  
25 such as emergency operating procedures, SAMGs and

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1 extensive mitigation guidelines.

2           Within Recommendation 8 were four specific  
3 tasks. And the fourth task that was provided in  
4 Recommendation 8 was to initiate rulemaking to require  
5 more realistic, hands-on training and exercises on SAMGs  
6 and EDMGs for all staff especially to implement with  
7 strategies and those licensee staff expected to make  
8 decisions during emergencies, including emergency  
9 coordinators and emergency directors.

10           Taking a look at what's currently in our  
11 existing staff training courses within our  
12 qualification programs, we identify three main courses.

13           Two are PRA courses. One is on accident progression  
14 analysis which basically deals with progression in  
15 post-core-damage conditions, or kind of essentially a  
16 Level 2 analysis.

17           And also an accident-consequence analysis  
18 course which deals with the transport, the radiological  
19 transport from core damage or essentially a Level 3-type  
20 analysis.

21           The third course is our prospectus on  
22 reactor safety course, which provides basically an  
23 overview of the concepts of design for safety,  
24 defense-in-depth, ECCS rulemaking and severe accident  
25 and safety goal policy. It discusses and provides

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1 training on accident sequences, accident progression  
2 both in-vessel and in containment. And also  
3 radiological releases and associated consequences.

4 CHAIRMAN SCHULTZ: What are the time frames  
5 for the courses? Are they week-long courses we're  
6 talking about there?

7 MR. TATE: They're essentially, yes,  
8 week-long courses.

9 CHAIRMAN SCHULTZ: For each of the three?

10 MR. TATE: The accident progression course  
11 I think may be a two-day -

12 MR. GIITTER: Maybe that's a shorter course.

13 MR. TATE: Yeah.

14 MR. GIITTER: The R800 reactor safety course  
15 is currently a week long.

16 MR. TATE: A week long, yeah, but the other  
17 two I think are one or two-day courses.

18 CHAIRMAN SCHULTZ: Both the other two are  
19 one or two days.

20 MR. TATE: Yes.

21 CHAIRMAN SCHULTZ: Thank you.

22 CHAIRMAN RAY: As I look ahead here, most  
23 all of the discussion appears to focus on training of  
24 agency personnel and the status of the courses and so  
25 on, but of course the Recommendation 8.4 refers to

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1 licensee staff also.

2 Is that something we'll talk about later  
3 or is it not yet decided?

4 MR. GIITTER: The focus of 12.2 is training  
5 for agency staff.

6 MEMBER RAY: Well, I'm just reading the words  
7 here, though.

8 MEMBER BLEY: Your previous slide, 64, says  
9 we're talking about both 12.2 and 8.4.

10 MR. TATE: Yea. Well, 8.4, it outlines what  
11 the Task Force recommended as far as what the licensees  
12 were required to do. And in our regulatory role, you  
13 know, we would need to understand, you know, what we  
14 would be requiring those licensees to do as far as the  
15 training.

16 So, you know, as a fallout of that we would  
17 - I'm not questioning what the Agency staff training  
18 needs to include. What I'm asking about is where do  
19 we deal with the training required for the licensee  
20 staff, which is what I read 8.4 to talk about?

21 MR. BEALL: Hi, good afternoon. I'm Bob  
22 Beall. I'm in NRR and rulemaking grants, and I'm the  
23 PR for Recommendation 8 activity which is onsite  
24 emergency response capabilities.

25 We're addressing 8.4 through my rulemaking.

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1 And that will become part of this committee when we  
2 come up with the proposed rule standards. So, you'll  
3 be seeing that sometime in late 2013 as when we have  
4 the proposed rules ready.

5 But we have right now, in fact, even today  
6 this morning, we did an ANPR for our NPR for our  
7 rulemaking. And we've asked licensees to provide their  
8 inputs on that question already. And we're hoping to  
9 have the questions from them - the comment period ends  
10 on June 18th. And so, we'll get the comments back from  
11 them and we'll start working on the proposed rule in  
12 a regulatory basis at that time.

13 MEMBER BLEY: I'm hoping you're going to come  
14 to us before you got the rule done and -

15 MR. BEALL: Oh, yes. We're talking about  
16 the rulemaking standard - the rulemaking schedule. So,  
17 right now we're working on the ANPR. And then by the  
18 end of this year we'll put out for public comment to  
19 regulatory basis.

20 And then we'll start working on the proposed  
21 rule, and the proposed rule will be out for public  
22 comment. A copy will be presented for the ACRS to take  
23 a look at in 2014.

24 MEMBER BLEY: I didn't say that quite right.

25 (Laughter.)

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1 MEMBER BLEY: I was really hoping that we  
2 would have some chance to interact with the staff as  
3 you go through this rulemaking process rather than just  
4 commenting on a rule at the end.

5 There's a lot of interest here in this  
6 particular rulemaking.

7 MR. BEALL: Well, we were instructed by the  
8 - in the SRM to follow the normal rulemaking process.

9 And following that, we become part of the -- come in  
10 front of the ACRS at the proposed rule phase.

11 MEMBER BLEY: I mean, you certainly have to  
12 come then.

13 MR. BEALL: Yes.

14 MEMBER BLEY: But we may write something and

15 -

16 MEMBER RAY: Well, I guess maybe there is  
17 a reason for a letter now that I think about it.

18 (Laughter.)

19 MEMBER RAY: I mean, if the point is we're  
20 only going to talk about staff training and not talk  
21 about what the licensees may need to do, that's - I  
22 probably shouldn't have changed my plans to come here  
23 today, I guess.

24 CHAIRMAN SCHULTZ: We do plan to write a  
25 letter that's associated with these issues we're

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1 discussing this afternoon and this morning.

2 MEMBER RAY: Yeah. Well, just, you know,  
3 Steve, the point is that, to me, ten percent of the issue  
4 is what appears we're going to talk about today. 90  
5 percent of the issue is what we're not going to talk  
6 about today. That seems strange.

7 MR. BEALL: Well, we're just starting to look  
8 at the process. We've asked a lot of questions in the  
9 APR on the Recommendation 8 issues that's in the - what's  
10 in the SRM and the NTTF report.

11 And we'll be getting comments back from the  
12 public starting June 18th, and we'll be working on our  
13 comment-response process at that time. And those  
14 documents will be made public towards the end of this  
15 year when we send out a draft copy of the regulatory  
16 basis.

17 MEMBER SKILLMAN: This is Dick Skillman.

18 It seems to me that there is something very  
19 seriously missing in this discussion, and here's what  
20 I believe it is building on Harold's point.

21 For this training to be meaningful to the  
22 NRC staff, each licensee must have presented a mature  
23 set of EALs that lead that plant into emergency action  
24 in ultimately the EPs, the SAMGs and the EDMGs for  
25 beyond-design-basis. And until that suite of

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1 documentation has been prepared and until the NRC has  
2 basically said to the licensee we're in agreement with  
3 your emergency plan, we need to - the concept of training  
4 is very vague because each license is unique because  
5 it's designed differently, it's sited in a different  
6 location, it has different population centers.

7           So, there needs to be at least in my view,  
8 a very vibrant interaction to make sure that the EPs,  
9 the SAMGs, the EDMGs the way the emergency plan is  
10 prepared and agreed to because it's part of the license,  
11 until all that's put together, it seems like having the  
12 staff being trained except at a very high level of  
13 conceptual detail, is maybe a wasted exercise.

14           Each license is unique, and what each  
15 licensee does is different. What you might do up at  
16 Indian Point would be vastly different than what you  
17 might do out at Cooper.

18           Reason? Population centers are hugely  
19 different. Significantly different.

20           MEMBER RAY: Well, I have a generic concern,  
21 actually, which is I guess maybe the opposite pole, which  
22 is right now today station staffs, plant staffs have  
23 a very full workload when it comes to training to  
24 maintain their licenses.

25           This it seems to me, inevitably means they

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1 have to do more. And what the Agency is going to require  
2 in that respect is important. It's going to have an  
3 impact, there's going to be resistance, and you're only  
4 going to get what needs to be done based on having a  
5 very clear understanding of what needs to be done whether  
6 it's plant-specific or generic and be willing to devote  
7 the time to it that it's going to take. It's going to  
8 be difficult.

9 And I rather suspect just as we were talking  
10 earlier about not having operators available to do  
11 walkdowns, that there's not going to be operators  
12 available to go to this training either without some  
13 increase in the staffing. And the resistance to that  
14 is going to be monumental.

15 So, it's going to be a real significant  
16 decision to say we've got to have training that does  
17 all these things on the part of the licensees, and we're  
18 going to test and examine them, and you're going to lose  
19 your license if you don't know how to do it.

20 So, I'm really interested in, well, when  
21 are we going to come to grips with that issue? And I  
22 guess it's a couple years from now, from what I hear.

23 MEMBER REMPE: One thing I'm not hearing in  
24 the discussion, too, is the interface between the  
25 Technical Support Center and the operators. And

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1 training is a way that everybody can speak the same  
2 language, too. And I'm not quite sure how - that was  
3 something we discussed at the time of the accident.

4 MEMBER RAY: yeah, but you're talking about  
5 increasing training staff, you're talking about  
6 increasing the amount of hours per year that all kinds  
7 of people, EOF and everybody else spends in this  
8 training.

9 So, anyway, to me, it's a big issue. I'm  
10 not saying how it should be resolved, but it's a big  
11 issue. It's not something that is easily decided.

12 Anyway, that's the point. I just looked  
13 at this and realized that it was not being covered at  
14 all and thought that was a -- like I say, 90 percent  
15 of the ballgame is, well, what are you going to require  
16 of the licensees who have to maintain the staffs to -

17 MR. BEALL: In fact, we're trying to get  
18 information from the licensees right now with ANPR.  
19 We've asked them the questions about how does it impact  
20 your cost, time to do the procedure updates and things  
21 like that.

22 MEMBER RAY: Well, it's going to have huge  
23 - I can give you the answers. It will be huge, very,  
24 very costly, a huge impact on time and so on and so forth.

25 I mean, you can imagine that I'm being

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1 facetious and I shouldn't be. In any event, ultimately  
2 we need to come to grip with this issue. Because like  
3 I say, it's going to - unlike the Agency training which  
4 is pretty straight forward, easy to agree about, this  
5 is not going to be easy.

6 MR. GIITTER: Right. And as indicated  
7 earlier, that's a Tier 1 activity that's being addressed  
8 for rulemaking. And how you integrate the EOPs and the  
9 SAMGs and EDMGs is still something that has to be  
10 determined. We're going to get public stakeholder  
11 input on that.

12 MEMBER RAY: At least in this presentation  
13 as in other ones today referring back to what the time  
14 sequence is in this regard that I'm talking about now,  
15 seems to me to be something that should be addressed.

16 MR. GIITTER: Right.

17 MEMBER RAY: Giving us more confidence, you  
18 understand that the big elephant in the room is the one  
19 I talked about, which is the licensees.

20 MR. GIITTER: We completely understand that.

21 And it would be easy just to kick the can down the road  
22 and say, well, we'll address this issue later once it  
23 gets resolved for rulemaking.

24 And our message to you is really quite  
25 simple. And that message is, you know, we believe

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1 currently there exists some knowledge gaps within the  
2 staff on basic severe accident phenomenology.

3 And in discussions we had with the Steering  
4 Committee, there was a feeling that we could be doing  
5 more than we're doing right now. And just as an example,  
6 the two regional administrators who were on the Steering  
7 Committee expressed the desire to the R800 reactor  
8 safety course taken out to the regions and having the  
9 resident inspectors have the benefit of having training  
10 in that course.

11 Ironically, and Travis will talk about  
12 this, when you look at who takes that course right now,  
13 it's NSPDP folks and some of our risk analysts. But  
14 surprisingly, a lot of the people out in the field aren't  
15 getting that training.

16 So, there was a sense that there was a gap  
17 there and there's something we could be doing right now.

18 And we actually looked into the possibility of having  
19 that course taken out to the regions.

20 And as you know right now, that course is  
21 supported by Dr. Powers. And we actually looked at  
22 bringing the length of the course from five days down  
23 to four days and things like that.

24 So, rather than just take an approach that  
25 we'll have to wait for the rulemaking, we looked at what

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1 knowledge gaps do we currently have within the staff.

2 So, that's the primary message to you today.

3 MEMBER RAY: Okay. Well, my message to you  
4 is this -

5 MR. GIITTER: I understand your message.

6 (Laughter.)

7 MEMBER RAY: This is fine. No problem with  
8 it. It's just that the big chore is still ahead of us.

9 And like Dennis said, I guess we think it would be  
10 productive if we weren't at the tail end saying this  
11 needs to be done over again and we'd rather be able to  
12 make some input while there's still an opportunity to  
13 do something.

14 MR. GIITTER: Okay.

15 MEMBER BLEY: So, even before you talk  
16 through this slide, I see that things are including -  
17 well, I see one thing I don't notice up here that was  
18 on your first slide, and that's the EDMGs.

19 And I only mention this because I kind of  
20 nosed around through the information that's stored down  
21 in the Ops Center. And on the B.5.b stuff, you find  
22 a submittal describing what they've done and some notes  
23 on how they'll use it, but in none of the plants I looked  
24 through did I find actual things labeled EDMGs.  
25 Something for you guys to think about.

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1 MR. GIITTER: That's a good point. And even  
2 in terms of SAMGs, you know, there's typically a vendor  
3 approach to SAMGs. And we've had I believe it was  
4 Westinghouse the Office of Research had set up a training  
5 opportunity where Westinghouse, I believe, came in for  
6 a couple of days or a day and a half and presented  
7 information on SAMGs and we videotaped that.

8 But, you know, aside from that we don't  
9 maintain copies of the SAMGs -

10 MEMBER BLEY: Actually, if you check in the  
11 Ops Center, you'll find they have -

12 MR. GIITTER: They do have them, okay.

13 MEMBER BLEY: They aren't guaranteed to be  
14 up to date.

15 MR. GIITTER: Well, yeah.

16 MEMBER BLEY: But they have a wide variety  
17 of them from many of the plants.

18 MR. GIITTER: Yeah, and my point there is  
19 if they're not up to date, I'm not sure you necessarily  
20 want to rely on them in an accident situation.

21 MEMBER BLEY: When you get the right ones.  
22 But until you do, you might want to see what they look  
23 like.

24 MEMBER SIEBER: There is no generic SAMG.  
25 They're plant-specific.

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1 MR. GIITTER: Right. But what I was  
2 suggesting is that Westinghouse came in and conducted  
3 generic SAMG training to the staff.

4 MEMBER SIEBER: On the principles.

5 MR. GIITTER: Right. They didn't get into  
6 detail on the -

7 MEMBER SIEBER: Not on the details of how  
8 you actually do it. So, if you train residents and  
9 they're in your EOF trying to tell people what to do  
10 perhaps, they've got to make sure they're using the plant  
11 procedures.

12 MR. GIITTER: Absolutely.

13 CHAIRMAN SCHULTZ: Travis, to introduce this  
14 slide, is this slide what is now available?

15 MR. TATE: Yes.

16 CHAIRMAN SCHULTZ: Or is it proposed that  
17 certain training be augmented to cover these items?

18 MR. TATE: This slide itself is actually  
19 identifying some of the training that's currently  
20 available as part of our qualification programs.

21 And so, we currently as part of our  
22 qualification programs, include training on our reactor  
23 technologies for - and simulated training on the GE  
24 Emergency Procedure and Severe Accident Guidelines, the  
25 Westinghouse and the B&W and CE design emergency

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1 procedure guidelines.

2 And then as Joe mentioned, Westinghouse  
3 came in and gave us a two-day seminar on the SAMGs that  
4 we videotaped and is available to the staff online.

5 MEMBER BLEY: Is that something we can see?

6 MR. TATE: Yes, I can actually - I can get  
7 the link to that training and -

8 MEMBER BLEY: Okay. We'd appreciate that  
9 if you'd give that to Antonio.

10 MR. TATE: Okay. Just to outline some of  
11 the physicians that specifically have some of this  
12 training outlined in their qualification program, our  
13 Senior Reactor Analyst in accordance with the Special  
14 Manual Chapter 1245 Appendix C-9 identifies either the  
15 accident progression analysis or the reactor safety  
16 course as required training.

17 Our branch-specific training plans in NRR  
18 identifies a prospectus and reactor safety course for  
19 reactor technical reviewers.

20 Our reactor risk analysts actually take all  
21 three of the courses, the progression analysis,  
22 consequence analysis and the reactor safety course.

23 And then as Joe said again, our nuclear  
24 safety professional development staff that are on the  
25 reactor tract also are required to take the reactor

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1 safety course.

2 So, looking at enhancements as Joe again  
3 said, we looked at what are the things that we could  
4 do with our existing training to kind of fill the gap  
5 in understanding severe accident phenomenology.

6 And so, we took some of the near-term  
7 actions what we identify where - to increase the  
8 frequency of some of the severe accident courses that  
9 are currently available, including transport and the  
10 reactor safety course to the regions, update that  
11 course, the reactor safety course, to include what  
12 information we do know now from the Fukushima accident.

13 Then, also, we're currently looking at our  
14 qualification program to identify where we need to  
15 address gaps there in severe accident courses.

16 And then as part of this process, we did  
17 hold a public meeting on May the 7th. Some of the  
18 stakeholder feedback, we did get one comment that was  
19 related to just ensuring that we consider that there's  
20 a proper balance between what we're requiring the  
21 operators to train on with the more probable transients  
22 that they might see.

23 So, I think that goes along with some of  
24 the comments we heard today from you guys as well. So,  
25 we do anticipate that will be addressed as part of the

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1 Recommendation 8 and the rulemaking that's going on with  
2 that as well.

3 MR. GIITTER: It really wasn't a comment on  
4 12.2 as much as it was on Recommendation 8. It was a  
5 comment NEI. And as Travis indicated, they felt that  
6 you have to be careful that you don't overemphasize  
7 training on severe accidents and underemphasize  
8 training on the routine operating procedures.

9 CHAIRMAN SCHULTZ: Travis, with respect to  
10 the previous slide where you listed those that are in  
11 the qualification program, you can answer this one of  
12 two ways; either how many have been through the courses  
13 that you've identified, or how many staff are qualified  
14 and have taken the course?

15 What population of the staff are we talking  
16 about here are going through this type of training?

17 MR. TATE: All of the SRAs in the regions,  
18 they each have - typically three SRAs per region will  
19 go through this training.

20 The reactor technical reviewers in NRR -

21 MR. GIITTER: That's probably the largest  
22 population. There's dozens of technical reviewers.  
23 And then within the Division of Risk Assessment in NRR  
24 we have risk analysts who would take all three courses.

25 So, you're looking at in terms of the

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1 percentage of technical staff, you're looking at a  
2 fairly small percentage within the Agency.

3 MR. TATE: Ten percent at the most.

4 CHAIRMAN SCHULTZ: Probably 70 to a hundred  
5 personnel all told? Something like that?

6 MR. GIITTER: Something like that, yeah.

7 (Off the record discussion.)

8 MR. TATE: Then some of our longer term  
9 accidents that we're looking at also, as I said,  
10 dependent upon Recommendation 8, but we also believe  
11 that some of the SOARCA tools that were identified as  
12 part of the SOARCA study could be valuable in training  
13 the staff.

14 There's also the effort with the Level 3  
15 PRA study ongoing that we will look at as that rolls  
16 along to identify additional training opportunities.

17 As Joe mentioned earlier, we do think  
18 there's going to be longer-term lessons that we learned  
19 from the Fukushima accident that we'll need to roll in  
20 as part of the training program updates as well.

21 We're also looking at adding SAMG courses  
22 if, you know, through the process and Recommendation  
23 8 is identified, we'll add the appropriate SAMG courses  
24 for our qualification program.

25 And we're looking at also the potential for

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1 new course development, you know, just depending on what  
2 comes out of Recommendation 8. And again we'll be  
3 seeking throughout the process, stakeholder feedback.

4 CHAIRMAN SCHULTZ: You mentioned the  
5 additional training that could be provided in the  
6 regions.

7 MR. TATE: Uh-huh.

8 CHAIRMAN SCHULTZ: With regard to the  
9 implementation of the longer-term actions and these -  
10 I understood from what you said, these are elements that  
11 are under consideration.

12 MR. TATE: Uh-huh.

13 CHAIRMAN SCHULTZ: Not determined, but  
14 here's some -

15 MR. TATE: Right.

16 CHAIRMAN SCHULTZ: -- additional resources  
17 that will become available that you might incorporate  
18 in training.

19 MR. TATE: Yes, correct.

20 CHAIRMAN SCHULTZ: Staff training.

21 MR. GIITTER: Yeah, and I think all of these  
22 things that were listed would inform the current  
23 training. And as Travis mentioned, you know, we would  
24 maybe even look at additional training if necessary.

25 But for example, you know, one of the things

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1 that we were talking about in terms of offering the R800  
2 reactor safety course to the resident inspectors is  
3 adding a module that summarizes the Fukushima accident  
4 and lessons we've learned so far from that.

5 And as we learn more, as Travis indicated,  
6 from Level 3 PRA, taking some of the insights we've  
7 learned from SOARCA, anything else we would factor into  
8 that training.

9 And certainly, you know, so this would be  
10 an opportunity to continue to inform the state of  
11 knowledge on severe accidents that would be reflected  
12 in the content of the course.

13 MEMBER SKILLMAN: Let me ask this, if I may,  
14 please. When I think of this type of training, I think  
15 of two independent environments. One is a classroom  
16 environment where an instructor presents technical  
17 information and students take notes and take a break  
18 and take more notes and take a break. And after two  
19 days, they get a qualification for it.

20 And then I think of another environment  
21 where a smaller group is placed in a simulator, and then  
22 their emotions are ignited by what they experience.

23 That is a completely different training  
24 exercise. And the lessons learned at least from my  
25 experience, are very different.

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1           Is there any part of this where the NRC staff  
2 is given the opportunity to get into a simulated  
3 situation where they really begin to see the machine  
4 unravel?

5           MR. GIITTER: I agree with what you said  
6 about the simulator. The problem is - and I did talk  
7 to Mark Miller, the head of the TTC on this issue. Right  
8 now the simulators or any simulator, is my  
9 understanding, doesn't really have the capability of  
10 modeling severe accidents. That's something that  
11 really goes beyond, you know, the typical simulation  
12 that you'd be able to recreate in a simulator.

13           So, without investing a lot of - I would  
14 imagine a lot of resources and effort into being able  
15 to get the simulators to simulate severe accidents, I  
16 see that as being a pretty tall order.

17           MEMBER RAY: It would be huge.

18           MEMBER BLEY: There are some commercial ones  
19 available that use the NRC codes as their basis. I don't  
20 know if that's something, you know, you guys can consider  
21 or not. But I know there's at least one out there, and  
22 maybe others, that are anchored in the NRC codes, and  
23 then they've extended them, so.

24           MR. GIITTER: Yeah. Again based on my  
25 discussions with Mark at least for the NRC simulators,

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1 he felt that would be difficult to do and quite  
2 expensive.

3 MEMBER BLEY: It's not there now, that's  
4 right.

5 MEMBER REMPE: Steve, I think Don wanted to  
6 say something.

7 MR. HELTON: Yes. If it's appropriate, I  
8 was just going to try to build off on that just to point  
9 out that -

10 CHAIRMAN SCHULTZ: Could you introduce  
11 yourself?

12 MR. HELTON: I'm sorry.

13 CHAIRMAN SCHULTZ: Thank you.

14 MR. HELTON: Don Helton, NRC staff, Office  
15 of Research.

16 Joe's correct that the simulators both on  
17 the NRC side and the industry side don't have the  
18 capabilities to go through the severe accidents.

19 In terms of things that we have done along  
20 those lines to try to get at a little bit of that flavor,  
21 the two-day Westinghouse course that's been mentioned,  
22 the last half of that day was sort of a tabletop exercise  
23 actually going through a plant-specific set of the  
24 Westinghouse SAMGs and walking through some of the  
25 decision points.

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1           The other thing that comes to mind is, is  
2           that there was an effort a couple of years ago to use  
3           MELCOR as a feeder for the ERDS software in the NRC  
4           Incident Response Center to do what I think was a onetime  
5           training of some of the Reactor Safety Team staff for  
6           what some of these parameters might look like in severe  
7           accident space.

8           MEMBER SKILLMAN: Thank you.

9           CHAIRMAN SCHULTZ: In terms of the training  
10          program for staff, and I'm thinking particularly of what  
11          - I was not here a year ago when Fukushima happened,  
12          but I can - I was in the industry in a place where I  
13          was with an agency that had to respond to the event in  
14          its own way. And it was quite challenging with the  
15          agency I was with to carry that through, and I imagine  
16          the same was true here.

17          So, I'm interested to know based upon the  
18          experiences here, are you looking at those experiences  
19          to amend or adjust the knowledge level associated with  
20          this training?

21          In other words, what I see here is taking  
22          some lessons learned and augmenting a technical training  
23          program for the same kind of population that's been  
24          trained, and providing some more academic coursework,  
25          if you will, associated with that.

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1           Is there thought about expanding that  
2 population to other staff who if you look back upon the  
3 Fukushima event or an event that might happen within  
4 the United States, need to know this information, need  
5 to know enough about it so that when they talk to the  
6 technical staff and then talk to others, they can do  
7 that in an effective way?

8           In other words, I - so, I'll let you respond  
9 to that and I might have some other questions related  
10 to it.

11           MR. GIITTER: I can give you my own personal  
12 thoughts. I don't know if anybody from NSIR is here  
13 or not, but I spent a fair amount of time in the  
14 Operations Center during the Fukushima event. And what  
15 was interesting to me was the extraordinary effort on  
16 the part of the staff to pull information from every  
17 source possible.

18           And in some cases, you know, NUREG documents  
19 that were published back in the 1980s that somebody knew  
20 about and they were able to get their hands on that were  
21 able to help the staff come to grips with some problem  
22 or question that they were dealing with related to the  
23 Fukushima event.

24           With the Fukushima event as well as looking  
25 back on our own experience with Three Mile Island, one

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1 of the big challenges is getting information. And we  
2 in the United States, of course we've with ERDS and with  
3 the Emergency Notification System and the entire  
4 Incident Response program we have, we try to do  
5 everything we can to ensure that we will get good  
6 information, but I think we have to be prepared in any  
7 event that we may not get all the information we want  
8 or need. And I think that's part of the challenge as  
9 well.

10 So, I would hope that from the experience  
11 from Fukushima, one of the things that we've learned  
12 is having a central repository of information that we  
13 would be able to access if we needed to.

14 And I used to be involved with the Incident  
15 Response program. I know that was something that we  
16 tried to do in the past, and I would imagine that's  
17 something they're trying to do right now, but I don't  
18 know if anybody from NSIR is here to speak to that.

19 But It's a good suggestion and I think it's  
20 something we need to look at. It wasn't within the scope  
21 of what we were looking for 12.2, however.

22 MR. MONNINGER: Joe, I could add some  
23 perspective also. This is John Monninger with the staff  
24 at JLD. I've been a member of the Ops Center, the Reactor  
25 Safety Team for probably the past 10, 12 or so years.

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1 And my initial position on the Reactor Safety Team was  
2 a containment systems and severe accident analyst.

3 So, the Reactor Safety Team is - it's led  
4 by a director and a deputy director. And you probably  
5 have dependent upon the, you know, ten, 12 different  
6 staff members there from chronologists, to  
7 communicators, to the PM, to people focused on  
8 reactivity, to people focused on core cooling, to a Level  
9 1 PRA type, to a severe accident-type analyst, to  
10 electrical systems person, et cetera.

11 And that's sort of the way the Ops Center  
12 is set up and we had four teams. A red, blue - red,  
13 white and blue and a gold team.

14 I think one of the problems you got into  
15 in this area in particular for SAMGs, one is they were  
16 voluntary. And the other is the NRC, its severe  
17 accident analysis is generally not something that many  
18 people get involved in at all.

19 There's a lot of expertise up in the Office  
20 of Research, and at one time NRR had a branch that  
21 contained systems in the severe accident branch, but  
22 there's essentially no licensing work in that area.

23 So, you had a very, very small, core group  
24 of staff who did have some knowledge of the SAMGs or  
25 severe accident progression. And in a very quick time

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1 frame, you run through those four people that are on  
2 the Ops Center.

3 General people, you know, someone who knows  
4 - many people do core cooling or reactivity and you can  
5 pull in people.

6 But so, I think the notion was, was to expand  
7 the fundamental base knowledge of severe accident, of  
8 melt progression, of hydrogen control of SAMGs to a much  
9 broader part of the staff. So, I think that was a lot  
10 of the background also.

11 There was, you know, the regions, the  
12 inspectors, the residents out there also didn't have  
13 a lot of that background.

14 CHAIRMAN SCHULTZ: That's a helpful  
15 perspective. Thank you.

16 Is there a systematic approach to training  
17 that is used in the augmentation of the coursework that's  
18 being proposed? In terms of course development as you  
19 augment it, do you take something like a systematic  
20 approach to training to develop the coursework or are  
21 you -

22 MR. GIITTER: I can tell you for the R800  
23 course, it was actually initiated by Denny Ross, Dr.  
24 Ross. And I sat in on the beta version of the course.

25 And, you know, I'm not - systematic may be a little

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1 too strong, but we did, you know, we did do an initial  
2 beta version of the course. We got feedback on it.  
3 We tried to improve it based on that feedback. And I  
4 think it took maybe two or three iterations until we  
5 really got it down to where we got really good feedback  
6 on the content and relevant substance of the course.

7 CHAIRMAN SCHULTZ: So, you used an approach  
8 that would accomplish that setting the goals and  
9 objectives of the training?

10 MR. GIITTER: Yes.

11 CHAIRMAN SCHULTZ: Developing the training  
12 and then testing that the goals have been achieved in  
13 the training program?

14 MR. GIITTER: Yes.

15 CHAIRMAN SCHULTZ: Thank you.

16 MEMBER REMPE: Along that line, the people  
17 coming in have different backgrounds than the people  
18 did when these courses were started. Back when the  
19 courses were started, TMI had occurred within the last  
20 five years. Now, you get kids that weren't born when  
21 TMI occurred.

22 And so, the courses need continual update  
23 and not just from Fukushima, but to address a younger  
24 audience that has -

25 MR. GIITTER: right. That's a good point.

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1 MS. REMPE: -- less perspective. And I  
2 hope that's being considered as you update the courses  
3 that -

4 MR. GIITTER: It should be. That's a very  
5 good point.

6 One of the things that we've done in the  
7 past and it's going to be harder and harder to do that,  
8 but we would have people that were actually involved  
9 in the Three Mile Island accident come in and talk about  
10 their experiences.

11 I know Frank Congel did that. And as we  
12 move forward, there's going to be fewer and fewer people,  
13 if any at some point, that actually responded to Three  
14 Mile Island. But that brings an aspect that you don't  
15 get from a textbook to hear somebody actually talk about  
16 it.

17 MEMBER REMPE: Videos are helpful.

18 MEMBER SKILLMAN: I'd like to go back to the  
19 discussion we had a few minutes ago. I spent seven years  
20 as TSC coordinator at TMI2. I'm a qualified emergency  
21 director and emergency support director at TMI1 for  
22 about 15 years. I believe I understand this.

23 I also believe that with the limitations  
24 on the simulator, your simulator support staff can  
25 create scenarios that allow the participants to be

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1 introduced to some of these design-beyond-base  
2 conditions. While the simulator will not have a great  
3 deal of fidelity, the concepts will be presented to the  
4 participants.

5 Okay. You're in the middle of an incident,  
6 you know, by golly you got a fire in a diesel engine.

7 You're in the middle of an incident and you have a raw  
8 water system piping break, pass or failure.

9 It's not as necessary for the fidelity to  
10 be pristine as it is for the team to experience that  
11 loss and recognize in design space I'm not in a different  
12 operating zone and I'm facing the need for more  
13 equipment, for a different type of procedure that I don't  
14 yet have, where's the tech support center to help me,  
15 and those types of things.

16 So, I'd like to challenge the idea that the  
17 simulator because it isn't, if you will, prepared for  
18 what might be an extended condition, may be almost just  
19 as good to present to your key people what that type  
20 of environment feels like.

21 Because once they've been through it, at  
22 least my view is they never forget it and they have this  
23 new sensitivity to the unexpected. But particularly  
24 to the unexpected that has the capability to take away  
25 emergency core cooling, to take away the raw water, to

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1 take away the ventilation capability, to take away their  
2 electrical power that might be the last meaningful  
3 device that allows them to land the plant successfully.

4 So, I'd like to suggest that there's  
5 probably a way to make due. And what you might end up  
6 making due with may be 85 percent good enough so that  
7 the team really says, you know what? That wasn't too  
8 shabby. It's not perfect, but we got it.

9 MR. GIITTER: Yeah, okay. Good point.  
10 I'll talk to Mark about that and -

11 MEMBER SKILLMAN: Thank you.

12 MR. TATE: That was my last slide. Any other  
13 questions?

14 CHAIRMAN SCHULTZ: You have one on public  
15 meeting; is that correct?

16 MR. TATE: Actually, I think -

17 MS. GIBSON: Joe, can I just make a comment?

18 MR. TATE: Oh, I'm sorry.

19 MS. GIBSON: I'm Kathy Gibson. I'm director  
20 of Division of Division of Systems Analysis and  
21 Research. And I used to be the director of the TTC and  
22 the PDC in training. And I just wanted to let you know  
23 that we have developed masks for the MELCOR code so -  
24 or we've started developing masks so it could be used  
25 as kind of like a desktop simulator to supplement not

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1 just formal training, but also training of our own  
2 analysts.

3 But as John said, resources in this area  
4 are really slim. And after the Fukushima accident and  
5 all of this other work that's going on, those resources  
6 are being used, you know, our resources and the Sandia  
7 resources are being used for all these other things.

8 So, you know, that is something that we have  
9 had on our plate and we were working towards that when  
10 this happened and that's got put on the back burner.

11 But we have developed some for some of the new reactor  
12 designs and for PWR and BWR.

13 MR. LEE: Richard Lee from the Office of  
14 Research. As Kathy mentioned, the first phase of the  
15 MELCOR using the so-called SNAP, which is our graphical  
16 user interface, the template was developed for the new  
17 reactors.

18 So, you have the ESBWR, you have the APWR,  
19 the AP-1000. All of those template has been developed.

20 Those models has been - actually we installed it on  
21 some of the staff at NRO.

22 So, basically you can do three type of  
23 analysis. One is the traditional accident analysis.

24 The other one is the SOARCA containment design base  
25 analysis, and the last one is the design base source

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1 term analysis.

2           There are three types of things that the  
3 staff can do and explore themselves. So, those have been  
4 installed onto some computers at NRO. We are now  
5 starting to develop the templates for the operating  
6 reactors starting with the Peach Bottom. The Surry and  
7 the Zion and the Byrons will be mixed.

8           So, this will afford the staff to do  
9 exploration themselves. You can do analysis themselves.

10          And for NRO, we encourage them to do especially the  
11 AP-1000 because the licensing is coming up. And the  
12 staff can look at the licensee submittal and look at  
13 all the design base source term as they wish. Those  
14 capabilities are already there.

15           CHAIRMAN SCHULTZ: Thank you. Other  
16 questions from the Committee on this topic?

17           MEMBER REMPE: I guess actually just one  
18 other point to the - well, events were happening last  
19 year. A lot of the people that were called in trying  
20 to help were the same people who did it 30 years ago.

21           And I know since we're talking about  
22 resources are limited, I hope that the staff has -- we've  
23 started teaching the staff that maybe more expertise  
24 is needed to have younger people because 30 years from  
25 now the people who came back aren't going to remember

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1 their names.

2 (Laughter.)

3 MEMBER REMPE: So, it just is something that  
4 - it's hard, I know, with something that didn't get a  
5 lot of attention because we just didn't think it would  
6 happen again.

7 MR. MONNINGER: There's something I think  
8 goes along with that thought. I mean, you can put -  
9 well, there's a lot of things.

10 (Laughter.)

11 MR. MONNINGER: You can put an employee in  
12 a training class for a week. And they'll soak in a  
13 certain amount of information and they'll remember a  
14 certain amount for the first week, the second week and  
15 then the month and then two months and then they have  
16 the binder up on the shelf after that.

17 So, my thought is it may go hand in hand  
18 with Recommendation 8, you know. It would be a lot of,  
19 I don't want to say the old-timers, but who, as you  
20 mentioned, they were probably involved in TMI. But if  
21 TMI would have never occurred, those people would not  
22 have had that expertise.

23 So, one way that the Agency it would seem  
24 like would potentially be more involved in this and gain  
25 the expertise would be through the rulemaking for the

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1 SAMGs.

2 We would have more of a business line within  
3 severe accident. So, you would have more of a core group  
4 of people that were fundamentally involved in those  
5 areas day in and day out as opposed to taking one training  
6 class every five or ten years. So, the question is,  
7 you know, how do you put it into the business line?

8 I mean, you do have it in the business line  
9 with the research staff and MELCOR code development,  
10 et cetera, but the regulatory staff or the inspectors,  
11 you know, it's more than just the onetime class. It's  
12 how do you then have the staff exercise that knowledge  
13 and ability and maintain awareness.

14 And hopefully through new regulatory  
15 requirements with industry, we will then have staff  
16 working with that.

17 CHAIRMAN SCHULTZ: Well, the staff is here  
18 and available. Are there public comments from the room,  
19 comments that the public would like to make on this  
20 particular segment?

21 I will also ask from comments from the  
22 telephone. I believe the line is open. We're checking  
23 on that.

24 MR. DIAS: It's open now.

25 CHAIRMAN SCHULTZ: Okay. The line is open.

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1 Are there any members of the public who would like to  
2 make comments on this segment of the presentation?

3 (No response.)

4 CHAIRMAN SCHULTZ: Hearing none, I'd like  
5 to thank the staff for their presentation.

6 MR. LEYSE: Can you hear me?

7 CHAIRMAN SCHULTZ: Yes, Bob.

8 MR. LEYSE: Okay. I have some organized  
9 comments.

10 CHAIRMAN SCHULTZ: Bob, could you introduce  
11 yourself again?

12 MR. LEYSE: Yes, Bob Leyse, L-E-Y-S-E. And  
13 I want to quote from ADAMS document ML12065A21, Page  
14 5. And this is relevant to the transition from EOPs  
15 to SAMGs.

16 So, here I'm reading: In a severe accident  
17 in many cases, a predetermined core exit temperature  
18 measurement that is 1200 degrees Fahrenheit would be  
19 used to signal the time for operators to transition from  
20 EOPs to implementing SAMGs.

21 For example, Westinghouse's Probabilistic  
22 Risk Assessment for the AP-1000 states: as the core  
23 exit temperature increases above 1200 Fahrenheit, the  
24 EOPs transition to red path, indicating inadequate core  
25 cooling, FR-C.1, end of parenthesis.

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1           Upon entering into the FRC1, the control  
2 room staff initiates actions to mitigate a severe  
3 accident by turning on the hydrogen igniters for  
4 hydrogen control and flooding the reactor cavity to  
5 prevent reactor pressure vessel failure, end of the  
6 Westinghouse quote.

7           Continuing with the rest, the problem with  
8 using a predetermined core exit temperature measurement  
9 to signal a time for operators to transition from EOPs  
10 to implementing SAMGs, is that experimental data shows  
11 that core exit temperatures have significant  
12 limitations. And I won't read those. You can go to  
13 the document.

14           Second part of my comments. I heard a  
15 reservation to MELCOR as a feeder to a lot of this stuff.

16       Well, I'm not quoting anyone else right now. But if  
17 you look into what is the basis for that MELCOR uses  
18 to decide when a reactor might take off in thermal  
19 runaway in a LOCA, and you'll find that the test bases  
20 that go into MELCOR for that are totally inadequate.

21           They're far less than what Sandia is using  
22 to feed MELCOR for the relatively unimportant scenario  
23 of a single fuel element being totally uncovered and  
24 air-cooled only and leading to combustion, end of quote,  
25 and I thank you.

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1 CHAIRMAN SCHULTZ: Thank you for your  
2 comments, Bob. With that, we'll transition to the next  
3 presentation. Again, thank you very much.

4 We'll move right in. We don't have a break  
5 scheduled. We'll move to the next presentation.

6 (Off the record discussion.)

7 CHAIRMAN SCHULTZ: John, would you like to  
8 introduce the staff presenters while they settle in?

9 MR. MONNINGER: Yes.

10 (Off the record discussion.)

11 MR. MONNINGER: So, this is John Monninger  
12 from the staff. Our next discussion will be on reactor  
13 and containment instrumentation following a severe  
14 accident.

15 We have Mike Case who's a division director  
16 within the Office of Research, one of his branch chiefs,  
17 Russ Sydnor, and then Dave Rahn from the Office of  
18 Nuclear Reactor Regulation, a senior I&C engineer.

19 MR. CASE: Okay, great.

20 CHAIRMAN SCHULTZ: Welcome.

21 MR. CASE: Thank you.

22 I'll kick it off. Like John said, I'm Mike  
23 Case. And I think John probably gave you the overall  
24 objective that we want to present all these Tier 3 items  
25 to you and get the ACRS' concerns and comments.

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1           This one is a little bit unique in that among  
2 the Tier 3 items, this one really didn't come from the  
3 Fukushima task force. This came from the ACRS. So,  
4 it's unique in that manner.

5           So, I think our team would be interested  
6 in not only your comments and concerns in the letter,  
7 but this is our opportunity to hear the issue from you  
8 firsthand.

9           So, we were sort of stuck with the written  
10 word, which was very well written. And so, we got your  
11 concerns, but this is the real opportunity for you to  
12 influence us because we'll be, in essence, your agent  
13 on this particular item.

14           And then the only other issue beforehand  
15 is that we were making the project plan to address this  
16 issue. We haven't really been released to address the  
17 issue.

18           So, we're trying to balance the notion that  
19 nobody really has asked us to solve that until of course  
20 the Commission paper goes all the way through the process  
21 and the Commission says go forth and do this on that  
22 particular time schedule.

23           So, we probably don't have all the answers  
24 to your questions, but I think the feedback will be good  
25 and help us get it in the right direction.

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1           So, with that I'll turn it over to Russ  
2           Sydnor. He was not really Bill Kemper. That was  
3           somebody else.

4           CHAIRMAN SCHULTZ: Michael, I appreciate the  
5           introduction. That's helpful.

6           MR. SYDNOR: Good afternoon. Again, I'm  
7           Russ Sydnor. I wanted to go over just briefly a  
8           background here. And it seems a little superficial in  
9           that you guys are the background for this  
10          recommendation, but I wanted to kind of repeat back what  
11          we heard you say in this recommendation.

12          You can read the recommendation there.  
13          It's brief and succinct, but the letter listed three  
14          concerns that you identified while you made this  
15          recommendation.

16          One was the obvious problems the operators  
17          experienced at Fukushima, which were obvious to the  
18          whole world and I think were also somewhat repeated in  
19          the Ops Center. I know Mike spent time in the Ops Center,  
20          and some other members of our team spent time in the  
21          Ops Center and experienced problems with information  
22          and getting information to valid information and  
23          understanding what information they were getting,  
24          whether it was valid or not. So, that was one thing  
25          you mentioned.

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1           You also mentioned that Japan has  
2 identified the need for enhanced instrumentation,  
3 reactor and containment instrumentation as part of their  
4 actions going forward.

5           And the third thing that we heard you say  
6 was that there's been some historical research  
7 initiatives that go back to the early 1990s where studies  
8 were done from a PWR and a BWR perspective to develop  
9 a methodology for going through the high-consequence  
10 beyond-design-basis events and identifying information  
11 needs, identifying what instrumentation is actually  
12 available. And then doing a delta analysis. And then  
13 also looking at survivability of that instrumentation.

14           So, we went back and took a brief look.  
15 So, those are some pretty extensive studies and  
16 significant results from those. And so, we went back  
17 and took a look at those as part of what we did on our  
18 team in coming up with a plan.

19           And just to reiterate a little bit before  
20 I get into how we developed our plan, this is at this  
21 point just a plan for how we propose to deal with the  
22 items.

23           So, again, any feedback you have, any course  
24 corrections, now is the time because we'll be putting  
25 the plan in the SECY and then the Commission will be

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1 weighing in on it.

2           Also on this slide just to start out how  
3 we analyze this, there's two points there. We looked  
4 - first thing we did was we looked at what do current  
5 regulations require. And most of the members of the  
6 team are fairly experienced individuals like myself that  
7 have spent a lot of time in the industry before coming  
8 to the NRC. And we were involved in TMI corrective  
9 actions, so we know what was done to put in improved  
10 instrumentation and information systems, post-accident  
11 systems as a result of TMI mods.

12           And so, we looked at that regulation. We  
13 looked at the changes that occurred over the years.  
14 And we also looked at the industry standard. There is  
15 a good IEEE industry standard that we actually endorse  
16 in our regulatory guide for post-TMI instrumentation.

17           We also looked at new reactors. And  
18 actually one member of our team, Dinesh Taneja, was from  
19 Office of NRO. And he made us aware of some things that  
20 members of the team weren't as familiar with, and that  
21 was the new severe accident analysis work that is  
22 required for new reactors under Part 72. Specifically  
23 Chapter 19, which I'm sure many here has been involved  
24 in reviewing those either as part of design certs or  
25 COLs.

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1           And there's actually some methodologies in  
2 the Chapter 19 that are very similar to the past research  
3 and how they analyze and look at severe accident  
4 beyond-design-basis events, how they determine  
5 information needs, and then look at survivability of  
6 that of instrumentation that could provide those levels  
7 of information. So, we looked at all of that as part  
8 of deciding.

9           And one other thing we did, we looked at  
10 everything else that was being done as part of the Japan  
11 lessons learned project. And we looked at some of the  
12 other Tier 1 items to get a flavor for other actions  
13 that were being taken that could influence this  
14 recommendation.

15           So, we identified five Level 1 items which  
16 are summarized here, that we think have some dependency  
17 that our item for reactor instrumentation and  
18 containment - reactor and containment instrumentation  
19 has some dependency on these items.

20           Now, I'll just go through these briefly as  
21 it's not necessarily an obvious dependency. We looked  
22 at the recommendations for seismic and flooding walkdown  
23 evaluations. And we also noted that ACRS made  
24 recommendations there to include severe storm as part  
25 of that.

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1           And so, that Request for Information that  
2           is going out as part of those walkdowns, we took a look  
3           at that and we believe that if done correctly those  
4           walkdowns should include not only looking at equipment  
5           that they need to protect, but also instrumentation as  
6           part of that.

7           And so, we could inform conditions that we  
8           might need to be aware of as part of survivability  
9           assessments, for example.

10           Station Blackout rulemaking is a fairly  
11           obvious dependency. One of the big issues at Fukushima  
12           was loss of power. I mean, it's one of the reasons they  
13           didn't have much of the instrumentation in the time  
14           frames they needed it. And then when power returned,  
15           they had additional issues.

16           So, we feel that that effort needs to  
17           address - or we need to ensure that effort addresses  
18           instrumentation needs as part of the analysis for what  
19           power supplies you need in the Station Blackout  
20           conditions, how long those - the coping strategies for  
21           those power supplies, is instrumentation being included  
22           in those load analysis.

23           A mitigation strategy order is an  
24           interesting one because it really deals with - primarily  
25           with extra equipment, or you might even say portable

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1 equipment that was originally identified as part of  
2 B.5.b or EDMGs. And then - but one decision utility  
3 has to make as part of that equipment if you're bringing  
4 in a pump, for instance, that's going to be a backup,  
5 an extreme backup for cooling for the reactor or for  
6 other uses, then you need to think about how is the  
7 operator going to monitor that equipment as part of your  
8 strategy?

9 So, there are instrumentation  
10 considerations as part of that if that's done correctly.

11 The spent fuel instrumentation order is  
12 actually a direct example of identification of those  
13 needs. The Japanese identified that along with reactor  
14 and containment instrumentation needs as lacking. And  
15 so did the Near-Term Task Force. And actually that was  
16 one where they made specific recommendations.

17 And so, we decided to include it as a  
18 dependency mainly because we think there could be  
19 lessons learned as part of that exercise that we may  
20 want to apply to our potential later rulemaking which  
21 I'll discuss a little bit when I get into our actual  
22 plan for dealing with this.

23 MR. CASE: Can I add on?

24 MR. SYDNOR: You can add on.

25 MR. CASE: Our strategy with the

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1 dependencies is we need information in order to make  
2 that assessment at the end. So, we actually need you  
3 all's help on these dependencies because people need  
4 to ask the instrumentation question in connection with  
5 these items.

6 So, the Statio Blackout rulemaking needs  
7 to not only do their Station Blackout thing, power to  
8 the buses and all that, but people have to ask  
9 specifically what about the instrumentation? Because  
10 if they write it down, then we can take that information  
11 and we can use that to use as the basis for our  
12 conclusion.

13 So, we need your help because you'll see  
14 all these items come through, to ask the instrumentation  
15 question. How are you guys handling the  
16 instrumentation? That will help us.

17 MR. RAHN: And can I add on to your add-on?

18 MR. CASE: Go on.

19 MR. RAHN: Yesterday we heard from the folks  
20 talking about hydrogen control and whether it should  
21 be done with filters or not. And this team of people  
22 went out to visit European plants and learn what they're  
23 doing.

24 We didn't hear anything regarding how did  
25 they monitor the effectiveness of those controls once

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1 they're initiated. And that would be an  
2 instrumentation issue that needs to be addressed.

3 CHAIRMAN SCHULTZ: Good example. Thank  
4 you.

5 MR. SYDNOR: And the last bullet there is,  
6 I think, a fairly direct dependency. This rulemaking  
7 for this, there's a lot of issues. There's procedures  
8 integration, there's training as you just discussed.

9 But one thing we learned in the industry  
10 as part of EOP improvements over 20 years after TMI was  
11 that when you put a number in an EOP and an operator  
12 has to depend on that number to make a decision, better  
13 understand what that number means.

14 And that wasn't true in 1983, but in 1993  
15 or 2003 there was an engineering analysis of the accuracy  
16 of that instrumentation and what that number really  
17 meant to the operator.

18 And so, there was a great improvement made  
19 to EOPs over the years in this area. And something  
20 similar, a similar-type logic to that could be applied  
21 to SAMGs and EDMGs.

22 In current reactors, obviously the Severe  
23 Accident Management Guidelines were a voluntary program  
24 and based on kind of generic design-specific guidelines  
25 that were developed by the vendors, either PWRs or BWRs,

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1 and whether it was CE plant or Westinghouse plant.

2 But within there, you know, and I was in  
3 the industry when they developed some of those and I'm  
4 not - I don't recall whether we had the same rigor as  
5 part of when information was provided in those.

6 So, as part of this rulemaking again, this  
7 is the type of questioning we think we can infuse in  
8 these Tier 1 activities to improve them and hopefully  
9 get some benefit from that later on.

10 So, we agreed with the ACRS recommendation  
11 that there was a need to look at this item. And so we  
12 said, well, how are we going to do that? So, we decided  
13 on there were some short-term activities that we should  
14 be engaged in, and some longer term activities.

15 The short term is really represented by the  
16 first bullet there. And that is what I've been  
17 discussing, ensure that the need for this enhanced  
18 instrumentation is being adequately considered during  
19 these Tier 1 Near-Term Task Force actions.

20 And we have some ideas for doing that. We  
21 haven't fully implemented that because we're still in  
22 the planning stage, but we've had some discussions  
23 within the team on how to communicate those issues to  
24 the other Tier 1 team so they understand what we're  
25 looking for.

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1           And so, we're developing some tools that  
2 we're going to recommend to the project team, the Japan  
3 Lessons Learned Project Team, on how to do that.

4           Another thing we identified and the  
5 Steering Committee felt very valuable, was to review  
6 and participate in domestic and international efforts.

7           We've identified a number of early efforts,  
8 IAEA efforts, IEC standard committee, the subcommittee  
9 45a on I&C has looked at Fukushima lessons learned and  
10 developed a laundry list of standards that may need  
11 improvement in the I&C area, for instance.

12           And then also domestically we're aware that  
13 there's some proposed efforts in DOE. And Mike has made  
14 some contacts there so that we're ready if some  
15 meaningful efforts develop there, to look at data from  
16 Fukushima and then determine that if you get information  
17 to help us determine instrumentation, we'll be ready  
18 to tap into that or even participate in those efforts.

19           And so as part of that bullet, too, it's  
20 probably not clear from the words there, but there's  
21 also time to go back and look at the work that was done  
22 under the past research.

23           Although, a superficial judgment on my part  
24 at this time is what new reactors is doing bears a lot  
25 of resemblance to work that was done in that early

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1 research. And so I think - and there's a regulatory  
2 footprint for that work in new reactors. So, there's  
3 a lot to be learned from following that.

4 So, what we propose is that we would try  
5 to influence - in the short term, try to influence these  
6 Tier 1 actions, gather, and then start -- initiate  
7 participation in domestic and international. And then  
8 longer term, gather and review this information and  
9 ultimately we want to determine whether we need  
10 additional regulatory action.

11 We don't believe we know that right now.

12 And so, we want to gather this information and make  
13 an informed decision about that.

14 And that's our three or four-step process  
15 that we've come up with as part of our plan that we're  
16 going to recommend in the SECY to the Commission.

17 Just briefly, the public meeting we had on  
18 May 7th, we presented this. We really only had two  
19 significant comments. The NEI comment had essentially  
20 endorsed the approach we were recommending. And, in  
21 fact, the approach would balance requirements for  
22 instrumentation that is needed to support prevention  
23 and mitigation in design basis, AOPs and the  
24 requirements for enhanced instrumentation enabling  
25 reactor operators to cope with beyond-design basis,

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1 severe accident events.

2 He was particularly concerned that we  
3 always factor the operator into these decisions. The  
4 operators and the emergency response teams are the ones  
5 that are going to be using this. And so, whatever we  
6 recommend or identify needs to have a valid user in those  
7 schemes of those procedures.

8 The second commenter we had was Lou Zeller  
9 from -- he's the science director for the Blue Ridge  
10 Environmental Defense League. And he really asked if  
11 we intended to take lessons learned out of the North  
12 Anna or Mineral, Virginia earthquake event and roll it  
13 into this item.

14 And our response was basically that those  
15 actions have their own implementation plan right now.

16 There's really no reason to slow those down with this  
17 item at this time, but we would - the actions coming  
18 out of that we'll have plenty of time to factor into  
19 our decision-making on this long term.

20 And so, those were the only two meaningful  
21 public comments that we had. So, that pretty much  
22 concludes the formal presentation. We can take some  
23 questions or -

24 MEMBER SKILLMAN: Yeah, Slide 74, please.

25 MR. SYDNOR: Two back.

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1 MEMBER SKILLMAN: Back two. Where does the  
2 Met Tower, you know, logical information fit here,  
3 please?

4 MR. SYDNOR: I don't believe the Met Tower  
5 was mentioned in the Fukushima recommendations. John,  
6 I don't know if you can - I'm not aware that it was.

7 MEMBER SKILLMAN: Very difficult to make a  
8 PAR without wind speed and direction. And one of the  
9 critical parameters for the control rooms, which way  
10 is the wind blowing? How cold is it? What's my raw  
11 water temperature? Because those will set up a whole  
12 series of events.

13 So, I think it's a picky comment that -

14 MR. RAHN: That's actually a current  
15 requirement though. I mean, we currently have that in  
16 our list of ERDS information.

17 MEMBER SKILLMAN: Okay. Thank you.

18 MR. CASE: But we'll take a look at it because  
19 if you follow the EOP, SAMG, EDMG string, that will  
20 identify a bunch of instrumentation.

21 If you look in the emergency plan, there  
22 might be other insights that we also want to worry about.

23 So, traditionally I don't think the Reg Guide picks  
24 up that instrumentation.

25 Like Dave says, it's already in the

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1 regulation. So, we know it's there. So, we know it's  
2 designed for design basis, but we have to do sort of  
3 the ACRS additional thought and say, hey, do we really  
4 want that thing to be operating in beyond-basis  
5 conditions? And if so, what would be the threats? And  
6 is it okay as is?

7 MEMBER SKILLMAN: If you're going to extend  
8 the PAR, the protective area recommendation, you need  
9 that information. And it's got to be good information.

10 MR. CASE: Right. Well, we've always got  
11 backups because the EP plan will say, go to the - now  
12 you can go to the damn internet and get something pretty  
13 close.

14 MEMBER SKILLMAN: Or else they'll say the  
15 field team will give that to you. But if the field team  
16 is not out there, you're stuck.

17 MR. RAHN: Too windy.

18 (Laughter.)

19 MEMBER SKILLMAN: Or cold. Thank you.

20 CHAIRMAN SCHULTZ: Other comments?

21 MEMBER REMPE: I guess one thing that might  
22 be mentioned is interactions with ongoing other research  
23 activities that might with a little bit of focus, be  
24 used to help your effort.

25 For example, the Level 3 analyses, the

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1 recent SOARCA analyses that are still apparently some  
2 calculations are being done, if the conditions that the  
3 sensors would have to survive could be extracted from  
4 those analyses -- again, I'm referring back to the old  
5 work that was done a long time ago where they used  
6 whatever the codes were back then, but this could be  
7 something that might help NRC accomplish their goals  
8 in a cost effective way.

9 But other than that I - it's interesting  
10 to hear that industry was supportive of your effort.

11 That's good.

12 MEMBER SHACK: Have you looked at the  
13 guidance that people use for the B.5.b equipment and  
14 those strategies and how they're supposed to deal with  
15 their instrumentation needs and, you know, as they're  
16 trying to operate that equipment?

17 And if you looked at those strategies, would  
18 it give you some hints as to what kind of instrumentation  
19 you might really want to have? Because those are,  
20 again, people dealing with sort of extreme events well  
21 beyond design basis kind of things.

22 MR. RAHN: Yeah, we're touching a little bit  
23 on it in the spent fuel instrumentation area in that  
24 one of the possibilities is to rather than have two  
25 permanently installed instruments, have one permanent

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1 and one that's staged and ready to go for bringing it  
2 in. And we're just kind of getting into the criteria  
3 for establishing what needs you need to prepare for in  
4 order to stage it properly. But with that scenario,  
5 we're starting to think about it.

6 In terms of addressing a transition from  
7 a normal design basis to a severe accident condition,  
8 there isn't a lot of time to bring in and set up and  
9 calibrate properly instrumentation. So, it's kind of  
10 like that thing would be preferred if it was already  
11 staged and -

12 MEMBER SHACK: No, what I meant was that you  
13 might think - you look at those strategies and sort of  
14 decide what instrumentation is going to be needed to  
15 make those strategies work.

16 MR. RAHN: Okay, I see what you're saying.

17 The mitigating strategies -

18 MEMBER SHACK: And to make sure that in fact  
19 that instrumentation is available. Or if it isn't  
20 available, you know, what needs to be done to make it  
21 available, but people have looked at those kinds of  
22 strategies for beyond-design-basis. And I guess the  
23 SAMGs do the same thing in a slightly different way,  
24 but just looking at those would seem to me places to  
25 get ideas for what that bear minimum amount of

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1 instrumentation is.

2 MR. CASE: Right, I got two comments on that  
3 one. I did go back to the B.5.b guy and say, how did  
4 you guys handle instrumentation?

5 I know we asked questions about it when we  
6 were going the review. But once again sort of like Russ  
7 was indicating when they do the rulemaking and they get  
8 to the EDMG stage, that's - when he talks about rigor,  
9 that's where I'm hoping that the rigor that we show in  
10 the EOPs where there's a good correlation between every  
11 action in there that calls upon an instrumentation, we  
12 know it's there.

13 So, we hope that rigor will go down all the  
14 way to the EDMG level that people will be asking that  
15 question. If they expect people to accomplish things  
16 in the EDMG space, where the instrumentation that you're  
17 monitoring to see that you're successful?

18 And so if we can get the rigor in there so  
19 that they write it down, then we can pick up the  
20 information.

21 In B.5.b space I think we asked all those  
22 questions, but we didn't have a lot of rigor to write  
23 all that down so we could just pull it, collect it and  
24 pull it.

25 MEMBER BLEY: I know of your idea of having

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1 it staged and it seems - but there was a plant almost  
2 20 years ago that as they were doing their risk  
3 assessment, got worried about scenarios of this sort.

4 They actually wrote and walked through a local  
5 procedure for doing a lot of the kinds of things that  
6 you saw happen at Fukushima on the fly.

7 So, they had preplanned how to do a lot of  
8 that kind of thing and where to bring in bridge circuits,  
9 that sort of thing, and hook them up to existing  
10 instruments with external power supplies and kind of  
11 worked it through. And that kind of planning probably  
12 fits into this somewhere.

13 MR. CASE: Correct. And I think that  
14 planning will be in the mitigating strategies and the  
15 EDMG -

16 MEMBER BLEY: They might still have that  
17 procedure in place. I don't know why they wouldn't.

18 MR. RAHN: We had questions of our own. Just  
19 while we got you here, we can -

20 (Laughter.)

21 MR. RAHN: The actual wording of the  
22 recommendation was one thing that we were - we can read  
23 it a couple different ways and we were wondering what's  
24 the intent, which is more positive intent. But  
25 basically the recommendation was that selected reactor

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1 and containment should be enhanced to withstand  
2 beyond-design-basis conditions.

3 Now, to there, are we going after the term  
4 "enhancing," or are we talking about the withstanding  
5 part? Are we mostly interested in getting existing  
6 instrumentation capable of monitoring the ranges and  
7 being qualified to survive this, or are we saying we  
8 need to enhance that instrumentation with other maybe  
9 out-of-the-box-type instrumentation?

10 For example, it's been proposed to us that  
11 we ought to be thinking about acoustic monitoring, for  
12 example, instead of normal pressure temperature sensors  
13 to be able to determine boiling.

14 MEMBER ARMIJO: I can't speak for everyone,  
15 but to me survivability is the first thing. The water  
16 level indications at Fukushima were a big, big problem.

17 And not in the spent fuel pool. I'm talking  
18 reactor. So, yeah, but other - any ideas that the  
19 industry brings forward should be considered.

20 MEMBER REMPE: I'm with Sam. Going through  
21 what the operators need and making sure they have the  
22 parameters to implement the right mitigating strategies  
23 and assess the effectiveness of those strategies is what  
24 I had in mind when I was participating in discussion.

25 MEMBER SHACK: If you need new ways to

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1 measure it to do that, then you need new ways to measure  
2 to do that.

3 (Simultaneous speaking.)

4 MEMBER SKILLMAN: The thought was a very  
5 small subset of the total instrumentation. This was  
6 not intended to be a huge redundant backup set of  
7 instrumentation. This was intended to be a small  
8 handful of instruments that we could depend on for the  
9 beyond-design-base-type event.

10 So, it could be core cooling, it could be  
11 fuel temperature, it could be water level in a spent  
12 fuel pool, it could be - a dozen or 15 was the - is the  
13 number that I remember. A small number compared with  
14 the population of what is present. Very small group.

15 MR. RAHN: If you take the small group of  
16 existing instrumentation and extend it to the  
17 beyond-design-basis conditions, that's where the real  
18 challenge comes in.

19 Because, for example, if after the waters  
20 boil dry in a BWR, for example, what's left? You know,  
21 what's left to measure and what's left to determine  
22 what's happening inside the core?

23 And so that, to us, begs a question of new,  
24 something that doesn't exist currently, that would be  
25 used for monitoring temperature more accurately than

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1 skin temperature, for example.

2 MEMBER REMPE: Okay. So, with that example  
3 if you're looking at BWRs with what happened at Fukushima  
4 -

5 MR. RAHN: Yes.

6 MEMBER REMPE: -- there were thermocouples  
7 that were Type T thermocouples on the outside of the  
8 vessel that weren't good beyond 350 C. You could put  
9 a Type K thermocouple in and I know it costs money to  
10 do the calibration curve, but it's not an exotic new  
11 sensor. It's a commercially-available sensor that  
12 would give the operators an idea of whether that vessel  
13 had reached high temperatures.

14 MR. RAHN: Or maybe some fraction of leave  
15 some in as the existing and put in others.

16 MEMBER REMPE: Absolutely. I mean, again  
17 people wiser throughout the plant than me should be  
18 involved with this decision, but I don't think that we  
19 need to go to too exotic as a -- at least to start off  
20 with if they can get what they need, but it would be  
21 nice to know if the core was in-vessel or ex-vessel.

22 CHAIRMAN SCHULTZ: In this regard, I  
23 appreciate the views and approach that you've taken here  
24 with regard to examining the different dependencies.

25 And also from your perspective, of course, it's good

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1 to see that you would want to ask that question, what  
2 about instrumentation, at the outset and you would like  
3 others to ask that question also.

4 And I think that's very important because  
5 as you mentioned, we have talked about a number of severe  
6 accident-related issues here and that hasn't  
7 necessarily always been a topic of conversation, and  
8 should be.

9 I also appreciate what you've described,  
10 Russell, about the desire to set up a communication  
11 protocol so that the dialog between one area that's  
12 discussing actions that could be taken to address severe  
13 accident again needs to take into instrumentation  
14 associated with achieving the goals of the added  
15 equipment as an example.

16 At the same time, there are things that can  
17 be done with additional equipment that may like to have  
18 instrumentation, but don't necessarily need them. We  
19 wouldn't want someone to be distracted because they  
20 don't have instrumentation from pumping water when water  
21 needs to be pumped, for example.

22 (Laughter.)

23 CHAIRMAN SCHULTZ: So, I think that's why  
24 the communication is very important to ask what is  
25 required with respect to instrumentation. And also

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1 then ask the other question, what if instrumentation  
2 is not available? What should be done?

3 In some cases, the action shouldn't be taken  
4 if you don't know what you've got. But in other cases,  
5 you do want to move forward whether you have information  
6 or not.

7 So, that's why the dialog that you've  
8 described and the communication is very important to  
9 answer those questions. And you set it up and as you've  
10 presented it here, is let's ask these questions and get  
11 answers. And that's a good way to hold the dialog and  
12 move it forward.

13 Other comments from the Committee?

14 MEMBER REMPE: I appreciated the preparation  
15 and optimizing their use of the Committee by giving us  
16 suggestions.

17 (Laughter.)

18 CHAIRMAN SCHULTZ: I would like to while you  
19 are here as we've done with the segments of presentation  
20 in the past, ask if there are public comments within  
21 the room. Any members of the public would like to make  
22 a comment for the benefit of the staff or the Committee?

23 (No response.)

24 CHAIRMAN SCHULTZ: Hearing none from the  
25 room, Antonio is going to check on the telephone line.

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1 (Pause.)

2 MR. DIAS: It's open.

3 CHAIRMAN SCHULTZ: The line is open. Any  
4 members of the public on the telephone line would like  
5 to make a comment at this time on this segment? Please  
6 feel free to do so by introducing yourself.

7 Otherwise, we do have public comments which  
8 will be coming up - an opportunity which will be coming  
9 up in about an hour from now before we close the meeting.

10 (No response.)

11 CHAIRMAN SCHULTZ: Hearing none at this  
12 time, we are now scheduled for break. Before we do so,  
13 John, it's now 2:35. We have one more topic to present  
14 on transfer of spent fuel to dry cask storage.

15 Bill Ruland is on my list along with Steve  
16 Jones to make that presentation.

17 MR. MONNINGER: Yes, I see Steve in the  
18 audience.

19 CHAIRMAN SCHULTZ: But does Bill want to be  
20 here also?

21 MR. MONNINGER: We'll place a call with him,  
22 but we're prepared to proceed with Steve also.

23 CHAIRMAN SCHULTZ: All right. So, then we  
24 can take a break and we can reconvene at five minutes  
25 of 3:00. That will give Bill some time to get over,

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1 if he'd like to, before we start that presentation.

2 We'll reconvene at five minutes of 3:00 and  
3 take a recess now.

4 (Whereupon, the above-entitled matter went  
5 off the record at 2:35 p.m. and resumed at 2:56 p.m.)

6 CHAIRMAN SCHULTZ: We'll close the recess  
7 and open the meeting again. And once again I'll ask  
8 John to introduce the next topic and Steve Jones.

9 MR. MONNINGER: Thank you, Dr. Schultz.

10 With us this afternoon is Steve Jones,  
11 Senior Reactor System Engineer from the Office of  
12 Nuclear Reactor Regulation.

13 His project discussing the potential  
14 expedited movement of spent fuel from the pools to the  
15 cask, it's, as all the others, are an interagency  
16 project. He's very much supported by the Office of  
17 Research, and also the Office of Nuclear Material Safety  
18 and Safeguard. So, it's another great example of the  
19 Agency staff coming together.

20 CHAIRMAN SCHULTZ: Thank you. Welcome,  
21 Steve. Look forward to your presentation.

22 MR. JONES: All right. Good afternoon. As  
23 John mentioned, I'm here to talk about expedited  
24 transfer of spent fuel to dry cask storage.

25 A little background to start.

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1 SECY-11-0137 first added this item as an additional  
2 recommendation as a Tier 3 item that is one that may  
3 involve extensive additional study because it involves  
4 expedited transfer of spent fuel to dry storage and we  
5 haven't looked at a lot of the areas associated with,  
6 in particular, the impact of the extra loading campaign.

7 This is coming out of numerous requests from  
8 stakeholders to initiate action to investigate early  
9 transfer of spent fuel. And that's based on perceived  
10 potential to reduce the probability and consequences  
11 of overheated stored fuel.

12 And it relates to Fukushima in that there  
13 was concern about the status of the spent fuel pool  
14 particularly at Unit 4 at Fukushima Dai-ichi. And  
15 although that event was unrealized, it remained a  
16 concern for a large portion of that accident.

17 To go briefly over the staff approach to  
18 this issue, we intend to validate our understanding of  
19 spent fuel safety with respect to the Commission's  
20 safety goals considering past evaluations and also the  
21 results of an ongoing spent fuel pool scoping study.

22 I believe all the members here had the benefit of a  
23 presentation from the Office of Research regarding that  
24 study.

25 CHAIRMAN SCHULTZ: We have.

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1 MR. JONES: And from that you recognize  
2 there's been a lot of - the staff has participated in  
3 numerous studies of spent fuel safety in pools going  
4 back to - the first major report was Generic Issue 82,  
5 Beyond-Design-Basis Accidents in Spent Fuel Pools,  
6 around the 1989 time frame.

7 And then again it was revisited  
8 predominantly with respect to decommissioning sites,  
9 but in NUREG-1738 and Generic Issue 173.A and B which  
10 was spent fuel safety in operating and decommissioning  
11 plants respectively.

12 And then once more following the events of  
13 9/11, several studies evaluated in a lot more detail  
14 the accidents that may by - accident progression in spent  
15 fuel pools related to security events.

16 From that information, that background and  
17 the results of the upcoming scoping study, we expect  
18 to analyze information and compare it with our  
19 regulatory analysis guidelines to -- and form a  
20 recommendation. We'll also be looking for any  
21 inconsistencies or gaps that we need additional  
22 research.

23 In a later slide I'll be talking about some  
24 of the gaps we know about and their relationship to the  
25 scoping study and the previous research that's been

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1 done.

2 We also intend to once we have formulated  
3 a recommendation, gather stakeholder input on that, plot  
4 our analysis and recommendation and recommend the final  
5 course of action to this Commission.

6 Briefly I'll touch back on the spent fuel  
7 pool scoping study. It's a limited scope consequence  
8 assessment. So, it's really looking at the exact  
9 configuration at a specific site and considering a  
10 seismic initiator based on the results of previous  
11 studies. Predominantly NUREG-1353 which was - those  
12 are documents for Generic Issue 82, and NUREG-1738.

13 It considers configuration of the plant in  
14 five different stages throughout the refueling cycle  
15 with a definite weighting towards the refueling process  
16 in that there's a lot more changes occurring and the  
17 decay heat is higher during the early stages of an  
18 operating cycle through refueling and the initial  
19 operating stage.

20 And it considers both the high or the  
21 existing configuration of the spent fuel at the site  
22 and low-density storage that could result if fuel  
23 greater than five years decayed is transferred out -  
24 was transferred out into dry cask storage.

25 And it also considers the event progression

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1 with and without mitigation. Generally mitigation is  
2 the additional strategies required under 50.54(h)(h)(2)  
3 as a result of the 9/11 security activities.

4 That scoping study will support  
5 predominantly validation of the seismic modeling.  
6 That's the way the seismic vulnerability of the spent  
7 fuel pool is considered in the previous studies.

8 It will also with regard to event  
9 progression modeling, how easy does an overheating of  
10 a recently discharged fuel assembly propagate that heat  
11 and ultimately cause a zirconium fire in some of the  
12 older fuel that's been discharged long ago for the case  
13 of the high-density storage, and whether or not it can  
14 propagate beyond empty cells for the case of the  
15 low-density storage.

16 And lastly, a validation of consequence  
17 modeling. There was a fairly detailed consequence  
18 model considered in NUREG-1738 as far as the release,  
19 the source term. However, there were very conservative  
20 assumptions made regarding what that source term was  
21 and how frequently the accident would progress to a state  
22 that would result in that source term.

23 So, in this case there's a lot more - at  
24 least a more advanced modeling of that in that the fuel  
25 event progression and consequence model is modeled.

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1           As I mentioned earlier, I'll talk briefly  
2 about some of the gaps that we know about right now.

3           There's some issues that would increase the value of  
4 transfer. Some of the major issues we know about are  
5 potential for criticality in the pool predominantly  
6 during mitigation.

7           For instance, if overheating resulted in  
8 degradation of the neutron absorbers, then criticality  
9 may be a concern when the pools reflooded using  
10 mitigation.

11           Multi-unit issues, that's regarding the  
12 configuration of the pools. The industry has a number  
13 of different configurations of the pools where two  
14 reactors discharge into a single pool. And also during  
15 refueling if there's a partial core discharge, there's  
16 a potential for there to be an interaction with the  
17 mitigation activities and things with the two-thirds  
18 of the core that's left in the reactor when the spent  
19 fuel pool is separated as opposed to the one-third core  
20 of hot fuel that's in the spent fuel pool.

21           The scoping study itself is focused just  
22 on the - when the core is, I guess, connected directly  
23 with the spent fuel pool, it's all considered as one  
24 unit. However, once the pool is separated, it's only  
25 evaluating the consequences from the one-third core

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1 that's present in the pool.

2 And then there's a whole host of issues that  
3 really would decrease - tend to decrease the value of  
4 expedited transfer. One is a small, but potential  
5 problem with a cask drop during handling.

6 And since the expedited transfer would  
7 require a greatly increased number of fuel transfers  
8 and also may result in the transfers occurring during  
9 a period where the fuel is in fact hotter in the pool  
10 and, therefore, less likely to be air-coolable, that  
11 alone could decrease the value of expedited transfer.

12 There's also operational risk with  
13 radiation dose to the operators who are packaging the  
14 fuel in the dry casks, and industry limitations with  
15 regard to how fast casks can be produced.

16 And then finally potential - greater  
17 potential for repackaging of fuel if the fuel is  
18 transferred at an earlier date before the design  
19 parameters for, for instance, a geologic repository or  
20 an interim storage location are defined.

21 MEMBER SKILLMAN: Before you change that,  
22 Steve -

23 MR. JONES: Yes.

24 MEMBER SKILLMAN: -- I struggle with the  
25 cask drop hazard. I understand the words and I

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1 understand it's not a good idea to drop a massive cask  
2 on hot fuel.

3 MR. JONES: Right.

4 MEMBER SKILLMAN: But many of these pools  
5 are quite generous in size. So, isn't there an  
6 ameliorating or a mitigating approach where the  
7 five-year-old fuel could be moved to a location where  
8 cask drop hazard is really almost of no consequence?

9 MR. JONES: The cask drop hazard is - I'm  
10 referring to here is for the pool that's remaining in  
11 the spent fuel pool.

12 In some cases the casks are handled within  
13 the structure of the spent fuel pool such that if a cask  
14 were dropped, say, just as it was being removed from  
15 the water back down, there's a small potential that it  
16 would cause a structural failure that would cause rapid  
17 leakage of the water in the spent fuel pool.

18 MEMBER SKILLMAN: But isn't that  
19 something that could be well-engineered to reduce its  
20 risk to a number that's really small?

21 MR. JONES: Yes. I mean, we already have  
22 some requirements related to that and that there's what  
23 we term "single-failure-proof crane" that's essentially  
24 used for all dry cask operation in the United States  
25 with the exception of I think two sites right now that

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1 have cask transfer operations that occur in an area  
2 removed from the spent fuel pool.

3 So, in that sense - and then other plants  
4 have in addition to that, impact limiters and other  
5 devices on the floor of the pool that would at least  
6 dampen any impacts in that one region right where the  
7 cask is normally located or there's some potential that  
8 the cask could be dropped on other locations in the pool.

9 And then again some of the pools just aren't  
10 vulnerable to that hazard. There's several that are  
11 constructed on bedrock or have extraordinarily thick  
12 floors that a cask really doesn't pose a structural  
13 threat.

14 MEMBER ARMIJO: On your last bullet there,  
15 repackaging for transportation, is that related to the  
16 potential embrittlement of the cladding when you're in  
17 dry storage?

18 We're going to be reviewing that issue  
19 coming up in a few weeks and -

20 MR. JONES: That is -

21 MEMBER ARMIJO: You know, if you're cold and  
22 in a pool, the temperature to the cladding stays low.  
23 You don't get into this hydrogen embrittlement issue.

24 Is that what you mean by that repackaging  
25 statement, or is that a different issue?

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1 MR. JONES: That's a piece of it. I think  
2 it goes into a number of the risks related above.  
3 Because in order to repackage it, you need to load it  
4 back into a pool somewhere.

5 And then when you do that, you're going to  
6 incur the additional risks of dropping the cask in the  
7 pool. There's additional radiation dose to the  
8 operators.

9 MEMBER SIEBER: There's all kinds of  
10 handling risks too.

11 MR. JONES: Excuse me?

12 MEMBER SIEBER: All kinds of handling risks  
13 you have to take.

14 MR. JONES: Well, the -

15 MEMBER SIEBER: The idea is that long-term  
16 dry cask storage cask is not a shipping cask.

17 MEMBER ARMIJO: I understand that.

18 MEMBER SIEBER: And so once you put it in  
19 there and that's not a long-term repository, you got  
20 to unpackage it to get out of there, put it in a shipping  
21 cask, then you have another transfer operation that may  
22 occur at the ultimate disposal site.

23 There's a lot of fuel handling, extraneous  
24 extra fuel handling -

25 MEMBER RYAN: I think one of the things that

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1 should interest you, Sam, is that in this - the system  
2 has been worked out. And by system, I mean thinking  
3 ahead to the repository and in the pool and dry storage  
4 pads and all that.

5 But if hotter fuel is going to be at the  
6 start of the head end of this, it kind of changes all  
7 of your parametric thinking all the way through the whole  
8 system and that's a simple way for me to think about  
9 it.

10 And all the questions that you raised and  
11 that Jack just mentioned are all kind of in play again  
12 because they haven't been thought through at the higher  
13 heat loads, the higher activity content and, you know,  
14 all the other things that go with every stage of that.

15 So, I think it's not that it's an insoluble  
16 problem. I think it's just parametrically going to be  
17 completely reworked again to see where we are and what  
18 needs to change, what's doable, what's not doable, what  
19 plants can do certain things that others may not because  
20 of the reasons you mentioned, their structure isn't as  
21 solid as somebody on bedrock and there's probably a  
22 couple dozen other major things to think about just to  
23 get started -

24 MEMBER ARMIJO: You know, just limited to  
25 the fact that the properties of the fuel cladding are

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1 changing in dry storage, they're not changing when  
2 they're submerged in water it adds a big complication.

3 MEMBER RYAN: Absolutely.

4 MEMBER ARMIJO: That's, to me, an issue that  
5 really needs to be settled.

6 MEMBER RYAN: That's one of many that are  
7 in that category. I think it's long-term or -

8 (Simultaneous speaking.)

9 MR. JONES: And if, for example, if the spent  
10 fuel pool scoping study reveals vulnerabilities and in  
11 fact the benefit to movement of, you know, expedited  
12 movement of fuel to dry cask was beneficial, we would  
13 have to take a very hard work at all these additional  
14 negative items that would affect that.

15 MEMBER RYAN: Well, even to see if they are  
16 negative or not.

17 MR. JONES: Right.

18 MEMBER RYAN: I mean, some might be, some  
19 may not be.

20 MEMBER ARMIJO: Some may be trivial, some  
21 may be -

22 (Simultaneous speaking.)

23 MEMBER RYAN: All the hard work that's gone  
24 into the last, I don't know, pick a number, 25 years  
25 would have to be revisited. The premise has always been

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1 is the range and age of the fuel that you're going to  
2 deal with, and now we're dialing that out. That's a  
3 new ballgame to me.

4 CHAIRMAN SCHULTZ: This I think clarifies  
5 it for me, but I did want to come back to the cask drop  
6 hazard again one more time.

7 Because what I had understood, again I think  
8 these comments helped me clarify it, but why we call  
9 it a decreased value is that we are now taking fuel that's  
10 only five years old and handling it within the cask,  
11 and that's the difference.

12 MR. JONES: I am not so much -

13 CHAIRMAN SCHULTZ: We don't have, I mean,  
14 over time you don't have an increased likelihood of cask  
15 drop that's there, but the fact is that you've now got  
16 a cask that you're dropping that has fuel that's only  
17 -

18 MR. JONES: Well, I should step back. The  
19 cask drop was one - I mentioned these earlier studies  
20 from Generic Issue 82 and NUREG-1738 that looked at  
21 accident, beyond-design-base accidents, spent fuel  
22 pool. The cask drop was identified in both as a, you  
23 know, not as large as a seismic event hazard, but a major  
24 contributor to a beyond-design-basis accident in the  
25 pool.

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1 In other words, major structural damage  
2 that could drain the pool and cause overheating of the  
3 fuel.

4 In order to have expedited transfer of fuel,  
5 licensees could no longer transfer just three or four  
6 casks per operating cycle. They'd be handling who  
7 knows. It depends. Maybe 16, 20 casks per operating  
8 cycle.

9 CHAIRMAN SCHULTZ: Until the inventory is  
10 decreased.

11 MR. JONES: Until we deplete the inventory.

12 And by doing that granted you could manage this, but  
13 you would be backing up the handling closer and closer  
14 to the previous refueling. And, therefore, have hotter  
15 and hotter fuel in the pool that has less and less  
16 likelihood of being air-coolable if there were a cask  
17 drop.

18 So, that's the piece - you're driving up  
19 the very small probability that a cask drop could  
20 initiate the accident you're trying to avoid by early  
21 -- or at least decrease the consequences of by early  
22 expedited transfer.

23 So, that's the sense that bullet was  
24 included in that slide.

25 CHAIRMAN SCHULTZ: It has an impact on both

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1 accounts then.

2 MR. JONES: Right. I think the impact from  
3 a cask drop itself would be - on the fuel inside the  
4 cask would be relatively small because - well,  
5 especially if it's in the pool itself and it does not  
6 cause any structural failure, it would be an underwater  
7 failure and it would likely be bounded by this, the  
8 normal spent fuel handling accident.

9 For outside the pool, then it's a little  
10 bit greater concern.

11 CHAIRMAN SCHULTZ: But it's consideration  
12 of that acceleration of removal that you're talking  
13 about that ought to be taken into account. Eventually  
14 all the fuel comes out of the pool -

15 MR. JONES: Right, yes.

16 CHAIRMAN SCHULTZ: Okay, thank you.

17 MR. JONES: Then there's a host of related  
18 issues. First of all, Order EA 12-049 mitigation  
19 strategies enhances the post-9/11 mitigation  
20 capabilities to some extent in that there's greater  
21 redundancy in equipment in particular.

22 And spent fuel pool spray capabilities are  
23 still under discussion. But at the last Steering  
24 Committee discussion, my understanding is industry  
25 agreed to include spray capabilities within the

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1 mitigation strategies.

2 And also Order EA 12-051, spent fuel pool  
3 instrumentation, you've seen that I think in other  
4 separate discussions, but there's enhanced level  
5 instrumentation that will be installed at all the  
6 operating reactor spent fuel pools and for the  
7 construction permit and COL holders.

8 Lastly, the Near-Term Task Force made  
9 several recommendations that were classified in Tier  
10 2 predominantly related to availability of  
11 safety-related makeup, and then also a  
12 seismically-qualified spray capability not only just  
13 a standpipe that would allow connection of outside water  
14 source to deliver spray to the pool. And that would  
15 really be an enhancement to the mitigation strategies.

16 There is potential to, I guess, roll this  
17 Tier 2 issue up with this one in that the scoping study  
18 relates to both that it's evaluating, in a sense, the  
19 effectiveness of mitigation, as well as the consequence  
20 change with the - as far as expedited transfer of the  
21 fuel.

22 Okay. We did hold a Category 3 public  
23 meeting a week and a half ago on May 14th, and also  
24 members of the JLD participated in an NEI Used Fuel  
25 Management Conference on May 8th.

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1           There was no specific feedback I guess on  
2 our overall approach. There were some stakeholder  
3 comments regarding requests for immediate action to  
4 transfer fuel which has, as I said, been the subject  
5 of several prior petitions.

6           Proposed areas of consideration and  
7 research to address the issue, we already have  
8 identified like I - we just went over several of the  
9 gaps that we know about. And industry, I guess concern  
10 that NRC is over-regulating spent fuel storage.

11           CHAIRMAN SCHULTZ: As the process will go  
12 then from what you've said with regard to the spent fuel  
13 pool scoping study, that's an input to this work.

14           MR. JONES: Right.

15           CHAIRMAN SCHULTZ: The study is completed,  
16 and then this work will take over investigating,  
17 answering the questions that you've put forward in this  
18 presentation, the additional issues to consider, the  
19 pluses and minuses.

20           MR. JONES: I think those will be considered  
21 in the event that there's a significant change. Right  
22 now the staff's position is that spent fuel pool storage  
23 and dry cask storage is safe.

24           And the previous studies have both  
25 confirmed that pool storage is, you know, more than meets

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1 the Commission's safety goals - safety goal policy in  
2 both the quantitative sense and the qualitative sense.

3 CHAIRMAN SCHULTZ: So, then let me phrase  
4 it differently. Answering the questions that you  
5 posed, the benefits and negatives associated with the  
6 movement of younger fuel, that that would be taken into  
7 consideration conditionally depending on the  
8 recommendations coming out of the scoping study.

9 MR. JONES: Right. The scoping study will  
10 give us results that reflect the potential safety  
11 benefit just examining it for one particular site. And  
12 really with regard to this particular item, the primary  
13 purpose of that input would be to look at does it - could  
14 it somehow - could the results of the scoping study  
15 somehow change our conclusions derived from the previous  
16 studies, Generic Issue 82 and NUREG-1738, in particular  
17 what I discussed, the seismic modeling, the event  
18 progression.

19 Because those previous studies made  
20 relatively conservative assumptions, it's somewhat  
21 unlikely they'd change those results.

22 The other potential is, you know, the  
23 acceptance criteria. Right now we're working towards  
24 the current Commission safety policy goals. And with  
25 respect to those, the previous studies indicate a

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1 relatively good margin between - for spent fuel pool  
2 safety relative to those goals.

3 CHAIRMAN SCHULTZ: Comments or questions  
4 from members of the Committee?

5 MEMBER ARMIJO: Well, it's a comment.

6 In all the other Tier 1 actions that are  
7 being taken combined with this spray capabilities for  
8 spent fuel pools, it all seems to tell me that prevention  
9 or actions that would prevent the pool from ever  
10 basically being uncooled are preferably if they're  
11 successful, you know. And that's what you have to  
12 determine.

13 But you would not be making a conclusion,  
14 overall conclusion, until you have all this other  
15 information. I guess that's what I'm hearing that -

16 MR. JONES: No, we -

17 MEMBER ARMIJO: You take that into account  
18 in this.

19 MR. JONES: We will take that into account,  
20 but I think we'll be looking at the margins and the,  
21 like I said, the effect that the spent fuel pool scoping  
22 study results would have as far as validating or  
23 invalidating previous studies.

24 The previous studies were conducted on a  
25 generic basis with relatively conservative assumptions.

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1 And therefore if there is a major problem as far as  
2 seismic modeling, the pool is a lot more fragile than  
3 we thought or it's a lot less fragile than we thought,  
4 propagation is much more rapid, the fuel is vulnerable  
5 to a zirconium fire for a longer period of time during  
6 the operating cycle, things like that that may increase  
7 the value or invalidate the previous results, would  
8 result us in looking at -- more further at those gaps.

9 But if the scoping study largely confirms  
10 those previous studies, based on our current criteria  
11 we would have a hard time really justifying any early  
12 transfer of fuel.

13 CHAIRMAN SCHULTZ: Any other comments or  
14 questions?

15 MEMBER SKILLMAN: Yes, Steve, I'm going to  
16 ask you, please, to go back one slide, please.

17 That last comment, industry concern to NRC  
18 over-regulating spent fuel storage, if you're able, can  
19 you tell us whether that concern is driven by, if you  
20 will, the NRC simply saying - or by the industry saying  
21 we just don't want the NRC in our socks on spent fuel,  
22 or was industry communicating we don't see that this  
23 was a big deal at Fukushima, so why are you guys giving  
24 us raspberries now?

25 MR. JONES: I would consider it more of the

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1 second because it wasn't - I think the position from  
2 at least that I've heard from industry, is that spent  
3 fuel storage has been much more an NRC concern than a  
4 concern resulting from what actually occurred in the  
5 spent fuel pools.

6 MEMBER ARMIJO: Well, to me it was an anxiety  
7 of what was going on in Unit 4 at Fukushima, led to  
8 conclusions that turned out to be wrong. And it started  
9 this and it's developed a life of its own, and you have  
10 to do this work to really put things back into  
11 perspective and close it out one way or the other. So,  
12 that's what you're doing.

13 MR. JONES: right.

14 MEMBER SKILLMAN: Thank you, Steve.

15 MR. JONES: Thank you.

16 CHAIRMAN SCHULTZ: Other questions?

17 (No response.)

18 CHAIRMAN SCHULTZ: I'd like to go to public  
19 comments now while Steve is here and before we finish  
20 the presentations from the staff.

21 Are there any public comments from the  
22 members of the public in the room today?

23 (No response.)

24 CHAIRMAN SCHULTZ: And the telephone line  
25 is open. So, if any members of the public on the

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1 telephone line would like to make comments with respect  
2 to this presentation especially since Steve is here,  
3 please do so. Introduce yourself and make your comment.

4 (No response.)

5 CHAIRMAN SCHULTZ: Hearing none then, I want  
6 to thank you, Steve, for the presentation on this topic.

7 And I would like then to have a discussion with the  
8 subcommittee related to our next actions on all of the  
9 Tier 3 items that we've heard in the last day and a half.

10 John, I wanted to describe for you - we're  
11 going to meet with the full Committee.

12 MR. MONNINGER: Yes.

13 CHAIRMAN SCHULTZ: We have on the agenda for  
14 the full Committee an hour and a half for the  
15 presentation associated with everything we've discussed  
16 in the last day and a half. So, we'll have to shorten  
17 it up some.

18 MR. MONNINGER: Yes.

19 CHAIRMAN SCHULTZ: I will say that all but  
20 two members of the full Committee have been available  
21 over the last day and a half to hear the presentations  
22 that we had. So -

23 MEMBER STETKAR: And Dana won't be here.

24 CHAIRMAN SCHULTZ: For the full Committee?

25 MEMBER STETKAR: That's correct.

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1 CHAIRMAN SCHULTZ: So, there's only one that  
2 currently will be present at the full Committee because  
3 Dr. Paris will not be here for the full Committee  
4 meeting.

5 MEMBER RYAN: Charlie will be there.

6 MEMBER STETKAR: Yes.

7 CHAIRMAN SCHULTZ: In any case, what I wanted  
8 to recommend and then we'll have other comments by the  
9 subcommittee, I would like to recommend that what you  
10 focus on for that presentation and discussion are those  
11 items that I think you've gotten the impressions over  
12 the last - the questions and the comments over the last  
13 day and a half are the most important questions that  
14 the subcommittee has had with respect to these topics.

15 There are some hot items that we feel you've  
16 brought to the discussions over the last day and a half.

17 Bring those and your responses or your comments related  
18 to those to the full Committee so that we can focus on  
19 those items.

20 In other words, items where we haven't had  
21 many comments don't need to be brought to full Committee,  
22 I think, but I'll ask for further discussion from the  
23 subcommittee at this point.

24 That's what I would recommend we focus on.

25 And if you have any questions or as you make that

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1 preparation with the staff, you can get in touch with  
2 me or Antonio and we can -

3 MR. MONNINGER: That sounds like a very  
4 logical approach and we will definitely support that  
5 approach.

6 CHAIRMAN SCHULTZ: And you can expect  
7 further discussion at that meeting. So, the  
8 presentation would be about 45 minutes, and the time  
9 allowed for comment and questions would be about 45  
10 minutes.

11 And then we do have planned a letter writing  
12 on the Tier 3 items as we've discussed throughout this  
13 meeting.

14 MR. MONNINGER: Thank you.

15 CHAIRMAN SCHULTZ: Other comments or advice  
16 from other members of the subcommittee?

17 MEMBER RAY: Did you want to go off the record  
18 here, Steve, at this point, or did you want this to be  
19 on the record?

20 CHAIRMAN SCHULTZ: Put it on the record.

21 MEMBER RAY: Okay. Normally the roundtable  
22 is off, but that's fine.

23 CHAIRMAN SCHULTZ: Okay. Any other items  
24 for discussion within the subcommittee?

25 (No response.)

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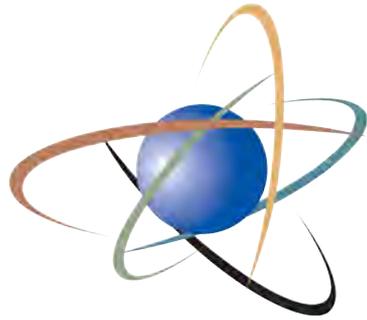
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1 CHAIRMAN SCHULTZ: Then I'll close the  
2 subcommittee meeting and adjourn.

3 (Whereupon, the above-entitled matter went  
4 off the record at 3:30 p.m.)  
5  
6  
7  
8  
9  
10



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# **Japan Lessons Learned Tier 3 Regulatory Actions**

**ACRS Meeting of the Fukushima  
Subcommittee**

**Rockville, Maryland**

**May 22-23, 2012**



**U.S. NRC**  
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# Initial NRC Actions In Response to Fukushima

UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 OFFICE OF NEW REACTORS  
 OFFICE OF NUCLEAR REACTOR REGULATION  
 WASHINGTON, DC 20555-0001

March 18, 2011

NRC INFORMATION NOTICE 2011-05: TOHOKU-TAIHEIYU-OKI EARTHQUAKE EFFECTS ON JAPANESE NUCLEAR POWER PLANTS.

**ADDRESSEES**

All holders of or applicants for operating licenses for nuclear power reactors under the provision of the 10 of the Code of Federal Regulations (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

All holders of or applicants for a standard design certification, standard design approval, manufacturing license, limited work authorization, early site permits or combined license issued under 10 CFR Part 52, "Licenses, Certifications and Approvals for Nuclear Power Plants."

**PURPOSE**

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice (IN) to inform addressees of effects of the Tohoku-Taiheiyu-Okai Earthquake on nuclear power plants in Japan. The NRC expects that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. Suggestions contained in this IN are not NRC requirements, therefore, no specific action or written response is required.

**DESCRIPTION OF CIRCUMSTANCES**

The following summary of events is provided based on the best information available at this time. The situation in Japan regarding recovery efforts for the Fukushima Daiichi Nuclear Power Station continues to evolve on an hourly basis.

On March 11, 2011, the Tohoku-Taiheiyu-Okai Earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and on-site power systems. Efforts to restore power to emergency equipment have been hampered or impeded by damage to the surrounding areas due to the tsunami and earthquake.

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ML11070432

IN 2011-05

**NRC INSPECTION MANUAL** OMB  
 TEMPORARY INSTRUCTION 2515/183

FOLLOWUP TO THE FUKUSHIMA (DAICHI) NUCLEAR STATION FUEL DAMAGE EVENT

CORNERSTONE: INITIATING EVENTS AND MITIGATING SYSTEMS

**APPLICABILITY:** This Temporary Instruction (TI) applies to all holders of operating licenses for nuclear power reactors, except plants which have permanently ceased operations.

**2515/183-01 OBJECTIVES**

The objective of this TI is to independently assess the adequacy of actions taken by licensees in response to the Fukushima Daiichi nuclear station fuel damage event. The inspection results from this TI will be used to evaluate the industry's readiness for a similar event and to aid in determining whether additional regulatory actions by the U.S. Nuclear Regulatory Commission are warranted. Therefore, the intent of this TI is to be a high-level look at the industry's preparedness for events that may exceed the design basis for a plant. If necessary, a more specific followup inspection will be performed at a later date.

**2515/183-02 BACKGROUND**

On March 11, 2011, the Tohoku-Taiheiyu-Okai Earthquake occurred near the east coast of Honshu, Japan. This magnitude 9.0 earthquake and the subsequent tsunami caused significant damage to at least four of the six units of the Fukushima Daiichi nuclear power station as the result of a sustained loss of both the offsite and on-site power systems. Efforts to restore power to emergency equipment have been hampered or impeded by damage to the surrounding areas due to the tsunami and earthquake. The following background information is current as of March 18, 2011.

Units 1 through 3, which had been operating at the time of the earthquake, scrambled automatically, inserting their neutron absorbing control rods to ensure immediate shutdown of the fission process. Following the loss of electric power to normal and emergency core cooling systems and the subsequent failure of back-up decay heat removal systems, water injection into the cores of all three reactors was compromised, and reactor water levels could not be maintained. Tokyo Electric Power Company (TEPCO), the operator of the plant, resorted to injecting sea water and boric acid into the reactor vessels of these three units, in an effort to cool the fuel and ensure the reactors remained shutdown. However, the fuel in the reactor cores became partially uncovered. Hydrogen gas built up in Units 1 and 3 as a result of exposed, overheated fuel reacting with water. Following gas venting from the primary containment to relieve

Issue Date: 03/22/11 1 2515/183

TI 2515/183

**NRC INSPECTION MANUAL** OMB  
 TEMPORARY INSTRUCTION 2515/184

AVAILABILITY AND READINESS INSPECTION OF SEVERE ACCIDENT MANAGEMENT GUIDELINES (SAMGs)

CORNERSTONE: MITIGATING SYSTEMS

**APPLICABILITY:** This Temporary Instruction (TI) applies to all holders of operating licenses for nuclear power reactors, except plants which have permanently ceased operations.

**2515/184-01 OBJECTIVES**

The objectives of this TI are to:

- Determine that the severe accident management guidelines (SAMGs) are available and how they are being maintained.
- Determine the nature and extent of licensee implementation of SAMG training and exercises.

**2515/184-02 BACKGROUND**

On March 30, 2011, the Executive Director for Operations chartered a task force to conduct a near-term evaluation of the need for agency actions following the events in Japan. During the task force's deliberations, the importance of severe accident management guidelines (SAMGs) has been highlighted. The SAMGs were implemented as a voluntary industry initiative in the 1990s and are not part of the agency's routine Reactor Oversight Program. In order to evaluate the current status of SAMGs onsite and determine the need for any further recommendations, the task force is requesting the enclosed information regarding SAMGs at operating power reactors be gathered, assessed, and summarized.

**2515/184-03 INSPECTION REQUIREMENTS AND GUIDANCE**

03.01 Assess the availability and readiness of the licensee's ability to access and implement the SAMGs at their facility. Answer the following questions by filling out the attached datasheet.

- When were the SAMGs last updated? Are controlled copies of the SAMG located in the technical support center (TSC) (Y/N), emergency operations facility (EOF) (Y/N), control room (Y/N)? For licensees that use one common EOF for multiple reactor sites, one review of the EOF will serve for all applicable sites.

Issue Date: 04/29/11 1 2515/184

TI 2515/184

OMB Control No.: 3150-0012

UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 OFFICE OF NUCLEAR REACTOR REGULATION  
 WASHINGTON, DC 20555-0001

May 11, 2011

NRC BULLETIN 2011-01: MITIGATING STRATEGIES

**ADDRESSEES**

All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operation and have certified that fuel has been removed from the reactor vessel.

**PURPOSE**

The U.S. Nuclear Regulatory Commission (NRC) is issuing this bulletin to achieve the following objectives:

- To require that addressees provide a comprehensive verification of their compliance with the regulatory requirements of Title 10 of the Code of Federal Regulations (10 CFR) Section 50.54(a)(2).
- To notify addressees about the NRC staff's need for information associated with licensee mitigating strategies under 10 CFR 50.54(a)(2) in light of the recent events at Japan's Fukushima Daiichi facility in order to determine if 1) additional assessment of program implementation is needed, 2) the current inspection program should be enhanced, or 3) further regulatory action is warranted, and
- To require that addressees provide a written response to the NRC in accordance with 10 CFR 50.54(d).

**BACKGROUND**

Following the terrorist events of September 11, 2001, the readiness of NRC-regulated facilities to manage challenges to core cooling, containment and spent fuel pool cooling (SFP) following large explosions or fires was enhanced through a series of orders and imposition of license conditions. These requirements were formalized in the rulemaking of March 27, 2009, resulting in 10 CFR 50.54(a)(2).

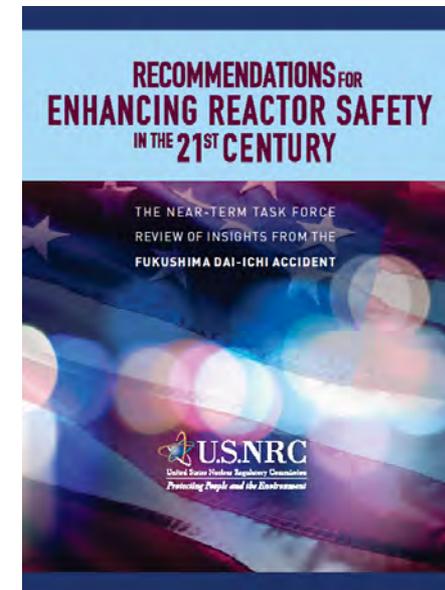
The NRC conducted a comprehensive inspection of the implementation of the mitigating strategies developed by licensees in 2008. Subsequently the NRC incorporated this inspectable area into the baseline reactor oversight process on a sample basis as part of the biennial fire protection inspection.

ML11250360

BL 2011-01

# NRC Lessons Learned Review

- Commission directed a methodical and systematic review of the safety of U.S. facilities in light of events in Japan
- Near-Term Task Force review completed July 2011  
([www.nrc.gov](http://www.nrc.gov))



## **U.S. Plant Safety**

- Similar sequence of events in the U.S. is unlikely
- Existing mitigation measures could reduce the likelihood of core damage and radiological releases
- No imminent risk from continued operation and licensing activities

# Identifying Lessons Learned

- July 2011
  - Near-Term Task Force (NTTF) report issued
- September/October 2011
  - NTTF recommendations prioritized into Tiers 1, 2, and 3
- February 2012
  - Draft orders and requests for information provided to the Commission
- March 2012
  - The NRC staff issued the Tier 1 orders and request for information on March 12, 2012

# Orders

- The NRC staff ordered licensees to:
  - Develop strategies and procure additional equipment to address beyond-design-basis external events and multiunit events
  - Include a reliable hardened vent in Mark I and Mark II containments
  - Enhance spent fuel pool level instrumentation for beyond design basis accidents

# Requests for Information

- The NRC requested that licensees provide information on:
  - the adequacy of facility design bases with respect to seismic and flooding hazards
  - whether facility configurations, as confirmed by seismic and flooding walkdowns, are in compliance with current facility design bases
  - current communications system power supplies and their availability during a prolonged SBO event
  - the required staffing necessary to respond to a multiunit, prolonged SBO event

# Rulemaking Activities

- Station Blackout (SBO) Rulemaking
  - Modify the SBO rule to require enhanced capability to mitigate a prolonged SBO
  - Advanced Notice of Proposed Rulemaking issued
  - The Commission directed that SBO rulemaking be completed within 24-30 months
- Emergency Procedures Integration Rulemaking
  - Create a new rule requiring the integration of the emergency procedures
  - Advanced Notice of Proposed Rulemaking issued
  - The rulemaking is expected to be completed in 2016

## **Other Recommendations for NRC Action**

- Tier 2 Recommendations – Could not be initiated in the near term due to factors that include the need for further technical assessment and alignment, dependence on Tier 1 issues, or availability of critical skill set limitations.
- Tier 3 Recommendations – Require further staff study to support a regulatory action, have an associated shorter-term action that needs to be completed to inform the longer-term action, are dependent on critical skill sets, or are dependent on the resolution of NTTF Recommendation 1.

## **Tier 3 Recommendations**

- Commission-approve Charter
- Longer-Term Task Groups
  - Team Leader (SES or Branch Chief)
  - Subject Matter Experts
  - Japan Lessons-Learned Directorate
- Lead is with the Line Organizations
- Recommendation for action to the Steering Committee through the lead office

## **Focus of Longer-Term Review**

- Identification and resolution of key issues and information needed to support a recommendation on the need for regulatory action
- Program plans to guide issue identification and resolution
- Planning framework will extend to decision point on whether regulatory action is needed, but not beyond

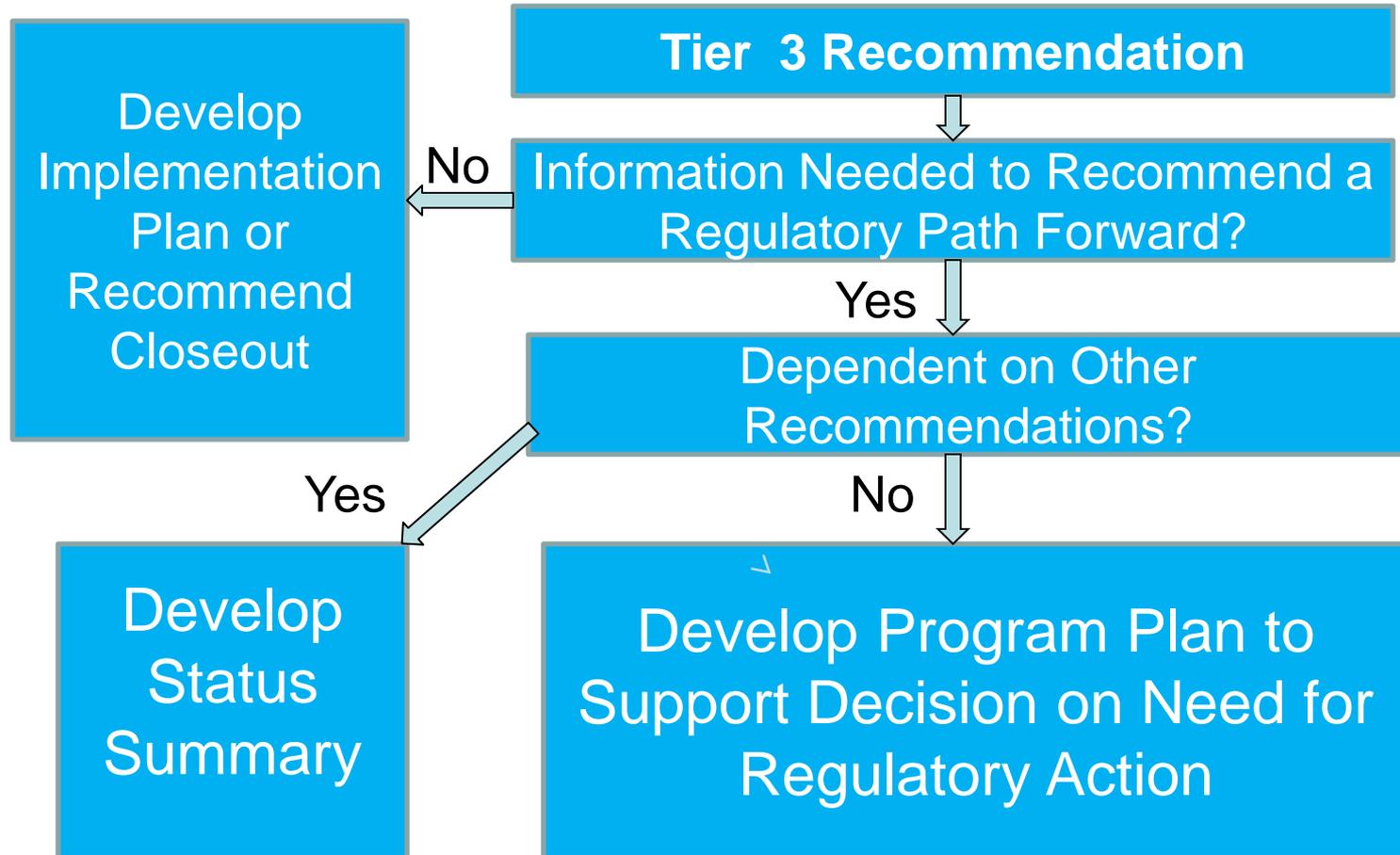
## **Tier 3 Recommendations**

- 2.2 Periodic Confirmation of Seismic and Flooding Hazards
- 3 Potential Enhancement to the Capability to Prevent or Mitigate Seismically-Induced Fires and Floods
- 5.2 Reliable Hardened Vents for Other Containment Designs
- 6 Hydrogen Control and Mitigation Inside Containment or in Other Buildings
- 9.1/9.2 EP Enhancements for Prolonged SBO and Multiunit Events
- 9.3 ERDS Capability
- 10 Additional EP Topics for Prolonged SBO and Multiunit Events

## **Tier 3 Recommendations (cont.)**

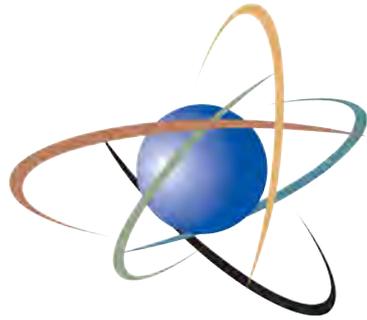
- 11 EP Topics for Decision-making, Radiation Monitoring, and Public Education
- 12.1 Reactor Oversight Process Modifications
- 12.2 Staffing Training on Severe Accidents and Resident Inspector Training on SAMGs
- Transfer of Spent Fuel to Dry Cask Storage
- Prestaging of Potassium Iodide Beyond 10 Miles
- Reactor and Containment Instrumentation Ability to Withstand Beyond Design Basis Conditions
- Basis of Emergency Planning Zone Size

# Flow Chart for Tier 3 Recommendations





**Questions?**



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# **Recommendation 2.2 Periodic Reassessment of External Hazards**

Jenise Thompson

May 23, 2012

# Background

- NTTF report asks staff to “initiate rulemaking to require licensees to confirm seismic hazards and flooding hazards every 10 years and address any new and significant information. If necessary, update the design basis for SSCs important to safety to protect against the updated hazards.”
- Recommendation 2.1 and 2.3 are currently underway for seismic and flooding hazards
- Recommendation 2.1 for other natural external hazards has not started work yet due to resource limitations.

# Staff Approach

- **Define and begin the initial pre-rulemaking activities necessary to position the agency for a future rulemaking to implement NTTF Recommendation 2.2, as resources become available**
- **Scope of rulemaking to include external hazards**
  - **Seismic**
  - **Flooding**
  - **Other natural external hazards**
  - **Other man-related external hazards (under discussion)**

# Pre-rulemaking Activities

- Collect information as it comes up for R2.1 and R2.3
- Engage with external stakeholders as appropriate
- What constitutes new and significant information?
- What will the staff do with the updated hazard information?
  - Use of risk-informed approach?
- How will staff determine if it is necessary to update the design basis for SSCs important to safety?
  - Threshold for regulatory actions
- Review of international practices and insights from Recommendation 2.1

# Public Meeting – May 7, 2012

- Questions from public
  - Nexus to Fukushima for inclusion of other man-related external hazards
  - “old” information “newly” discovered
  - Handling of information submitted as contention to new reactor licensing
  - Similar actions in the past (GI program)
  - Schedule concerns



**Questions?**



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# **NTTF Recommendation 3: Seismically Induced Fires and Floods**

May 22, 2012

Kevin Coyne, RES/DRA

# Background

- Seismic events have the potential to cause:
  - multiple failures of safety-related SSCs;
  - induce separate fires or flooding events in multiple locations at the site; and
  - degrade the capability of plant SSCs intended to mitigate the effects of fires and floods.

# Background

- The NTTF recommended, as part of the longer term review, evaluation of potential enhancements to the capability to prevent or mitigate seismically induced fires and floods
  - Scope includes internal seismically induced fires (e.g., breakers, transformers) and floods (e.g., tanks, piping systems)
  - External seismically induced fires and floods are considered to be outside the scope of this issue
- Prioritized as Tier 3 in SECY 11-0137
  - Commission agreed with Tier 3 Prioritization, but
  - Directed the staff to initiate development of PRA method to evaluate potential enhancements as part of Tier 1 activities

## Background (con't)

- PRA Method Challenges:
  - hazard definition & characterization
  - seismic fragilities for SSCs, including fire protection components
  - modeling concurrent and subsequent initiating events
  - treatment of systems interactions
  - human reliability analysis methodologies suitable for seismically induced hazards
  - multiunit risk considerations

# Current Status

- Staff developed an initial plan for PRA method development in SECY 12-0025.
- PRA pre-planning activities include:
  1. Define objectives of method
  2. Identify relevant stakeholders
  3. Information gathering
  4. Coordination with other ongoing initiatives
  5. Resource and schedule estimate

## Current Status (con't)

- Key Considerations
  - Limited number of staff with required knowledge, skills, and abilities
  - No current consensus state-of-practice methods exist for seismically induced fires and floods for NPPs
  - ASME/ANS Joint Committee on Nuclear Risk Management recently formed a working group to address multiple concurrent events
  - Other Tier 1 activities will provide substantial information relevant to this issue

# Staff Assessment

- Results from several Tier 1 recommendations will better inform the this issue:
  - 2.1 Seismic and flooding hazard evaluation
  - 2.3 Seismic and flooding vulnerability walkdowns
  - 4.2 Mitigation Strategies
  - 5.1 Containment venting
  - 7.1 Spent fuel pool
- More efficient to wait until sufficient information becomes available from these efforts.

## **Staff Assessment (con't)**

- Some work can be done now:
  - Standards development organization engagement
  - Assess results from NTTF  
Recommendations 2.1, 4.2, 5.1, 7.1  
and other activities
  - Continue PRA method development activities

# Staff Recommendation

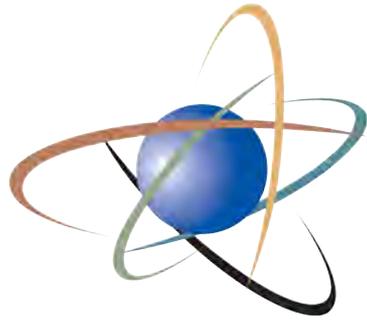
- Continue development of PRA methodology
  - Engagement with PRA standards development organizations
  - Feasibility study to assess approaches for evaluating multiple concurrent events
- Assess results from Tier 1 activities and other related work
- Future re-evaluation of Recommendation 3

## **Public Comments (May 3)**

- Agreement on prioritization of issue as Tier 3
- Qualitative risk assessment approaches should also be considered
- Ensure that the PRA method (and its application) includes documentation of key assumptions.



**Questions?**



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## **Hydrogen Control and Mitigation (NTTF Recommendation 6)**

Brett Titus

Office of Nuclear Reactor Regulation

# Background

- The NTTF recommended, as part of the longer term review, identification of insights about hydrogen control and mitigation
  - Scope includes generation, transport, distribution, and combustion of hydrogen
  - Primary areas of interest consist of containment and adjacent buildings (although other locations are not excluded)
- Prioritized as Tier 3 in SECY 11-0137
- Commission agreed with Tier 3 Prioritization

## Staff Assessment- Recommendation 6

- Interdependencies with other NTTF Tier 3 recommendations.
  - Implementation of Rec. 4 (SBO)
  - Rec. 5 (Hardened Vents) greatly reduce the likelihood of hydrogen explosions
  - Filtered Vents- concurrent analysis
    - Outcome could impact the path forward for Rec 6
    - These efforts will be collaborative

## **Staff Assessment- Recommendation 6**

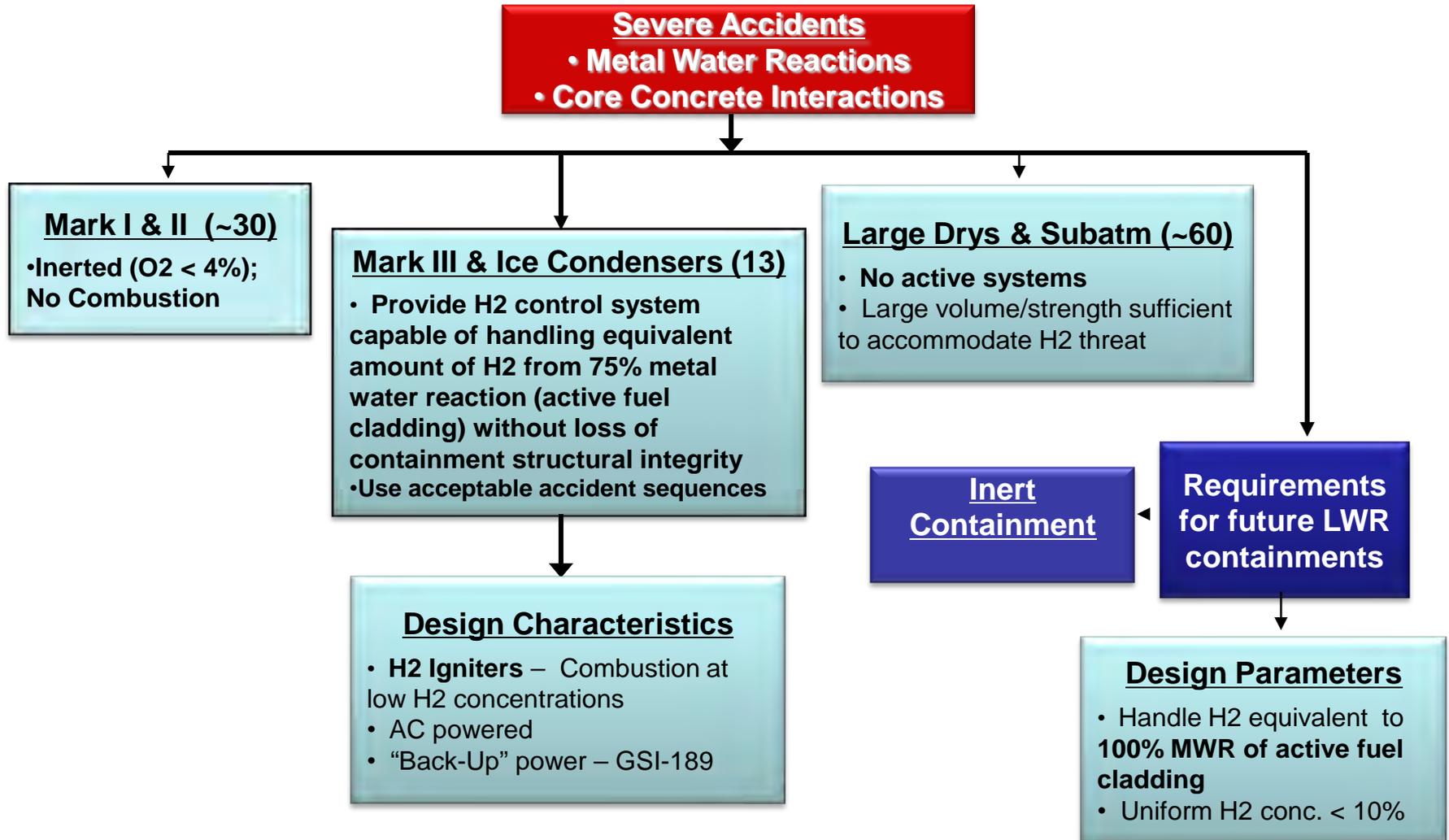
- Potential risk of hydrogen production and combustion is well known
  - Three Mile Island (1979)
  - Numerous Generic Issues and Generic Safety Issues
  - Many studies performed worldwide

## **Staff Assessment- Recommendation 6**

- 10 CFR 50.44, “Combustible Gas Control for Nuclear Power Reactors” revised in 2003
  - Eliminated requirements for H<sub>2</sub> recombiners and relaxed monitoring rules commensurate with risk significance
  - Retained requirements for mixed atmosphere, inert MK I&II containments, maintained 75% clad-water H<sub>2</sub> reaction criteria (100% for New Reactors) in MK III and Ice Condensers

# 10 CFR 50.44

## Combustible Gas Control for LWRs



# Staff Assessment - Recommendation 6

- Key Questions to be Investigated
  1. Is there new information regarding H<sub>2</sub> in general?
  2. Was the failure of the buildings consistent with our understanding?
  3. Are there important gaps in our understanding of the threat from H<sub>2</sub> gas?
  4. Is there new information which conflicts with the current technical basis?
  5. Has new technical information been revealed to necessitate regulatory action?

# Plan for Addressing Recommendation 6

## 1. Examine additional H<sub>2</sub> control measures in adjacent buildings

- Conduct stakeholder meetings for all existing containment types
- Evaluate additional mitigation measures to improve robustness of reactor and auxiliary buildings
- Quantify the impact on safety and risk

# Plan for Addressing Recommendation 6

## 2. Evaluate the sources and timing of H<sub>2</sub> generation

- Review accident sequence info from Gov't of Japan, TEPCO, INPO, and international orgs
- Compare the actual accident timing and amounts of generated H<sub>2</sub> to analytical predictions
- Assess implications of results on the existing state of knowledge

# Plan for Addressing Recommendation 6

## 3. Assess the potential migration/release pathways

- Review available forensic info from Gov't of Japan, TEPCO, INPO, and international org
- Use information (supplemented by reasonable assumptions) to conduct best estimate modeling to evaluate containment release pathways
- Assess implications of results on the existing state of knowledge

# Plan for Addressing Recommendation 6

## 4. Review the Technical Basis for 10 CFR 50.44

- Considering the results of Tasks 1-3, confirm the validity of the existing basis or identify gaps and characterize their safety/risk significance
- Conduct stakeholder meetings for all existing containment types
- Determine if any regulatory action is needed

# Challenges

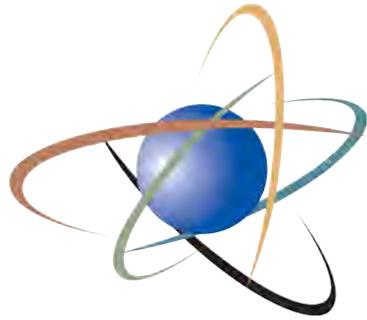
- Very little reliable empirical data on H<sub>2</sub> has been reported since the accident
- Verifiable information on chain of events may not be available for 10+ years
- H<sub>2</sub> generation and control following a severe accident is a highly specialized technical discipline

# Public comments

- Public meeting on May 14, 2012



**Questions?**



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# **EP NTTF Recommendations Tier 2 & 3 Implementation**

Kevin Williams

Office of Nuclear Security and Incident Response

# NTTF EP Recommendations

## Tier 2 Action

- NTTF Recommendation 9.3 - Emergency preparedness regulatory actions (the remaining portions of Recommendation 9.3, with the exception of Emergency Response Data System (ERDS) capability addressed in Tier 3)

## Tier 3 Actions

- NTTF Recommendations 9.1/9.2 - Emergency preparedness (EP) enhancements for prolonged SBO and multiunit events (dependent on availability of critical skill sets)
- NTTF Recommendation 9.3 – ERDS capability (related to long-term evaluation Recommendation 10)
- NTTF Recommendation 10 - Additional EP topics for prolonged SBO and multiunit events (long-term evaluation)
- NTTF Recommendation 11 - EP topics for decision-making, radiation monitoring, and public education (long-term evaluation)

# NRC Staff Commitments

- SECY-11-137 stated that the staff will initiate the Tier 2 actions associated with EP regulatory actions when sufficient technical information and applicable resources become available.
- SECY-11-0137 stated that the staff will provide assessments of the Tier 3 recommendations once it had completed its evaluation of the resource impacts associated with the Tier 1 and 2 recommendations.
- The staff will address the Tier 3 EP-related recommendations, schedules, and resources in the upcoming July SECY paper to the Commission.
- The staff will take regulatory action, as appropriate, after evaluating the licensee responses to the 50.54(f) letters (staffing and communication).
- The staff will continue to engage with stakeholders on the Tier 2 and Tier 3 EP-related recommendations.

# Advanced Notice of Proposed Rulemaking

- The staff considers existing EP framework and regulations provide reasonable assurance of adequate protection of public health and safety in the event of a radiological emergency.
- The staff is considering an Advance Notice of Public Rulemaking (ANPR) to be utilized to determine if a technical-basis for rulemaking can be developed for EP-related NTTF Recommendations (9.1, 9.2, 9.3, 9.4, 10, and 11).
- Some of the recommendations may screen out to long-term studies.
- The staff would initiate the ANPR when sufficient resources become available which would include stakeholder engagement.
- The staff will address the ANPR and a completed evaluation of the resource impacts and scheduled in the upcoming July SECY paper to the Commission.

# Emergency Planning Zones

- The staff considers that the existing Emergency Planning Zone (EPZ) size provides reasonable assurance of adequate protection of public health and safety in the event of a radiological emergency.
- EPZ size re-evaluation is a longer-term action that is already being assessed by existing activities.
- The staff will utilize insights from the current Level 3 Probabilistic Risk Assessment (PRA) study results to inform the process for evaluation of potential impact that a multi-unit event may have on the EPZ.
- Any changes to EPZs would be discussed with stakeholders in public meetings.

# Potassium Iodide (KI)

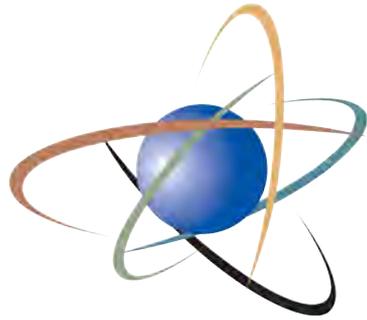
- The staff considers that the existing KI framework and regulations provide reasonable assurance of adequate protection of public health and safety in the event of a radiological emergency.
- The staff has concluded that based on available data to date, it is unlikely that the FDA thyroid dose PAGs were exceeded beyond 10 miles as a result of the accident at Fukushima.
- The staff will continue to monitor and evaluate the results of the findings by the Japanese government from studies conducted in and around the Fukushima.

# Public comments

- Public meeting on May 4, 2012



**Questions?**



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# **Recommendation 12.1 Status**

May 23, 2012

Tim Kobetz,

Chief, Reactor Inspection Branch

Office of Nuclear Reactor Regulation

## **Recommendation 12.1**

**Strengthen the Reactor Oversight Process (ROP) to more fully include defense-in-depth considerations**

- Expand the scope of the annual ROP self assessment**
- Expand the scope of the biennial ROP realignment**

# **Dependent on Recommendation 1**

This recommendation is dependent on Recommendation 1 which recommended establishing a logical, systematic, and coherent regulatory framework that balances defense-in-depth and risk considerations.

# Plan

- The staff will continue to implement the ROP in accordance with current policy
- Staff will begin to consider potential changes to the ROP self assessment and realignment programs when an action plan for Recommendation 1 has been established.
- The staff does not envision any unique challenges.

# Communications

- Periodic stakeholder interactions will take place as necessary during the NRC's routine monthly meetings with NEI and the industry on ROP topics.
- Update the Commission on the status of Recommendation 12.1 in 2013 annual ROP Self-assessment SECY paper (issued in spring 2014).

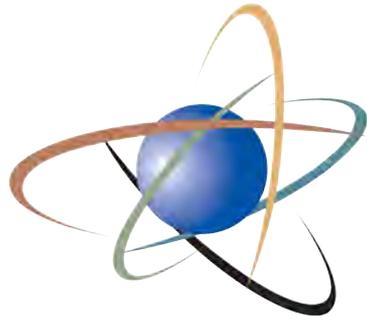


# Public Meeting on May 7<sup>th</sup>

- No questions or comments were received



**Questions?**



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# **Staff Training on Severe Accidents and Severe Accident Management Guidelines**

May 23, 2012

Joseph G. Giitter

Travis L. Tate

# Purpose and Background

- Purpose
  - discuss the plan for Near-Term Task Force (NTTF) Recommendation 12.2 by describing the current level of NRC staff training on severe accidents and outline future training enhancements
- Background
  - SECY-11-0093 , NTTF Report – July 12, 2011
  - Staff Requirements Memorandum (SRM) for SECY-11-0093 – August 19, 2011
  - SECY-11-0137 – October 3, 2011
  - SRM for SECY-11-0137 – December 15, 2011

# NTTF Recommendations

- Recommendation 12.2 (dependent on Recommendation 8)
  - “Enhance NRC staff training on severe accidents, including training resident inspectors on Severe Accident Management Guidelines (SAMGs)”
- Recommendation 8.4
  - “Initiate rulemaking to require more realistic, hands-on training and exercises on SAMGs and EDMGs for all staff expected to implement the strategies and those licensee staff expected to make decisions during emergencies, including emergency coordinators and emergency directors”

# Severe Accident Training

- Accident Progression Analysis
  - post-core damage conditions
- Accident Consequence Analysis
  - transport from core damage
- Perspectives on Reactor Safety
  - overview (design for safety, defense-in-depth, ECCS rulemaking, severe accident and safety goal policy)
  - accident sequences
  - accident progression (vessel/containment)
  - radiological releases and consequences

# Relevant NRC Training

- Emergency Operating Procedures (EOPs)
  - GE Emergency Procedure and Severe Accident Guidelines
  - Westinghouse Emergency Procedure Guidelines
  - B&W / CE Emergency Procedure Guidelines
- Westinghouse SAMGs (video)

# Qualification Training

- Senior Reactor Analyst
- Reactor Technical Reviewer
- Reactor Risk Analyst
- Nuclear Safety Professional Development Program

# Enhancements

- Near-term actions
  - Frequency of severe accident courses
  - Update courses based on Fukushima lessons-learned
  - Qualification Program severe accident courses
  - Stakeholder feedback
    - Public Meeting – May 7, 2012

## **Enhancements (cont.)**

- Longer-term actions
  - Dependent on Recommendation 8
  - State-of-the-Art Reactor Consequence Analysis (SOARCA)
  - Level 3 Probabilistic Risk Analysis
  - Fukushima lessons-learned
  - Qualification Program SAMG courses
  - Potential new course development
  - Stakeholder feedback

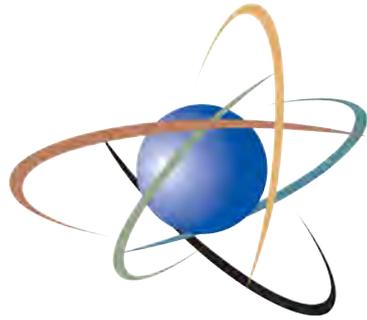


# Public comments

- Public meeting on May 7, 2012



# Questions?



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**Reactor and Containment  
Instrumentation  
(ACRS Recommendation 2(e))**

Bill Kemper

Office of Nuclear Reactor Regulation

# Background

ACRS 2(e) – “Selected reactor and containment instrumentation should be enhanced to withstand beyond-design-basis accident conditions”

- Current Reactors –Implement Post-TMI instrument recommendations to address design basis accidents
- New Reactors—Implement Post-TMI instruments plus describe severe accident capabilities

# Dependencies

- Seismic and Flooding Evaluations
- SBO Rulemaking
- Mitigating Strategies Order
- Spent Fuel Pool Instrumentation Order
- EOPs/SAMGs/EDMGs Integration Rulemaking

# Staff Recommendations

- Ensure that the need for enhanced reactor, containment , and SFP instrumentation is being adequately considered during Tier 1 NTTF actions
- Review/participate in domestic & international efforts to study/develop severe accident info needs and identify instrumentation gaps
- Gather and review information results from higher Tier actions
- Determine needs for a regulatory framework for enhanced reactor and containment instrumentation

# Stakeholder Feedback

- Public Meeting held on May 7
- NEI Feedback
- Public question

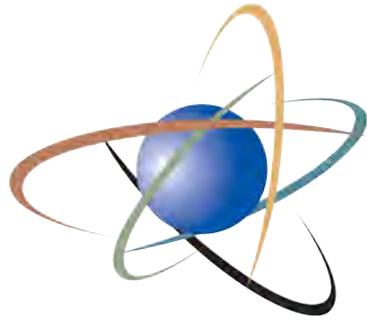


# Public comments

- Public meeting on May 7, 2012



**Questions?**



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# **Additional Recommendation 5 Expedited Transfer of Spent Fuel to Dry Casks**

Steve Jones

Office of Nuclear Reactor Regulation

## Background

- In SECY 11-0137, the staff included an additional recommendation for expedited transfer of spent fuel to dry cask storage.
- Stakeholders have repeatedly requested such action as part of petitions for regulatory action based on the perceived potential to reduce the probability and consequences of overheated stored fuel.
- This issue has a nexus to the Fukushima Daiichi event because the potential for overheating of stored fuel, although unrealized, was a significant concern.

## **Staff Approach**

- Complete validation of spent fuel safety with respect to the Commission Safety Goals, considering past evaluations and results of spent fuel pool scoping study.
- Analyze information using NRC Regulatory Analysis Guidelines to inform a recommendation.
- Identify any inconsistencies or gaps that may need additional research.
- Gather stakeholder input on staff analysis of information.
- Recommend course of action to the Commission.

# Spent Fuel Pool Scoping Study

- Limited-scope consequence assessment
  - Specific to a single site configuration
  - Seismic initiator based on results of past studies
- Considers:
  - Configuration through 5 stages of operating cycle
  - High and low density fuel storage (racks unchanged)
  - Event progression with and without mitigation
- Supports:
  - Validation of seismic modeling
  - Validation of event progression modeling
  - Validation of consequence modeling

## Identified Gaps

- Issues that increase value of transfer
  - Criticality (e.g., degraded neutron absorbers)
  - Multi-unit issues
- Issues that decrease value of transfer
  - Cask drop hazard (i.e., increased cask movement with hot fuel in pool)
  - Operational risks (e.g., radiation dose)
  - Industry limitations (e.g., cask production)
  - Repackaging for transportation and disposal

## Related Issues

- Order EA 12-049: Mitigation Strategies
  - Enhances 10 CFR 50.54(hh) mitigation capabilities
  - SFP spray capabilities subject to further discussion
- Order EA 12-051: Spent Fuel Pool Instrumentation
- NTTF Recommendations 7.2-5 (Tier 2)
  - Safety-related makeup availability
  - Seismically-qualified spray capability

## **Stakeholder Feedback**

- Category 3 Public Meeting held on May 14
- NEI Used Fuel Management Conference on May 8
- No specific feedback on program plan
- Stakeholder comments included:
  - Requests for immediate NRC action to require transfer of spent fuel to dry casks
  - Proposed areas of consideration/research to address the issue, which is already in the plan
  - Concern that the NRC is over-regulating spent fuel storage



**Questions?**