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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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587th MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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FRIDAY

OCTOBER 7, 2011

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ROCKVILLE, MARYLAND

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The Advisory Committee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Said Abdel-Khalik, Chairman, presiding.

COMMITTEE MEMBERS:

SAID ABDEL-KHALIK, Chairman

J. SAM ARMIJO, Vice Chairman

JOHN W. STETKAR, Member-at-Large

SANJOY BANERJEE, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

COMMITTEE MEMBERS: (cont'd)

HAROLD B. RAY, Member

JOY REMPE, Member

MICHAEL T. RYAN, Member

WILLIAM J. SHACK, Member

JOHN D. SIEBER, Member

GORDON R. SKILLMAN, Member

DESIGNATED FEDERAL OFFICIAL:

ANTONIO DIAZ

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

(8:28 a.m.)

CHAIRMAN ABDEL-KHALIK: The meeting will now come to order.

This is the second day of the 587th meeting of the Advisory Committee on Reactor Safeguards. During today's meeting the Committee will consider the following: NRC staff recommendations on the Near-Term Task Force report regarding the events at the Fukushima Daiichi site in Japan; (2) preparation of ACRS reports.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Mr. Antonio Diaz is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's sessions.

There will be a phone bridge line. To preclude interruption of the meeting, the phone will be placed in a listen-in mode during the presentations and Committee discussions.

A transcript of portions of the meeting is being kept, and it is requested that the speakers use

one of the microphones, identify themselves, and speak with sufficient clarity and volume so that they can be readily heard.

We will now proceed to the first item on today's agenda, Near-Term Task Force report regarding the events at the Fukushima Daiichi site in Japan. And I would like to call on Mr. Virgilio to begin the presentation.

MR. VIRGILIO: Thank you, Mr. Chairman. Good morning to you, and good morning to the members of the ACRS.

With me today I have Eric Leeds, our Office Director for NRR, and Jim Wiggins, our Office Director for NSIR. Eric will be doing the bulk of the presentation, and Jim and I will be supporting him and providing answers.

I just have a few things I wanted to say. First of all, this is not the first time, nor it will be the last time, that I think we will be here meeting with the ACRS to talk about the lessons learned from Fukushima. This is very significant, and I do see a role for the ACRS in this, as you do, too, and we look forward to the interactions.

The second point is is in developing our proposed recommendations and our assessment of the

Near-Term Task Force, we were principally guided by safety, as always, so you can see into the prioritization and some of the work we have done. We have been focused on safety, and we have reviewed the recommendations and provided a sense of prioritization in terms of tiers. And we will talk about that today, the first, second, and third tier.

We also were guided by the practicality around the implementation of the recommendations, and what I mean by that is is we are constrained by skill sets in the staff. And so as we looked at what we could move out on quickly, one of the things that factored into that is is what skill sets do we have available, and how challenging is it going to be to manage our workload?

In moving forward with that recommendation or that prioritization, we recognize that it's very important to move forward promptly, but it is also important that we do not have our activities divert either the staff's attention or the licensee's attention from the safety of the operating fleet. That has got to be first and foremost in how we attract -- attack these issues. And also, it is going to be critically important that we do it right the first time.

Our process for implementing these recommendations is going to be, of course, in accordance with the Commission's direction, but it will be very challenging with respect to ensuring that we maintain that focus. In the paper, we provide a few examples of what we consider higher priority, safety significant work, that we will not -- we will not in fact fail to perform as a result of moving forward with these recommendations.

And the other thing that we want to do is we want to leverage the lessons learned from the past. We have done rulemaking for as many years as we have been an agency, and over the years we have recognized the importance of having a strong technical basis to support the rulemaking activities. We have recognized the importance of having good stakeholder interaction and getting that feedback from the stakeholder.

We have recognized the importance of having all of the guidance documents available at the time that we move forward with the rule, and we don't want to lose those lessons learned. We need to respect those. Even as we accelerate the processes that we will be using, we need to make sure that we do have that stakeholder involvement, including the ACRS, and we do have all the guidance documents in place.

The final point that I would make in opening is is that as we move forward, we will get more information, as we actually have the sequence of events and timeline. We will get more information as we interact with the stakeholders. But one of the things that I think we all have to be mindful of is is we need to exercise discipline around the addition of items that we believe need to be done in response to Fukushima.

In our latest paper, the one that we issued on Monday, we identified a half a dozen issues that the Near-Term Task Force had not identified -- for example, loss of ultimate heat sink. I mean, these are important issues. We believe they need to be evaluated, but we also recognize there is a direct line of sight between those six issues that we have in the paper and what happened at Fukushima, as best we know it today.

And we exercised discipline. That list of six started out as a list of dozens, and we worked it down to make sure that we were focused on the right issues.

That's not to say that we are not always looking for safety issues. We just need to make sure they're in the right process. And as we work forward

on the Fukushima issues, we want to make sure that we are laser sharp in our focus on these are issues that are related to the event, and we have other processes for dealing with other issues that are not related to the event.

That's really all I wanted to say in terms of opening remarks, and now I would like to turn it over to Eric Leeds, who will begin the presentation.

MR. LEEDS: Thank you, Marty. Good morning, everyone.

All right. If we can get started. If we can go to the next slide, please. Thank you.

As Marty mentioned, the Near-Term Task Force completed its review, and we -- they issued their report to the Commission on July 12th, and the Commission briefing was conducted on July 19th on that report -- this report.

As directed by the Commission, the staff has been engaged in a detailed review of these recommendations to determine the appropriate next steps. We have now provided the Commission with two papers recommending a prioritization of the Near-Term Task Force recommendations and proposed actions on those that should be undertaken without delay or that should be undertaken in the near term.

The purpose of today's meeting is to discuss the staff's proposed prioritization of the Near-Term Task Force recommendations, including a discussion of resources as presented in our paper submitted to the Commission on October 3rd, this past Monday. We refer to that as the 45-day paper.

Next slide, please.

I will briefly touch on the staff's review of the Near-Term Task Force recommendations and then discuss the staff's proposed prioritization of those recommendations. I will also discuss additional issues related to the Fukushima Daiichi event beyond those identified in Near-Term Task Force, as Marty just mentioned. Finally, I will discuss our current resource estimate to undertake the recommended staff actions described in this paper, as well as our planned next steps.

Next slide, please.

I would like to take a minute to emphasize the task force report conclusions. The task force was very strong in their conclusions. They discuss that a similar sequence of events to that experienced at the Fukushima Daiichi plant is unlikely to occur in the U.S. The task force concluded that there is no imminent risk from continued operation and licensing

activities at U.S. nuclear power plants.

The staff has independently assessed the events at Fukushima Daiichi, and we agree with the Near-Term Task Force conclusions -- that there is no imminent risk from continued operation and licensing activities.

The task force report also contained a systematic review of the insights from the Fukushima accident. Now, the Near-Term Task Force report provided 12 overarching recommendations, and I'm sure you are all familiar with them. And they are structured around defense-in-depth principles -- protection from design basis natural phenomena, mitigation of emergency situations, and ensuring preparedness for emergencies.

Next slide, please.

Now, in the Commission's staff requirements memorandum, they directed the staff to propose a charter for the staff review of the Near-Term Task Force report. That charter has been provided to the Commission.

They asked the staff to provide recommendations of actions to be taken without delay. That paper -- we call that the 21-day paper -- completed this action, and that was submitted to the

Commission on September 9th. We briefed the Commission on that paper on September 14th.

The Commission also requested a paper prioritizing the Near-Term Task Force recommendations. That was the 45-day paper, this past Monday's paper, October 3rd. And that is the focus of today's meeting.

And the last item -- the Commission asked the staff to provide a separate assessment of the Near-Term Task Force Recommendation 1 within 18 months. This assessment will propose a regulatory framework that will appropriately balance defense-in-depth and risk considerations.

Next slide, please.

By way of background, the staff's September 9th paper identified and made recommendations regarding the task force recommendations that can -- and in the staff's judgment should -- be implemented, in part or in whole, without delay. This paper laid the groundwork for the development of our October 3rd paper, the 45-day paper.

Next slide.

CHAIRMAN ABDEL-KHALIK: Before we proceed, let me ask you the same question I asked the task

force. There is much yet to be learned from Fukushima. Do you believe that any of the immediate actions to be implemented without delay can be negated or rendered inappropriate by any additional information that may come out of Fukushima?

MR. LEEDS: I think it's very important that we keep our ears tuned and our eyes peeled for what is going on at Fukushima and to continue to learn. If you recall, the Near-Term Task Force report was written at a time when we had our -- the best information that we had indicated that they had compromised the spent fuel pool. Since that time, we've learned that that was not the case, that the spent fuel pools at Fukushima remained intact.

CHAIRMAN ABDEL-KHALIK: I'm asking you about the --

MR. LEEDS: I'm getting to --

CHAIRMAN ABDEL-KHALIK: -- in your September 9 --

MR. LEEDS: -- I'll answer your question.

CHAIRMAN ABDEL-KHALIK: -- and in your October 3rd --

MR. LEEDS: I believe that it's very important that we continue to observe what is going on at Fukushima, and we be flexible enough to adjust to

what we learn.

CHAIRMAN ABDEL-KHALIK: Okay.

MR. LEEDS: We mentioned the additional recommendations, above and beyond the Near-Term Task Force recommendations. Marty mentioned that there were a number of them that we have considered and we continue to consider. We still have a group of folks over in Japan. We are watching this. We will continue to evaluate for lessons learned from Fukushima.

CHAIRMAN ABDEL-KHALIK: Okay.

MR. LEEDS: Was that more direct?

CHAIRMAN ABDEL-KHALIK: That's fine.

MR. LEEDS: Okay.

CHAIRMAN ABDEL-KHALIK: Thank you.

MR. LEEDS: Next slide, please.

All right. In developing its October 3rd paper, the staff continued its review of the Near-Term Task Force recommendations within the context of the NRC's existing regulatory framework, and considered the various regulatory vehicles available to the agency to implement these recommendations.

The staff initially prioritized the recommendations based on its judgment of the potential and relative safety enhancement, which could be

realized by each recommendation. The staff then refined its prioritization based on a consideration of additional factors, as Marty mentioned, such as the availability of critical skill sets, dependence on actions associated with each of the recommendations, and the need for additional technical assessment and alignment.

The staff then performed an assessment of each Near-Term Task Force recommendation to determine the required regulatory activities, an estimated schedule, and associated resource impacts. An important element of this assessment was the objective of not unnecessarily diverting the NRC's or the nuclear industry's focus from other important ongoing safety-significant activities in the course of addressing the Near-Term Task Force recommendations.

Before March 11th, this agency and all of its staff members were very busy making sure that we kept this industry safe. That hasn't changed. Fukushima is just another additional activity on top of all the work -- the good work that the staff was doing before March 11th.

We believe that the staff's proposed prioritization represents a measured approach that allows the NRC to move forward on these

recommendations with the greatest potential for near-term safety improvements without unduly impacting existing regulatory programs and safety activities.

MEMBER POWERS: I am perplexed. Staff was full-time busy before. Now you're going to ask them to do some additional stuff. Something has to disappear. I mean, there's just no two ways about it. Something has to disappear. What disappears? Something disappears.

MR. VIRGILIO: Some of the lower priority licensing work that we are doing today will likely disappear, but it's not going to be confined just to NRR. We are looking across the entire enterprise --

MEMBER POWERS: Everybody --

MR. VIRGILIO: -- to find resources to --

MEMBER POWERS: You didn't have an idle person in the agency.

MR. VIRGILIO: You're right. You're right. And so we're going to have to make some very hard choices about the kind of work that we are not going to be able to do, or the types of work that we are not going to be able to do, in order to move forward with these recommendations.

MEMBER POWERS: How do you decide? I mean, what's a low priority licensing activity to you

is --

MR. VIRGILIO: We already that some --

MEMBER POWERS: -- the most important thing in the world for the applicant.

MR. VIRGILIO: We already know, Dana, that there are some licensing actions that we have today that provide additional operating flexibility. They are safety neutral. Those are examples of things that we will probably have to delay in order to support working on the Fukushima lessons learned.

MR. LEEDS: Truthfully, I think that's one of the biggest challenges we have going forward. And it's not something that --

MEMBER POWERS: It is your major challenge. You just haven't got any folks.

MR. LEEDS: And it's not something that you just can categorically say, "Well, we're not going to work on, say, extended power uprates." I can give you an example of an extended power uprate where the licensee actually improved the core damage frequency, you know, for that plant, made that plant safer by completely redoing the auxiliary feedwater system for that plant. But that was a safety enhancement that came along with an extended power uprate.

So just to categorically say this type of

work won't be done, that may not be in the best interest of safety.

MR. VIRGILIO: While we haven't decided yet, license renewals are another area where if we know that a license renewal is not needed immediately, and most of them that are in the backlog today are not, it is a source of the kinds of skills that we are going to need to do this Fukushima work.

And Eric made that point, and I'll emphasize it, that it's not just a resource issue. It's a skill issue. We need to have the right skills. But there are certain things that we -- we believe are higher safety priority, like, for example, the NFPA 805 conversions, that we would like to preserve in order to ensure that we continue to move forward from that safety perspective while we do this work at the same time.

MR. LEEDS: Next slide, please.

As you can see, what we did was we binned all the recommendations into three tiers. The first tier is to start without delay. The second tier is start in the near term, and I will differentiate those two. And then, Tier 3 are the longer term actions.

CHAIRMAN ABDEL-KHALIK: I note that the categorization into Tiers 1, 2, and 3 is based on the

start point. Is there an end point associated with each of these categories?

MEMBER POWERS: When you get them done.

CHAIRMAN ABDEL-KHALIK: Well, I mean --

MR. LEEDS: It varies.

CHAIRMAN ABDEL-KHALIK: -- don't make a plan saying you will get them done when you get them done. You must have a plan.

MR. VIRGILIO: As we move forward from where we are today, we will develop the Gantt charts. That will give us the start dates, the key dates for each of the milestones, and the end points. As you know, the Chairman has said that he would like to see us complete these actions within the next five years. And we will try to, as best we can, to meet that challenge.

CHAIRMAN ABDEL-KHALIK: But that is sort of forthcoming in terms of detailed plans as to start and end dates for the various action items. Okay.

MR. LEEDS: Next slide, please.

The first tier consists of those Near-Term Task Force recommendations which the staff determined shouldn't be started without unnecessary delay, and for which sufficient resource flexibility, including availability of critical skill sets, currently exists.

This tier includes all the actions that were identified in the 21-day paper that I referred to, the September 9th paper, as well as two additional items.

Go to the next slide.

CHAIRMAN ABDEL-KHALIK: Before we get into the details, if one were to apply a completeness test to your set of immediate recommendations, which are the ones in the September 9th, plus the two additional items that you included in your October 3rd, and if we just do a thought experiment by focusing on the first two items, the protection measures, 2.1 and 2.3 -- so here is the thought experiment.

If the people at Fukushima Daiichi had fully implemented the immediate actions you prescribe under Recommendations 2.1 and 2.3, prior to March 11, 2011, would that have: a) prevented the accident, b) clearly identified deficiencies in the design basis that must be corrected, or c) none of the above?

(Laughter.)

(Simultaneous speakers.)

CHAIRMAN ABDEL-KHALIK: Let's just focus.

MR. WIGGINS: This is Jim Wiggins. From the task force forward, it was believed that 2.1 and 2.3 have the largest safety benefit in this context. It would -- if those be done -- well, first, there was

little seismic damage to the core parts of the plant to begin with, but the flooding damage was the thing that was more catastrophic.

There certainly would have been a substantial less damaged state initially. But when you start asking questions about how long it took to recover certain things, you start to wonder about the durability of that condition.

Now, in the Fukushima plant, they lost diesels, they lost fuel oil, that kind of stuff, so --

CHAIRMAN ABDEL-KHALIK: I'm sorry. These are protection measures, right? And, therefore, the question is: if they had fully implemented the immediate actions that you are recommending here, before the event, would that have prevented the accident or clearly identified deficiencies that need to be corrected?

MR. WIGGINS: It would have identified deficiencies that would need to be corrected. That's for sure. It's hard to say that it would have prevented the earthquake. That's obvious. It would have been -- it's whether it would have been able to sustain it.

CHAIRMAN ABDEL-KHALIK: Correct.

MR. WIGGINS: Okay? And it's more the

flood than the earthquake based on what we know about what happened actually out there. Still though, still, if everything worked, if everything worked at the facility, the facility does not have enough commodities to operate indefinitely.

And with the state of destruction in the area there, there would have been concerns about that point. You would have eventually exhausted your diesel fuel oil supply, and then you're on the path to the same place you ended, even if you didn't have competent seismic qualifications and flooding protection. So --

CHAIRMAN ABDEL-KHALIK: Let me ask you a followup question.

MR. WIGGINS: -- there's kind of a layer approach to this thing.

CHAIRMAN ABDEL-KHALIK: Let me ask you a followup question, then, if I may. Would you agree that a similar set of questions can be used to test the completeness of the immediate actions for accident mitigation? Namely, given an accident, would the measures that you are recommending for immediate action have adequately mitigated the event or at least identified deficiencies that need to be corrected in order to adequately mitigate the event?

MR. WIGGINS: I've got my answer. That's not how the near-term items were approached.

CHAIRMAN ABDEL-KHALIK: But wouldn't you --

MR. WIGGINS: I don't know the answer to that. We didn't ask ourselves that question. The question we were asking on the near term or the without delay were exactly that. What are items that are so clearly indicated that there is no reason to hold up and do further review to understand the efficacy of the solution?

There were some, and that's how -- explains why a couple get added between the 21-day effort and the 45-day effort. We spent more time understanding what those things were.

CHAIRMAN ABDEL-KHALIK: Well, let me go back to the way I introduced the question. This is a thought experiment, trying to understand whether or not the set of immediate actions that you are recommending is complete.

So that is the purpose of the question. Would you agree that an answer, an affirmative answer, to either A or B, namely, you know, you can prevent the accident or identify deficiencies, or in the case of mitigation you actually mitigate the event, or

identify deficiencies, is a necessary condition to assure completeness of the immediate actions that you are recommending?

MR. WIGGINS: How do you define "immediate"?

CHAIRMAN ABDEL-KHALIK: Immediate actions, presumably, based on the same definition that you use to enhance safety.

MR. VIRGILIO: Said another way, do we believe that the immediate actions are enough? Then, I would say no. I mean, first, we don't know everything there is to know. The detailed sequence of events and timeline, the first installment of that, is due to us in mid-November. These are actions that we believe will, in fact, contribute to safety, given that event.

CHAIRMAN ABDEL-KHALIK: That's why I asked you the first question, which is, do you believe that anything that will come out of Fukushima in the future will negate any of the actions that you are recommending?

MR. VIRGILIO: I don't think it will negate, but I think it may add to. And you're starting to see evidence of that in the six that we added to the Near-Term Task Force. I think that as a

group we had enough concern about, for example, the loss of ultimate heat sink that we added that to the list. I can't say that this is complete, because it doesn't address the loss of ultimate heat sink as an example.

MR. WIGGINS: I don't mean to be picky. When I say "immediate," if you're looking at the short term without delays, I think we will acknowledge -- you know, I think we know that those are not enough. More needs to be done. We approached that question, that task, from a different perspective. We weren't looking for completeness at the near term without delay set. The completeness looks like the whole set plus additional ones that you might need to consider.

Do I think anything that comes out of Fukushima will likely negate any of these actions? Not negate, may render some of them not as necessary as you might think as of today. And as you get into the higher recommendations, particularly in 11, there are some things in 11 that I think as more is known it may shed some light on whether things are actually needed or not.

There is a piece in 11 about a radiation monitoring -- real-time radiation monitoring network. That's a Tier 3 item right now. You know, one of the

reasons it is in Tier 3 is we've got to spend more time thinking about that. Would it hurt? No. Is it necessary? It's unclear. We'll have to see where the Fukushima results continue to come out.

CHAIRMAN ABDEL-KHALIK: So you believe that a question regarding the completeness of the immediate actions is inappropriate or irrelevant?

MR. VIRGILIO: I would just say we would recognize today that it's not complete. It is not the complete set, but it is those actions that in fact do contribute to safety, and actions that we can step out on today.

MR. WIGGINS: There is a potential -- this is Wiggins again from NSIR. There is a potential for more coming out of Fukushima to indicate there is additional things that need to be done to satisfy a definition of "complete." The task force, though, I think we would -- our group would conclude that the task force is -- likely most of the important stuff is in there, maybe all of the important stuff.

CHAIRMAN ABDEL-KHALIK: Wouldn't you believe that sort of at least a minimum goal for immediate actions is to identify deficiencies that need to be corrected? And, therefore, wouldn't you believe that this sort of thought experiment would be

appropriate to be applied to these immediate actions?

MR. WIGGINS: I have no idea. I'm totally --

CHAIRMAN ABDEL-KHALIK: I don't want to carry this too far. I know you have a lot to present.

MR. LEEDS: I'm struggling with the question that you are actually asking.

CHAIRMAN ABDEL-KHALIK: Because it is conceptual. I'm just trying to get to the --

MEMBER POWERS: It's a mystery to me, I will have to admit.

CHAIRMAN ABDEL-KHALIK: Well, I'm --

VICE CHAIRMAN ARMIJO: Understanding the Chairman's question in a different way, in looking at your set of recommendations, broad set, I ask, would this have prevented, effectively carried out, all of those recommendations? Had they been done at Fukushima, would it have prevented a catastrophe? And I believe it would.

I have very little doubt that if -- if people had understood that the tsunami risk was much, much greater, they would have taken actions, built a higher seawall, do something else. They didn't. And that -- the same thing with station blackout. And so taken as a group, I can see where all of these

recommendations as a whole would have taken -- turned -- a natural disaster wouldn't have turned out into a massive failure of a nuclear plant.

So I think there's things -- and we'll get into it later -- that may not be necessary, wouldn't have contributed at all to the safety at Fukushima, but I think the task force list and this list, while maybe not complete in every respect, would have made a huge difference. And that's about as best you can do right now.

MR. WIGGINS: I would even offer my view -- it's complete, given what we know that happened at the facility. And it is complete given what is also going on internationally, but you have to include those additional six items that were beyond the task force to get there. Particularly, the ultimate heat sink piece would do that.

I believe it's a complete set based on what current knowledge is. Okay? And I think, as I said, as we get more knowledge, you can't rule out that something else might come to the table. There is probably at least as much chance, if not more, than some things that are currently on the plate would get a loss of focus or get defocused or become less important, and potentially could be shifted out into

a longer time period as we learn more.

But, you know, it's hard to -- this event, from the beginning, has been a challenge in terms of what you knew and when you knew it.

MR. LEEDS: Can I just share a thought, following up on what Jim just said? Hindsight is always 20/20. You know, so we've got a list of actions that are coming out of Fukushima. We need to be prepared to fight the next war, and we don't know what that next war is going to be. So that's why, you know, redundancy and diversity and all of those principles are so near and dear to us.

CHAIRMAN ABDEL-KHALIK: I'm just trying to conceptually find a sort of collective objective to what you are recommending, what the outcome of these immediate actions should be.

MR. VIRGILIO: And I think what we're saying, Mr. Chairman, is is it's not just the immediate actions. At the end of the day, when we complete Tier 1, Tier 2, Tier 3, and resolve the issues around the additional items, it will be a complete set. But I don't think we're asserting that Tier 1 alone is a complete set.

MR. WIGGINS: And it would get prevention, mitigation, and it would get the organizational

handling of the issue, which includes communications, both onsite -- onsite to offsite in the emergency planning and other arenas. Those are the -- there are some organizational elements that became uncovered in this that we learned that we could do things here to shore up our conditions here in our plants. So --

MEMBER BANERJEE: Can you amplify a little bit on that remark about ultimate heat sink?

MR. WIGGINS: Yes, we have looked at -- we have been trying to follow -- we have been following what has been going on internationally in this. And the, for instance, European stress tests are -- have included the ultimate heat sink in terms of their list of questions. So we want to actually ask ourselves whether there needs to be something there in the ultimate heat sink. That's why it's on the list of the six as considerations. We haven't really been more specific than the fact that we want to think about it.

MR. VIRGILIO: For example, if you look at the specific event was the air-cooled diesel generators that protected the spent fuel pools on Unit 5 and 6, that was a tremendous safety benefit to having those air-cooled diesel generators. It reduced the source term that we were worried about from

possibly six down to four spent fuel pools.

MR. WIGGINS: As you know, some of our plants have -- some of the plants in the U.S. have air-cooled. They have radiators that can -- that cool a self-contained water cooling system. But those are not the dominant types that are out there. The dominant types that are out there rely on some type of safety-related service water as an eventual heat sink for the diesel engines.

So if -- you know, this type of an event, like certainly what happened in Japan, took -- removed the ultimate heat sink. So, you know, it's something we want to think about. And whether you have -- is there something in addition that ought to be done? Or is there some piece that informs what the actual equipment looks like that we are talking about here? Parts of this stuff -- the items that are in the Near-Term Task Force are looking at I guess you could say non-installed equipment.

Now, maybe this informs what that equipment has to be able to do. If you need a generator-type thing, it wouldn't have to operate with its own cooling system, let's say for instance. That may be one way this comes out.

But we listed the issue because it is an

issue we think is something that we need to think about, but we haven't really spent enough time thinking about it to understand what needs to be done.

CHAIRMAN ABDEL-KHALIK: Eric, I think you have a lot to present, so I recommend you proceed.

MR. LEEDS: Thank you, Mr. Chairman.

As you can see, our Tier 1 -- the Tier 1 recommendations that we believe we should move out promptly on -- seismic and flood hazard reevaluations, the seismic and flood walkdown, station blackout, and the 50.54(hh)(2) equipment, or B(5)(b) equipment.

Next slide, please.

In addition to those, we have included the reliable hardened vent for both Mark I and Mark II containments, spent fuel pool instrumentation, strengthening of onsite emergency response capabilities, and that refers to staffing and communication, and a more general emergency preparedness.

These recommendations on this slide are consistent with those that we presented in our September 9th paper, the 21-day paper, with the addition of the Mark II containments, reliable hardened vents for the Mark II containments, as well as the spent fuel pool instrumentation.

Can we go to the next slide?

In the 21-day paper, we hadn't included the Mark II and the spent fuel pool instrumentation recommendations. Our continued review question those two items. Based on what we learned in our questioning of the staff, we decided to move Mark II containment and the spent fuel instrumentation into those items that we can move out promptly on, and that we should --

VICE CHAIRMAN ARMIJO: I would like to ask you a question on that. You know, going back to what I had said earlier about your list of items, your Tier 1 items making -- would have made a huge difference in what happened at Fukushima. I don't see how that would meet -- spent fuel instrumentation improvement would have made any difference at all in that event, since the pools were not affected, they didn't release radiation, didn't contribute to dose to the public or land contamination.

So it seems like it's inconsistent with your criteria that you mentioned earlier. And other issues which may come up later about hydrogen mitigation are way back in Tier 3. And from a priority standpoint, I don't see where this -- how you can justify this as being near-term action requiring

orders and implementation when it made no -- would have made no difference at all at Fukushima, compared to all of the other things, which are really important. So that's my question.

MR. WIGGINS: You are correct that it would not have made a difference in terms of the analysis of the event. But in a real setting, it caused a diversion of attention to the people who were trying to cope with the reactor parts of it. They had -- because they didn't know what was going out in the spent fuel pool, they devoted resources, time, allocated attention, to try to deal with what might be happening in the spent fuel pools.

You may have seen as they were pumping in water in the buildings that -- beyond what they needed to basically stop the -- any residual effect of the explosions that occurred, and went for days and days and days, that we thought we were -- the Japanese were -- we were even suggesting that they continue doing this -- pumping water in the reactor buildings in the belief that the spent fuel pools were in fact not full. If we knew that they were full, or if you had indication that they were full, you would have spent possibly more time figuring out the alternate or additional ways to get water into the reactor system.

So I would offer that. It's more of eliminating a distraction than it is fixing an actual first order problem.

MR. LEEDS: It's interesting that you raise that. I was very skeptical about this one. In fact, on the ad hoc committee that looked at this, I was very resistive to including spent fuel pool for just the reasons that you stated.

And then, after listening to my peers talk about it and going back and looking back at the tape and watching the government fly helicopters over those buildings and start dropping water on the spent fuel pool, I thought, you know, look at all the attention and resources that were diverted for a non-problem that could have been avoided if we had simply had -- and that's what got me to change my mind on the issue, because I was in the same place as you are.

VICE CHAIRMAN ARMIJO: Well, okay. I hear you, but I think the distraction was probably more outside of Japan than inside of Japan, as they worked -- I think properly worked on cooling the core and, in parallel, did the best they could to dump water on open pools, which is a reasonable thing to do.

But the instrumentation might have told them, "Oh, don't fly the helicopter over." I doubt

it. They probably still would have flown the helicopter over, just to make sure.

So the thing is, you have limited resources, a lot of important work that has got to get done. I just don't see how this fits as a near-term, high priority activity requiring orders, distraction of the industry to work on things that really make no real difference. It's nice to do. I'm not disagreeing with that. But it seems out of -- doesn't meet your overall criteria when you look at all of the things you describe.

MEMBER CORRADINI: Can I just ask -- can I just follow on Sam's question? I'm sorry. I didn't mean to interrupt you. I guess I want to understand -- I read the 45-day, and then going back to the Near-Term Task Force, I can see why more information avoids uncertainty and incorrect decisionmaking. That I understand, and so I guess that was the point that you were making.

But what I'm struggling with is, now we do this, and you put this on the Tier 1 list. What are the design basis requirements? In other words, if this was on the Tier 1 list to go to the licensees and say, "This could have affected an incorrect decision or a worry; give us information as to what you need,

so you would avoid that," that's one thing.

But to then go to the next step and say, "Consider issuing orders about implementation," but I'm not sure what to implement, because I don't know the design basis of what to implement on.

MR. VIRGILIO: That all has to be resolved before we issue the orders. And if you go back to the tables in the paper, what we show is that stakeholder interaction precedes the issuance of the regulatory vehicle. You know, because we do -- really need to decide -- in the Near-Term Task Force report, I believe they called out safety-related.

And we all have some question about, well, what is the standard? What is the appropriate standard for this instrumentation? Does it need to be safety-related? Does it need to be commercial grade, et cetera, et cetera? So, I mean, that is one of the things that we need to sort out as part of the stakeholder interaction.

We need to be clear about what are the requirements, what does success look like, before we issue that order.

MEMBER CORRADINI: Okay, because just -- I'm kind of where Sam is on this. But I guess I'm willing to parse it from the standpoint, if you're

saying you should immediately initiate interaction with stakeholders to understand, fine. But issuing orders on something I'm not sure what I'm designing to gets me a bit nervous. That's kind of where I'm --

MR. VIRGILIO: Yes. And the steps that are laid out in the tables to the enclosure show you -- I hope show you that the stakeholder interaction and the decisions on what success look like --

MEMBER CORRADINI: Okay.

MR. VIRGILIO: -- precedes the imposition of any regulatory requirement.

MEMBER CORRADINI: That helps me. And then, to the Chairman's question, I was expecting you were going to answer him that Tier 1 was information gathering and assurance that I meet the current design base, so that I don't see a vulnerability or a gap, because that's the way -- when I read to Near-Term Task Force, and I looked at Tier 1, that's how I interpreted what appeared in Tier 1, is that there is no immediate concern.

But we want to look at the design base relative to seismic, flooding, et cetera, to see if I have a gap and fix it.

MR. VIRGILIO: The 2.3 walkdowns, Mike. That's exactly what 2.3 will --

MEMBER CORRADINI: The reason I ask it here is, even in spent fuel, it may not be a gap, but I want to know information from stakeholders to see if they saw something that concerned them, and they might actually be, excuse me, ahead of staff in wanting to do something in spent fuel. So the interaction.

MR. LEEDS: Actually, to your point, the industry indicated that spent fuel pool instrumentation was something they wanted to step out of. And so that also helped influence my decision as to where to go with that.

VICE CHAIRMAN ARMIJO: It's just whether it --

MR. LEEDS: But what is that instrumentation? They were talking about a camera so the crew could see. Well, we don't know if a camera -- that's something, as Marty said, that we need to dialogue with our external stakeholders and --

CHAIRMAN ABDEL-KHALIK: The recommendations on page 33 clearly, you know, say that you will engage stakeholders to define what needs to get done before you start with, you know, issuing orders.

MR. WIGGINS: It is not only the specific what needs to be done, but it's what are the

parameters around it, the success measures. In many of these discussions, I guess you could say it's also what pedigree needs to be applied.

One of the things that affected our ability -- one of the reasons why spent fuel pool instrumentation, 7.1, was not in the short list, the Tier 1 list, or the without delay list initially, is that we were debating amongst ourselves the task force recommendation that says it needs to be safety-related instrumentation. There are some of us that challenge whether what you really needed was reliable, not safety-related. You don't need the full pedigree.

So we -- basically, the clock timed out for the first paper, and we had to make a decision. So we didn't do it there, but then we had time for the second paper to talk about it a little bit more, and then we put it into the first -- the short list with the understanding that there will be this dialogue with stakeholders, and it is going to be the -- what instrumentation is necessary -- are we really talking about here? And how do you make it reliable? And the writeup would say "up to safety-related."

There is a lot in that "up to," right? It doesn't necessarily have to be safety-related. It could be. But we will have to figure out where we --

but we're not going to issue the orders and start work until we actually understand what the rules are, because the orders need to be precise. They need to be inspectable.

CHAIRMAN ABDEL-KHALIK: Please continue.

VICE CHAIRMAN ARMIJO: We just got your document, so we haven't read it completely. And we've got to understand it.

CHAIRMAN ABDEL-KHALIK: Dana, do you have a question?

MEMBER POWERS: Yes. I'm trying to understand a little bit your evolution on this issue of the instrumentation. You got persuaded because of the issue of distraction that -- concerns about the spent fuel came up with, and assuredly we know that.

But suppose that we had level indicators and thermocouples in the pool that went clear to the bottom and things like that, but we had a hydrogen explosion that dumped a bunch of concrete into spent fuel pool 3. And now the operator has to worry about whether that instrumentation is any more reliable. Don't we just get back into the distraction issue?

MR. LEEDS: It's an interesting point. What does "reliable" mean? What are we expected to survive?

MEMBER POWERS: Well, especially after you have had a fairly catastrophic explosion that you know absolutely has dropped fairly substantial chunks of concrete in on top of the fuel -- the fuel pool. It seems to me that I never get out of the potential of a distraction issue, ever.

If I replace the electronic instrumentation with your camera, and the explosion damaged the camera, I'm right back where I was before.

Now, I'll ask a question, but I don't know that you would know the answer -- you're probably the wrong people to answer -- you know that we dumped the concrete into the pool, and they have aluminum racks in those pools. And they are getting a corrosion of the aluminum, because they are leaching the calcium hydroxide out of the concrete. Do we have aluminum racks in any of our plants?

(Simultaneous speakers.)

MEMBER POWERS: Yes. I don't expect you to actually know the answer to that, but it's one of Jim's -- we're going to learn things as we go on here, especially as we dissect the plant. That seems to me a more crucial issue to me than the instrumentation is, if the racks are decomposing on me and I'm going to collapse that fuel down, now I've got to -- another

problem emerging six months after the accident. And I really don't need more problems at that site.

VICE CHAIRMAN ARMIJO: Well, if I was going to worry about instrumentation, why not the reactor and containment instrumentation? Which really wasn't all that reliable after some of the events that happened.

So, you know, I'm still trying to get your prioritization of what to work on first. Not to say that this isn't good to do, but it's -- just doesn't seem to fit the criteria you mentioned.

MR. LEEDS: If I can go to the next slide?

MEMBER BROWN: Before you leave the Tier 1 stuff, I was interested in Jim's comment earlier relative to, if everything had worked, say the seawall had been higher, you hadn't been flooded out, you would have still had a commodity issue, you would have ended up at the same place, just a little bit longer path down the road.

And that seems to be a recurring theme that almost all of our corrective actions -- or, excuse me, mitigating actions are to bring in outside resources in order to supplement the plant after a -- whatever, two-, three-day, four-day, whatever the period of time is.

And then, I look back at the Midwest flooding we had, and just recently -- Fort Calhoun, I have no idea how long it was inaccessible. The only way you could get anything there was by helicopter. Why isn't that of a more immediate interest? In other words, that is -- looking at our plants today, do we have plants that are in a zone where they could become inaccessible, where there is a significant amount of land area flooded out and you have no access? And how long would that be? And that we need at least some thought process of other means to have access.

That's not a hard -- I didn't see that. I did a quick paw through. It was just an interesting comment relative to the commodity issue. I didn't see anything in the items of -- and that's just a thought process of there is no technical, there is no nothing, it's just, how do you get stuff in if your infrastructure has been destroyed? How long was it before anything could be driven into Fukushima? I don't know what that is, how long that was.

MR. WIGGINS: Maybe I would say, at least in my mind, I was viewing that as a -- that becomes -- let's just -- I would call it a national issue. What you'll see the industry -- the industry is talking about essentially stockpiling in common areas that are

remote from individual sites. They are stockpiling equipment, too. Still have an issue about transportation.

We haven't gotten too far along with this, talking to the rest of the federal community, but we have talked to FEMA or heard from FEMA. They understand there may be a role from the federal sector that might be to transport this stuff in.

We had an exercise -- while we were gone, I had a pretty thorough exercise last May, this national level exercise 11. It actually was a large footprint earthquake through the center of the United States, and the issues that popped up there that are nuclear related was exactly that. It was the transportation of commodities to the affected site. There is one reactor that had a problem more than the others in this scenario.

So there's the beginning of a dialogue and the beginning of a recognition that there is a national piece to this, too.

MEMBER BLEY: Jim, when you say it's a national problem, does that mean it's not something the NRC ought to have on their list? I mean, it seems to me it's something the utilities should have on their list, their organizations should, and you guys

should as well.

MR. WIGGINS: We're working it as part of our normal emergency planning process with other federal agencies. It starts at FEMA, but there is also other agencies that we interact with that look at these type of national broad problems, this type of an issue. It happens -- just as in Japan, this would be more than just a reactor problem. The reactor is a pretty important thing, but it is more than just that. And that is dealt with in terms of an overall national response framework.

There's the discussion you could have about how that framework handles this event. Not well, by the way, because the framework isn't designed to handle an international event that doesn't have a domestic impact.

MEMBER BLEY: And if we --

MR. WIGGINS: But it would be a different story if it happened in the U.S. There is a framework. That framework brings in national government assets beyond licensees, beyond NRC, beyond FEMA, Department of Defense and others, DOE and other entities that come together to just solve these types of problems as they come up. That's part of an exercise that we typically don't run that's -- it's

out there in the plants.

MEMBER BLEY: I'm just staring at you a little blankly, because I don't know what a framework is in this sense, and --

MR. WIGGINS: It's a document. It's called a national response framework. It's the country's plan for reacting to events, one of which would be a radiological problem. It involves roles of each of the -- of a whole number of federal departments and agencies that are coordinated through the national security staff and the White House. And, you know, that's what played out in this large exercise.

We couldn't do as much as we wanted to in the exercise, but we at least were able to participate in meetings of this group, where you kind of allocated national resources against prioritized problems. And in the nuclear plant -- and it was just the very thing we're talking about. It's just the transportation of diesel fuel, diesel oil -- diesel fuel. That was the issue that was being worked during the week of the exercise, and, you know, they had at least on paper a solution.

MEMBER BLEY: I had been assuming that in the early actions and mid-actions dealing with station

blackout that these kind of things were on the table to get worked out rather than a framework that works kind of on the fly.

MR. WIGGINS: The station blackout rule has a presumption of recovery of the grid, the current rule. A way of reading this task force says maybe we need to reconceptualize the station blackout rule to not be so much dependent on the recovery of the grid. Rather, the rule will -- best as we can tell now, will segment the response into areas, into three basic pieces.

One is the close-in piece where the license -- that's the coping piece, where the plant has to be able to handle it with installed equipment. The second piece is a time where the plant has to handle it with installed, plus this other equipment that is onsite, and then there is a last piece, which is where you bring other resources to bear for a more protracted duration.

And we haven't gotten anywhere near along in this to tell exactly what all of those is and whether it's a 24 and 72, or an eight and 72, or what the numbers are, that would be in the eventual rule. But that's what the item is -- to go through rulemaking, figure out how that is.

But there's a reconceptualization of station blackout that is looking at a way to say, "Well, let's not presume that you are going to get the grid back in a reasonable amount of time. Let's just look at a prolonged duration."

MEMBER BLEY: I thought that third piece was a piece you folks would be working with industry, and now we have this larger entity involved, which I don't know is on the same timeframe that you guys would need to be on.

MR. WIGGINS: Industry is working, but I'll tell you -- well, we haven't talked -- Marty may have. But I don't know if industry is far enough along the line to understand, once they have the central depot of equipment, if they have asked the questions on how they are going to move it. You know, would they provide for that as part of their plan? Or would they depend on the U.S. Government to provide that capability?

What I was trying to say is there are provisions for the U.S. Government to provide that type of capability. It is done more or less on an on-demand, ad hoc process. There is a framework for doing it, but not -- you might not be able to find detailed procedures.

CHAIRMAN ABDEL-KHALIK: Dana, do you have a question?

MEMBER SIEBER: Well, that is a critical issue with, you know, facilities that can be moved from plant to plant. And I suspect that you would have to do some kind of an analysis to determine whether that is the optimum way to do it, because my first impression is that it is not.

MR. WIGGINS: Well, there is a balance between what you need onsite and what you can depend on you are going to get.

MEMBER SIEBER: That's right.

MR. WIGGINS: But wouldn't you think, Jack, that would inform that second number? You know, how long do you have to handle it with indigenous resources onsite, installed and others, until you can count on something from offsite coming in?

MEMBER SIEBER: Right.

MR. WIGGINS: So maybe the 72 that -- Near-Term Task Force turns out not actually to be the right number. It may have to actually be longer than that.

MEMBER SIEBER: Yes. Well, the interesting thing is the grid system has changed and is changing rapidly now.

MR. WIGGINS: Yes.

MEMBER SIEBER: And the four-hour/eight-hour is wishful thinking, in my opinion. And so the station blackout rule and the reg guides and all of that -- and you have identified that in your report, that you need a new rulemaking, but that has to be thought out very carefully and in perhaps greater depth and with more pessimism than it was originally conceived.

MR. WIGGINS: I would agree with you. And some of us are more pessimistic, but that's the topic of another discussion that looks like cyber and things like that that --

MEMBER SIEBER: I will join that group in this area.

CHAIRMAN ABDEL-KHALIK: Okay.

MEMBER POWERS: If I focus just on Fukushima, it seems to me this long-term capability issue is a non-issue. You had seven other plants there that did not have a flooding, did have a station blackout. They came through swimmingly. Wrong term.

But, I mean, I guess the point I would like to make is that in thinking about these long term, do not forget there are seven other plants that were affected by this earthquake in a fairly dramatic

fashion. And most of them did marvelously, including two at Fukushima.

CHAIRMAN ABDEL-KHALIK: Keep going.

MR. LEEDS: All right. If we can go to the Tier 2 recommendations. The second tier consists of those Near-Term Task Force recommendations which could not be initiated without delay due to factors that include the need for further technical assessment and alignment, dependence on Tier 1 issues, or availability of critical skill sets.

These actions do not require a long-term study and can be initiated once sufficient technical information and applicable resources become available.

The staff believes these recommendations will further enhance safety and intend to initiate them as soon as the necessary technical information and/or resources become available. We anticipate this being in the near term.

Go to the next slide.

MEMBER STETKAR: Eric?

MR. LEEDS: Yes, sir.

MEMBER STETKAR: You have mentioned about three or four times this morning one of the decision criteria about Tier 1 versus Tier 2 is availability of critical skill sets. Could you give me an example of

what -- something that is in Tier 2 rather than Tier 1 because of that lack of the appropriate skills immediately available?

MR. LEEDS: Certainly. We only have two items in Tier 2, and one of the items is the spent fuel pool makeup capability. The Near-Term Task Force recommended several different safety-related ways that you could make up capacity of the spent fuel pool. And the staff that would do that work and would focus on that, they are going to be busy doing other things. They are going to be busy on the Tier 1 items. The safety --

MEMBER STETKAR: Okay. Thanks. I understand. It's not --

MR. VIRGILIO: The other example is the emergency preparedness. We've got to focus attention on implementing the rule that the Commission has just, in fact, approved. And that is going to be -- that will, in fact, absorb the skill sets that we are going to need to move forward on that --

MEMBER STETKAR: The second answer is more of what I was looking for, is -- the first one I understand the limited number of people that --

MR. LEEDS: The second one is how it's tiered?

MEMBER STETKAR: -- something that has to be a second priority. I was worried that we didn't have the available skills and we needed to bring them into play or something like that. And the emergency response is more of an example there, so thanks.

CHAIRMAN ABDEL-KHALIK: Why the focus on just makeup capability rather than both makeup and cooling?

MR. VIRGILIO: I think there is makeup and cooling in there. I think that's shorthand, because if we go to the recommendations themselves, there was safety-related.

(Simultaneous speakers.)

MEMBER BLEY: Yes, even Recommendation 7 is makeup capability and instrumentation rather than cooling.

MR. LEEDS: It's a good question. Thank you.

All right. If we can go on to the next. We'll go to Tier 3 recommendations. The third tier consists of those Near-Term Task Force recommendations that require further staff study to support a regulatory action. Having associated shorter term action that needs to be completed to inform the longer term action are dependent on availability of critical

skill sets or dependent on the resolution of the Near-Term Task Force Recommendation 1.

The staff focused its initial efforts on developing the schedules, milestones, and resources associated with the Tier 1 and Tier 2 activities, and has not yet developed similar information for the Tier 3 recommendations. Once the staff has completed its evaluation of the resource impacts of the Tier 1 and Tier 2 recommendations, it will be more able to accurately address the Tier 3 recommendations.

Next slide.

There is a list of the Tier 3 recommendations, on this slide and on the next slide. As you can see, the 10-year confirmation of seismic and flooding hazards -- taking a look at seismically induced fires and floods, reliable, hardened vents for other containment designs besides the BWR Mark I and Mark IIs, overall hydrogen control --

MEMBER CORRADINI: Can I understand the third bullet? So there is going to be consideration or analysis to decide in Ps -- PWRs for part of --

MR. LEEDS: Well, one of the designs that we talked about were the ice condensers, smaller design. You know, should we take a look at that for vents? For even for the larger designs -- but this

would be a longer term action after we take care of the Mark I and the Mark IIs.

MEMBER POWERS: We have, of course, been through that at least once that I was heavily involved, and I think once before that, and could never -- never have worked our way around it. Is anybody bothering to assemble all of that past experience with this idea of vented, filtered containment?

MR. VIRGILIO: As part of this effort, we will, in fact, make sure that we understand and respect the history that precedes this effort.

MEMBER POWERS: It's one that got some fairly intensive examination, and it just doesn't get you very much.

MR. VIRGILIO: I know. We went back to the 1980s to look at the decisions that were made on the Mark I containments and what led to the generic letter and what led to us deciding that the industry voluntary initiatives around that generic letter were sufficient. So we understood. There is a rich history around this particular issue.

MR. LEEDS: All right. If we can go to the next slide.

The other Tier 3 recommendations are

emergency preparedness for prolonged station blackout and multi-unit events, the enhanced capability, and also other emergency preparedness issues, as you see here -- decisionmaking, radiation monitoring, and public education.

MEMBER RYAN: What are you including in radiation monitoring and public education? And what are your thoughts on those two?

MR. VIRGILIO: The original thoughts, particularly in the public education, was around KI, where there was a lot of misinformation, including information being promulgated here in the United States with respect to what -- by government officials, no less, with respect to what could work and what wouldn't work and under what conditions should one take KI. So that was the real focus of the Near-Term Task Force recommendation on that particular issue.

With regard to radiation monitoring, we know that in certain countries, particularly in some in Europe, they do have fixed monitoring sites. As a matter of fact, we have -- in some of the OSARTs that we have had here in the United States, that recommendation has, in fact, come up -- that we evolved from where we are today to do -- from the

field monitoring to actually have fixed radiation monitors in certain locations around the nuclear powerplants.

MEMBER SIEBER: Marty, why did the EP recommendations end up as Tier 3? To me, Tier 3 is later on.

MR. VIRGILIO: Well, we do have some of them, actually, in Tier 1, Tier 2, and Tier 3. There is sort of a mix.

MEMBER SIEBER: For example, estimating what the source term is and being able to calculate atmospheric dispersion, in my view, takes -- will need some additional work.

MR. VIRGILIO: Absolutely.

MEMBER SIEBER: And the talent is here in the agency right now, because I know the people who do that, but -- and that would have a -- make an impact, maybe a significant impact, on sizes and timing of evacuations.

And what happened at Fukushima and our inability to decide what the release rates were and what the magnitudes were resulted in differing opinions as to how far out evacuation should occur and cause some consternation worldwide as to what was going on. And I would think that that would need

attention sooner rather than later.

MR. WIGGINS: The EP issues turn out to be driven by resources. It's -- as we said, the priority is to implement the new rule, and that is going to occupy the attention of a number of individuals in the group. We are just going to basically run out of the skills needed to do these types of things.

Now, there might be -- I am still kind of thinking, and we are kind of thinking in our office that there might -- you are not going to get all the skills occupied all the time. So there might be some availabilities along the line that we might be able to apply to some of these issues in there.

But, you know, from just a gross planning point of view, if you -- we are committed to put the new rule in place, we are committed to try to do the new rule and the EP parts of the Near-Term Task Force in parallel. But if it comes down to where we are -- have to make a decision on one or the other, we are going to go -- come down on the new rule. So it was just resources.

MEMBER SIEBER: Yes. On the other hand, the same kinds of analytical tools apply to other kinds of gaseous release, and there is a lot of nationwide experience among the contract community

that could -- I'm curious about one of the things, since you brought it up.

One of the things that we have been looking at all along is station blackout. And we know that in order to implement station blackout the way the lessons learned from Fukushima taught me so far is it's going to take a rule change to do it.

On the other hand, you have been working on reg guides, and so forth, for the old rule and that -- would you want to continue to pursue issuing reg guides for a rule that you know you are going to change? Or would you just say, "We'll leave that go," work on the rule change, and then get out the regulatory guides associated with the new rule to correspond to it?

Are you going to drop off some work like that to --

MR. LEEDS: That's a good thought. Right. Why pursue something that we know that we are going to change, unless there is some technical reason that we need to answer those questions.

MEMBER SIEBER: Yes. Well, licensees I think will understand the intricacies of that. But if you put out a rule that really doesn't address the Fukushima situation, or a reg guide, it could confuse

the public into thinking you folks, including us, really aren't in touch with reality as to what has been going on. So I question that.

MR. LEEDS: That's a good point.

CHAIRMAN ABDEL-KHALIK: Harold, I just -- you've got 10 listed up there. I just want to underscore 10.2 is an item which I think is currently seen as out there beyond any near term. It's a really important critical item as far as I'm concerned, as long as we're sitting here underscoring things. And I hope that it gets started sooner rather than later. It has to do with command and control, Marty, and --

MR. VIRGILIO: Oh, yes.

CHAIRMAN ABDEL-KHALIK: -- the issue of who is qualified to do what when. And as a long-time plant operator, I just think it's really important to get started wrestling with that problem, because it's a big one.

MR. WIGGINS: I think it -- it is going to be started in a form that looks -- it actually looks like the integration of the emergency operating procedures, the SAMGs, and the EDMGs. You've got see where the -- how the procedures get integrated, and then you can think about roles and responsibilities, at least that's where we were when we were looking at

this.

MEMBER RAY: Well, I was glad what the Near-Term Task Force said about we're going to have to give attention to who is qualified to do what and what it takes to be qualified to assume responsibility and to provide direction. And that's going to be not only difficult but I think -- keep looking at Fukushima -- it has got to be a highlighted item. When do I take charge? And what authority do I have to make decisions as a non-licensed management person, for example?

MR. VIRGILIO: Or government official.

MEMBER RAY: Huh?

MR. VIRGILIO: Or government official.

MEMBER RAY: Or government official. Darn right. So I only mention it now, because I think among the things that we talk about, to me it's really an important takeaway from this experience. Not so much TMI, but here it really does I think have an important role to play. So I just wanted to mention it.

MR. VIRGILIO: We do, too. I think that there will be -- if TEPCO is successful with their sequence of events and their approach to understanding what happened, they will provide us additional

information around that. We also I think going into this believe that the structure in the United States is so much different than the structure in Japan for decisionmaking.

We would not be elevating the question about venting to some -- to Washington. That's something that's --

MEMBER RAY: Well, no. I'm worried about who is in the tech support center when this decision has to get made, and what their ability is to make that decision the right way. And I think that's implied in 10.2 the way it's written. I agree with it the way it's written.

And I just -- because you just listed 10 up there, to me it's a more difficult issue than merely the question of integrating SAMGs and emergency procedures. It has to do with who is empowered to make these decisions, what do their qualifications have to be. Today's environment -- that is going to be a tough challenge.

MR. WIGGINS: My point is that the -- we might -- it may end up that there is a different strategy for this. You know, so once we understand where that is going, I agree with you. The two go very close together. You know, if you have kind of a

procedure-driven operation, my point was you just have to understand what direction the procedures are going and where do the responsibilities lie. Do we still have the SAMGs decisions in the TSC?

Then, you ask the question, okay, now, what kinds of qualifications does a person need in order to make the decision to implement those?

MEMBER RAY: Just get started. Don't get distracted by other things.

(Laughter.)

This is going to take a long time to work out.

VICE CHAIRMAN ARMIJO: I have a quick question, and that is hydrogen control -- in view of the effects of hydrogen at the Fukushima plant, why -- how can this be a Tier 3 activity compared to spent fuel instrumentation in Tier 1? Just is it a skill set problem or what?

MEMBER BLEY: It's not a technology problem, I don't believe. Is it? Do you see it as one?

MR. VIRGILIO: I think you're right, Jim. I think this is, in fact, more information from Japan. We know we're getting after reliable containment vents early on, or containment venting early on, which I

think will help us.

Now, I think in defining reliable we have to go back and look at, why are those vents there in the first place? And it was really for the loss of cooling as opposed to relieving the hydrogen. But I think we are going to have that discussion with the stakeholders about under what conditions do you vent, and how do you use those vents? Which might take us beyond the original thoughts of why those vents are installed today.

MEMBER BLEY: But where they are installed might not get all the hydrogen out. It might have other paths.

MR. VIRGILIO: Right. And I think that's what we saw in Fukushima. While I think that's -- Jim's point, I think it's important to understand, you know, what seals failed under what conditions, how we wound up with the hydrogen in the various locations that it's in today. I mean, that's critical information I think to moving forward.

MEMBER POWERS: Well, why is that? It seems to me -- my take on it is this. We don't know where the hydrogen came from. And people have come out of the woodwork with hypotheses on how hydrogen might have got in there. There are enough possible

mechanisms that it seems to me, oh, we made a mistake when we did the hydrogen role. We thought inerting the containment was enough. We didn't have to worry about the reactor buildings for the ones and twos. We did for the threes. Mistake on our part.

There are lots and lots of potential paths. We will never have 100 percent assurance just for defense-in-depth. Let's go back, do something for the buildings, just like we did for the threes. And I don't care how it actually occurred at Fukushima. The next accident, it will come by some other path, because there seemed to be -- I mean, I get emails, people asking me if this is a reasonable mechanism or not in light of Fukushima. I don't know. I haven't been inside the plant. I really don't want to go right now.

(Laughter.)

There just seem to be lots of paths. Why not -- I mean, this is something we kind of know how to do. And I will admit if I had to do it, this seems like a really, really good opportunity to apply these catalytic passive hydrogen recombiners for this particular situation. I'm not wild about them for every situation, but this one looks like a good one.

Why don't we just do this? I mean, you

can find out all the details about Fukushima you want to. The next accident is going to be different, and you are still going to -- hydrogen is just a pain. Get rid of it. We know how to do it. Fix it.

MR. VIRGILIO: Well, we really do look forward to further interactions with you, then, as we take on this --

(Laughter.)

MR. LEEDS: All right. If we can go to the next slide, please. I've got about six more slides to get through. We have hope for 10:00.

The other two remaining -- the remaining Tier 3 recommendations you see before you. That would be reactor oversight process modifications, in light of what we learned from Fukushima, and staff training on severe accidents, including the severe accident management guidelines.

The next slide, please.

Additional issues -- many additional recommendations have been received, both from external stakeholders, including the Office of Science, Technology -- I'm sorry, the Office of Science and Technology Policy, from Congress, from our international counterparts, from other federal and state agencies, from the non-governmental

organizations, the public, the nuclear industry, and from the NRC staff.

We are in the process of beginning to evaluate these additional recommendations, and we are emphasizing, as Marty mentioned earlier, maintaining a discipline with regard to which recommendations are associated with the staff's efforts to implement the lessons learned from the Fukushima Daiichi event, and which recommendations are more appropriately addressed through other existing NRC processes, such as the 10 CFR 2.206 and 2.802 processes.

At this time, the staff has identified a number of additional issues with a clear nexus to Fukushima Daiichi that may warrant regulatory action but which were not included in the Near-Term Task Force recommendations, and those issues are shown on the following slides.

If we can go to the next slide.

The additional issues, as you see them there, are filtration of containment vents, instrumentation for seismic monitoring, certainly the basis for the emergency planning zone size.

MEMBER CORRADINI: That goes both ways, though, I assume.

MR. VIRGILIO: Yes.

MEMBER CORRADINI: In other words, if you are going to go through this, there may be analyses that show that some are too large. They can be structured in terms of directional emergency planning versus -- I interpreted this to mean that it wasn't just to grow them, it was to analyze them in a risk-informed manner.

MR. VIRGILIO: Yes. I mean, we are not entering this with the notion that they are undersized.

MEMBER CORRADINI: Okay.

MR. LEEDS: Okay.

MEMBER CORRADINI: Sorry.

MR. LEEDS: No. Thank you for that. The next slide?

We had six items that we included in the paper -- pre-staging of potassium iodide beyond 10 miles. --

MEMBER RYAN: Before you leave that point, the pre-staging of potassium iodide has an up and a down side. It is not without allergic reaction in the population. It is not huge, but it is certainly not trivial. So I hope on that kind of an issue, as well as the order to evacuate or not, which carries with it loss of life and property, if you do it, that those

balances get evaluated carefully.

Now, you know, what happens during an evacuation, for example, is very site-specific, as I'm sure you can recognize. But, again, we are balancing risks. We are balancing the risk of an evacuation to the risk of not -- and sequestering in place and using KI and those kinds of things. So it is tradeoffs that you are evaluating, not one path forward.

So I hope that gets a little bit more detailed attention as you revisit these issues.

MR. WIGGINS: In both KI and the EPZ, the staff is not entering it with a bias toward we have to make a change. But we need to be open to the possibility that we might. So we -- there has been various issues raised by stakeholders questioning this -- these two issues. And we just think we want to ask ourselves -- understand, these six items are at the consideration stage.

We haven't even completed that. But I think it's fair to say that the bias -- we are not entering it under a bias that we are convinced that we have to -- we have to expand the EPZ or convinced we have to expand use of potassium iodide or --

MEMBER RYAN: You may determine you might have to shrink it, it would be better to shrink it.

So I think the point is it's a two-way street, and those issues are very much interrelated. Having participated personally in the evacuation from several hurricanes in the southeast, I haven't been in one where there wasn't deaths on the highway. So it's not without risk.

MR. LEEDS: Thank you. And as Jim mentioned, these are just under consideration by the team at this point.

MEMBER RYAN: I just offer that, because I deal with that --

MR. LEEDS: Thank you.

MEMBER RYAN: -- and make sure we look at all of the variables.

VICE CHAIRMAN ARMIJO: What is the thought about transfer of spent fuel to dry cask storage areas? Is the thought there to accelerate it or evaluate it or --

MR. VIRGILIO: Accelerate is what some of the stakeholders believe, and we want to give that further consideration, because we know that that may not be the answer.

MR. LEEDS: From a heat standpoint, we have already done that study, and it is irrelevant. Now, if you are looking at it from a source term,

perhaps there is. So --

VICE CHAIRMAN ARMIJO: But it is happening anyway.

MEMBER RYAN: Sam, is your question -- is it the idea of putting it in dry storage casks as opposed to having a higher inventory in a fuel pool?

MR. VIRGILIO: Yes.

MEMBER RYAN: So that's the point.

VICE CHAIRMAN ARMIJO: Well, I understand it, but it's happening anyway. You generally need to do that. They -- so this -- the idea here is, let's get it done as quickly as we can, and somehow that will solve the problem.

MR. VIRGILIO: That's what has been recommended.

VICE CHAIRMAN ARMIJO: Well, okay.

MR. VIRGILIO: And that's why we have this under consideration.

VICE CHAIRMAN ARMIJO: Okay.

MR. LEEDS: And then, the last one, loss of ultimate heat sink. Just for the Committee, the staff expects the list of potential additional recommendations to continue to increase as we receive feedback from our external stakeholders through our interactions in the international regulatory

community, and as we learn more from the Fukushima Daiichi event.

As additional recommendations are raised, we will evaluate them and we will propose action as appropriate.

Next slide, please.

Just briefly, I know that this isn't the Committee's focus. However, this is going to have huge resource implications for the staff, and will greatly affect the staff going forward. It is one of my chief concerns. On this slide you can see the number of FTE that we are considering for 2012 and 2013. It's a best estimate, could exceed those estimates.

Just for your information, for this past year that just ended, the fiscal year '11, we spent 32 full-time equivalents, 32 bodies, on Fukushima. That is the staff. That doesn't include management. So it has already had an impact on the staff and an impact on our work going forward.

CHAIRMAN ABDEL-KHALIK: But it is kind of interesting looking at the estimated total, realizing that there is a large error bar associated with these numbers that is still consistent with the completion time of five years for all tasks.

MR. LEEDS: Yes.

MEMBER REMPE: Because it does impact things. In this report you issued, SECY-11-0137, you mention the joint DOE/NRC study, to start trying to understand the sequence of events that occurred. But there is another important aspect of trying to use -- influence the data that are actually obtained out of these reactor vessels. And has that been considered in this resource estimate?

And don't you think it's important, if you are going to try and gain lessons learned, that you have some focus in that area, to try and obtain the appropriate data samples, understanding where the end state of the core -- with it relocated to the lower head, where it is and how the melt progression occurred? And how will you address that?

MR. VIRGILIO: That is going to take us years to do. But, I mean, let me first talk about the timeline for a minute. There are a couple of activities going on. The TEPCO, with some sort of INPO, is now actually doing a three-step approach to developing the sequence of events. The first is, what happened with the reactor? The second is, what happened with emergency preparedness? And the third is -- goes to Harold's point about decisionmaking, and

how that all played out in Japan.

Now, the memorandum of understanding that we signed with DOE is to gain insights that will help us improve our codes for modeling accident progression. So there are two parallel efforts ongoing at --

MEMBER REMPE: Based on the limited data that are out of Fukushima.

MR. VIRGILIO: Right. I think that we are going to need more data as time goes on. As some of you who have been around here as long as I have might remember how long it took us to get the data from Three Mile Island. So this is a long-term effort. We know we need to do it, and we know it will, in fact, influence our decisionmaking further down the road.

MEMBER REMPE: I think it's something that -- it ought to be requested and be thought about, because some of those issues and what data you want and initial insights with a camera maybe won't have to be as long as it was after TMI. And I think that that would be something important to do.

MR. VIRGILIO: Yes. Maybe we've got advances in technology -- robotics and cameras -- that can help us accelerate the timelines. But we know we need to do it.

MR. LEEDS: Next slide, please.

The next steps, as you saw in the October 3rd paper, these are the three IOUs that we left with the Commission. We need to provide them -- get back to them and provide them an evaluation of the Tier 3 items, the schedules and resource impacts.

We are continuing to identify and provide a prioritization for those additional issues, the six that I had mentioned. And we plan on providing the Commission with our initial thinking with regard to how we will proceed with regard to the Near-Term Task Force Recommendation 1, which looks at an extension of the design basis.

The next slide, maybe the most important slide, ACRS involvement.

(Laughter.)

As I said at the beginning, the staff -- the Commission directed the staff to include scheduled milestones and recommendations for appropriate stakeholder engagement, and specifically involvement of this Committee.

In our October 3rd paper to the Commission, the staff has identified areas where we anticipate your involvement. These include those areas where the staff routinely interacts with you,

such as on rulemaking and regulatory guidance.

As the staff implements the recommendations in this paper, in accordance with Commission direction, we will look for other potential areas where engagement with the ACRS will enhance the staff's technical and regulatory decisionmaking.

That's our presentation.

MEMBER BLEY: I would like to say something to you that is a little different from what some of my colleagues have said. When we put operators -- or when they end up in a spot where they really are operating blind in some areas, the problem is not just one of some minor diversion or, you know, additional stress. It is a state of confusion that can lead to bad decisionmaking and get you into serious problems.

Back at TMI, we decided we finally ought to have vessel level indication. After a number of unfortunate and very confusing events for operators during shutdown/draindown conditions, we added much more reliable instrumentation for loop levels. And this one might be the place to say, "Let's take a better look at instrumentation of the spent fuel pools and maybe other conditions."

The other piece of that, you have an

integrated program, which is trying to reduce the chances of some of the problems that led to concrete falling down, other problems that compounded the situation. So I think as part of an integrated program we get benefits. And I think that thing for the operators is very important.

CHAIRMAN ABDEL-KHALIK: Are there additional questions to our presenters today?

(No response.)

Well, thank you very much. We appreciate your presentation. It was very informative and very thoughtful.

Thank you very much. We look forward to further cooperation.

We are off the record.

(Whereupon, at 9:59 a.m., the proceedings in the foregoing matter went off the record.)

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

ACRS Briefing on the Japan Near Term Task Force Report – Prioritization of Recommendations

Martin Virgilio
Deputy Executive Director for Reactor and Preparedness Programs
October 7, 2011

Prioritization of Near-Term Task Force Recommendations

Eric Leeds
Director of the Office of
Nuclear Reactor Regulation

Agenda

- Background
- Prioritization of NTTF Recommendations
- Additional issues
- Resources
- Next steps

NTTF Conclusions

- No imminent risk from continued operation and licensing activities
- NTTF report provided 12 overarching recommendations addressing principles of defense-in-depth, protection, mitigation and emergency preparedness

Status of SRM-SECY-11-0093

- Required four Notation Vote Papers on NTTF report:
  - Proposed charter (complete)
  - Staff recommendations (complete)
  - Prioritization (complete)
  - Recommendation 1 (due within 18 months)

Staff Review of NTTF Recommendations

- Commission paper (SECY-11-0124) contains staff's assessment of the NTTF recommendations that can and, in the staff's judgment, should be initiated, in part or in whole, without delay

Prioritization of NTTF Recommendations

- Commission paper (SECY-11-0137) contains staff's prioritization of the NTTF recommendations, including:
  - Recommended regulatory actions
  - Implementation challenges
  - Technical and regulatory bases
  - Additional recommendations
  - Schedule and milestones

Three Tiers of Recommendations

- Tier 1 – Start without delay
- Tier 2 – Start in the near term
- Tier 3 – Longer term actions

Tier 1 Recommendations

- Recommendations which should be started without unnecessary delay and for which sufficient resource flexibility, including availability of critical skill sets, exists

Tier 1 Recommendations

- Seismic and flood hazard reevaluations (2.1)
- Seismic and flood walkdowns (2.3)
- Station blackout (4.1)
- 10 CFR 50.54(hh)(2) equipment (4.2)

Tier 1 Recommendations (cont'd)

- Reliable hardened vent for Mark I and Mark II containments (5.1)
- SFP instrumentation (7.1)
- Strengthening on-site emergency response capabilities (8)
- Emergency preparedness (9.3)

Additions to Tier 1

- Reliable Mark II Containment Vents
  - Concurrent with Mark I (5.1)
- SFP Instrumentation (7.1)
  - Interact with stakeholders regarding functional requirements
  - Issue order requiring implementation

Tier 2 Recommendations

- Recommendations which could not be initiated without delay due to factors that include:
  - Need for further technical assessment and alignment
  - Dependence on Tier 1 issues
  - Availability of critical skill sets

Tier 2 Recommendations

- SFP makeup capability (7.2, 7.3, 7.4, and 7.5)
- Emergency preparedness (9.3)
  - Remaining portions with the exception of ERDS capability

SFP Makeup Capability (7.2, 7.3, 7.4, and 7.5)

- Engage stakeholders in support of rulemaking activities to provide reliable SFP instrumentation and makeup capabilities
- Development of regulatory basis, proposed rule and implementing guidance

Emergency Preparedness (9.3)

- Tier 2 - remaining portions with the exception of ERDS capability
- Engage stakeholders on planning standard elements
- Issue order requiring necessary changes

Tier 3 Recommendations

- Require further staff study
- Follow after Tier 1 actions
- Depend on critical skill set availability
- Depend on resolution of NTTF Recommendation 1

Tier 3 Recommendations

- Ten-year confirmation of seismic and flooding hazards (2.2)
- Seismically induced fires and floods (3)
- Reliable hardened vents for other containment designs (5.2)
- Hydrogen control (6)

Tier 3 Recommendations (cont'd)

- EP for prolonged SBO and multiunit events (9.1, 9.2, 10)
- Enhanced ERDS capability (9.3)
- EP-related decision-making, radiation monitoring, and public education (11)

Tier 3 Recommendations (cont'd)

- Reactor Oversight Process modifications (12.1)
- Staff training on severe accidents, including SAMGs (12.2)

Additional Issues

- Additional issues identified by external stakeholders and NRC staff
  - Disciplined assessment of relationship to Fukushima lessons learned
  - Future assessment and potential prioritization

Additional Issues

- Filtration of containment vents
- Instrumentation for seismic monitoring
- Basis of emergency planning zone size

Additional Issues (cont'd)

- Prestaging of potassium iodide beyond ten miles
- Transfer of spent fuel to dry cask storage
- Loss of ultimate heat sink

Resources

- Tier 1 and Tier 2 estimates
  - Fiscal Year 2012 – 30 FTE
  - Fiscal Year 2013 – 90 FTE
  - Total (including out years) – 205 FTE

Next Steps

- Evaluate Tier 3 schedules and resource impacts
- Identify and provide prioritization of additional issues
- Provide options regarding NTTF Recommendation 1

ACRS Involvement

- SRM-SECY-11-0093
  - Required staff to identify areas for involvement of ACRS
- SECY-11-0137
  - Areas for ACRS involvement
    - Rulemaking, including associated regulatory guidance
    - Other potential areas

Acronyms

- EP – Emergency Preparedness
- ERDS – Emergency Response Data System
- FTE – Full-Time Equivalents
- NTTF – Near-Term Task Force
- SAMG – Severe Accident Mitigation Guidelines
- SBO – Station Blackout
- SFP – Spent Fuel Pool