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NUCLEAR REGULATORY COMMISSION

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591st MEETING

ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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THURSDAY

FEBRUARY 9, 2012

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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., J. Sam Armijo, Chairman, presiding.

COMMITTEE MEMBERS:

J. SAM ARMIJO, Chairman

JOHN W. STETKAR, Vice Chairman

HAROLD B. RAY, Member-at-Large

SAID ABDEL-KHALIK, Member

SANJOY BANERJEE, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

JOY REMPE, Member

MICHAEL T. RYAN, Member

STEPHEN P. SCHULTZ, Member

WILLIAM J. SHACK, Member

JOHN D. SIEBER, Member

GORDON R. SKILLMAN, Member

NRC STAFF PRESENT:

ANTONIO DIAS, Designated Federal Official

JAMES BURKE, RES/DE

MICHAEL CASE, RES/DE

NILESH CHOKSHI, NRO/DSEA

ERIC LEEDS, NRR

ROY MATHEW, NRR

SHEILA RAY, RES/DE

DAVE SKEEN, NRR/JLD

ROB TAYLOR, NRR

MARTY VIRGILIO, DEDO

GERALD WAIG, RES/DSS*

JAMES WIGGINS, NSIR

ALSO PRESENT:

SCOTT BAUER, NEI

ADRIAN HEYMER, NEI

ED LYMAN, Union of Concerned Scientists

JIM RICCIO, Greenpeace

*Participating via telephone

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Adjourn

P R O C E E D I N G S

8:30 A.M.

CHAIR ARMIJO: Good morning. The meeting will now come to order. This is the first day of the 591st Meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting the Committee will consider the following: first, status update on implementation of the

Near-Term Task Force, NTFF, recommendations; second, Draft Final Regulatory Guide 1.93, "Availability of Electric Power Sources"; third, Draft Final Report on the Biennial ACRS Review of the NRC Safety Research Program; and four, 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 from members of the public regarding today's sessions. Mr. Bob Leyse has requested time to make an oral statement regarding the report on the biennial ACRS review of the NRC Safety Research Program.

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

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.

At this time, I would like to welcome staff and the presenters and I would like to turn this part of the meeting over to Professor Abdel-Khalik to lead us through the discussion. Said?

MEMBER ABDEL-KHALIK: Thank you, Mr. Chairman.

Today, the staff will brief us on their plans for implementing Tier 1 recommendations of the Near-Term Task Force on Fukushima, as amended, by the SRMs to SECY-11-0124, SECY-11-0137, Section 402 of Public Law 112-74, and the staff's screening of stakeholder recommendations including our own recommendations.

Specifically, we will hear about the draft 50.54(f) letters to be issued to address Recommendation 2.1 for seismic flooding and other

natural external hazards reevaluations; Recommendation 2.3 for seismic and flooding walkdowns; and Recommendation 9.3 for enhanced emergency planning, communications, and staffing.

We will also hear from the staff about the orders to be issued to address Recommendation 4.2 regarding mitigating strategies for beyond design basis external events; Recommendation 5.1 regarding reliable hardened BWR vents; and Recommendation 7.1 for reliable spent fuel pool instrumentation.

The staff will also discuss planned rulemaking activities associated with Recommendation 4.1 regarding station blackout and Recommendation 8 regarding integration of on-site emergency procedures.

Before we get into all of that, the staff will present their screening process for additional stakeholder recommendations including our own recommendations and the six additional issues identified in SECY-11-0137 and the disposition of such recommendations.

Today, we will also hear from NEI regarding the industry's response to Fukushima and the proposed FLEX approach to expediting implementation of the Fukushima lessons learned.

We are scheduled to go until noon today.

We will try to finish a few minutes early to allow people the opportunity to observe the historic affirmation vote on the Vogtle COL.

So without further delay, I'd like to call on Mr. Marty Virgilio, the Deputy EDO for Reactor and Preparedness Programs, to begin the staff's presentation.

Marty?

MR. VIRGILIO: Good morning. And thank you very much for that introduction. You have pretty much laid out the expectations for this presentation and what we'll be talking about today. And with me today I have two of our Steering Committee members, Eric Leeds, Director of NRR; and Jim Wiggins, Director of NSIR, and they'll be helping to respond to any questions that you might have.

In addition to what was laid out in terms of the objectives for this meeting, I just wanted to say that one of the things that I want to try to make sure that you understand at the end of the presentation is how we've adjusted our thinking since the October time frame, since that October 3rd paper that you referenced in your introductory remarks; how the ACRS's recommendations were part of what influenced our thinking and caused us to change our

direction. And third, I'll share for you and the public probably -- well, actually for the first time, what specifically is included in the 50.54(f) letters and the orders that we'll be providing to the Commission on February 17th.

That said, this is the third time that I think I've been here before you to talk about Fukushima. And we were, in fact, heavily influenced by the two letters you sent us, the letter back in October and the letter back in November. And I'll get into the specifics of that.

In terms of my introductory remarks, I just wanted to talk about a couple of things that have guided the Steering Committee as we have moved through this process. The first is that given the findings of the Near-Term Task Force and our assessment of those findings, we don't see any immediate safety issues that require us to take an action. That said, one of our principal objectives is to not distract either the NRC staff or the industry's focus from the safety of the operating reactor fleet.

We have been, I think, very disciplined in how we've addressed additional issues and potential lessons learned from Fukushima and I'll talk specifically about the process that we have used to

address additional issues, including those that were provided in your two letters to us. It's really important to us and it has been that we do not displace work that is of higher priority or higher safety benefit. And that's been a challenge because there's been a lot of additional work placed upon us as a result of Fukushima.

We have done our best to move forward to implement our -- proposed implementing the right requirements the first time. And I saw that in your letters to us is a sense that we wanted to make sure that what we were -- what you were recommending, what we were going to do in terms of response to that was not something that would need to be done over again because we've missed the point.

And finally, the lessons learned that we've gained through 30 some odd years of experience at the NRC of imposing requirements have taught us about having guidance available at the time that we issue our requirements, ensuring our expectations are clear, and ensuring that we take stakeholder input, and use that to shape the requirements.

So with that introduction, I'd like to go to Slide 2 and just go with a little bit of background. The October 3rd paper that SECY-0137, we

placed a number of the Near-Term Task Force recommendations into tiers. And Tier 1, just so we're all on the same page, were those recommendations which the staff determined should be started without unnecessary delay, where we had sufficient resources, and availability of critical skills.

Tier 2 were those recommendations that couldn't be initiated immediately due to a number of factors including the need for some additional technical assessments, alignment, the right skill sets. Those are the kinds of things that put an item into Tier 2.

And then Tier 3 were those recommendations that require additional staff study before we were ready to move forward.

Recent events have shaped our thinking as I mentioned in my introductory slide. And I would go to the House and Senate hearings as one of the events that have influenced our thinking, the language in the appropriations bill; your two letters, October 13th, November 8th; the NEI letter of December 16th that provided the FLEX; the resolution of six additional issues that we identified in the SECY paper; and the comments that we received from stakeholders.

We opened up a mailbox and stakeholders

had the opportunity to provide us comments. We had a meeting on the 13th with industry, a steering committee, the steering committee meeting where we received comments from industry and stakeholders. And then subsequent week, I think it was the week of the 16th of January, we had a number of stakeholder meetings and we were also influenced by what we heard during those meetings.

If we can go to Slide 3, as was mentioned in Said's introduction, the appropriations language, Section 402 did two things. I would say it focused us on other external hazards and that was an item that was addressed in your letter to us, so it came as no surprise and we were already thinking down those lines as a result of your recommendations to us. So other external hazards are being addressed as part of Recommendation 2.1. And I'll talk a little bit about that in detail when we get to that.

And then the accelerated schedule and I've underlined the language there that speaks to the accelerated schedule. They basically said do as good as you outlined in your October 3rd Commission paper or do better than that. And so that was an influence on our thinking about the schedules.

CHAIR ARMIJO: Marty, before you go

forward, related to the accelerated schedule, do you have based on the language in the law, does the staff feel it has adequate flexibility to adjust either the amount of effort put on to any particular Tier 1 activity compared to another Tier 1 activity that may be more important? Are all Tier 1 activities viewed as equally important getting equal resources?

MR. VIRGILIO: They're getting sufficient resources to get us to the finish line on each one of them. I wouldn't say they're equally important. I think we would see some of higher priority than others. I would point to 4.2 as an example, the mitigation systems for dealing with extreme external events as being probably more important than the instrumentation on the spent fuel pools. That said, we've worked them all. We've had, fortunately, as a result of mostly the resources of these two gentlemen, we've been able to meet the schedules.

CHAIR ARMIJO: Just to make sure I get to where I'm trying to get, in our previous letter we had provided some recommendations related to I believe spent fuel related stuff about reconsidering the effort in that. It's right now in Tier 1, but we said until you've done some risk work, you know, reconsider that as placement. And do you have the flexibility to

do that if you think it's the right thing to change it?

MR. VIRGILIO: Yes. We have worked that and some items we've accelerated -- we've kept in Tier 1. We've moved into Tier 1. We've moved into Tier 3. We have exercised that flexibility.

CHAIR ARMIJO: But as far as moving something that's currently in Tier 1 into say Tier 2 or Tier 3, do you think you have that flexibility?

MR. VIRGILIO: We did it, yes. We had that flexibility and we have done that.

CHAIR ARMIJO: Thank you.

MR. VIRGILIO: So we've made our adjustments since October as a result of all these external influences and our own thinking.

As for the schedule, in the paper that we provided on October 3rd, we promised the Commission that we would have the orders in the 50.54(f) letter some time this summer. We were thinking some time between June and August. So now we've accelerated the schedule and our intent is to provide them to the Commission on the 17th of February.

So if we can go on to Slide 4. The staff developed a process for reviewing all the stakeholder recommendations we received. We tested that process

with your recommendations to us as well as recommendations we received from others. And at this point, all of your recommendations have been reviewed then prioritized.

The next slide, Slide 5, is just a brief pictorial of how this works. And you can almost think about it in three segments. The first segment is our senior level advisors and we put together an ad hoc group of our best SLS to look at the additional issues that we received from stakeholders. They do a screening and make recommendations to us based on the validity of the issue and the nexus to Fukushima. This goes back to my opening point is it's important, I believe, that we exercise discipline.

One of the lessons learned personally from Three Mile Island is that a lot of people had a lot of good ideas and they took the opportunity to leverage the events of Three Mile Island to bring those to the table and we wound up imposing, if you all probably remember, NUREG-0737 and some of the other things we did at the time. Every good idea that everybody had was imposed at that point in time. And we're not going to make that mistake again.

MEMBER ABDEL-KHALIK: So how would this process prevent rework of activities that had already

started?

MR. VIRGILIO: This process in itself not necessarily will prevent the rework. What it's going to do is prevent us from taking on within Fukushima, specific issues that probably ought to be dealt with in other processes. And as a matter of fact, there are a couple of your own recommendations that we believe fall into that category. We're not dismissing them. They're very important. But we just don't believe that they ought to be tied to Fukushima.

MEMBER ABDEL-KHALIK: Going through this process for the first time, addressing either the six additional issues you had in SECY-11-0137 or the ACRS recommendations in the two letters, doesn't really impact anything that had already started. But a year from now, after activities on some of these recommendations had already started, if somebody comes up with a bright idea, would you need to adjust this process to prevent rework of ongoing activities?

MR. VIRGILIO: We might, but I don't see it right now. I'm trying to think through an example of something that would cause us to do that again and I'll talk a little bit about filter vents in the context of venting the BWRs and other containments which might be an example that we could talk about in

that context.

MEMBER CORRADINI: Yes, let's talk about that one some.

MR. VIRGILIO: We will get to it, Mike, I promise.

MEMBER ABDEL-KHALIK: I think it's something that you need to think about because this works well with no sort of direct impact once you -- when you're evaluating essentially a brand new set of recommendations. But if you have things going on already at different stages, somehow you have to incorporate that into your screening process.

MR. VIRGILIO: Yes. Yes, we will. The second stage of the process, if those senior level experts believe that an issue is valid, it's tied to Fukushima, that we ought to work on it, they pass it through to the Steering Committee, then the Steering Committee makes a decision on how we're going to disposition the issue. And typically, it goes into one of the three tiers or it goes into another program that we have ongoing. All of this becomes visible to the stakeholders as we post it up on the website and that's our intent.

MEMBER CORRADINI: So this is, in some sense, I just want to make sure I understand, Marty,

at least -- I think Said's point is valid, but the way you're describing it, this is kind of a living document that if somebody wants to understand where things are they can see it.

MR. VIRGILIO: A living process, yes. I wouldn't say it's so much a document, but it's a process that we have. And then we'll keep posting on the website the results of our evaluation of new issues. And it seems like every day we get another report with new issues that we want to screen through this.

MEMBER CORRADINI: Thank you.

MR. VIRGILIO: The next page is the beginning of several charts that are very specific in responding to the recommendations that you provided to us in your two letters.

MEMBER CORRADINI: Can I ask maybe a slightly different question? It's kind of what Sam asked, but differently. If you took the conferees' direction and screened it through your process, would you have changed anything? In other words, if it weren't -- do you know what I'm trying to ask?

MR. VIRGILIO: In essence, going to all external hazards, right, we have taken your recommendation and we have screened it through and

already decided that we were, in fact, going to work it, that we were going to expand 2.1 and 2.3.

MEMBER CORRADINI: I should have used us not --

MR. VIRGILIO: Right. So by the time we got to the --

MEMBER CORRADINI: Bad example.

MR. VIRGILIO: -- conferees' report it was already decided that we were going to expand the scope of our review. No, that was a good example.

MEMBER CORRADINI: Thank you.

MR. VIRGILIO: So what I have on the next several charts is very specific of how we have dispositioned each of your recommendations and I think we could spend the entire meeting here, but I don't think that's a wise expenditure of our available time. So what I want to do is I want to touch on the ones that I thought were the most important and that if you want to come back we can talk about any of them. But if you look at Slide 1 and the way this is laid out, the first of these slides addressed the Tier 1 items and then I'll get into the Tier 2 items and the Tier 3 items.

MR. LEEDS: Next slide.

MR. VIRGILIO: Yes, next slide, please.

CHAIR ARMIJO: You're in control. Eric, you got the job.

(Laughter.)

MEMBER CORRADINI: I think the back room, if you just wait, the back room will do it for you. You guys are used to the Commission meetings. Here we do it ourselves. We don't have the resources.

(Laughter.)

MR. VIRGILIO: So on the first chart just to focus on the Tier 1 actions, and I would just take one specific is you recommended that we expand the scope of the walkdowns, Recommendation 2.3, to include the integrated effects of severe storms. And the staff evaluated this request and expanded the scope of the walkdowns, so now we are, in fact, looking at the integrated effect of severe storms as part of that process.

Just going on to Slide 7, again we're still with Tier 1 recommendations and the one I thought was the most significant on this slide is that you recommended that we also apply the Near-Term Task Force Recommendation 5.1 which was the vents that you recommended that we apply that not only to the Mark I containments, but also the Mark II containments. And so we have. And that is included as a Tier 1 item as

we move forward.

Slide 8, now we start getting into what we categorized into Tier 2 from your recommendations and I think the most significant on this slide is that you have recommended us to expand the scope of the Near-Term Task Force Recommendation 2.1 to include an update of our guidance, an expedited update of our guidance related to flood protection. And we have --

MEMBER ABDEL-KHALIK: If we could just look at the right hand side, the first bullet. Is this really a Tier 2 item? If so, why is the 50.54(f) letter associated with other natural external hazards being issued now?

MR. VIRGILIO: We are, in fact, going to be -- because of resources. It really comes down to our resources and industry resources. What we want to do is we want to focus on flooding and we want to focus on seismic. Other external events to some degree will be picked up during the flooding evaluation, but things such as extreme temperatures, droughts, and other external events are now in our mind best dealt with as a Tier 2 item because we just don't have the resources to do it all and we've made a prioritization based on our assessment of external events and the safety significance of external vents.

MEMBER ABDEL-KHALIK: Marty, I'm sorry to interrupt, but this specific item has been included as a result of congressional directive and you're saying that this item is a Tier 2 item?

MR. VIRGILIO: Yes.

MEMBER ABDEL-KHALIK: Even though you're issuing 50.54(f) letters now?

MR. VIRGILIO: Yes.

CHAIR ARMIJO: I misunderstood that.

MR. VIRGILIO: The congressional direction is to expand to other external events. Tier 2 is not two years from now. It's as resources become available, we will shift from the flooding and it's mostly the flooding folks. It's that expertise that we find that we're going to have to draw on to deal with the other external events primarily. And we believe that flooding from a safety significance is a higher priority and that's why we want to put our emphasis there, especially when you think about the margins, the small margins you might have. You call those the cliff edge effects that we've talked about in the past.

So I guess we didn't feel constrained by the congressional direction that we had to do it as a Tier 1 item and displace --

CHAIR ARMIJO: I hope not.

MR. VIRGILIO: -- and displace something that may be more important to safety.

MEMBER CORRADINI: But just to clarify Said's question, but yet from the standpoint of information gathering, now is when you're -- as we read the appendices --

MR. VIRGILIO: It will -- we're going to be delaying that piece. Rob, do you want to?

MR. TAYLOR: This doesn't preclude us issuing a separate or additional 50.54(f) letter to gather the information we need on other external hazards. We will consider that as we move through and take action on the Tier 2 action regarding that. So we'll gather some of the information we need related to the flooding now with the 50.54(f) letter we're planning to issue, but we may need to issue an additional 50.54(f) letter to gather additional information to resolve that particular piece.

MEMBER ABDEL-KHALIK: Let me just be clear, so enclosure 3 that you forwarded which pertains to other natural external hazards will not be included in the 50.54(f) letter to be issued soon?

MR. VIRGILIO: I'm not sure. We've got a version control question right now in my mind as to

which enclosure 3 you're talking about.

MEMBER STETKAR: There's an enclosure that talks about things like high temperature, high wind.

MR. VIRGILIO: Do you know the relative time frame of that?

MEMBER STETKAR: It's the one that's on the web, Marty.

MR. VIRGILIO: Okay, so it's the one that we used for the meetings.

MEMBER STETKAR: Okay.

MR. VIRGILIO: Our thinking has advanced since that time. At that point in time, we were thinking that we were going to be able to do it all at once, but now where we are, having gone through and looked at the resources, looked at the skill sets that we need, we've come to realize that we can't do it all at once. So what you have is a version that we used the week of the 16th in the stakeholder meetings. Right now, that's not the current working version.

MEMBER CORRADINI: Okay, that helps. It helps me a lot.

MR. VIRGILIO: Sorry for the confusion.

CHAIR ARMIJO: It's not confusion, it's relief.

MEMBER ABDEL-KHALIK: I think just you

indicated we have sort of a version control here. And I think it would be important that at the end of the day that we get copies of the latest version of the 50.54(f) letter or letters that you plan to issue so that our letter and comments would be directly pertinent to what you intend to do.

MR. VIRGILIO: We'll work with Mr. Hackett on that.

MEMBER ABDEL-KHALIK: Okay.

MR. VIRGILIO: All right. Slide 9, this is now -- these are the items we binned into Tier 3 from your recommendations. And I think that the one that I wanted to focus on which I think is a very important recommendation is that having to do with select reactor and containment instrumentation and ensuring that it can withstand beyond design basis conditions. We evaluated this recommendation as a Tier 3 and for all of the Tier 3 our thoughts are that in July we owe the Commission a paper with all the plans and schedules. So if you think about the paper we provided on October 3rd, each issue was addressed with an enclosure that laid out the detailed plans and schedules for how we were going to address the issue. And so all of our Tier 3 issues will be addressed in a similar manner in our July Commission paper.

MEMBER ABDEL-KHALIK: If you look at the third bullet in this slide, our recommendation regarding additional hydrogen control and mitigation measures in reactor buildings or plants with Mark I and Mark II containments is meant as a near term defense-in-depth measure for aging BWRs. Does the designation of this recommendation as a Tier 3 activity meet that objective?

MR. VIRGILIO: We are probably in a different place. I would say that we believe that we need to do additional study before we move out on that particular recommendation. And so we did not see that we had the -- all the technical issues addressed to the level that we thought we needed to to make it a Tier 1 and impose it today as we're imposing the vents for the Mark I and the Mark II containments.

MEMBER POWERS: What is the technical information you need?

MR. VIRGILIO: I think that as we get into the hydrogen generation, we're talking about severe accidents and most of what we're doing in Tier 1, I'd say all of what we're doing in Tier 1 is the prevention of severe accidents. Our objectives in Tier 1 are to ensure the core and spent fuel pool remain cool and the containment maintains its

functional capacity and capability.

MEMBER POWERS: I think I understand that. What I don't know is technical information you think you need to handle combustible gas control.

MR. VIRGILIO: I think it goes right down to how much is going to be generated and how are you going to deal with it beyond the inerting that you already have in those Mark I and Mark II containments.

MEMBER POWERS: That's not what this refers to?

MR. VIRGILIO: I know. You're looking at combustible gas control.

MEMBER POWERS: In the reactor building which is not inerted and what manifestly was a problem in these accidents that was not really anticipated at the time the hydrogen rule was written because we didn't think there would be a problem if, in fact, we inerted the containment. Manifestly, that's not true. And you're saying well, we need more technical information. I just want to know what technical information you need.

MR. LEEDS: Maybe I'll take a crack at it. We're very concerned about the venting capability for all the containments. Right now, we're focusing on Mark I and Mark II. I've had a lot of discussion with

Brian Sheron and we've got research taking a look at all the containments, ice condensers, large driers, everything, to take a look at how can we -- what we need to do in terms of hydrogen gas generation, the venting of these containments for each one of these containments. And we're looking at that as a Tier 1 issue where we're actually elevating our review of that for reactor buildings and for the things that you're talking about. We see that as a longer-term issue. We just don't have the resources.

MEMBER POWERS: I understand.

MR. LEEDS: And we think that the safety priority should be --

MEMBER POWERS: -- big enough, you will never have the resources. I'm just understanding why you've gone to Tier 3.

MR. VIRGILIO: That's what Eric said, Dana.

MEMBER POWERS: On this particular one, you've said -- I mean in the events of the accident, I do not need anybody to go into the containment and study things. I know absolutely we had hydrogen combustion events in the reactor building and that was a surprise to just about everybody because we thought inerting got us out of a problem there. Okay,

manifestly, it did not.

You're saying we've gone to Tier 3 because there's more technical information. I just want to know what that technical information is.

MR. VIRGILIO: Let me answer it a different way. As part of Tier 1 and as we look at the containment vents, part of the design requirements that will be included in that order could it be to look at the inter-connectivity to ensure that that doesn't happen, that you're not actually pumping gas into the secondary containment. It's actually going up. So the issue, in fact --

MEMBER POWERS: Additional technical information, you think you've solved the problem a different way?

MR. VIRGILIO: Now that I understand what your question is, yes. I believe that by ensuring that the venting is not going to lead to pockets of hydrogen gas in secondary containment. That's the issue.

MEMBER POWERS: But that's a very different response than what you've given me here.

MR. VIRGILIO: Yes.

MEMBER POWERS: I mean it's not my objective to argue with you over your prioritization.

It's to understand your prioritization.

MR. VIRGILIO: That's okay.

MEMBER POWERS: And what you're saying is this is not technical information that's --

MR. VIRGILIO: Now that I understand your question, ensuring that gas pockets, hydrogen gas pockets do not build up in the secondary containment as part of Tier 1. It's part of what we're going to require in the order with respect to containment venting.

MR. WIGGINS: Or another way to say is that in a very practical sense when you look at the things that we have laid out in Tier 1, there's a lot of technical work that the staff needed to get to the point where we are now. We focused strongly on the Tier 1 stuff with preventive type or mitigative type things to try to move away from the potential of having these severe type accidents. So we put a lot of attention on prevention in the 1, 2, 3 things that are looking at prevention. And it's not easy.

These are -- as you know, they're fairly complex ideas to try to get your hands around and even more complex to try to figure out how you can get something done relatively quickly as a screening level review to make sure or assure yourself that you don't

have real big problems out there in the operating facilities.

Then we start getting into what's left, what's next. You get, as Marty said, the 4.2 piece which has transitioned when you hear from industry into what they want to do with FLEX as a substantial amount of help that you can put in that puts distance, if successful, from wherever you are in a severe accident.

And then for in terms of hydrogen, we've been spending most of our time just trying to get our arms around the containment venting question in terms of what containment should we be venting, what does reliable mean, and then we've been -- we had introduced the question about whether it should be filtered. So had to kind of deal with all that.

Especially with what we know, we think the hydrogen got in the plant because they couldn't maintain the containment pressure. So if we can fix that problem, you can put a little distance between it and the hydrogen piece and then I can go on from there.

I would think that we just haven't had the opportunity to put the staff on to look at all the parameters. Yes, you can say -- I don't want to

belittle this. You make a statement that says sure, we can go hang instruments around, but that's not where it ends, right? If you put an instrument in there what are you going to do with it? That was the story we got into the last time we discussed the spent fuel pool. What are you going to do about it?

MEMBER POWERS: So you're going off on tangents that I didn't want to pursue and I don't want to argue on your prioritization. I just want to make sure I understand the prioritization. And what I understand now is what it says as the prioritization is not reality. The reality is you think you can solve the problem. I don't happen to agree with you, but that's okay. I'm not doing the job here. And we'll probably get a chance to discuss it again.

MR. WIGGINS: I would just characterize it as not necessary solve it, but put a lot of further distance to the problem would make it much more unlikely.

MEMBER POWERS: Well, no. We never solve.

MR. WIGGINS: It makes it much more unlikely, that's all.

MEMBER POWERS: We all know we never solve 100 percent, I can always find a sequence of events that undoes any solution to a problem. We just reduce

the probability of it. Okay, I understand better. I now wonder how many other categorizations have been made on a basis that's really quite different than what I understand it to be.

CHAIR ARMIJO: I think if I understand your philosophy is Tier 1 greater focus on prevention as opposed to mitigation in the event that everything fails.

MR. VIRGILIO: Not exactly.

CHAIR ARMIJO: Tier 1 doesn't presume --

MR. VIRGILIO: Not exactly, Sam. I would say that Tier 1 has got a mix of prevention, mitigation, and emergency preparedness. We looked at issues that we thought would have the most influence, but it is prevention of the severe accident and mitigation of a severe natural phenomenon before you get to a severe accident by ensuring that the core remains cool and that the spent fuel pool remains cool and the containment maintains its functionality.

The Tier 3 issues, I think, get us into what happens if those mitigation features don't work or are not fully successful.

MR. LEEDS: Please recall, also, that the critical skill set is very influential and in our minds about where we're going and how we tier these

things. And not only the staff's critical skill set, but also the licensees. We're going to send them off doing an awful lot of work. We want to make sure it's prioritized and we want to make sure that they focused on the right things first as we go through. We're going to need to get to all of them. But you've got to have some sort of an order.

MEMBER REMPE: Is it possible to elaborate a little bit more what you plan to do between now and July on the instrumentation? Are there going to be opportunities -- will you be discussing this with us before you go and have some sort of letter going to the Commission?

MR. VIRGILIO: If, in fact, you host the meeting, we can come and talk to you about where we are relative to all the Tier 3 items.

MEMBER REMPE: Okay.

MR. VIRGILIO: We'd be pleased to do that. And I think once we get beyond the February paper, we'll start to focus more intently on all of the Tier 3 items because we do owe the Commission a detail plan and schedule for each one of those in July. So some time later in the spring, I think it would be just an appropriate time for us to sit down on each one of these.

MEMBER REMPE: Sounds good.

MEMBER BANERJEE: I'd like to go back to Dennis' question. Are there some unresolved technical issues which are going to be tackled in this Tier 3?

MR. VIRGILIO: As a general rule, I would say yes, we do have some technical issues that we need to --

MEMBER BANERJEE: Could you give me an example?

MR. VIRGILIO: I think go right back to the severe accident instrumentation. I mean what are the environmental conditions that we are thinking about and --

MEMBER BANERJEE: I mean with regard to the hydrogen.

MEMBER POWERS: I could certainly think of one that's going to be just --

MEMBER BANERJEE: I think can of a couple, too. But let's see what they think.

(Laughter.)

MR. VIRGILIO: I think about how much are you going to have to deal with and what are the most effective ways to deal with the amount of hydrogen that might be generated in a severe accident.

MEMBER POWERS: But you've already dealt

with that problem.

MR. VIRGILIO: Pardon?

MEMBER POWERS: You've already dealt with that problem.

MR. VIRGILIO: We've dealt with it once, but I think we would want to go back and look again in light of the lessons learned.

MEMBER POWERS: You can go back and look, but I mean you've handled combustible gas in the Mark III reactor filter.

MR. VIRGILIO: Yes, we have.

MEMBER POWERS: And the amount of hydrogen that gets generated there is not going to be greatly different than the amount that gets here.

MR. VIRGILIO: When I think about how we disposition some of the six issues that we identified ourselves, we come back to that point. We believe we have addressed it in the past and we want to go back and make sure that our decisions remain valid in light of some of the lessons learned from Fukushima.

And we'll talk about some of the Tier 3 issues that we identified and that's the category we've placed them in. Confirmative research is sort of a way to couch that. You know, or you may know that we're working cooperatively with John Kelly over

in DOE to look at severe accident phenomenon, severe accident progression, to make sure that what we thought before Fukushima is, in fact, still true today.

MEMBER CORRADINI: If I might just add, and if something is calculated that turns out to be not there once the autopsy is done, try to learn from that.

MR. VIRGILIO: Yes.

MEMBER POWERS: I mean I know what I'm acutely familiar with, our ability to predict BWR core degradation accidents. I'm acutely familiar with the experimental database that underlies it. And it's much, much weaker than our ability to analyze PWRs. But on the other hand, the one area that I'm fairly confident of is that severe accidents will generate hydrogen.

(Laughter.)

MEMBER BANERJEE: I guess I thought you would tell me that we didn't know the areas of hydrogen control as well as we should and that we would investigate this.

MR. VIRGILIO: We'll look at it, but I'm not sure I would want to state that today that we don't know.

MEMBER BANERJEE: So you will look at it?

MR. VIRGILIO: As part of Tier 3.

MEMBER BANERJEE: Okay.

MEMBER ABDEL-KHALIK: Jack?

MEMBER SIEBER: Dr. Banerjee's point is a little bit along the lines of my thought. You know, Fukushima had hydrogen vents on containment and during the course of the accident apparently the hydrogen vents didn't work properly because the containment buildings were destroyed, the vents were destroyed.

What's the chance of us learning enough about what went wrong at Fukushima that caused these disasters to recognize that we have to do something about that in any requirements we place on U.S. reactors for hydrogen vents? To me, that's sort of a tough question and I'm not sure that in the time frame we're talking about it's practical to find the answer or maybe others know the answer and I don't. But perhaps could you fill me in a little bit on that aspect.

MR. VIRGILIO: From the information that we have as a result of the time line that was developed jointly by TEPCO and INPO, we understand that there was a delay in operating those events. The operators were thinking about the evacuation. They

weren't quite sure what to do. I think they were looking for signals from other -- higher authorities. And they delayed the venting and that delayed venting I think started the ball rolling that wound up in the containment failures. I see that to be a very different case here in the United States where the operators know what they need to do and I'm quite certain that they would take an action.

MEMBER SIEBER: So you presume that the vent pass where the containment itself actually leaked and put hydrogen in the buildings and that's what caused the buildings to be destroyed?

MR. VIRGILIO: The current thinking, based on our assessment is that the pressure built up inside containment and the head lifted, seals leaked, valves leaked, and allowed hydrogen gas to escape.

MEMBER SIEBER: Okay.

MR. VIRGILIO: And collect in various locations. The vents themselves may have been interconnected. If you look at what happened at Unit 4, I mean that's --

MEMBER SIEBER: I understand the system.

MR. VIRGILIO: Yes.

MEMBER SIEBER: Well, some place along the line I think you have to address this issue in the way

that you document the requirement that you're going to place on U.S. utilities in the new requirements.

MR. VIRGILIO: I think we have in the order --

MEMBER SIEBER: That's an open question to most people.

MR. VIRGILIO: I think we have in the order. And the order is, I think, mostly focused on ensuring that you have adequate means of cooling the core and that involves in the BWR, that system involves relieving heat from the containment as you put heat in through the RCIC. So that's sort of what we're looking at at this stage of the process.

Slide 10. I think again we're in the Tier 3 binning of your recommendations. The second bin on Slide 10.

Recommendation 8 is a Tier 1 recommendation. And rulemaking will be initiated to address the integration of emergency response capabilities.

MEMBER ABDEL-KHALIK: Yes. Now if fire response procedures are to be considered as a Tier 3 recommendation, would that increase the likelihood that significant rework would have to be done on the work already started on the integration of the EOP,

SAMGs, and EDMGs by the time you get to addressing Recommendation 3?

MR. VIRGILIO: I think not, because Recommendation 8 itself is a rulemaking that is proceeding on a three, four-year path. It's following the normal rulemaking process. So our thoughts were and looking at particularly seismically-induced fires and floods and how that fits into this is -- we'll be able to catch up with that rulemaking.

MEMBER STETKAR: Marty, I think were not necessarily focusing on seismically-induced fires and floods. Plants have existing fire response procedures to a greater or lesser degree of sophistication that require in some cases fairly innovative local operator actions and in that sense it seemed -- without trying to pigeonhole the cause of the fire which could have been a seismic event, it could have been some other cause, the plant operators still do have a varying degree of fire response procedures that are outside the scope of their normal EOPs and that may be in parallel or something with their other sort of guidance that are outside their EOPs.

So that was sort of the genesis of our concern, not necessarily specifically fire -- seismic-induced fires in the context of a seismic event.

MR. VIRGILIO: And when we discussed that, part of our thinking was that some of those procedures need -- should actually remain outside of the scope of what we're trying to do with the SAMGs and that it would be best to address some of those issues through on-site command and control of the operations staff. So there's a balance as to how much you want to put into those procedures and how much you want to leave to the flexibility of the operations staff in dealing with whatever situations arise at the time.

MEMBER ABDEL-KHALIK: The word "integration" includes at least definition of transitions and if fire response procedures are to be incorporated with the on-site emergency response guidelines, that would definitely impact the transitions amongst the different sets of procedures, especially if there are actions prescribed in those fire response guidelines that are counter to the actions prescribed in the EOPs as is the case now.

MEMBER BLEY: The nexus back to Fukushima on this one is there. That brought our focus back to it, but there have been events in the last five to ten years, several events in which it's the difficulty of having multiple procedures and operation at the same time have caused significant confusion in responding

to those events and that these could come up in the kind of events we're looking at at Fukushima really brought us together. And the idea of having the complete package of procedures for all sorts of emergencies as well as going on to the severe accident level and having them tied together seems one of whole cloth to us.

MR. VIRGILIO: And us as well. And this goes back to the seamless transition from one to another as situations change in the plant. So I don't think we're in disagreement. It's just a matter of how we're going to treat the fire protection or the fire response procedures which might be a question that we're going to need to discuss further as we move into the Tier 3 piece.

MEMBER BLEY: And here the problem isn't quite one of transitions. It's multiple things going on at the same time that you can't abandon one and sequentially go to the other.

MR. VIRGILIO: Right.

MEMBER BLEY: And that comes up in events as well.

MR. VIRGILIO: And I think we're going to have to make those judgments about command and control and how much you want to put into these procedures and

how much flexibility you want to leave for the plant staff to deal with some situations that arise. How much can you address through the procedures, I think is something that we ought to discuss further as we deal with this Tier 3 issue.

MR. WIGGINS: Is there a connection to -- you've got a fire that's sitting out that's a separate, currently separate regulatory question right now with the potential transition to NFP-805 base fire response. I believe that -- I don't understand why that would not result in a need for sites to kind of revise their procedures if they go to 805 because it's a different way to cope with this now. You've only got a couple moving parts in this at the same time.

MEMBER STETKAR: Half or slightly less than half of the sites have committed to go to 805. We still have the other half.

MR. WIGGINS: I understand we get to where the scenario that you describe because the fire, the current fire regulations don't require you to superimpose anything other going on on top of it. You aren't -- the requirements don't drive you to an EOP plus fire right now and that's how you get to the --

MEMBER BLEY: But Mother Nature has several times.

(Laughter.)

MR. WIGGINS: Yes, but the fire starts with the transformer failure and the oil in the transformer ignites, and that's what we've seen in operating experience, that's been the fire generation. So you have a loss of off-site power. You're in an EOP because of either a transient or something like that. Then you also have fire response. I guess -- I don't know, I think it's going to sound a lot like the combustible gas, but at least in -- it's in 3.

It's not off the Fukushima list of things to consider. I don't know that we've thoroughly wrung it out at this point. We've been, frankly, I believe that the Steering Committee at least have been focused on -- remember the Tier 1 mission from the Commission. Let's get a list of things that clearly can be put in place now without unnecessarily delay.

We had to be real careful about the extent of which we needed to think about things as we try to make at least our personal judgments on what wasn't necessary or unnecessary delay.

MEMBER ABDEL-KHALIK: Can you sort of walk through your logic by considering a so-called SISBO plant, self-imposed station blackout.

MR. VIRGILIO: Yes.

MEMBER ABDEL-KHALIK: Could you walk through your logic and convince me that at this stage you don't need to integrate fire response guidelines?

MR. VIRGILIO: I think with the SISBO plants what we need to do is make sure that they're in the first of the plants that we look at as far as the 805. And that's what we've tried to do, is try to make sure that they're the plants and a number of them are coming off of that position of self-induced station blackouts as part of the 805 strategies.

I think that's the more important focus to have on that right now than to continue to support that strategy.

MEMBER ABDEL-KHALIK: Wouldn't you think that inclusion or exclusion of these fire response procedures from the initial part of the rulemaking would impact the public response to that rulemaking and the thinking that goes along with what you're asking for in the rulemaking, so delaying inclusion which I just can't see how you can get out of it to a later stage would essentially impact the effectiveness of the process?

MR. LEEDS: I was purposefully trying to be quiet because I'm in a different place on this issue.

MEMBER ABDEL-KHALIK: That's perfectly fine.

MR. LEEDS: And I really appreciate your description about the importance of the transition. How do you transition from a conflagration into the EOP, into the SAMGs and working on that? I think that helped me better understand where you're coming from on this.

I'm coming from a different place from the whole Steering Committee and I'll have to speak for myself and not for the Steering Committee. I went along with this recommendation to put in Tier 3, but I don't think it's a Fukushima. The fires at Fukushima was not a problem at Fukushima.

If you go to K&K, they had seismically-induced fires. If you go to other experience, you've got seismically-induced fires or you have fires that you have to worry about. So I think that we pulled it into Fukushima. I kind of disagree that I don't think it belongs and we should handle it separately, NFP-805, through our separate processes.

Now that having been said, let's go to where we are now, Tier 3, rulemaking. I think that the rulemaking process needs to play out. If we have a lot of stakeholders bringing up the issue, hey, you

guys missed it, you should include fire in your holistic look at how you handle emergency situations at plants. And you should include that in the rule. I think that's part of the process. I think that's where it should be handled.

MEMBER ABDEL-KHALIK: This is part of the process.

MR. LEEDS: It is, but I don't think it's part of Fukushima. That wasn't an event at Fukushima. So that's where I'm coming from on it.

MEMBER ABDEL-KHALIK: But we're talking about integration of on-site emergency procedures.

MR. LEEDS: I think that's how the ANPR -- I think that should influence the ANPR, how we go forward with the ANPR and then I'll be very interested in stakeholder response. And if the stakeholders push us in that direction, it can be picked up in the rulemaking part of the process. I agree, but I'm in a different place.

MEMBER ABDEL-KHALIK: Let's move on unless people want to pursue this issue further.

MR. VIRGILIO: Slide 11, two ACRS recommendations that we believe we need to deal with through other processes. Listed on this chart, I would be remiss if I didn't take on the containment

accident pressure credit head on.

(Laughter.)

I know you took the opportunity to put it in your letter and so I'll take the opportunity to reiterate our position that we're going to look at these on a case-by-case basis. So I'm sure on every case we'll have a conversation with you about it.

CHAIR ARMIJO: There's no ambiguity there.

(Laughter.)

MEMBER SKILLMAN: I would like to go back to the fire discussion before we move away here. One of the key questions that plant operators ask themselves is what else can go wrong? And while I agree one would say there was no fire associated with Fukushima, the only reason is because Fukushima is at its heart an inundation event, an overwhelming inundation. But had the inundation not been as thorough as it had been, there could have been fires as there were at KK7.

And so before dismissing fire as not Fukushima related, I for one on the ACRS have been thinking in the what else could have gone wrong? An even worse scenario could have been a series of plant failures along with fire and in that particular case if one were to imagine that happen at Fukushima, there

would have been no fire fighting capability. There would have been the colossal releases of hydrogen in the explosion, plus what could have been an event that might have turned even more towards Chernobyl with fires in the plant that were not fightable with source term that precluded any access and basically a burndown and a meltdown.

So if I go to what else can go wrong in the Fukushima event, it's not hard for me to see that fires could have been a very prominent part of this terrible scenario. And so for that reason, I'm uncomfortable that the issue of fire is a Tier 3. For my money, I'm with Eric Leeds. This is probably not completely a Fukushima event, but the issue of the industry addressing the fire issue ought to be among the most important things that we're addressing and to the extent that it could have played out in the Fukushima scenario I think it needs to be kept on your list as a higher priority.

MR. VIRGILIO: Thanks for that comment. I would say that going back to what work is not getting displaced within the NRC staff as a result of Fukushima, the NFP-805 conversions, because of their impact on fire risk remain a high priority for us and will not be slowed. We're not going to take resources

off of that project in order to deal with this. So we agree about fire risk and the importance.

MEMBER SKILLMAN: Thank you.

MR. VIRGILIO: Okay, next steps, at the bottom of this chart. We will deliver the paper to the Commission on February 17th. Within that paper will be an enclosure that basically includes the table that I presented to you today with our assessment and our response. We'll also prepare a letter to you as we always do, responding to your letters and what we'll do is we'll publish the results of this information, not only in a letter and not only the information we've talked today with respect to resolving your comments, but the resolution of comments from other stakeholders. All of that will be posted on our website.

CHAIR ARMIJO: Marty, the information on these tables will not change when you send something to the Commission on February 17th. This is it. This is the disposition --

MR. VIRGILIO: We're going through concurrence now for the papers, so these tables are in the paper that's being concurred on by various members, various organizations within the staff, so I can't say they won't change, but I think they're

pretty close to final.

MEMBER BLEY: Marty, can I take you back to your Slide 5, just a question. You described the process you go through for screening and assigning things and reference the website. And just not right now, but if somebody could give us information on how to find the description of the process and how it's working. I've noticed around there and I see a lot that's going on, but I don't find this process described in how things are being assigned. And I'd like to get a look at that.

MR. VIRGILIO: We'll follow up. Got it.

MEMBER BLEY: Thank you.

MR. VIRGILIO: All right --

CHAIR ARMIJO: Marty, just a heads up for everyone. I just noticed that we failed to schedule a break and I'm not calling for one now, but just a heads up that maybe somewhere around 10 o'clock we should be thinking of a time for a break. That's not to cut you up.

MEMBER ABDEL-KHALIK: We'll find an appropriate time around that time.

CHAIR ARMIJO: So that's what I'd like to do.

MEMBER ABDEL-KHALIK: We have till noon,

but we still have to hear from NEI and the public.

CHAIR ARMIJO: I'm not calling for a turn off of the meeting. I'm just saying about 10 o'clock it would be a good idea to have a break.

MEMBER ABDEL-KHALIK: Okay.

CHAIR ARMIJO: Let's go on.

MR. VIRGILIO: Another significant influence in our thinking was industry's proposal on FLEX, so in addition to the direction we've received from Congress, your comments, stakeholder comments, I would say that a high priority or list of things that changed our thinking was their December 16th letter where they outlined their proposal for mitigating beyond design basis external events.

MEMBER ABDEL-KHALIK: Are you on Slide 12?

MR. VIRGILIO: Yes, I'm sorry. I'm on Slide 12.

MEMBER ABDEL-KHALIK: Thank you. So just to be clear, the second bullet on this slide, you're referring to the current, potentially deficient design basis. Is that correct?

MR. VIRGILIO: No. What we're talking about is -- well, two ways. One, imagine if during the walkdowns they find something that is not consistent with the current design basis of the plant.

They would have to -- we would expect the licensee to follow the processes we've outlined in our Manual Chapter 9900 for looking at a degraded or a nonconforming condition. That degraded or nonconforming condition goes into the Corrective Action Program. They could choose, at that point in time --

MEMBER ABDEL-KHALIK: Before you go on too far, again, it refers to the current design basis, not the reevaluated design basis as a result of the reevaluations to be conducted under NTTF Recommendation 2.1.

MR. VIRGILIO: What would a licensee do with respect to 2.1, okay, go back and let's talk about seismic or flooding.

MEMBER ABDEL-KHALIK: I'm just talking about this specifically.

MR. VIRGILIO: Right. When you talk about beyond design basis events, you're talking about beyond the current design basis, not the reevaluated design basis as a result of completion of NTTF Recommendation 2.1.

MEMBER ABDEL-KHALIK: Yes, thank you. Thanks for that clarification.

MEMBER SIEBER: Before you get into this

too deeply, I'd like to just ask one question about station blackout. If you go back to Slide 6 and I'm not suggesting you do that, but it basically says that the staff will initiate a rulemaking on station blackout and it seems to me I read someplace where we're going to change the four hour, eight hour coping times to just eight hours and beyond. And the concern that I have is that we have input to what the station blackout rule ought to look like and the kind of requirements that would be imposed through a rulemaking prior to going through the process, issuing a template rule that basically presupposes a set of requirements that aren't necessarily the right ones to have. I guess that's more of a comment than a question. I want to have us in a position where we can discuss and perhaps provide advice as to what the station blackout rule and its ancillary regulatory guides ought to look at before it gets published. Hopefully, that's possible.

MR. VIRGILIO: I know you meant it as a comment, but I'll take it into a question for a minute.

MEMBER SIEBER: Okay.

MR. VIRGILIO: We will talk about our proposed order on 4.2, that is -- I think it's the

stopgap measure, if you will, right between here and the actual rulemaking for station blackout.

MEMBER SIEBER: Right.

MR. VIRGILIO: Consistent with your recommendations, we're looking at this in a more performance-based approach. So we've walked away from specific time frames, but we're going to be asking licensees to evaluate coping times once again.

MEMBER SIEBER: Right. Well, it would be, to me, a good idea. One approach would be to use Level 3 PRAs for certain sites where the risks may be high just from knowing the vulnerabilities that are around it to decide what coping times ought to be. And so far, I haven't seen that openly discussed in any of the documents. Rather than argue that or discuss it now, I'd just like to make that point because I think that's a place where the ACRS would have a contribution to make.

MR. VIRGILIO: And what we'll talk about in a few minutes is where we stand with respect to the rulemaking in the ANPR and opportunities. I think you'll have to invite us back for future meetings and discussions on that.

MEMBER SIEBER: I apologize for interrupting the flow of your --

MEMBER ABDEL-KHALIK: Let me follow up on the question I raised earlier about the second bullet and the clarification.

Let me again try to clarify the word "acceptable" in this second bullet. Does the staff view the FLEX approach as in any way negating the need for the seismic flooding and other external hazards' reevaluations or any possible regulatory actions and/or plant modifications that may result from such reevaluations?

MR. WIGGINS: We've made it clear to industry that FLEX is not the solution. The remedy design bases issues where it's not met, that's what we've said.

MEMBER CORRADINI: Can you say that louder? I'm sorry.

MR. WIGGINS: In our discussions with industry, we've said look at 2.1 and 2.3. 2.3 compares the existing conditions in the plant to the existing design basis. 2.1 will compare the existing conditions in the plant to what that design basis would have been if we decided it today. We've told industry that in our view, you can't use FLEX as a substitute to close the gap on 2.1. You have to close design basis gaps using design basis methodologies.

MEMBER ABDEL-KHALIK: So in essence, FLEX is viewed as an interim compensatory measure that meets the need for recommendation 4.2 in the interim until any plant modifications that may result from the reevaluations based on Recommendation 2.1 are fully implemented. Is that correct?

MR. WIGGINS: Sort of.

(Laughter.)

It depends. When you said "interim" that got me going.

(Laughter.)

MEMBER ABDEL-KHALIK: As compensatory measures.

MR. WIGGINS: The FLEX process, if it plays out the way it's been described to us provides two things. It provides compensatory measures that would be in place that you can place some level of reliance on as industry makes its way through the resolution of these other things like 2.1, station blackout, all those things. Okay? So in that sense that's certainly true.

The reason I was balking at interim is another part of FLEX goes at beyond design basis. It goes beyond where you actually think things ought to be today. It's compensatory or mitigating measures

for the potential that we got it wrong when we do the design basis or something happens. We get a repeat of the reevaluation of the seismicity east of the Mississippi. Five years from now you've got another USGS survey that goes it's just incrementally just a little bit worse. So the FLEX gets at even when we do decide the design basis, it just says well, provide some protection out beyond it. Okay?

MEMBER ABDEL-KHALIK: I understand.

MEMBER SHACK: Well, but that conflicts with the answer you got to your first question is whether that applied to the current design basis. I would argue that it means exactly what it means. It's beyond design basis accidents, even after they've come up to their design basis, the new design basis. You still are looking for some sort of mitigating system --

MR. WIGGINS: Out beyond that.

MEMBER SHACK: Which is what you just described.

MR. LEEDS: Compensatory doesn't mean temporary. We expect these fixes to go on in perpetuity.

MEMBER SHACK: In perpetuity. It's not an interim measure for beyond design basis.

MR. WIGGINS: That's the problem I had with the word "interim." It's not an interim measure in terms of vapor. It goes away. There's two -- you can say there's multiple roles, regulatory roles it fulfills. It fulfills this role now in this period between while we decide what the real design basis ought to be for the facility. And then even after that it will provide beyond even that design basis.

MEMBER SHACK: I sort of look at it as B.5.b on steroids.

MR. WIGGINS: That's close enough.

MEMBER SHACK: The intent is to have it deal with things that you can't anticipate.

MR. WIGGINS: That's another discussion we can get into. When you start thinking of B.5.b, 50.54(h)(h)(2), those things were all looking at large area fires caused by conflagrations. What happened in the Near-Term Task Force Report in this person's view is that the task force team determined that a lot of the things that were done to service those provides equipment that can be useful in a completely different scenario, a natural phenomena scenario. FLEX is looking at the last piece.

MEMBER ABDEL-KHALIK: However, the designation of this equipment has reasonably

protected.

MR. WIGGINS: Yes.

MEMBER ABDEL-KHALIK: Means that it does not negate the need for any modifications that will result from the reevaluations to be performed under Recommendation 2.1.

MR. WIGGINS: That's not our expectation. You're right. What we state today in talking to industry and other stakeholders, I think we tried to make it clear that corrective actions that need to be taken at plants related to an adjustment of the design basis have to be done the way you do design basis stuff.

MEMBER ABDEL-KHALIK: Correct.

MR. WIGGINS: Safety related Class 1E. All the regalia. When you're talking about things that are beyond that, then you can get to reasonable, reliable. You get to more judgment on how much is enough. You don't have to have all the pedigrees necessary that you would normally have for safety related, in our jargon.

CHAIR ARMIJO: So when you finally get to the point where you're saying now I know I need to upgrade the design basis, there's a lot of equipment that is through the FLEX program that has been there,

acceptable to the staff, but when the bar is raised, that equipment has to go through a process that makes it design basis equipment.

MR. WIGGINS: The licensees have to go through a process to decide what's necessary to achieve that new design basis.

CHAIR ARMIJO: Okay.

MR. WIGGINS: I learned around this Agency never to say never. And what we're talking about now and what we talk about five years from now could be different. But what we said today is that if you have to close the gap on a design basis space, you have to close it using the same traditional ways you deal with design basis activities. FLEX provides backstops, potential additional enhancements, whatever you want to call it. Additional confidence or comfort that you have other ways of dealing with things in case you made a mistake.

MEMBER SCHULTZ: Do you find difficulties with making the FLEX approaches inspectable and enforceable?

MR. WIGGINS: No.

MR. VIRGILIO: And we'll talk about the specifics of the orders that were issued.

MR. WIGGINS: But that's a key point. And

stakeholders have brought that up. The way we structured the orders in the 50.54(f) letters and what we intend to do with -- there are licensees' responses to all of these. And what we intend to do with those responses internally will provide a good path for an inspector to know what to look for.

MEMBER CORRADINI: Would it matter if it's safety-grade or not?

MR. WIGGINS: No.

MEMBER CORRADINI: I'm trying to get to Steve's question.

MR. WIGGINS: If an order requires something and a licensee says this is how we're going to achieve the order, then they're going to need to comply with the order.

MR. VIRGILIO: The lesson learned from Three Mile Island is is we need to write a safety evaluation and not have the inspectors trying to figure out from a licensee's submittal what it is that they need to inspect against.

MR. WIGGINS: And regarding the 50.54(f)s they owe an answer, because that's what 50.54(f) requires, a response. We'll have to take those responses and make a decision about what regulatory actions are necessary next time. And that's where the

imposition occurs.

Now that imposition may -- there may be some time between -- depends on what the answers are, how fast we have to turn it around into something that's an order or a regulation. I would hope that if things work out in its best light, you get sufficient basis to solve the issue that you brought up through rulemaking activities Just do it once in rulemaking, not go through orders and have to come back subsequent to the orders to revise the regulations so you make the orders moot. We'll have to see. It all depends on what answers we get back and the evaluation of those.

MR. VIRGILIO: Slide 13. In our October 3rd paper to the Commission, the staff identified six additional issues that were not raised by the Near-Term Task Force that we believe warranted additional consideration. And they are listed on this slide: filtration of containment vents, instrumentation for seismic monitoring, etcetera, etcetera.

We have gone through the and we've dispositioned these. The instrumentation for seismic monitoring, we believe, is an issue that's come more from North Anna than from Fukushima and therefore we're taking it into the North Anna lessons learned

process. I would say that with respect to the emergency planning zone, KI, spent fuel transfer, we believe that those -- for those three issues, our approaches are adequate, but here is where we'll use additional studies under Tier 3 to validate our current approach and loss of ultimate heat sink. I'll talk about that in more detail. But we've split that into two parts.

The most important issue, I think, is the filtration on the containment vents. And we're considering a set of policy issues that we'll present to the Commission in the July time frame. I think that there are many issues to this. Maybe some of the more important is should the hardened vents be such that they would be functional under severe accident conditions. That's somewhat different than where we are today in terms of preventing a severe accident.

Should we require the hardened vents to be filtered is yet another question. And then should we require further plant modifications such as specific vents. This goes to Dana's question on secondary containments. So these are the policy issues and others that will wrap into the July paper and present to the Commission and I would expect and welcome opportunities to talk to you between now and July

about the filtered vents because I think it is a very significant policy issue.

MEMBER ABDEL-KHALIK: We will schedule the meeting.

MR. VIRGILIO: Good. The next slide --

MEMBER ABDEL-KHALIK: This is probably a good point to take a break.

MR. VIRGILIO: Yes.

MEMBER ABDEL-KHALIK: So let's take a 15-minute break and we will reconvene at 10 o'clock.

(Off the record.)

CHAIR ARMIJO: All right, let's try and get back to order. Gentlemen.

Said, I think we got it back to order.

MEMBER ABDEL-KHALIK: Great, thank you. We're back in session. So Marty, if you would continue.

MR. VIRGILIO: Okay, can we go to Slide 14, please? This slide delineates where our thinking has evolved since the October 3rd meeting. That's really the only point of this slide where you have an asterisk. If you were to go and compare the October 3rd paper to what we're going to present to the Commission, you would see the difference.

The 2.3, the seismic and flooding

walkdowns have been enhanced by the ACRS recommendations on severe storms. 4.1, the blackout rulemaking, has been enhanced by the Commission direction and the ACRS recommendations to do it via ANPR. 4.2 has been influenced by the FLEX paper and the ACRS recommendations on a performance-based approach. 5.1, we've talked about the filters for the vents and 7.1, enhanced by the recommendations of the ACRS with respect to the environment that the instruments are going to have to operate in.

So now what we shift to is a review of the specific information being requested in 50.54(f) letters and the modifications that would be required if the Commission approves the orders that we're going to propose to them on February 16th.

So we'll start with 2.1, seismic and flooding evaluations. This is going to be a 50.54(f) request to the licensees.

MEMBER ABDEL-KHALIK: That's Slide 15?

MR. VIRGILIO: Yes, I'm sorry. Slide 15.

MEMBER ABDEL-KHALIK: Before we get started on this, I guess consistent with Commission requirement in SECY 11-0124, you included a definition of the word "vulnerability" in these orders. And the definition of that word vulnerability related to this

recommendation appropriately compares the capabilities against the increased demand due to the reevaluated hazards. However, is there a reason why the wording of the definitions with regard to seismic reevaluation and flooding reevaluations are different?

MR. VIRGILIO: In our Steering Committee meetings, we resolved those differences. I'm looking at Rob.

MEMBER ABDEL-KHALIK: Let me ask the specific question. Specifically, is there a reason for adding?

MR. VIRGILIO: We have one definition now, so the version of what you saw --

MEMBER ABDEL-KHALIK: It's almost identical, but I'm asking whether there was a reason for the word "degraded" in the definition included in the flooding reevaluation?

MR. LEEDS: We changed that. You're looking at a version that was -- that was the version control issue. That goes back to January 16th, so now there's one definition for both seismic and flooding.

MEMBER ABDEL-KHALIK: So could you tell me whether the latest definition does or does not include the word "degraded" or not? The definition says degraded or unable to meet the increased demand.

MR. VIRGILIO: If we could just get to the definition. I don't have the paper in front of me.

MR. TAYLOR: We'll have to get it. It's been evolving and even was evolving this morning as the paper. So I don't have the current version of the paper. I don't think the definition was changing, but I don't have the current version with the definition in it.

MR. VIRGILIO: Let me just go to the essence though. The essence of the vulnerability in this context is where plant features important to safety are projected to fail to perform their intended safety function when subject to the new calculated conditions.

MEMBER ABDEL-KHALIK: Marty, my concern was inclusion of the term degraded which is a qualitative term versus inability to meet its function which is a switch, yes or no.

MR. VIRGILIO: Rob is going to read the definition.

MR. TAYLOR: The current definition, subject to evolution as we move forward is "plant-specific vulnerabilities are those features important to safety that when subject to an increased demand, due to the newly calculated hazard evaluation have not

been shown to be capable of performing their intended safety functions."

MEMBER ABDEL-KHALIK: And this is the same definition that's going to be used for both seismic and flooding?

MR. TAYLOR: Yes.

MR. VIRGILIO: Yes. Our current thinking is yes.

MEMBER ABDEL-KHALIK: Because the original version we have the definitions are different and included disqualitative term. Thank you.

MEMBER STETKAR: Marty, does that mean at the design basis acceleration to meet that definition a component is guaranteed to fail? And if not, what does that definition mean in the terms of seismic hazard?

I can sort of rationalize it in flooding because a piece of equipment is either wet or it's not wet. On the other hand, if the median capacity of a piece of equipment is XG and there's a 30 percent probability of exceeding XG at a 10^{-4} frequency, if we have that earthquake, is that piece of equipment unable to perform its function or is able to perform its function? Because there's some probability that it might and there's some probability that it might

not. So it's not clear how I do a screening based on that past/fail unless the screening says that the combined seismic hazard and fragility guarantees that the component which will fail which leads into an entirely different regime well beyond the design basis for all these plants.

So I'm not sure how people interpret that vulnerability when they do these evaluations, especially within the context of the seismic issues. As you said, flooding, it's a little more clear cut.

MR. TAYLOR: I would add this. That's an excellent question. And those are the types of questions we expect to resolve in further dialogue post issuance of the 50.54(f) letter. You go to a certain level when you write these types of documents and then you continue the dialogue in the public forum to deal with those types of situations, things that have been talked about in work shops to understand how would you deal with a certain type of situation that was identified and what would be an acceptable approach. So those are the types of things that will be worked out.

MEMBER STETKAR: I'm glad to hear that. And I'm really glad to hear the term degraded got out of there because that could be degraded.

MR. WIGGINS: Well, we were mixing a bunch of concepts at the last Committee meeting we straightened out. And there's different things going on in 2.3 and 2.1. 2.3 is looking basically at fundamentally the minimum thing it has to do is compare what's out there to what's in the licensee's current design basis.

And actually, you could get into a connotation of degraded because you look at how you judge operability. We got a lot of history about that if you have degraded conditions. And that was the essence of the conversations we were having at the last Steering Committee. There is an expectation, just like anything else, if a licensee finds a problem they're going to have to make a reasonably prompt operability determination with regard to that problem and fix it.

With regard to your original question, I don't like the word guarantee. I don't believe there's any guarantees in this business. What you have to do is make your very best judgment and kind of give you a backstop behind it.

MEMBER SHACK: You could ask it to meet design basis requirements. You would set some probability of failure. I mean, you know --

MR. WIGGINS: But where I'm going here is in order to get something in 2.1 done and get positive actions in a reasonable time period, first of all, I'll offer this. The North Anna experience indicates that you can exceed acceleration profiles and not damage the plant. That's not lost on us. Okay? I've been saying to people that wanted to hear and some that didn't for a long time, if you look at the North Anna experience, the plant tells you something about how plants are designed and built in this country.

The designs do not translate into the construction verbatim. The designs are translated into constructors. They add additional margin because they use cookbook solutions, catalogs, and things like that for pipes, support designs, things like that. There's a lot of margin around and I think North Anna shows it.

We're going into this kind of idea with that type of an expectation. We would expect licensees to do the 2.1 analysis. You have to see the current version of what the direction is, that they would make a sweep through this and make -- be in a position to make a judgment about the capabilities of the facility. And then they will come back and do the more detailed thing later. Okay?

We get back to our discussion about the role of FLEX in this. That certainly provides some backstop in case that judgment was incorrect. So that's what I think my last recollection of where we were going in this thing is there would be something done where the licensee would be in a position to make a judgment with regard to the capabilities of their system structures and components against this adjusted design basis that would be done relatively earlier in the whole process. And then there would be this rather detailed probabilistically-based engineering study that would be confirmatory in nature. And then we recognize that you have this 4.2 stuff that's there, too, to provide some backstop in case the judgment on the first piece is off. Is that still the way the order is written, Dave?

MR. SKEEN: Yes.

MR. WIGGINS: Does that help?

MEMBER STETKAR: That helps.

MR. WIGGINS: That gives you a little bit of sense of why it's so tough to get through, even the Tier 1 items that we have out there. And I was saying to some, it's some sense as to why it's been difficult to add additional things to Tier 1. And we were trying to make our way through these some very tough

Tier 1 issues with the intent that we ought to be getting some actions taken as soon as they can be taken in the plant.

It's not just a paper exercise that we're going through here. We need some real physical improvements. We want to see real physical changes made out in the plants. So we've gotten ourselves involved in how to make that happen.

MEMBER RAY: Well, recognizing the merit in that and we all appreciate it, if you go out ten years and look back on what we're doing now, what do you see when it comes to the licensing basis, for example?

MR. WIGGINS: The way the Task Force report would suggest that we figure out how to do 2.1. We would have gotten 2.1 behind us by half that time.

MEMBER RAY: What I mean is do you see --

MR. WIGGINS: We have to do 2.1 every ten years.

MEMBER RAY: What I was trying to drive at is do you see a changed licensing basis?

MR. WIGGINS: Yes.

MEMBER RAY: That has come about using the processes that we up until now have found necessary to change the licensing basis.

MR. WIGGINS: Again, you've got to help me in this. Correct me if I'm off on this. It's not 2.1 or 2.3 that answers that question. It's 2.2.

MEMBER RAY: Well, let me give you an example though to maybe make more clear what I'm saying. There is -- I can tell you for sure a lot of confusion about what IPEEE did or did not do relative to licensing basis. And I'm concerned about repeating that. People think that because they put into a risk model things that have changed over time can be seismic, can be other stuff, and gotten an acceptable answer that now that's their new licensing basis. Just an inclusion in a PRA. And I'm just saying, we've got to be clear here that at the end of the day there's an objective, definitive, objectively established on all -- both sides of the table licensing basis.

MR. VIRGILIO: Lessons learned from Three Mile Island. I don't think that in some of those areas we wound up -- I think your IPEEE is a good example. I think there are probably Three Mile Island modifications that wound up in the same place. I know that we challenged the inspection staff through the 1980s in trying to define what is it that licensee is committed to? What did we require? What was

acceptable? At the end of the day I think we want to look back ten years from now and be very clear about what changed the licensing basis.

I have a personal belief that what we'll find is is that we will, in fact, change the licensing basis, particularly with respect to flooding at some plants.

MEMBER RAY: That's what I'm trying to understand, Marty, as I mentioned, too, is not are we doing the right things in the short term because as far as I'm concerned, we probably are. And I'm not wanting to tinker around too much with those things because I believe industry and staff are really engaged in trying to make as much progress as soon as possible. But I'm trying to be concerned about what I said ten years out, what's left of what we did now?

MR. LEEDS: If I could just add to that and I don't know if this hits your point directly, but I'm going to go back to Jim's direct example on North Anna. We learned something new on North Anna. There were new accelerations experienced by that plant. We're changing the licensing basis of that facility going forward.

Now when they make modifications, they have a new ground motion response spectra that they

have to design those modifications for. Going backwards, they have to take a look using the IPEEE. They're taking a look at some critical components seeing what do they have to do with those critical components? Do they need to beef it up?

Certainly, they survived the event, but going forward, we've changed how things are set for that.

MEMBER RAY: The first part of what you said is important. Yes, I mean, someone could say look, I've got a really good PRA model at my plant. I've now reflected this experience in it. Done. Or you could say what I think you said which is good. And we need to revise the licensing basis. It's that last piece that I'm asking about that I just said.

MR. LEEDS: That's what we've done with North Anna. I see that as a model going forward.

MEMBER RAY: That's fine. And it just isn't that clear when you read this stuff, believe me.

MR. WIGGINS: That's been the discussion as we worked our way through this. As Eric said, we've looked at going forward -- this will set up a two-sided decision. There will be a point in time that going forward anything that would have to be done for seismic would have to meet the new spectra.

Going backward, you use analyses to determine best judgment, whether you need to redesign or -- what we kind of have been talking about is we don't think there's a lot of merit that pulling a lot of calculations out of storage and updating seismic spectra just for the purpose of making the calculations whole in the past. But if you were to replace the component or the system or structure or something like that, the North Anna fix would have them update, have an updated design basis.

MEMBER RAY: I don't want to bog us down. I just want to make sure that there's a point in time when the process can actually work.

MR. WIGGINS: Yes, and I wasn't trying to be trite either in terms of when you look at 2.2, 2.2 is a recurring version of 2.1. It suggests that every ten years you've got to kind of replete the 2.1 version. I believe if we don't have it tied up as completely now, then by the time we get through 2.2 it will certainly be tied up because you have to tell people what to do once you get the answer.

MEMBER RAY: Well, I've said the main thing I wanted to say here now and I will see how it comes out when we're all done. But it's looking down the road back at what we're doing now that I'm more

concerned about.

MEMBER SHACK: This is an immediate problem. You'll have to decide what is acceptable at North Anna. If they're not meeting their design basis under the new hazard, what level is acceptable? I mean you'll have to come up with some criteria for that.

MEMBER CORRADINI: But if I might repeat what I thought Harold was asking, but for sure, just doing an IPEEE is not acceptable to reverse it. That's what I think you were asking.

MEMBER RAY: But that's still the impression other places that can form if we're not clear about what's needed. Okay.

MR. WIGGINS: Seismic PRA analysis will inform whether you have to make any changes to the plant as a result of the new spectra. Regardless of that answer going forward, if you decide to put in a new pump or a new wall or something like that that you need a seismic input on. Current expectation is that the seismic input would be the updated seismic input, not the old seismic input. That matches the North Anna fix. Going forward, North Anna has a new spectra that has to be concluded. if they build a building or a wall or put a component in or make a judgment about

pipe support or anything like that, they have to use the new spectra and not the old, not the one they were originally licensed for.

MEMBER ABDEL-KHALIK: John.

MEMBER STETKAR: We're starting to run a little short of time here. So let me preface something by asking you has today's version of the seismic enclosure for 2.1 changed substantially relative to the version that's on the web that we've been reading for the last couple of weeks?

MR. VIRGILIO: I would say yes.

MEMBER STETKAR: Yes, is good enough. Does today's version still require a three-tiered screening process and a requirement for licensees either to perform a seismic PRA if they're above some screening criteria, something called an SMA or nothing? It still does?

MR. VIRGILIO: Yes, that's -- in general, that is the approach.

MEMBER STETKAR: What's the basis for those screening criteria?

MR. TAYLOR: Those have evolved to some degree. With regards to how we characterized --

MEMBER STETKAR: I don't need the specifics because obviously the specifics have changed

and that's upsetting. But I can read the specifics assuming we can get what we -- what's today.

What I'm curious about is what is the fundamental technical basis that's used for those screening criteria?

MEMBER BLEY: To flip from one analysis --

MEMBER STETKAR: Why do I decide that I need to do a PRA whereas someone else decides that they can do something called an SMA and a third person decides that they don't need to do anything? What's the technical basis that is the fundamental input to those screening criteria?

MR. CHOKSHI: This is Nilesh Chokshi. I think the factors we are looking at on deciding between margin approach and PRA are three fold. One is how much change in the hazard from the design basis. That's one factor relative to change. Other is absolute hazard. Below certain level of hazard even relative doesn't make a difference. Hazard is low. And third is what's the plant's current capacity.

MEMBER STETKAR: How do we know the answer to that?

MR. CHOKSHI: Because some of the things

we know like from IPEEE changes they have made. Changes they have made.

MEMBER STETKAR: I'm glad -- let me stop you right there in the interest of time. I submit that the information provided in the IPEEE is not adequate to make that latter decision. Because it did not identify the actual fragilities of individual structured systems and components. They were plant-level fragilities that in some case were reported only as plant-level HCLPF capacities that were calculated by a wide variety of estimates, so you can't consistently use the IPEEE information to evaluate the capacity.

MR. CHOKSHI: I fully agree with you that that's not the only factor. Other things they have done as a part of that review, for example, they decide I'm going to do this based on my -- so whatever information is pertinent to the staff, the plant's capability, so we're going to look at it.

MR. LEEDS: Nilesh, I thought it had nothing to do with IPEEE. I thought it was ground motion response spectra in the hazard. If you exceed what you already are bound to, then you don't have to do anything, if you've got the others.

MEMBER STETKAR: In the interest of time,

let's proceed. I submit that simply because the hazard is different, you have no information about the relative risk. If you don't have consistent information about the capacities, consistent information about the capacities across the board, you don't understand the risk. It's like saying that my loss of offsite power frequency has increased from .03 to .033. That's an increase, but not recognizing that you mischaracterize the failure rates of your diesels by a factor of ten. Your station blackout vulnerability -- your understanding of station blackout vulnerability is very, very different without that other piece of information.

I submit that the IPEEE information and how it's been used in staff's kind of evaluations of the potential risk in seismic events isn't adequate to make that decision. We'll have to look at more of the details of this in its current version.

MEMBER ABDEL-KHALIK: Do you still remain that screening criteria number of 1.3 for the ratio between GMRS and SSE?

MR. CHOKSHI: The answer is no. We have revised that discussion.

MEMBER ABDEL-KHALIK: Is there still a number in there?

MR. CHOKSHI: It just discusses a study we had done, but it doesn't -- it's not a fixed criteria.

MEMBER CORRADINI: So it's mushy.

MR. CHOKSHI: Yes, the reason is we wanted to bring some other factors into play.

CHAIR ARMIJO: Just a top-level, it's made it very difficult for us to -- we reviewed the attachments to the 50.54(f) letter and are obviously out of date, at least some of them. And we've been working very hard to write a letter and we would appreciate the most up-to-date versions soon.

MEMBER ABDEL-KHALIK: I think we will have to make a determination as to how we will focus our letter. Giving us your latest revisions today would essentially render useless an incredible amount of effort that was put into this evaluation by this Committee. And for us to try to hunt through and identify the differences between where you are today and where you were yesterday would be very difficult. And therefore, we will discuss how to handle this amongst ourselves.

We may end up essentially writing our letters based on the versions that we have evaluated and it becomes your responsibility then to say that such recommendations are not applicable because we

changed for some reason or another. But that's one way. And we'll discuss that amongst ourselves.

CHAIR ARMIJO: We're going to have a lot of discussion on that, but at least --

MEMBER STETKAR: Make sure your staff gets our staff today's version, you know, like noon.

(Laughter.)

MEMBER ABDEL-KHALIK: Because clearly this becomes sort of like plowing the ocean if you keep changing things on us on a relatively short notice. Thank you.

MR. VIRGILIO: Point taken.

MR. WIGGINS: I have another appointment.

MR. VIRGILIO: I'm sorry.

MR. WIGGINS: We have staff to answer if anything comes up.

MR. VIRGILIO: So on 2.1, the only thing additionally I would say is just to point you to the time line that's included on this slide. So if we could go to Slide 16, Recommendation 2.3, the seismic and flooding walkdowns and that's another 50.54(f) request.

MEMBER ABDEL-KHALIK: Now I have a series of questions about this particular recommendation and we'll just go through them one at a time because they

are sequential.

MR. VIRGILIO: Okay.

MEMBER ABDEL-KHALIK: Again, the definition of the word "vulnerability" of this enclosure compares the capabilities against the current design basis. So what additional information do you expect to gain beyond those obtained in response to Temporary Instruction 2515-183?

MR. VIRGILIO: I would look at 183 as a compliance-based walkdown. What we're asking licensees to do, in particular with respect to flooding, is in addition to walking down the plant to ensure the plant meets the current licensing basis and this is with respect to flooding now, to look at -- to describe any additional condition noted during the walkdown that might represent a cliff-edge effect. And we'll work to ensure we develop some guidance to help licensees with that.

But I think with respect to flooding, that is really our concern, that we take advantage of this walkdown, so it will precede the evaluation done under 2.1. And this is not something that we can -- it's not something that I would say falls into our processes outlined in the Inspection Manual chapters, etcetera, etcetera. It's not something that we would

see as an explicit deficiency that might be a violation of the license or the licensing basis, but we're going to encourage licensees to look beyond just the mere compliance walkdown with respect to flooding.

MEMBER ABDEL-KHALIK: Do you believe there is a need for Phase 2 walkdowns after Phase 1 of the hazard reevaluations of Recommendation 2.1 had been completed?

MR. VIRGILIO: There might be. I think it's a little too soon to tell, but it might be to everybody's advantage to go back out into the plant to the physical plant after the evaluations under 2.1 are done, just to confirm that this is where we are. You might find something that would convince you that you have more margin, less margin, whatever. It's not part of the process yet.

MEMBER ABDEL-KHALIK: It may not be an explicit part of Recommendation 2.3, but one may interpret Recommendation 2.3 as requiring such Phase 2 walkdowns. Is that correct?

MR. VIRGILIO: Imagine that they did find something that was a deficiency and not matching the current licensing basis and they put it into their Corrective Action Program and actually did take an action to fix something or do an analysis to say that

it makes no difference. It might under those conditions precipitate another walkdown.

MEMBER ABDEL-KHALIK: The latter part, particularly, of Recommendation 2.3 refers to monitoring and maintenance for protection features such as water-tight barriers and seals in the interim period until longer-term actions are completed to update the design basis for external events.

MR. VIRGILIO: Okay, in that context I can imagine that that could become a periodic walkdown to go back and look at seals or a periodic maintenance program to go back and look at, for example, some neoprene seals that you might have on water-tight doors. That would be part of a program. And from our TI, I think that was one of the things that we found that in some cases licensees hadn't established the appropriate maintenance programs, hadn't put it into quote unquote the maintenance program, therefore there was degradation.

MEMBER ABDEL-KHALIK: The reference to longer-term actions to be completed to update the design basis for external events, wouldn't that imply actions that would be taken after completion of Phase 1 of Recommendation 2.1?

MR. VIRGILIO: It could.

MR. LEEDS: It certainly could.

MEMBER ABDEL-KHALIK: So wouldn't it be appropriate to include the possibility of a Phase 2 walkdown in your 50.54(f) letter for 2.3?

MR. LEEDS: Can I try this from another direction? Whenever we do anything on a generic basis, we always look for lessons learned. And we always take those lessons learned and we feed it back to the industry and we feed it back into our processes. And depending on what we learned from 2.3 and what we find in different plants, I can envision that we are going to come out with some sort of generic communication saying here's what other people found, here's what the industry found. You should go back and look at that.

The other way that we use this is we take it and we use it as a smart sample for our inspectors. We go here are the things that were found at all these different plants because of these walkdowns. Inspectors, go out and look at this. Now the industry is smart. They know what we do. So as soon as they see something come out that some other plant found something, they go look at it for their site because we come and take a look and say okay, you have the same disease, how come you didn't find it, how come

you didn't fix it?

And so I'm answering your question in a different way. It's not a Phase 2. I think it could evolve to a Phase 2. I think it may just naturally occur just because of our processes.

MEMBER ABDEL-KHALIK: I'm just concerned about the sequencing and the value of doing these walkdowns because without looking at the details someone might say that if Fukushima Dai-ichi had done similar walkdowns on March 10th, they would have passed which means that these walkdowns don't add value.

MR. LEEDS: The walkdowns are not a substitute for 2.1. If they had done 2.1, like we expect them to do 2.1, they would not have passed.

MEMBER ABDEL-KHALIK: Right, but that's the point, exactly the point I was making that you need to do follow-up walkdowns after identifying the new design basis, after completing Phase 1 of 2.1.

MR. LEEDS: And I don't deny that that's a good idea. It probably is a good idea, but you're farther down in your thinking and farther along than where we are. We're just focusing on Tier 1. You're talking about something way past Tier 1.

MR. SKEEN: This is Dave Skeen. I'm with

the Japan Lessons Learned Project Directorate. We have to go back to what was the purpose of the walkdowns in the first place. And what the Task Force had said was what they were looking for is could you go out in a relatively short period of time and look for vulnerabilities from flooding and seismic issues, while we knew we had to go back and reanalyze under 2.1 flooding and seismic. So the thing was this is not something that was going to live on.

You go look at these things now, identify, if you've found some vulnerabilities you can take care while we're all reanalyzing, and then naturally when you reanalyze your flooding and seismic hazards and if that leads to design changes, yes, you have to go back and look at that. Again, this was supposed to be the quick thing that you could do while you're all figuring out what the real flood height and seismic hazards should be.

MEMBER ABDEL-KHALIK: I guess different people can read the words a different way and that's what I read in looking at the wording of Recommendation 2.3, that there is something that has to be done after you reevaluate the hazard.

MR. SKEEN: But again, I think we have processes to handle that. Once you do make design

changes or if I change your design basis, yes, of course, if you make changes to the plant, we have to be involved in that.

CHAIR ARMIJO: John?

MEMBER STETKAR: Marty, you learned this morning that apparently the enclosure on the other natural external events has been relegated to later. Does the request for the current walkdowns in 2.3 integrate some of that sort of systems interaction and if I can call it hazard or event interaction notion so that as you do your flooding walkdown, you think about vulnerabilities to combined high wind and flooding events or seismic-induced dam failures that could cause flooding.

MR. VIRGILIO: Yes.

MEMBER STETKAR: Thanks. I'm glad. And we'll see how you did that. So thanks.

MR. VIRGILIO: As far as the time line, we're going to work with NRC to develop procedures and request that within 180 days after we have agreed on the procedures, that they provide the results of the walkdown.

CHAIR ARMIJO: Marty, I'd like to ask a question and it relates to 2.1 and strictly on the flooding issue. The impression I have is we're going

to really work around the design basis and maybe with reevaluation look at somewhat greater than the design basis, but our flooding consultant, Dr. Baker, coined a term that impressed me which was "spectacularly above design basis" which was the Fukushima event, tsunami flooding, three times the design basis.

And obviously, I don't see how we're addressing that very rare, pretty rare, but rare event that's way beyond any flooding design basis that we have other than saying hey, if it goes beyond that level, we're relying on FLEX to bail us out. Is that --

MR. VIRGILIO: That's a good characterization. Where do you draw that line? You were holding up your pen earlier. That's going to be the challenge as to what should be the new design basis. Certainly, for some facilities it's going to be in a different place than the current licensing basis and design basis. And then what do you do for events beyond that? And that is really where we get into our features for mitigating beyond that point.

CHAIR ARMIJO: I understand.

MEMBER RAY: I'm sorry, let me build on it just a little bit. Marty, you would agree with the proposition I would expect that we've seen an

evolution in the seismic hazard definition. That's what the Central and Eastern Update represents.

MR. VIRGILIO: Right.

MEMBER RAY: Do you foresee something similar happening with regard to flooding, a different approach to defining the flooding potential? It does exist out there. We haven't adopted it, but have you given any thought to that at all? At least that's what I think of when Sam asked his question.

MR. VIRGILIO: I have to look back to --

MEMBER RAY: Let me interrupt you, before you get your answer, there's the probable maximum flood traditionally, sort of like the maximum credible earthquake that we all grew up with. And then there's something different, paleotechnology that is used, actually by the federal government, in some cases now, not yet reflected in anything we've been talking about or looking at. Any comments on that?

MR. CHOKSHI: This is Nilesh Chokshi. As you are aware, we looking at what -- how we can apply the flood hazard in a probabilistic sense. There are some aspects you can do, some aspects that are extremely difficult. And we are working with research to look at sort of going in the future, what are the things we can do in that space. Working with other

industries and Corps of Engineers and others.

MEMBER RAY: Are you aware that some agencies of government, anyway, have moved -- at least we're informed this is the case -- to use of these more -- comparable to the Central and Eastern U.S. data in the seismic area? Is that something that's on your radar screen?

MR. CHOKSHI: Yes, we have been talking to people in FERC and other people. So there is sort of a look at what's out there, yes.

MEMBER RAY: Okay, because we are, too.

MEMBER ABDEL-KHALIK: Please continue.

MR. VIRGILIO: Okay. Recommendation 4.2. These are the mitigation strategies beyond the design basis external events. And this will be required by order and --

MEMBER ABDEL-KHALIK: Slide 17.

MR. VIRGILIO: I'm sorry, Slide 17. The order requires or reflects a three-phased approach for mitigating beyond design basis external events and in the initial phase, the order requires the use of installed equipment, resources to maintain or restore the core cooling, containment cooling and spent fuel pool cooling. The transition phase is where the operations staff use portable, on-site, protected

equipment to maintain or restore these functions until they can be accomplished with resources brought to bear from off-site. So that final phase is the off-site phase where you obtain sufficient resources to sustain those functions indefinitely. So those are the three phases to the approach.

MEMBER POWERS: Marty, let me ask you a question, strictly philosophy, has nothing pertinent here maybe, but more long-term philosophical issue. When I think about this final phase, I say gee, I don't really have any kind of quantitative appreciation of the level of infrastructure damage that could occur in an event that was sufficient to disable a nuclear power plant. They're fairly robust relative to a lot of things.

And I don't have a good appreciation of what the institutional response of the government, private sector would be to these things. But I could well imagine that were I the governor of a state that had suffered one of these major events, that I would be in the business of commandeering any kind of transportation equipment that existed for another set of problems that I had outside of the nuclear power plant.

I would have a substantial population, I

would think, that's at risk for dehydration and starving to death because I can't get food to them. I did go on the web and Google around and say the average city only has about three days' worth of food. And water supplies are more critical. I may commandeer everything I can to address that problem and what not. In thinking about this final phase, do you think about those kinds of issues?

MR. VIRGILIO: Yes, and we've had a number of discussions. I see that INPO is taking a very strong leadership role in this area. They're talking about regional response centers and they're thinking about how do they transport equipment from the regional response centers where they've already pre-staged what they would believe be needed for this long-term phase. How do you get it to the site. What's obstructing that?

MEMBER POWERS: Suppose they had all of that and they were going to helicopter things in, for instance. It might be that the governor would say well, that's good and well, but I'm taking your helicopters because I've got a different set of problems. And my problems are going to take priority over yours. Is that a thing we need to think about?

MR. VIRGILIO: That's something we need to

think about because at one time I know that the thoughts were toward relying on the civil defense or whatever was available and I think now the thought is they need to have private contractors because they want to ensure the reliability.

MEMBER POWERS: It's just not clear to me, certainly it was not clear to the civil defense would work, but it's also not clear that the private contract -- because I'm not sure everybody is going to be private at this point. The governor does have the power to comment here.

MEMBER BLEY: And maybe dealing with people dying.

MEMBER SIEBER: But the real emphasis should be placed on infrastructure damage because I think that that's what makes this phase very difficult or impossible.

MEMBER POWERS: Yes, my point exactly, that I have a poor understanding and it seems to bear on what's feasible and what's not feasible.

MEMBER ABDEL-KHALIK: Would the term "reasonably protected" be clearly defined?

MR. VIRGILIO: In the implementation guidance? Yes. Our notion is that if this equipment is going to be necessary in response to a hurricane or

whatever, it has to be capable -- it has to be protected against that particular hazard. That will all be worked out in the implementing guidance.

MEMBER ABDEL-KHALIK: A clear definition of the meaning of "reasonably protected." Thank you.

MR. VIRGILIO: Yes. I mean some of the other things that will be specific in the order is the development of the strategies, consideration of the simultaneous loss of AC power, and ultimate heat sink to the unit. We talked about reasonably protected, but that will be specifically included in the order and fleshed out in the guidance.

We're asking licensees to be able to implement the strategies in all modes and full compliance at the end of the day includes all the procedures, guidance, training, acquisition, staging, installing, etcetera, etcetera. So what is included on this slide is supported by a number of specific design features that would be included in the order.

The time line and this is -- we've set this out and it will be set out in the order that the licensees submit their plans after the guidance is developed and then they have basically two refueling cycles after the issuance of the guidance in order to install the equipment. We've tried to bracket where

everybody would be considering some folks have spring outages and some folks have fall outages, but we're going into this with the notion that Eric has the authority to relax the time lines in the order, if in fact, we don't get it right. Getting it right means allowing the licensees an opportunity to do the design and install the design. That typically takes two outages.

MEMBER ABDEL-KHALIK: We have not had access to the detailed wording of these orders and therefore we have not had the opportunity to review them in detail. I assume that we will have the opportunity to review them and comment on them in time for our comments to have an impact.

MR. VIRGILIO: So if we were to give you the whole package this afternoon --

MEMBER ABDEL-KHALIK: We definitely will not comment on them a this meeting.

CHAIR ARMIJO: We need time to do our work and I've looked at what the schedule is votes and notation papers and all that stuff and it looks like we are out of that loop and that's unfortunate, but we would appreciate the document as soon as you can get them to us.

MEMBER CORRADINI: Just to clarify, these

are the go-to-press documents or will there be --

MR. VIRGILIO: We're still working on them. They'll be refined up until I would say the day that we submit them to the Commission, but we owe the Commission, we've given them -- we will give them sort of a crosswalk and we can offer you the same crosswalk from where we give you what we have today to the final version to make it easier for you.

MEMBER ABDEL-KHALIK: We will talk probably amongst ourselves as to when would be an appropriate time for us to document our review of these orders and perhaps we may want to invite you for the March meeting to do that if our recommendations are to come in on time, but we will discuss that and decide it amongst ourselves.

MR. VIRGILIO: I'm sorry this has caused a problem and an inconvenience, but we really did want to take into account the stakeholder comments we got the week of January 16th and what was put up on the web was to promote the discussions and the comments that we had. So that's how we wound up where we are today.

MEMBER ABDEL-KHALIK: I understand. I understand. You had a lot of pressure to get this thing done, but at the same time it doesn't do us much

good to write you a letter on orders that have already been issued.

MEMBER SKILLMAN: I would like to ask a question, please, Marty. To what extent will this order or perhaps to what extent is the order that you envision writing right now including required changes to the emergency plants?

MR. VIRGILIO: We'll get to that in Recommendation 9.3. To install the equipment, and I mention the point procedures guidance training acquisition, all of that will have to change to reflect that this new equipment is now at the station and these strategies is what is being taken credit for in responding to these severe beyond design basis external events.

MEMBER SKILLMAN: Let me explain the basis of my question. From March 28, 1979, the TMI accident, it took a week or ten days to pull together the decision making that included State of Pennsylvania, Governor Thornburgh, decisions up to the White House, NRC involvement, the bringing to Three Mile Island the required personnel resources, law enforcement, the local communities, the issues pertaining to that evacuation that was ordered. None of that had been thought out before that accident.

Since we now understand how riveting the immediate attention is to this type of event and now impactful it is to the local community, we certainly have gone a long way in emergency preparedness. It seems that we're going to be talking about beyond design basis external events, we need to be talking about not only the hardware, but the political infrastructure, and the decision-making infrastructure that are really tied to each one of these. It's kind of a hybrid of Dr. Powers' question and Jack Sieber's question.

What I would suggest is one cannot talk about addressing beyond design basis external events and hardware without talking about the required decision making to assure that the execution accomplishes what the intended outcome is. What we learned at TMI, had we known what that was going to look at or what that was going to involve before the accident, we would have done things very, very differently.

MR. VIRGILIO: And that is part of our thinking. So it is part of our plans. We agree with you. When do you bring this equipment to there? When did you make the decision on -- and how do you deal with the transition phase and how do you deal with the

long-term phase.

MEMBER SKILLMAN: Who makes the decision? Who gives the permission? Who gives the right of way? Who sends the C5a with the lead? Those types of decisions are ones that we dealt with in real time and I hope we never have to deal with those again because we thought it through.

MR. VIRGILIO: And that's part of we're going to require is that thinking through to make sure that -- you're right. Just having the hardware doesn't do it for you.

MEMBER SKILLMAN: Thank you.

CHAIR ARMIJO: Marty, just to make sure I understand, Three Mile Island, severe, but it wasn't a Fukushima-type thing where 20,000 were killed or missing from the natural disaster, but how does your planning and the role of FEMA in a natural disaster compounded by severe damage to a nuclear plant, how -- do you integrate your finding and thinking with FEMA, what they would be doing just to handle residential damage, business damage, non-nuclear stuff? Is there some coordination there? Is there something that keeps the governor from taking something you really need for a nuclear plant and using it to ferry some dignitaries out of his office?

MR. VIRGILIO: In the long term, we'll have to do that. We've just recently revised the EP rule, but our thinking is that as you work your way through this, you will, in fact, have to look at that again. And FEMA will be an essential partner in all of this as well as the states, the decision makers.

CHAIR ARMIJO: Dana's comment worries me that some political -- I may have other problems and decide that this nuclear plant equipment would be really nice, yet your nuclear plant really has problems.

MR. VIRGILIO: The real world we live in.

MR. LEEDS: I think this is a valid issue and that we need to pursue it and need to think about it and need to work it. I would just like to remind the Committee members and I'm sure you all remember, Hurricane Andrew passed right over Turkey Point, destroyed southern Florida. That was horrific the amount of damage, but there was a way to get people, communications, things into that plant. We made it happen.

Then Hurricane Katrina devastated the coast. Waterford was right there on the coast. We had at our Regulatory Information Conference following Hurricane Katrina, we had people from the site talking

about the company response and how they had brought not only their own employees, but employees' families on to the site to protect them and how the next day at the fence line there were 18-wheelers pulling up that the company sent down to bring food, water, everything they needed at that site. So we have some experience at that. Unfortunately, it's --

MEMBER POWERS: And it's exactly that experience that gives you pause because of the event big enough to make that unavailable to you, do some serious damage to the local infrastructure.

MR. LEEDS: I'm not saying the concerns aren't valid. They're very valid. We need to address.

MEMBER ABDEL-KHALIK: We need to be mindful of the time because we have a presentation by NEI and as a target let's shoot for 15 minutes from now.

MR. VIRGILIO: Okay, Slide 18. I think we've talked about the reliable hardened vents. This is an order. This is a requirement for the BWR Mark I and Mark II containments to have reliable hardened vents to remove decay heat and maintain control of containment pressure.

What is not shown in this slide is some

more specifics that are included in the order with respect to the capacity of events, the accessibility for operators to operate the vents, the means to monitor the status of the vent systems, the means to monitor the effluent discharge for radioactivity and to Dana's point, the minimization of any unintended cross flow within and between the units is a part of this order. It's a specific element of the order. Operation testing, maintenance will be part of the order and again, as part of the preamble to the order, will recognize that we are working with the Commission to address the policy issues surrounding filtration and severe accident management use of these vents. So the time line, what you'll note in all three of the orders, the time lines have been harmonized, so it's allowing a licensee to integrate all three of the orders as they think through the engineering and implementation.

And again, we've set out tentative time lines and we believe that they're achievable for most plants, but recognize that some plants, the outage schedules may be such that they couldn't meet the schedule and that's where we go back to the provisions of the order that allow Eric the opportunity to set site-specific schedules that might be somewhat

different.

MEMBER ABDEL-KHALIK: Now the implementation guidance will be issued by the end of August?

MR. VIRGILIO: Yes.

MEMBER ABDEL-KHALIK: And the licensees are supposed to submit their plans within 60 days after that. When would the ACRS have an opportunity to reviews these implementation -- the implementation guidance associated with these?

MR. VIRGILIO: The work is ongoing today. We've started having stakeholder meetings on the development of some of these guidance documents and we just need to get together with you to pick the time.

CHAIR ARMIJO: Marty, just a question. Your future work, for example, reliable hardened vents. Do you intend to have that coming out one topic at a time? Everything coming out at the same time for review, just kind of puts the burden on a lot of us, but for example, would you come out with a package of this is what you propose to do with the issue of reliable, hardened vents, something that we could review in our normal structure or is it always going to be coming up, this is what we have on all of the recommendations, big huge packages of work.

MR. VIRGILIO: These are running in parallel and these guidance developments, while we've said that we're going to have all the guidance in place by August 31st, they're all running sort of parallel. It's not one large package of guidance.

CHAIR ARMIJO: Is there some that might come out earlier that we can work on before?

MR. VIRGILIO: Some of the more simple ones, I think, having to do, for example, with spent fuel pool instrumentation, certainly can be developed sooner than maybe the more complicated one --

CHAIR ARMIJO: That would help us a lot rather than trying to review a whole bunch of stuff that's simultaneous.

MR. VIRGILIO: Yes. It's helps us, too.

(Laughter.)

Next, Slide 19. Spent fuel pool instrumentation. Here again, this is the order to require the operating reactors to have reliable indication of water level in the spent fuel pool. Again, design features, what we're talking about in the order specifically are permanent fixed, primary channel, and a backup instrument channel that may, in fact, be portable or fixed, independent from each other and with separate power supplies, arranged in a

manner that provides reasonable protection of the level of instrumentation function against the kind of damage that one might envision in this kind of a severe beyond design basis external event.

While we're not requiring this instrumentation to be safety related, we are expecting that the instrumentation will be able to survive things such as the maximum seismic ground motion considered during the design of the structure. It has to be reliable to operate in the temperature, humidity, and radiation fields that would be consistent with water and saturation levels. It needs to be testable and needs to be monitored from either the control room of where you would want the operators to take an action. It could be continuous or it could be on demand. These are the kinds of specific items that are included in the order.

Moving to Slide 21, there are two Tier 1 issues that are actually within -- that are being dealt with as rules. One is the station blackout rule and the other is emergency procedures for the integration of the emergency procedures we talked about earlier. And for the station blackout rulemaking, we're very close to having the ANPR and what we wanted to do is make sure that it was

compatible with, complementary to 4.2. So we're still working that issue.

And with regard to the emergency procedures integration rulemaking, we're also working under an ANPR and that's on a slightly slower time line, but we still expect that rulemaking to be completed in 2016.

MEMBER ABDEL-KHALIK: You skipped Slide 20. Are you going back to it?

MR. VIRGILIO: I'm sorry. Slide 20 I pulled out of the package because I thought we were going to get to it earlier when Jim was still here.

Slide 20 is the enhanced EP staffing and communications. This is part of our 50.54(f) request and licensees are going to be requested to provide an assessment of current communications and equipment used during an emergency to ensure that it is capable of operating under an extended station blackout condition. And licensees will also be requested to provide an assessment of the staffing needed to respond to large-scale natural events and to implement the strategies included in the emergency plans.

So regarding the current communications equipment, I think what we're expecting is a description on new and improved power supplies to be able to cope with the

long-term station blackout.

With respect to staffing requirements, we are expecting that the current staff will have to be augmented in some way. I don't know that all that staff would have to be on site at all times. Certain assumptions will be made with respect to accessibility to the site following a large natural disaster, recognizing that the infrastructure will probably be in some way damaged, roads, bridges, what have you. And that will be worked out in the guidance.

We recognize the nexus between this item and 4.2 and so we're going to be asking for information on an accelerated time line, the written responses within 90 days recognizing that there will be a supplemental response that will have to require or request -- that aligns with 4.2, the order for the mitigating equipment because that's going to require additional on-site staff.

So we've talked about Slide 21. Slide 22 is the very last slide in the pack and February 17th our deadline to provide the paper to the Commission with the orders and the 50.54(f) letters. Our thoughts are that if the Commission, in fact, does approve the moving forward on the schedule we've suggested, we could be March 9th issuing the orders in

the 50.54(f) letters. And then after that point in time we'll be continuing to interact with the stakeholders as we develop all the guidance that we've talked about today.

That concludes our presentation and we're ready to answer any additional questions that you might have.

CHAIR ARMIJO: Yes, Marty, I need a clarification on the process. It was my understanding, maybe mistakenly, that the 50.54 letters basically the EDO has authority to issue them when he's ready to go and the Commissioners get them for information.

MR. VIRGILIO: Right, the Commission --

CHAIR ARMIJO: And but the orders, of course, are different.

MR. VIRGILIO: Right.

CHAIR ARMIJO: So is that correct that the 50.54 letters and its attachments will go out once you're ready to go?

MR. VIRGILIO: We will provide them to the Commission. The Commission has asked for five days review time and unless they object in those five days, we'll issue the 50.54(f) letter or raise a concern.

We would issue the 50.54(f) letter at that

point in time, but the orders require Commission review and approval.

CHAIR ARMIJO: Okay, got it.

MEMBER ABDEL-KHALIK: Are there any additional questions to the staff? Well, thank you very much. We appreciate the opportunity to hear from you and we will be in touch.

MR. VIRGILIO: All right, thanks.

MEMBER ABDEL-KHALIK: At this time, I'd like to call on Mr. Adrian Heymer from NEI to present the industry's talk on actions in response to Fukushima.

(Pause.)

MR. HEYMER: Good morning. My name is Adrian Heymer. I'm the NEI coordinator of the regulatory activities associated with Fukushima and with me here today is Scott Bauer who is a loanee from Palo Verde in Arizona and he's a project manager. He's a project manager responsible for FLEX and the rulemaking on station blackout.

What I'd like to do today is to give you a brief overview of the numerous industry activities that have occurred since the events at Fukushima, but first I'd like to commend the staff for taking time to engage and seek public input. It's been very

difficult. It would have been only too easy for them to have just marched ahead having expedited, being given the direction to expedite the issuance that arose in the 50.54(f) letters. But they've taken time to engage the public and we've had some very good interactions and I think the approach that they've taken from the time they started to develop the Near-Term Task Force Report and even until now has been very structured, deliberate, and disciplined approach which I think has benefitted where we are beginning to end up.

The primary focus of industry's activities to date and we outline these in an integrated plan that we cultivate forward which you should have a copy of. If not, we'll make sure that there's a copy of it there today. As regards the safe operation --

MEMBER ABDEL-KHALIK: Is that document different than your document of December 16th?

MR. HEYMER: No.

MEMBER ABDEL-KHALIK: It is the same?

MR. HEYMER: The December 16th document was associated with FLEX.

MEMBER ABDEL-KHALIK: Right.

MR. HEYMER: This is a document that outlines the overall industry approach as an

integrated plan. And we've updated it. We updated it in December.

MEMBER ABDEL-KHALIK: We have that. Thank you.

MR. HEYMER: But I think as we go forward the safe operation is critical. If we were under a magnifying glass before, we're under a very high-powered microscope now. But joking aside, it's critical that we do not get distracted. One, obviously, from a public health and safety perspective, but secondly, just as important from our perspective is the business aspects.

As a result, we've been really focusing on those actions that we need to take from Fukushima, the lessons learned, that will provide tangible safety benefit earlier on in the process.

INPO, as you noted earlier today, went forward and developed a time line working with TEPCO, Tokyo Electric Power Company. And they're continuing to move forward and develop -- work with the Electric Power Research Institute and Tokyo Electric Power Company in developing a root cause that will not only look at the technical issues, but also the organizational issues.

Now we recognize that once you do that

sort of evaluation, the root cause might identify some other issues and if that's the case then we'll adjust and move forward and incorporate those as we go, but it's important that we actually make a start on implementing some of the lessons learned that we believe is -- that we can do in the near term.

Our focus is really getting back to the core on the basic and fundamental functions for operating a nuclear power plant which is protection of the core. Cool the core, cool the spent fuel pool, maintain containment integrity and the containment functions, basically inject water, make sure we have the ability to remove heat. And that's what's being focused on.

The Integrated Plan has got the seven elements. You're well aware of that. It's got some principles and some goals which have been a guiding measure as we move through these. And I've listed on here sort of the organizations that are responsible for the barest elements of the plan going forward. But you shouldn't take this as a silo approach. For example, when you get down into the regulatory -- responding to the regulatory actions, although NEI has the overall lead, obviously, there's areas where the Owners Group such as in the BWR event issue, it's more

appropriate for them to take the lead.

When we get into the severe accident management activities, the rulemaking associated with that, that's more of a combined Electric Power Research Institute, the Owners Group, INPO, and ourselves. Although the lead is here, it's really an integrated industry effort as we go forward. And I'll be willing to take any questions on the way forward as we move through the discussion or the end of this presentation.

MEMBER SKILLMAN: I would like to ask a question about your fourth item there, strategic communications and policy outreach. What is the definition in that context of strategic communications, please?

MR. HEYMER: As regards the strategic communications, it's just not interacting with the media and the public at large, but is also going out to the policy makers, looking at overall policy, whether or not we need to effect a change in those directions. So it's very specific elements, but then there's an overall strategy behind it of where are we going to place our emphasis.

MEMBER SKILLMAN: Could you identify some of the agencies that you're reaching out to in the

1 context of strategic, please?

2 MR. HEYMER: Obviously, members of

3 Congress, Department of Energy. We're reaching out to

4 the public, to the media, to state and local

5 governments in that regard, and obviously, this Agency

6 here.

7 MEMBER SKILLMAN: Thank you.

8 MR. HEYMER: While the NRC was developing

9 their Near-Term Task Force Report and going forward

10 and prioritizing, conducting a peer review, we have

11 moved forward in undertaking several actions. And

12 I've listed these on this report. But I want to

13 emphasize is the actions that the industry takes some

14 of them are very similar or may sound very similar to

15 what is being proposed in perhaps 2.3. But the very

16 fact of what you do, for example, in a business

17 environment to satisfy yourself and now you bring that

18 into the regulatory arena, there's a degree of

19 documentation and structure that you have to put to it

20 which sometimes adds a little bit to the process.

21 I mentioned the time line and the root

22 cause evaluation. We've conducted preliminary

23 inspections to confirm that the plants are capable of

24 providing adequate cooling to the reactor and to the

25 spent fuel pool and maintaining integrity, so in other

words, looking at some of the design basis aspects, as well as looking at do we have the capability to deal with a flooding event? Do we have the capability to deal with a fire that might emanate from such an event caused by an earthquake? And it's really a walkdown.

We've looked at the seismic aspects as well to a limited extent. And we've also taken into account what actions -- we have a station blackout requirement, do we still satisfy them? And then we've gone forward and said to ourselves, okay, what would it take to extend that station blackout requirement and going out 24 hours. So not taking specific actions to ensure I can get out there, but what actions would I need to take, what modifications would I need to make to ensure that I can get out to a coping period of about 24 hours.

MEMBER SIEBER: Do you have a document that describes your assessment and opinion regarding that third bullet? And if so, does the staff have it?

MR. HEYMER: That was conducted under INPO as an internal industry activity and as such that was to provide insights. I think those insights are being transferred into a response and interactions with the NRC as regards the rulemaking.

MEMBER SIEBER: But not the document.

MR. HEYMER: But not the document, that's correct.

MEMBER SIEBER: I'm curious as to what the document says.

MEMBER STETKAR: Adrian, this Committee has had some questions of the staff about kind of arbitrary time windows for coping periods, whether they're four hours or eight hours or 72 hours or whatever. You just mentioned 24 hours. What technical basis does the industry have for that number that applies to every site. And have you done analyses in the sense of what Jack just asked, have you done analyses to justify why that's a reasonable number that applies generically?

MR. HEYMER: The aim behind it was if you look at the station blackout rule as it is most people --

MEMBER STETKAR: Excuse me, I'm not asking about legal issues. I'm asking about technical analyses.

MR. HEYMER: I'm trying to get to your answer.

MEMBER STETKAR: I just want to make sure we're on the same page.

MR. HEYMER: Station blackout is a four-

hour coping or an eight-hour coping, some are four, some are eight, and some are slightly different. What the idea was okay, what would it take to extend beyond that. And then you ask the question well, how long, how far?

And so they took an arbitrary measure of okay, what would it say to go to 24 hours? So there was no real technical basis.

MEMBER STETKAR: So there is some risk at individual sites that if you were to do an integrated, let's say a hazard fragility analysis, at some sites that reasonable coping period could 32 hours and 18 minutes, for example. You haven't done that type of look?

MR. HEYMER: We have not.

MEMBER STETKAR: But you are ordering and installing equipment? In other words, you're spending capital to --

MR. HEYMER: I'll get to that element in a minute, but it's not necessarily just associated with the station blackout aspects.

MEMBER ABDEL-KHALIK: So industry's response to INPO 11-04 is considered proprietary.

MR. HEYMER: Yes.

MR. BAUER: I think the important point

back to what the NRC is saying up here is that under the order, we will basically install a coping strategy that will allow us to cope indefinitely, so that there will be the three phases where we look to installed equipment, on-site equipment, off-site equipment, but the goal will be able to put in place the requirements to cope indefinitely to the loss of AC power.

MEMBER STETKAR: At the moment, you've just drawn a line at 24 hours for some --

MR. BAUER: Right, INPO EPR was basically done early on and basically said let's go out and figure out what it takes to get out to 24. What does that tell us about our plans? What can we do immediately to purchase equipment, to put in place some capabilities beyond what we currently have.

MEMBER BLEY: Let me ask John's question a little differently. You did this to get to 24 hours, but when you identified things that could be done, did you try to characterize whether they were only good for 24 hours or maybe they're good for longer periods of time?

MR. HEYMER: We did specifically go out with that intent in mind, but I think there's a general conclusion that once you start -- what you put in place or what you might put in place to get to 24

would help you go beyond that.

MEMBER BLEY: You haven't really done anything with that yet?

MR. HEYMER: No, but it's really -- it's a sensitivity of what could we do, let's start thinking about it in advance of what we might get and what we suspected might happen and was confirmed in the July/August time frame as regards an NRA sort of requirement.

We think from our perspective is that once you start looking at this in depth, it really varies from station to station of what the time is. It's performance based as you quite rightly said.

MEMBER STETKAR: And hazard vulnerability, even in a given station.

MR. HEYMER: You might get out to 72 and in other cases it might be 36 hours and 18 minutes.

MEMBER STETKAR: Or seven.

MR. HEYMER: Right.

MR. BAUER: Once you bring in the equipment, for example, portable diesel generators, diesel-driven pumps, and all that, your key issues are fuel to that equipment and then water supplies to basically keep a flow of water going. So the plants to look at, my first source water, my condensate

storage tank; my second source is and they looked at what it would take to get to where they would have to go get water for long term.

MR. HEYMER: Some plants move forward and ordered equipment and some plants procured equipment and got it on site. Others have not and now we're looking at can we expand that especially since we know what is going to be occurring as we move down the road in regulatory space.

Can we take some proactive actions as an industry at large and actually move forward as an industry and procure a specific set of equipment or a subset of the equipment we might need and could still use should we have an event? So that's one of the things, that's the ordering. Not everyone has moved to heading in that regard. Some people haven't, depending upon their situation and circumstance. And we're going to be considering trying to expand that to an industry-wide activity in the next couple of weeks.

CHAIR ARMIJO: Could you kind of give me an idea of fraction of the industry that had actually physically ordered or put in place additional equipment compared to 50 percent, 10 percent?

MR. HEYMER: I don't know the exact answer to that, but what I do know is that somewhere in the

order of around 30 to 35 portable diesel generators have been procured. In one instance is a large backup diesel generator being procured. About 30 to 40 additional diesel-driven pumps have been procured along with some of the equipment that would go with that. So that just gives you an example, perhaps 25 percent to 30 percent. And others are considering it as we go forward. It depends upon the circumstances of the company and the circumstances of the station.

CHAIR ARMIJO: I understand, okay.

MEMBER SCHULTZ: What has been the approach taken with regard to the reactor operator training assessment? Has that been an industry approach or has it been utility by utility?

MR. HEYMER: That was an industry approach that went out to make sure that the operators understand what is required to deal with a design basis event and severe accident management guidelines. Is there a way to progress? Do they understand how they progress from emergency operating procedures into the severe accident management guidelines and going forward. And so that's the type of activity. It was industry wide and it's a part of an on-going activity under the Institute of Nuclear Power Operators.

And finally, the other item that we've

done is we've developed as an industry-wide activity, additional procedures and work management controls associated with spent fuel pool cooling, to be implemented when calculations show that the pool will exceed 200 Fahrenheit in about 72 hours and assuring that the operations group in the control room and in the emergency response centers are aware of what is the time to boil. Those sort of measures might be protecting, making sure that someone can't bump up equipment, whether it's an electrical cabinet or whatever, so putting a physical protection around that such that you don't cause an event or a transient for that system when you're in that sort of configuration.

MEMBER SKILLMAN: Let me ask this question, what actions have been taken at the leadership levels above the plant staff in preparation for a major event and here's the description. The operators have trained on their normal procedures. They've trained on their EOPs. They trained in the transition from the EOPs to the severe accident management guidelines. They perform their biennial exercises and there is a general, if you will, sense of preparedness. The staff is prepared. The procedures work. The NRC is satisfied that the staff is able to do what it's supposed to do.

When an actual event occurs, another level of individuals are drawn into the event. It is the senior plant manager, the senior plant staff, and ultimately, the owner of the facility up to what can be the CNO or the Board of Directors. What exercise has been undertaken to ensure that either a fleet or a group of operators really understand how that executive leadership is drawn into the decision making so that they are fully supportive and not disengaged as they were at Fukushima and originally at TMI?

MR. HEYMER: As regards our normal drills and exercises, the senior management team is involved as regards -- in that regard.

In addition to that, following Fukushima, the senior management echelon be it at the station and within the companies have been well-briefed on what happened at Fukushima, what is the expectation, I understand I think certainly at the level, without getting into real details of what happened and what actions are required, and are well aware that there is a need for certain people at certain levels to take actions and make decisions. And they are there that those decisions are made. They are aware of some of the issues that were raised at the Fukushima Dai-ichi and Dai-ni stations and I think have learned from that

experience.

But as I go back, when you run some of these exercises and drills, the senior management team are involved in those activities.

MEMBER SKILLMAN: Let me follow-up. There are certainly the involvement in the decision-making relative to the plant physical conditions. But in an event of these magnitudes, there has been a transition from the senior staff working with the plant to the senior staff working with the state and local governments, with the fed, with the various federal agencies.

Have you considered having a drill at very high levels that exposes the sensitivity of those infrastructure requirements to the existing senior staff at these locations, at these facilities?

MR. HEYMER: We haven't gone that far. But what I will say is that at the time of Fukushima, we had senior executives briefing senior state and local government officials on what was happening at Fukushima and how that plant, how the U.S. plant might be a little bit better equipped to deal with that sort of event. So there was that interaction at that time.

But as regards running a drill whereby you sort of engage the governor, we haven't done that in

every instance but we have done something similar associated with a security event.

MEMBER CORRADINI: So can I ask a question, generally? Dana asked it and Dick is asking it kind of again. So take an event -- forget about Japan. Let's talk about the tornadoes going through last summer. Let's talk about Katrina. Let's talk about the staff mentioned Hurricane Andrew. You take a natural disaster that affects the general area. Is NEI going to take a role in helping from an emergency management standpoint where there is competing worries? I think that is where I sense Dick was going. Maybe I misunderstand.

Were there competing worries and it rises up to the point that it is not just the site manager or the site VP, but it is broader.

MEMBER SKILLMAN: Yes, what ultimately happens is the entire resources of the company are brought up into the field of vision and now the people that are making decisions include the shift foreman, and the plant operators, and the licensed reactor operators, and the aux operators. Now you have got the plant manager, the plant manager's boss. You may have the Chief Nuclear Officer. You may have the Board of Directors. And now the decision-making

widens into the state and local governments. It broadens out into the federal agencies that are responding.

And my thought is, unless there has been some pre-thinking along those lines, the men and women that are in those very high positions can be surprised by the magnitude of the decisions that they are now being asked to do to confront. And it ties into Dr. Powers' question. Have we ever drilled at that level so we truly are prepared? Because a lot of what you are talking about here is preparation for a very unforgiving, very serious event.

MEMBER RAY: Dick, this is -- we're talking -- Excuse me, Adrian. We're talking I think really here about recommendation 10.2, which is a Tier 3 item and we are going to get to it. There is a lot of meat in what you are talking about but it is precisely what 10.2 is. And you know, which says evaluation, command and control structure, and qualifications of decision makers. We recommended that it be initiated now. The staff has kept it in Tier 3. That is where it stands.

MEMBER SKILLMAN: I wanted to hear NEI talk about it --

MEMBER RAY: Well, I'm just saying we are

going to go over this ground in that connection.

MR. HEYMER: Just to perhaps just to give you a perspective, if you look at the Mineral earthquake, the North Anna event, which exceeded the design-basis, okay, not only were the plant management involved, but the president of Dominion Nuclear, Dave Heacock was involved in that and interacted. They briefed the Chief Executive Officer. They briefed the governor.

So they went through the complete gambit of state and local to make them aware of the situation at the plant. They invited the governor down and briefed the governor again in more detail. So those interactions did occur. Can we improve on them? Is there something that we can learn? Probably the answer is yes. And as Mr. Ray said, that is a topic that is going to be looked at and I think we can improve it. We can always improve on what we have got.

I think the experiences in the last 12 months with the tornadoes, the earthquake, and the hurricanes has shown there is a good interface between the station, the senior management team, and the state and local authorities, as well as with the Commission and the federal government. And we just need to make

sure that have we done all that we can do in that as regards the communication and the awareness and the decision-making and who is going to make the decision when.

MEMBER SKILLMAN: Thank you. Thank you.

MR. HEYMER: Getting now into the specifics, I want to talk a little bit about to start with external events, which is predominately 2.1 and 2.3. I think when we look at these and some of the comments that we made in our letter, there are resource limitations. And I don't mean that to say from a company perspective, although they are there. They are also there on a national perspective and they are there on a global perspective.

Many of the seismic PRAs that are done around the world today use U.S. personnel to perform those activities. And when you look at the fact that even just a walkdown, if it is a straight-forward flooding walkdown, we are looking at something like 4,000 hours plus training and report development.

If you are looking at seismic PRA, you are probably looking at somewhere in the region of 20,000 hours to develop a seismic PRA and then there is everything that surrounds that.

The other activity when you look at what

is required of the schedules and I think the staff recognized this, is that the some of the walkdowns, especially in the area of seismic, we may need and outage to actually complete those and to sew those up. So some of the timeframes that have been given are a little bit tight from our perspectives. That's not to say we don't want to do it. We recognize we do but we just may need a little bit more time to implement those activities.

As regards the evaluations, I think the best as far as we can see at the moment seismic is an area, and I'm going to get to it in a minute, where there is a very I would say almost extreme resource limitation there. We can perhaps do about ten seismic PRAs in parallel of once and we can --

MEMBER POWERS: You're optimistic.

MR. HEYMER: And that is probably about a three to four million dollar exercise and consumed, as I said, 20 well perhaps even greater number of 20,000.

MEMBER BLEY: Adrian, one of the early ones surprised me and I wonder if you can explain it to me a little bit. I think you said 4,000 hours for a flooding walkdown.

MR. HEYMER: That is what our estimate is at the moment.

MEMBER SKILLMAN: That is surprising. And having done a number of walkdowns and not having been paid nearly that amount of money, maybe my billing rate is too low. I'm a cheap date.

MR. HEYMER: And that really takes into account plant staff, operations staff, etcetera.

MEMBER RAY: Is the source definition as part of that?

MR. HEYMER: It may be. I mean --

MEMBER RAY: That's what I thought because you know, flooding is so far behind seismic when it comes to the hazard definition that 4,000 hours doesn't sound like a lot to me, if you are talking about defining the hazard.

MR. HEYMER: Well this is just for the walkdown aspect.

MEMBER RAY: Well, I hear you. That's why I am just asking the question.

MEMBER STETKAR: Have you -- I mean, the problem is the staff falls into this also. You talk about flooding walkdowns. You talk about seismic walkdowns. You haven't mentioned it but there could be wind walkdowns. There could be, I don't know, debris walkdowns. There could be missile walkdowns.

Experience shows that you can do an

integrated walkdown. We used to use the term spatial interactions where you have a team that visits a room and looks for vulnerabilities to the complete spectrum of hazards. That is cost-effective. That is not having seven different people visit the same room for seven different purposes and look at the same wall, or the same pump, or the same cable trays for fires and floods and seismic and things like that.

So some of these arguments about resource requirements don't seem to reflect kind of an integrated view of how most efficiently to gather the information that is necessary to support a broad spectrum of potential hazards and vulnerabilities at a given site. And I am wondering if the industry is kind of responding to pigeonholed items and kind of reacting to the amount of resources without being a bit more kind of forward thinking in terms of this integrated approach.

MR. HEYMER: We have looked at can we combine some of these. And some of the sort of feedback that we got from various, and it may be that they are pigeonholed in their own technical specialization, --

MEMBER STETKAR: If you only talk to a seismic person, they will tell you it takes forever to

do a seismic walkdown.

MR. HEYMER: Yes, so my be a little bit of that.

MEMBER STETKAR: And so that is true.

MR. HEYMER: But I think the other thing is we have got to develop a common understanding of when we say a walkdown, what is it we are looking for, what is the criteria, and then reach an understanding with the staff. And then perhaps we can actually sit down and once we focused on certainly the seismic and flooding, which in our mind are the highest priority ones that we should be really focused on, if there is a resource limitation in those two areas.

MEMBER STETKAR: I think the kind of part of my question was that may be the current thinking but don't preclude gathering information about other potential hazards simply because you are now focused on seismic and flooding.

MR. HEYMER: We will certainly look at that and see how we can combine and make best use of our limited resources. I think it becomes, I think, a little bit more critical, once we get into the evaluation site. And that is what I think --

I mean we are probably looking at about, okay we may need an extra month or two or a couple of

months as we go as the walkdown criteria to do it and then submit the report and with the deficiencies we have found. But I think once we get into the evaluations, that is where it becomes a little more challenging.

MEMBER RAY: But even so, Adrian, in the seismic area you have got very good and recently updated hazard definition criteria. Are you as satisfied with the methodology for defining the flooding hazard that is currently on the table?

MR. HEYMER: Well there is a methodology that the new plants have used. And --

MEMBER RAY: Well I'm talking, yes, about the expertise required, and the clarity around defining the hazard and so on and so forth.

MR. HEYMER: There is no doubt about it when we have looked at this. Although there is the experts out there to deal with flooding, I think from an industry perspective, we are probably going to be, we are not as familiar with the flooding issues.

MEMBER RAY: That's my point. I am just wondering if you are, in the future, going to have a comment to the effect that oh my gosh we have got a -- we are so familiar with seismic we tend to focus on it. How many can I do at a time? Do I have the

guidance I know how to do it? There may be debates about technical details. But I am just wondering if you have looked at the flooding and do I really know how to do that?

MR. HEYMER: We have started to really sort of looking at that intently. We have had a task force working on that where we are trying to glean information from the new plant activities going forward and the experiences there. And we are learning first I think there is a fairly intensive industry effort in that area.

MEMBER RAY: Well, I just --

MR. HEYMER: But I mean, I still think from a flooding perspective it is the one if you ask the executives what concerns them, they tend to not talk about seismics so much as flooding.

MEMBER RAY: That's right. That's right.

I mean, we had a subcommittee meeting here, I happened to chair it recently, on the Levy Plant. So we applied the modern methodologies for assessing the tsunami hazard, for example, which derives from the Gulf of Mexico. The dominant source if the Mississippi River Delta. Well, and we were all very much engaged in that and got some experience, some exposure to that. But trying to apply that to

Crystal River, which is in-between Levy and the source is another matter.

And I just wonder if you guys have seen that as a problem.

MR. HEYMER: I think it is a challenge. It is one that we are working on to overcome but it is one that --

MEMBER RAY: I just urge you to keep that in your mind and in your comments because it is not obvious to me how you are going to do that.

MR. HEYMER: Not only is it important that we focus on the Fukushima-related activities first but I think we probably are going to need some form of prioritization within that, I mean, if you take flooding or you take seismic. We can't do everybody at once. We would like to. So we can't do everybody in parallel. So which ones do you choose first? And I think we have to deal with that.

As regards flooding, we are looking at that topic and is there a methodology that we could come up with to prioritize which plants go first and we have got to look at that from a seismic perspective, although I think that might fall out naturally, once you run the ground motion response back through the GMRS and look to where you stand

there.

MEMBER RAY: Well in this case, the flooding had nothing to do with an earthquake. But I will leave it there and just --

MR. HEYMER: Yes.

MEMBER RAY: -- tell you to look at it and keep it in your thoughts and your --

MEMBER ABDEL-KHALIK: Let me just point out that we have a time check. We need to allow time also for public comments. So Mr. Chairman, we will most likely go beyond 12:00 but at this time, I would like to shoot for a target of 20 minutes from now for you to complete your presentation.

MR. HEYMER: Right. Okay.

MEMBER POWERS: In an effort to make sure that you don't meet his criterion, you mess up his schedule.

(Laughter.)

MEMBER POWERS: I am curious about this. On the -- I think the staff was contemplating multiple walkdowns for you. And it has been suggested that you can do multiple information gathering. Do we know enough about the theory of walkdowns and experience enough to think that we can do that or do walkdowns for diverse purposes prove less effective than

walkdowns on focus purposes?

MR. HEYMER: I think again it comes down to what is the criteria and the guidance a little bit, Dr. Powers. But I think when you start saying okay now we are going to do a combined walkdown, okay, the resource issue, the number of people you are using may not be, okay, it may be fewer but it may take you a little bit longer.

MEMBER BLEY: I think that is true but there is key guys that have to be on the walkdowns, and that is the guys who understand the plant and detail, understand plant operations, understand it in an integrated way, and probably understand your PRA, if you have got one. And that group is really key to it working right.

The other guys who are the experts in fragility analysis or in water damage or whatever, need to help to say how important is this component compared to these. How do I put them in order? What do I look at? And if you have those plant guys coming in on every walkdown, you are doing more than, well you are almost multiplying buy the number of walkdowns those guys' time and effort.

And the scenarios get related. So my experience is similar to John's. If you are doing

them together with one or two experts in the technical area and several experts on the plant, it is really much more efficient. Scenarios are going to be related as well.

MEMBER STETKAR: Well and the problem is the focused technical walkdowns is the seismic people know in their own mind what they feel is important and that doesn't necessarily benefit from that broader perspective you have for the bigger team. Similarly the fire people. Similarly the flooding people. Each expert operates within their own little world and spends a lot of time, perhaps inefficiently without that broader perspective. So anyway, I will try to keep you back on schedule and be quiet now.

MEMBER BLEY: I think the other point I want to make here is not only do we need guidance but if we never really tested that guidance before, especially in the area of evaluations or in the area of seismic PRA, that we really need a lead plant to go through that and test it. The lessons that have learned as we go on to fire protection, I speak volumes to that activity.

And the final topic on this slide is I think as regards to the other external events, they are not directly related to Fukushima. And I think

looking at some of the other Tier 1 issues that we have got on our plate, we think they are a lower priority and it would be more appropriate to treat those in Tier 2. So we think the staff --

CHAIR ARMIJO: Well, it may be that everything you do for seismic and flooding, the things you really put in place would also protect you against some other external event, but it may not. So somewhere along the line you have to look at shortcomings of what you have done for seismic and flooding to see if it would protect you against some specific thing or a specific site to make sure it has really been addressed. The question of when you do it and how much resources you put into it sure is open. But it shouldn't be ignored but maybe deferred. Is that what you are saying?

MR. HEYMER: Yes.

CHAIR ARMIJO: Okay.

MR. HEYMER: We're not saying don't do it but we are saying that if we are really doing a focused effort and we really want to get stuff moving and achieve some real Near-Term targets, let's focus on what is really closely related to the Fukushima activities. And the others we are going to do but they are not of an urgent priority.

As regards seismic in itself, I think one of the points in the interest of time I want to make here is we believe there is margin. There doesn't tend to be, as far as we can see the cliff-edge effects that you may see in flooding.

I know we have discussed earlier today with the NRC staff there is margin in the design calc that we do, the way we combine loads, etcetera. We know from the IPEEE that there is a degree of margin there. And then the operating experience, whether it is through SQUG, the Seismic Qualification Utility Group experience database, the North Anna event, or the other four or five events that have occurred throughout the world where the design-basis from a seismic perspective has been exceeded. We have margin and on top of that we are going to put FLEX in place.

SO I think what that allows us to do is that when we run the GMRS and we do get some different answers, we do have some margin there. We do have the FLEX activity and that gives us, I think, confidence that we can take the time to do an evaluation to determine what do we need to do about that delta that we may have identified.

Some of the potential approaches. We have spoken about seismic margins. We need to determine

what is that. In our mind if it is a PRA-based seismic margin, then you may as well do a seismic PRA. But there may be some other activities that we could look at from the seismic margins and we are looking to interact with the NRC staff to develop those and put those in a guidance document.

MEMBER STETKAR: You're aware nuke plants, obviously, --

MR. HEYMER: Yes.

MEMBER STETKAR: -- are doing sort of the false face base.

MR. HEYMER: Right.

MEMBER STETKAR: If you want to call it a PRA seismic margins. So that is sort of current standards.

MR. HEYMER: And then we have the seismic PRA. And although there is a standard out there, we have tried to test that standard at a plant. There were some issues. We are trying to resolve those with the standards community.

I think in the near term we will probably go forward and work with the staff to develop a guidance document to come up with whether you want to call it a seismic-focused PRA or an improved PRA from a seismic perspective. We shall see.

The final bullet on there is based on the experiences we have had recently in some areas, some plants might just want to do a deterministic evaluation and change out critical equipment. We will have to see how that turns out. But sometimes when you get into these PRA-based approaches, it is -- there is a dollar as well a schedule issue.

CHAIR ARMIJO: Before you leave that, do you have, with reference to the spent fuel pools, do you have adequate guidance to do the seismic risk analysis for the pools? Different things are being requested, such as peer reviews of the spent fuel.

MR. HEYMER: We don't believe there is guidance out there as regards sufficient for us to be able to go forward now to do a seismic PRA for the spent fuel. And a number of us just questioned well, if you consider what happened at Fukushima where you had a couple of units exceeded their design-basis, where you had three large explosions and the spent fuel pools came through, --

CHAIR ARMIJO: Data points.

MR. HEYMER: -- do we really need to do a seismic PRA? We think they are robust but if that is what is required but it is going to take some time to put the guidance together and move ahead with that and

we need to recognize that.

CHAIR ARMIJO: So are you engaged on that issue with the staff?

MR. HEYMER: We will be engaged, yes.

MEMBER STETKAR: Adrian, on this issue of requiring very, very specific guidance to do a PRA of this pen as opposed to the PRA of this pencil, we have done seismic PRAs. The industry has done seismic PRAs with varying degrees of sophistication. For core damage events that have looked at seismic failures of large structures, things like containments, things like buildings, they have looked at seismic failures of pipes. They have looked at seismic failures of electrical equipment. They have looked at seismic failures of valves and pumps. They have looked at human performance after seismic failures of said equipment. It is hard for me to think of a fuel pool that doesn't have structures, pumps, and pipes, and valves, and electrical equipment. I don't see any different philosophical guidance or methods for evaluating response to a particular seismic input for a fuel pool, other than people talk about water sloshing and things like that.

MEMBER POWERS: Water sloshing is a very, very difficult problem.

MEMBER STETKAR: That is a difficult problem. But other than that, I can't think of specific guidance that --

MEMBER POWERS: Liners flexing.

MEMBER STETKAR: But we look at liners flexing for other things. In principle, we do.

MEMBER POWERS: Well if it was --

MEMBER STETKAR: So it is just this notion that we can't do anything because we do not have the guidance for the pen seismic analysis but we do have the guidance for the pencil.

MEMBER POWERS: Qualitative things. But in the end, they have to do something quantitative and I see a challenge to doing that.

CHAIR ARMIJO: That's what I was trying to get at. If it was a straightforward as John tells us, why are we requesting peer reviews? If it is an established process, we just simply do it, provide the information to the staff, and move on. But this peer review thing leads me to believe that this is a kind of a special kind of thing that needs quite a bit of attention and we don't have variance to say --

MEMBER STETKAR: I mean we require peer reviews for any probabilistic analysis of anything. So this is no different.

CHAIR ARMIJO: Well I wasn't talking about -- I was talking more about the structural work.

MR. HEYMER: Moving on just quickly now. I think from an emergency response perspective I think we have a convergence of views, certainly as regards to multi-unit staffing and the communications with the staff. There is an issue over access. We have had some further interactions with the staff on that and I think we are going to end up, we believe it has to be a phased approach to access. Looking back at what has gone on historically, whether you look at Fukushima or whether you look at the events of Turkey Point or else Katrina, you can get people to the site and you can get people to the site in a certain time frame. And it may be there is a small period of time, four or six hours, that it is very difficult to get people on-site. But between that and about 24, it will be limited and then we should be okay.

On spent fuel pool instrumentation I think we are again well-synchronized there with the staff. I think there is a pretty good understanding of what is required and we are moving forward.

The severe accident management guidelines, the accident and transient procedures and guidelines of how we move from one to the other, the rule-making,

that is ongoing. We have had a group involved in that with EPRI, INPO and the owners' groups since May of last year. So we are moving forward on that and I think we are about to give some good input as regards to the rule-making activities as we go forward.

But that is complex, again, and it is quite an effort to start thinking about changing procedures and the rest of it. But that is something that we can work on and we have got a head start on that.

We are about to talk about FLEX. And on a hardened vent issues, I think from that perspective, we understand the BWR Mark Is, the Mark IIs are putting the vent in and designing it. Okay, you are starting as a new installation. I think one of the things that is concerning the industry a little but, although they are continuing as an owners' group activity, it is not as regards to Mark Is. It is almost like a Baskin and Robbins sort of design out there. I think we have got about, for every plant you look at there is a different configuration so it is not going to be one-size-fits-all sort of a fix. And then you have the complication of where are we going on the filtered vent and how would that impact things going forward. So that is an evolving issue.

On FLEX all I would say as an introduction to Scott is that we developed that sort of concept or approach based on our experiences of contingency equipment for security and we were faced with the same sort of problems there. And one of the things we struggled with the September/October time frame of last year is if we are talking beyond-design-basis event, how do we define that? I mean, if I am a 0.15 G plant, is that 0.2? Is it 0.3? I mean, what is it? And once I have done it, isn't there always something that is beyond it? There is always another scenario that you can come up with. And we were faced with that sort of similar problem in security and that is why we came to this approach where a flexible response using portable equipment that you can connect into the plant and see where you go from there.

So with that, Scott?

MR. BAUER: Thanks, Adrian.

As Adrian mentioned, I am the lone employee from the STARS Alliance. Actually I am from the Palo Verde station but I am representing all the STARS plants. I was supposed to be going home in a month or two and they asked me to stay and I agreed. So that is probably says something about my ability to make good judgments.

I am the project manager for the 4.1 and the 4.2 Task Forces or the two issues, the rule-making on extended loss of AC power, as well as 4.2, which we are now calling this FLEX approach.

We originally started out in separate paths on those things and now because of the turn for the better on the way the order is going to be worded, we are going to basically combine those two efforts because they are gonna obviously feed off of one another.

So the intent of the FLEX approach or the extended coping strategy is to provide an additional layer of safety for beyond-design-basis external events. And the goal is to prevent core damage.

So I think we have reached agreement with the NRC on this point that the aim of all these strategies we develop are going to be to prevent fuel damage.

Now the equipment will also still be available, obviously, to plant staff in the event of beyond core damage to be used for that type of situation as well, through the SAMGs, primarily. So again, the focus of the order is going to be on maintaining the key safety functions, core cooling, containment functions, spent fuel pool inventory.

We obviously foresee using multiple power supplies, sources of cooling water and a lot of the work is -- and this will be an engineered approach. So this will not be a do the best you can with this piece of equipment. There will actually be calculations that support how much flow you need to put into steam generators or into the reactor to keep the core cool. There will be procedures to that tell you how to put the stuff in place, when it has to be in place. So it will be also tied with the 9.3 effort on the ERO staffing to say we have got to have the right people in the right place at the right time.

There will be the three phases. How long can I cope on installed equipment? When do I have to transition to FLEX equipment? And when do I have to transition to offsite equipment? And then all the issues that come up with that, including can I get the equipment to the site. If the equipment is on-site, I have got to make sure it is stored in a location that is reasonably protected, which we will address in the guidance document, and also be such that I can have the right people, the right skill sets to get it, move it to where it needs to be, install it in the right time I need it.

We will have programmatic controls,

procedures, and we will rely on the Building Block 3, which is the offsite support centers.

And obviously there is a lot of interaction between this issue and a lot of the others, which I will go over in a moment but we are trying to make sure we have all the connections with those other activities.

MEMBER ABDEL-KHALIK: No let's look at this diagram. And if we look at the current design-basis, which you are referring to here, is the current existing design-basis which may be deemed deficient as a result of the reevaluations to be conducted under Near-Term Task Force recommendation 2.1.

MR. HEYMER: It's existing design-basis, as we know it today.

MEMBER ABDEL-KHALIK: So let's talk about this horizontal line between the current and the design-basis external events or current plus FLEX.

So FLEX in no way can be viewed as a potential substitute for the reevaluations of the design-basis to be conducted under NTTF recommendation 2.1 and/or any regulatory requirements that would result therefrom. Is that correct?

MR. BAUER: That is correct. And we are not proposing a replacement for those.

MEMBER ABDEL-KHALIK: Great, thank you. I'm glad we have it on the record.

MR. BAUER: So in this document, on the left on this slide, the SBO coping capability on the current is essentially what we do today under 50.63. So that is the current coping capability.

What we will have in the future is we will have an additional capability to cope essentially indefinitely with a loss of all AC power. That will also be to prevent core damage.

Now under the existing coping capability, 60 percent of the plants in the country were alternate AC plants. So they rely on some sort of diesel, gas turbine, whatever, that they start up and they use to cope. Obviously in the future, those sources are not available and we can't rely on them. So it will be in your EOP strategy where you get to go start the alternate AC and it doesn't start, it will kick you then to the next procedure that tells you here, you need to enter the extended loss of all AC process and implement a FLEX coping strategy.

As I was mentioning -- Next slide. As I was mentioning before, this obviously integrates with a lot of other activities. So we are, as just Tuesday we had a meeting with the staff on the ERO staffing

communications and talked about how the staffing evaluations need to be done consistent with putting the FLEX in place to make sure that we do the staffing evaluation knowing what procedures we need to follow, knowing what movements have to be made to move equipment into place, etcetera. Next slide.

This is kind of a picture of what the FLEX strategy will be. So the FLEX strategy will essentially allow us to cope with an extended loss of AC power and/or a loss of the ultimate heat sink. It will be designed around both and/or either event.

We have talked about the IER 114, so there has been quite a bit of evaluation done by the sites. There are responses to that. I wish I could show them to you but I can't. And they were sent in on January 27th to INPO and they are currently collating those to tell us what the key pinch points in the industry are as far as where the coping needs some additional actions.

We are looking at using that essentially -- there is a number of assumptions that go into that. So one of the first things we will have to do is reach an agreement with the staff on what the key assumptions are for what we call the Step 1 or the baseline coping strategy.

So we will develop that baseline coping. That will be an engineered coping analysis that basically says put this piece of equipment here, power up this bus, do this in the right amount of time and you will prevent core damage.

And that will be PWR-owned or the owners' groups are doing thermal hydraulic analyses and procedure activities to basically support this effort.

CHAIR ARMIJO: Scott, before you go, the extended loss of AC power input, the first input into the analysis, do you have a number that you are specifying there? Is it 72 hours, 24 hours, or is that TBD, or is that plant-specific?

MR. BAUER: It is extended loss of AC power indefinitely.

Now, the decisions points when we do the site-specific analysis are how long can I cope on installed equipment. It will be different for each site but they will have to justify that I can move the FLEX equipment in in time. So they may have to extend their installed area to be able to justify that they can the FLEX equipment installed appropriately. And then they will cope for a period of time on that and then they will have to justify that they can. And will have to deal with all the infrastructures of can

we actually get this equipment to the site. All of that.

CHAIR ARMIJO: Everything in and then to just keep running. So this really means indefinite.

MR. BAUER: Yes.

MEMBER STETKAR: Scott, you are also looking at, I'm sure, DC. I see words like AC but you are also looking at capabilities of DC supplies over comparable time intervals.

MR. BAUER: We are looking at -- Obviously if you use all your AC, you are reliant heavily on DC and we are going to look at maintaining that DC capability.

MEMBER STETKAR: Okay. Because you might have different strategies for different windows, depending on DC survivability or capabilities.

MR. BAUER: Right.

MEMBER STETKAR: So I was just curious.

MR. BAUER: Yes.

MEMBER STETKAR: Okay.

MR. BAUER: Base case is not going to look at a loss of DC at timing for zero. So if you lose all AC and DC, that is not part of the basis.

MEMBER STETKAR: It wouldn't handle Fukushima Unit 1.

MR. BAUER: You know as Dr. Powers said earlier, anyone can come up with a scenario that we are not going to be able to live with and we have got to start someplace and decide what their ground rules are. But the base case we are putting out right now is that it will be loss of all AC but DC will be available.

MEMBER BROWN: For some period of time.

MR. BAUER: Yes. And if the plant, you know, if you can strip loads and you can get your batteries to last for 24 hours, then you have got -- If you can't and only get them to last for four hours, then you will have to have a FLEX strategy that says I can bring in a charger or something to keep that DC bus going or I can get AC power back in it someway.

Now the second step is basically going to be kind of a, I hate to use the word, stress test but that is what we have kind of been talking about it. Is to take a look at the base case and say hey for my site-specific situation, you know, my flood-prone side and my seismically whatever the case may be, what is the primary external event that most impacts my site?

We are going to do some stress test cases to say well if you got to the cliff-edge flood effect,

what would that do to the assumptions in Step 1 and what could we possibly do to develop strategies to deal with those cases? Those strategies may not be engineered. They may simply be for, if they lost DC, it would be go ahead and start your turbine-driven aux feedwater pump or your RCIC and you can survive in that situation for a period that buys you sometime. The strategy may not go any further than that to say hey, here is what you would have to do in the long-term. But we are going to do some tests of the case to say what else could possibly happen and how could we put a toolbox of equipment in place that would give you some strategies to be able to deal with those exacerbated conditions. So that is what the Step 2 is going to be.

And then Step 3 is basically going back and how do I enhance my coping strategies to incorporate that. Next slide.

So this is a potential list. We have actually got a list going out to the Chief Nuclear Officers as we speak of equipment very much like the left-hand column there that we are going to probably launch off and go purchase this equipment and have it on-site. Because as I mentioned, the IER 411 evaluations have been done, the INPO has been

collecting those, collating the information, and we pretty much know there is going to be a set of equipment, including like communications equipment which answers part of 9.3 that we know we are going to need and there is no reason we can't go get some of that right now.

So the things that are going to be the things we are going to probably pause on are things that have an engineering basis to them and before we go out and buy a diesel-driven pump with a certain capacity or a high head pump that can charge into their pressurized reactors vessel, we are going to wait until we get agreement on the guidance with the NRC to make sure we are not going off and doing something that we will have to redo later because we changed the criteria.

So that concludes my discussion on FLEX, unless you have any questions.

MR. HEYMER: Some of the challenges that we have outlined, and this really summarized them, one I just want to pick out of here is there are a number of task interdependencies that we are going to have to deal with. Scott showed you some of those on the slide associated with 4.2 but you also have, obviously, an overlap from reevaluation of the design-

basis getting into EOPs and SAMGs, the Mark I events and the procedures, the spent fuel pool and when you get into the station blackout activities linking into EP that Scott spoke about, those really force you to look at more of an integrated approach as opposed to a siloed approach. And it is important and we are focused on the fact that we are just trying to keep everybody in tune with what is going on so that we don't become siloed, so it is integrated. And that is a specific challenge for the industry.

I think it is going to be a challenge for the industry not to be distracted. There is going to be a lot going on. Where the security was really a separate event outside the plant block, now we are talking about items and activities are going to effect the power block going forward. And I think that is important that we continue to focus on that aspect.

As regards implementing modifications, generally just to implement them we may need two refueling outages, certainly if we are looking at two divisions. And when we are talking about the need for two operating cycles, we agreed that if I got an outage coming up starting October the first this year, and I complete the guidance on perhaps August the 31st, the first cycle starts at the time I load fuel

in the October outage. So the first cycle takes me through for perhaps two years. I shut down. I go into an outage. I start up. That is my second refueling cycle. I shut down. I have got an outage then. So do the final implementation. That is how we read what the staff is talking about but I think it is important that we recognize that you may need some time to take some measurements and to do the detailed design, confirm it before you make any modifications that may involve a plant shutdown.

In summary, I think we explained to you we are already moving forward and taking actions to enhance safety. We think FLEX and the equipment that Scott spoke about a few moments ago will provide early tangible safety benefits. We do have a concern about the evaluation, how we are going to do the evaluation or reevaluation. Certainly the seismic and flooding in the timeframes that are being suggested and that is something that we are going to have to have some discussions going forward with the NRC staff.

And I think once we have implemented some of the things in Tier 1, we need to take a look at that and see how do they affect certainly the Tier 3 activities. We have started the guidance development. Scott's team has just finished the first draft of the

FLEX guideline. It is by no means the final topic that we could give to the NRC staff today but I think it is indicative of the progress that we are trying to make ensuring that we understand the lessons learned and implement them as quickly as possible.

MEMBER ABDEL-KHALIK: Thank you. Are there any additional questions for either Mr. Heymer or Mr. Bauer?

CHAIR ARMIJO: I just had one really quick question. In the FLEX equipment, offsite FLEX equipment, have you developed some sort of standards on commonality of fittings, connections, types of equipment? Do you have sort of like the preferred standardized?

MR. BAUER: Building Block 3 has two plants taking -- two fleets taking the lead to look at standardized electrical connectors and standardized mechanical connectors for both high-pressure connections and low-pressure connections. So that is being looked at.

CHAIR ARMIJO: And as far as diesel generators, is there a preference for air-cooled versus water-cooled or are you looking at that?

MR. BAUER: I'm sure we will look at that. I don't know that specifically that question has been

asked.

MR. HEYMER: The standardized connections, as Scott said, there is two fleets going forward and taking a look at that. But overall, that is a work in progress but we are focused on sort trying to drive that into some form of closure in the not too distant future as regards standardization of connections. We realize that is an issue because whether it is a regional support center or you are going to tap into what is available at another plant, you want to make sure that when it comes on-site, you can connect them because that was an issue at Fukushima.

MEMBER ABDEL-KHALIK: Thank you, gentlemen. At this time, we would like to ask if there are any questions or comments from the floor, from members of the public who are present in the room.

Yes, sir. Please come to the microphone.

MR. RICCIO: Hi. My name is Jim Riccio and I work for Greenpeace. I'm sure all these actions are necessary. They are just inadequate. I'm wondering why this Agency is again dumping a very easy issue of getting the waste out of the pools, rather than merely be able to measure as the water drains from the pools.

It is sort of a no-brainer. The entire environmental community has been asking you to reduce the amount of waste in the spent fuel pools since at least 9/11. And this agency and this committee have continually dumped the issue.

There has been a bunch of discussion about the design basis. I would ask that the NRC reads their reporting requirement that the industry actually acknowledge when they are not in compliance with the design-basis. At NEI's behest, you wiped out that reporting requirement several years ago.

And again one of the major blind spots, you know, yes you are trying to create more margin and make these reactors less dangerous. You are simultaneously boosting power on 35-year-old reactors, which reduces the response time for operators to take action and simultaneously increases the amount of time that it will take you, those operators, to shut down a reactor.

So there are some major blind spots. You are focusing on very few things that actually may have something to do with Fukushima. We ask that you broaden your perspective. Get the waste out of the pools. Reduce the risks that are within your control. But it seems again NEI has a little bit too much

influence and again we are not addressing those issues.

I know that NRDC has a bunch of petitions filed in on all the task force recommendations. I am going to sincerely recommend they sue you all.

And to try to motivate you to actually take steps to reduce the risk emanating from the spent fuel pool that you have been ducking now for at least ten years and seemingly you will duck for another ten.

I know you have already missed my colleague Paul Gudger who knows a lot more about fire protection than I do because he went down to deal with the Vogtle license. I'm sure Ed has some comments as well but there are many opportunities for this Agency to take better action than what is contained in this task force report.

MEMBER ABDEL-KHALIK: Thank you, sir. Is there anyone else? Any other members -- Yes.

MR. LYMAN: Hi, Ed Lyman from the Union of Concerned Scientists. Jim's taller than I am.

You know as usual we have more questions than answers at this point but I just wanted to flag a couple of concerns we have. And the way we see this process evolving is that NEI and the industry has staked out their magic bullet for dealing with the

post-Fukushima at large. And they are essentially throwing down the gauntlet and daring the NRC to pose requirements which may exceed what they were already doing.

When we heard that equipment, FLEX equipment was already being procured, we were very concerned because obviously not only hasn't the order been issued covering 4.2 but the guidance is still several months away. What guidance is this equipment that is being procured going to meet? Now on the one hand we heard Mr. Bauer say that any equipment that had some engineering calculations need to be done, they were going to wait for the guidance. But I thought I heard Mr. Heymer say that diesel generators and diesel-driven pumps had already been procured by a number of plants. And I would like clarification on that.

The other issues has to do with procedures. Now one of the -- We again heard that all this equipment is going to come with development of procedures for how it is going to be used. I think everyone agrees that detailed procedures are an important missing piece in being able to actually use the equipment when it is needed in the right place and make sure that it is functional and usable.

And I would just like to point out that in the history of the B.5.b requirements, that the original proposed order by the NRC for B.5.b, what became 50.54(h)(h), that the language was licensees develop, implement, and maintain guidance strategies and procedures for using that equipment.

There was much debate about whether the word procedures should be included in the order and the rule and ultimately, it was struck from the rule. So the rule only reads guidance and strategies; no procedures. I would say the outcome of that was the fact that the B.5.b equipment as inspected turned out in many cases not to be useable even for its intended purpose to comply with 50.54(h)(h) because the absence of procedures ended up with nothing but the NEI guidance on B.5.b which was not detailed enough to actually address real world situations.

You are heading toward the same situation now. The proposed wording of the order on 4.2 is develop, implement, and maintain guidance and strategies. Again, there is no reference to procedures. I would say if the industry has already planning to develop procedures, why not include that in the order. Is there any problem with having procedures specifically mentioned as one of the

requirements to be developed in wording.

Thank you.

MEMBER ABDEL-KHALIK: Thank you. Anybody else who would like to make comments from the floor? All right. Is there anyone on the line, on the telephone on the bridge who would like to make comments? If there is anyone online, please say something so that we would know that the lines are open.

PARTICIPANT: I'm here but I don't have any comments. Thank you very much.

MEMBER ABDEL-KHALIK: Thank you. Anyone else who would like to make a comment?

Well hearing none, I return it back to you, Mr. Chairman, 25 minutes later but we got it done.

CHAIR ARMIJO: Thank you very much. I think it was worth the time. And I would like to keep on schedule for the rest of the day. So we are going to have a very short lunch. I would like to reconvene at 1:00.

(Whereupon, at 12:23 p.m., a lunch recess was taken.)

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

(1:09 p.m.)

CHAIR ARMIJO: We can reconvene and I think Jack is going to lead us through this.

MEMBER SIEBER: Okay, thank you Mr. Chairman. Before we begin, we do have an NRC staff member who is with us by telephone connection. Mr. Gerald Waig of the NRC staff in Research, Division of Safety Systems, and Gerald if you hear us, could you please acknowledge?

MR. WAIG: Yes. Good afternoon. This is Mr. Waig.

MEMBER SIEBER: Okay and Mr. Waig's purpose on the telephone is to answer questions that he may be knowledgeable of that the members may ask. There is also a line open to the public but I understand that at this point in time, there is no one on that line. And so with that, we will begin.

On September 7th of last year, we had a subcommittee meeting on the Revision 1 of the Regulatory Guide 1.93. Now Regulatory Guide 1.93 was originally issued in December of 1974. That was Rev O and the title of that was "Availability of Electric Power Sources." And today we are discussing Rev 1 of Reg Guide 1.93.

And a number of things happened from 1974 until today that would affect the content of what Rev 1 should contain. The most important of which that is reflected in Rev 1 is in 2003 there was a Northeast blackout in which nine nuclear units were isolated from the electric fault power supply system. And I think it was the ECAR system. And connected to that was PJM system which somehow or other the system operator recognized what was going on and isolated. And so the remaining connected plants in Pennsylvania and Maryland and New Jersey were not affected.

It turned out that in the 2003 Northeast blackout, all nine units tripped. All nine units have diesel start, except for one who had one diesel start and the other one failed to start. And that particular incident, after investigation and study brought about a need for a number of changes to the Regulatory Guide to comply with the actually GDC-2 and GDC-17.

Now it also turns out that when the original Regulatory Guide in 1974 was issued, there were plant that preceded the general design criteria and, therefore, that Reg Guide would not specifically apply to them because the rule didn't apply to them. On the other hand, the staff at that time and

continues to this day, applies the appropriate constraints on sources of electric power through the technical specifications. Reg Guide 1.93 explicitly states that the technical specifications are the ruling entity for the supply of electric power sources.

Now, since the draft of this was issued for public comments in 2011 or 2010, excuse me, and four months after that, the Fukushima event occurred. Reg Guide 1.93 does not reflect any actions by the staff with regard to Fukushima. On the other hand, the station blackout is only an adjacent part of this particular Regulatory Guide. Station blackout has its own Regulatory Guide which is under review by the staff at this time.

And so the purpose of this long introduction is to get the perspective of where Reg Guide 1.93 fits into the overall system of regulations that govern first of all, how many sources of supply you should have; what you should do if you are less than one of those sources; and to recognize and provide guidance for grid instabilities, grid blackouts and so forth as to how nuclear power plants should respond.

There is a lot of detail in this revision

of Reg Guide 1.93 and I think that our subcommittee when through all of that detail and then had a discussion at the end of the subcommittee meeting as to what we would advise the full committee to do at that time.

So what I would like to do at this point is introduce to you Mike Case, who is director of the Division of Engineering for Research and he is responsible for the staff activities in this area. Mike?

MR. CASE: Thank you very much. I think I will start off with a note of appreciation. Because besides doing some of the technical work on some of the Reg Guides, I am responsible for the Reg Guide update program. And quite frankly, the ACRS has been a partner in that activity over the past several years and in my mind they have been a very valuable partner. And that from time to time we have asked you to do things with your schedules in order to accommodate Regulatory Guides getting out the door. We really appreciate that from the NRC perspective, besides the technical comments that you add value to all the Reg Guides.

And first the program itself we have about 450 Reg Guides in the NRC's repertoire of Reg Guides.

And we have been working our way through when we are down to about less than 175 to go. So the program is moving along. And when we first attacked the Reg Guides in the program, we obviously took the ones that were high priority, ones that had a lot of regulatory issues embedded in them and ones that were very valuable for new plant reviews and we did them first.

And so where we are in the program is we are starting to move towards these lower priority reg guides that a lot of times don't have a lot of big regulatory issues embedded in them but they need to be updated. And so I think the one that Sheila is going to lead you through today is a Reg Guide that is sort of that ilk in that this particular Reg Guide is 38 years old. And as you heard in the summary before, much of the same things, it doesn't have a lot of big regulatory issues embedded in it. What we do now with the advent during that 38 years of things like standard tech specs, those are the products that we use to make any sort of adjustments in this area right now.

So the Reg Guide provides some very valuable background but it is not a particularly big Reg Guide as far as the regulatory issues. It does pick up significant operating history that occurred in

that 38 years and we talked about that earlier, it is the station blackout and the Generic Letter that was associated with it. And it also picks up current thoughts on how we apply these for evolutionary plants and for passive plants. And it doesn't have -- has little Fukushima implications.

So from an update perspective, I think this particular update has been a success. I think it is ready to be issued and hopefully the committee, after they hear Sheila's presentation, will come to a similar conclusion, and be able to indicate that in a letter to us.

And now just sort of to work my way back to Sheila and she can start the presentation. Over the past, maybe the past quarter, between the research staff and the staff at NRO and the staff at NRR, there has been about four electrical people who have retired. And they retired with probably close to two centuries of accumulated experience in the electrical area. And so now we have a new generation, Mike and Sheila coming on. And you also wonder well why the hell am I wasting my time updating this Reg Guide if it doesn't really have a lot of regulatory value. The real value in updating it in that it writes down for people like Sheila what we have learned and what the

staff was thinking when it is doing some of these things. So this particular Reg Guide has as much value in the discussion section as it has in the regulatory position section.

So it is very -- although it seems like it is an ordinary reg guide, it actually provides great value for the Agency as we move forward and as new people like Sheila who are bright and upcoming, they have the benefit of the staff with them over 38 years.

So with that, --

MEMBER STETKAR: Mike, before you switch and plus you as being trucked out as the manager, has there been thought that Agency management levels in terms of potential implications of issuing this Reg Guide in 2012 versus the path forward on resolving station blackout issues and alternate power supply issues in the context of the Fukushima 50.54(f) letters and eventual rule-making and so forth? And in particular this Reg Guide contains specific numerical criteria for times. You can operate under this configuration for two hours or 12 hours or some number of hours. I know our committee has interactions with the staff regarding the specificity of times without necessarily any in-depth evaluation of the technical basis for that time.

What I am curious about is does issuance of this Reg Guide at this particular point in time, I'm not talking about March 10, 2011, implicitly reinforce the notion that these times are acceptable, in an environment where many people are questioning the basis for coping times and allowed operating configurations.

MR. CASE: My short answer would be no.

Here would be my rationale. This particular Reg Guide is mostly focused on design-basis issues. The thoughts are really concerned about the design-basis and how you maintain that. All the Fukushima activity will actually go in a different Reg Guide. It will go in the station blackout Reg Guide and it addresses beyond design-basis issues. And so one of the wisdoms from the Fukushima Task Force is you ought to keep those thoughts different or in different places. You know because they had that one long-term one they say hey, you need to look at the regulations and see whether you can rearrange them so that you don't mix those two issues.

So I think the answer is, the answer to Fukushima would be in the station blackout Reg Guide. It may have a reflection back in this one but we will live to see what happens. But the big idea is that I

would not unnecessarily mix those two ideas.

MEMBER STETKAR: Thanks.

MR. CASE: And so now we can go to Sheila on this Reg Guide.

MS. RAY: Thank you. So this is Reg Guide 1.93, "Availability of Electric Power Sources." Next slide.

Reg Guide 1.93, Revision 0 was issued in December of 1974 and the LCO actions and completion times were incorporated into the standard tech specs. This Reg Guide, as mentioned previously, was revised for three reasons: First to incorporate lessons learned from the 2003 Northeast blackout and Generic Letter 2006-02 on grid reliability; second to address the impact of deregulation; and thirdly, to include information on passive reactors -- passive and evolutionary reactors. Next slide.

Slide 3. This slide applies to single and multi-unit sites. It is consistent with standard tech specs, however as mentioned previously, lessons learned from the Fukushima event will be incorporated in a future revision of this Reg Guide. Next slide.

Slide 4. The Northeast blackout in August of 2003, where nine nuclear power plants tripped and power was restored anywhere from one to six and a half

hours. The staff issued Generic Letter 2006-02 as a result of issues identified in the Northeast blackout. Next slide.

MEMBER SKILLMAN: Sheila, just so I understand what I think I heard just several minutes ago. I thought Michael said there will be an effort to keep Fukushima lessons and this Reg Guide separated from each other. You just mentioned the lessons learned from the Fukushima will be incorporated.

MS. RAY: If there are any issues.

MEMBER SKILLMAN: If there are what?

MS. RAY: If there are any issues identified. We will evaluate that when we get to the time where we have lessons learned. That may impact this Reg Guide but we will evaluate it at that time.

MEMBER SKILLMAN: Should I interpret that to mean if the Fukushima lessons somehow turned what is in this Reg Guide upside down, then this Reg Guide gets revised?

MEMBER BROWN: I wouldn't call it turning it upside down. Ninety-nine percent of everything in this Reg Guide deals with LCOs, having one or two -- out of service. It doesn't really talk for the most part across everything -- losing everything. And it identified and it has been around the times are

somewhat consistent with what they have had for years.

If somehow we get through, and this was my take on the discussion we had in the subcommittee meeting was that if something falls out of the evaluation of Fukushima that says hey look we don't really want to operate for that long with these particular pieces of equipment out of service or what have you. In other words, I have got two diesels; one is down 72 hours or 48 or 24, or some other way you calculate the number whatever it is, then it would have to be revised to reflect that if that is the thought.

So I mean, right now why hold up on updating? That was my interpretation. Why hold up on updating it when we have got a lot of work to go and you really ought to at least bring in some of the other thought processes that went on for making this revision in the first place.

MEMBER SKILLMAN: Thank you, that helps.

MEMBER BROWN: So that was kind of my take from the meeting.

MEMBER SKILLMAN: Yes, thank you.

MEMBER SIEBER: I might add to that the station blackout has its own Reg Guide. I think it is Regulatory Guide 1.155.

MEMBER SKILLMAN: I was just trying to get clear in my mind what I thought might have been a discrepancy between what Mike said and --

MEMBER SIEBER: Reg Guide 1.93 deals more with the structure of equipment that should be installed at the plant in accordance with GDC-17 and how available it should be and when it is not available it goes through stages what has to be done.

On the other hand, station blackout, that whole process is another Reg Guide and another rule. And they are intertwined in some areas but those areas are minor and I agree with Charlie's explanation that the kinds of changes that a revision of the station blackout rule might bring about may impact Reg Guide 1.93, but not in a -- we don't anticipate that in a major way that it will impact Reg Guide 1.155.

MEMBER SKILLMAN: Thank you.

MS. RAY: Next slide. Slide 5. Reg Guide 1.93 discusses staff positions on acceptable restrictions if the available power sources are less than the LCO. DG-1244 was issued for public comment in September 2010. Next slide.

Slide 6. We made some changes to this Reg Guide based on subcommittee comments. First we used a direct quote of GDC-17 instead of a paraphrased

version. Second, we added clarification to the Part B discussion on inverters to state that the inverters we are referring to are between the safety-related batteries and the 120 or 125-volt safety-related buses.

MEMBER STETKAR: Sheila, we had a little bit of discussion. I'm glad you added the definition here. I still have a question about why those are the only types of inverters you are interested in the world.

Why are 120 or 125-volt in particular the only types? You are not interested in perhaps other voltage inverters?

MR. MATHEW: This is Roy Mathew from NRR.

MEMBER STETKAR: Remember, this will be applied in the future to plant designs that maybe you haven't thought about.

MR. MATHEW: Right. The reason why 120-volt uninterruptable power, that is a source of power for all control protected from a protection control system perspective power system. That is a level of voltage all plants are designed as of now.

MEMBER STETKAR: All plants?

MR. MATHEW: All plants meaning all operating plants and most of the new reactor designs.

But there voltages, RPS system which is covered in a different tech spec. So that is not covered here. There are 24 or 48-volt those are not part of the electrical system which we are referring to.

MEMBER STETKAR: This does not cover, for example, inverters in new plant designs that actually supply power for all of the digital instrumentation, integrated digital instrumentation control and protection functions.

MR. MATHEW: No, that will come under Chapter 7 probably. Chapter 7, yes. Peter Kang from New Reactors is here. He can probably highlight.

MR. KANG: Dr. Stetkar, my name is Peter Kang from New Reactor Branch -- Office of New Reactor. And yes, you are right. Like EPR, AREVA design they use a 250-volts and for the controls of the circuit breakers as well as monitoring. So there is various voltages, yes. And then you go down to the 24-volt systems as well.

MEMBER STETKAR: Well also ESBWR in particular, if my memory serves me correctly, uses inverters to power their instrumentation control and protection systems.

MR. KANG: Yes.

MEMBER STETKAR: It is actually an

inverter supply system.

MR. KANG: Yes.

MEMBER STETKAR: And it is clear if we are only talking about traditional current operating plant DC to AC instrumentation inverters, which is the focus of this particular bullet, the scope of this Reg Guide then does not apply to the ESBWR type inverters, which might actually be a heck of a lot more important to safety of a plant than these types of inverters. And that sort of precipitated our original discussion about getting a better definition.

MEMBER SHACK: But it does say for evolutionary plants -- Guide.

MEMBER STETKAR: So they are covered that way. I'm glad at least we got a definition. I was kind of hanging up on making sure that we thought carefully about the scope of what our inverters and we are not now so narrowly focusing this that people can justify saying well I have equipment that is outside of this Reg Guide, so it is not applicable.

MR. MATHEW: I think we are covered here. Like Bill pointed out for the new reactors evolutionary plants, depending on the design, they may need a customized tech spec.

MR. KANG: Using AP1000 originally start

out with 125-volt, 120, 125-volt DC system but they later changed it to 250-volt systems.

MEMBER STETKAR: Okay, thanks.

MS. RAY: And one of the other changes we made was using the terms orderly shutdown instead of immediate shutdown. And an orderly shutdown is per the normal operating procedures. Next slide.

Slide 7. And based on an additional comment, this is a revision we will be incorporating into Section D, discussion, to state that the period of continued operations is based on the necessary time to perform corrective maintenance, the capacity and capability of the remaining electric power sources, and the low probability of a DBA occurring during this period. Next slide. Slide 8.

The regulatory basis for this Reg Guide is GDC-17. And new to Revision 1, we added a sentence to state that for a pre-GDC plant, the applicable criteria are in the FSAR. Next slide.

Slide 9. Revision 1 also includes a discussion on grid-risk-sensitive maintenance. To minimize risk, licensees should perform grid reliability revaluations as part of maintenance risk assessments.

For example, if degraded grid conditions

exist, licensees should consider rescheduling the maintenance. Otherwise, licensees can use equipment protection measures or compensatory measures to limit risk. Next slide.

Slide 10. Provision 1 also concludes a discussion of communication with the transmission system operator such that the nuclear power plant operator should be aware of grid conditions that could affect operations and also be informed of results of grid studies in order to manage risk. Next slide.

MEMBER RAY: Wait. Can we try that one more time?

MS. RAY: So this is on communication with the transmission system operator.

MEMBER RAY: Yes.

MS. RAY: And the nuclear power plant should be aware of any grid conditions so they can evaluate operability in any operations.

MEMBER RAY: Has anybody had input to this who knows, has experience in grid operations?

MS. RAY: Yes, this is from a NERC standard, NUC-001. And there is actually a --

MEMBER RAY: Okay, that explains it.

MS. RAY: Okay.

MEMBER RAY: All right. Because trust me,

there is no way they can do that. But all right. That's ridiculous.

MR. MATHEW: Let me clarify. One of the lessons learned acknowledged during the 2003 blackout and NRC Generic Letter 2006. One other issue was what we found from utilities. They didn't have a real protocol to help to communication and what are the normal means of communication between the transmission system entity and the nuclear operator. Because of that, you know, you have to make some judgment where an offsite power is operable or not and you need a lot of information from the grid people to make that assessment.

So part of the Generic Letter we obtained a lot of information saying there is a need for interface communications with the transmission system operator. And we work with the Federal Energy Regulatory Commission and they issued this NUC-001 that is a standard which has to be complied with all transmission system operators now.

MEMBER RAY: It's meaningless. Okay? I mean the idea that you understand changes in the grid that can affect plant operations and that you then with that understanding do something. That's implied, right? Or that the plant operator obtains up-to-date

information on existed and projected grid conditions to maintain a current and valid risk assessment and manage possible change in risk, I just can't conceive of that and I have been a grid operator as well as a nuclear plant operator. It is just beyond my comprehension what you are talking about.

MEMBER SKILLMAN: My experience is different than Harold's. Ice storms, specifically, are a real threat. And I know from Central Pennsylvania, we were tied into the PJM operator and we could watch that ice moving westward across Pennsylvania. And the real issue wasn't so much to keep the plant operating. The question was, are we going to have some of our offsite power taken out from this ice.

MEMBER RAY: Well what did you do, Dick?

MEMBER SKILLMAN: Simply used that for the plant risk condition and for identifying which safety system trains may have been lined up for maintenance.

MEMBER SHACK: It's really A-4 assessments they are talking about here. Don't take it out and service it.

MEMBER SKILLMAN: You're deep in your maintenance role and you are deep in your equipment and you are saying hey wait a minute. Let's just

everybody just chill for 72 hours until we see where the storm goes.

So I don't want to suggest your experience is invalid. I just want to say that I have had experience where we would say let's keep an eye on that weather because that might affect us. And in any case well we were going to bring the maintenance in over the weekend, let's don't. Let's leave the situation alone.

MEMBER RAY: All right. That makes sense to me. I mean, if it referred to weather for example, I mean I think that is a good insight into how you might apply this. But if you are just talking about what resources are on or off, what lines are in or out of service, that kind of stuff in terms of grid stability, for example. If you lose a given line are you likely to lose offsite power, for example? You can't expect the plant operator to know that and do as you would for an ice storm, for example.

In other words, the condition of the grid and its vulnerability to an n-1 event in terms of just take the blackout that affected San Onofre recently. There wasn't anything in the world they could have known before it happened that it was potentially going to occur. And yet that implies to me that maybe they

should have.

Now like I say, an ice storm is a different proposition. But you know, you are talking a grid that is interconnected from British Columbia to the Mexican border and things occur that there is no way a plant operator can anticipate.

MEMBER SKILLMAN: Yes, clairvoyance is not part of the skill set.

MEMBER SIEBER: But this does solve some problems because grid operators can do stability studies and evaluate removing lines from service and what that does to grid stability.

MEMBER RAY: Well that's right, Jack.

MEMBER SIEBER: On the other hand, when a bird lands on a wire and contaminates an insulator, you probably can't predict that through the system operator.

MEMBER RAY: Well I'm still wondering if this is intending that the plant operator do the first thing you said, which is be sufficiently plugged in that they know how fragile the grid is under a particular load and alignment conditions.

MEMBER SIEBER: Well it is interesting to note in the Northeast blackout that one grid system collapsed and its adjacent grid system, which Mr.

Skillman was referring to did not collapse. It was because of rapid system operator action to isolate. And part of that is knowledge of the fact that there is a bunch of nuclear plants sitting on his system that need the electric power.

MEMBER RAY: But that is exactly right. I just I am looking at the obligation on the nuclear plant operator here. And I am saying I mean I don't know what the nuclear plant operator could do to effect that, other than say I am a nuclear plant operator and don't disconnect me.

MEMBER SIEBER: The Reg Guide talks about an agreement made between NERC and the NRC that would provide these functions from the system operator in cognizance of the fact that there are nuclear plants that need reliable sources of offsite power. The net effect of this is that agreement between NERC and the NRC that raises the consciousness level and the analytic capabilities of system operators to try to improve grid stability for nuclear plants. And this recognizes that communication must exist between the plant operator and the system operator, which was not always the case.

CHAIR ARMIJO: Jack, who has the responsibility to initiate that communication? The

way it reads here it is the plant operator has to always be requiring or somehow -- or is it the system operator has the obligation to inform the nuclear plant that hey things are going south and you had better do something.

MR. MATHEW: Yes, let me try to answer that. If you read NUC-001, which is the mandatory standard for transmission system operator as well as for the nuclear operator to comply with that standard, it says they have to communicate back and forth. The requirements of the power plant message communicated to the transmission system operator, meaning what work that he needs, what power he needs, those kinds of requirements and vice versa.

MEMBER RAY: Look, I do understand that and I was actually involved in the development of that requirement. But I read this as sort of a real-time dialogue and assessment that the nuclear plant operator had to engage in and I just don't think that is possible.

MR. MATHEW: The real-time is only for let's say if you are going to take diesel out, you are going to test the diesel, Maintenance Rule (a)(4) risk assessment says you shall manage the risk before you perform any maintenance. So part of that evolution,

the nuclear reactor operator will be in communication with the transmission operator to see whether they can take the diesels out. So that is kind of real-time thing that is happening.

MEMBER RAY: Okay, if that is what you mean by that by this, in other words, don't take an emergency diesel generator out of service without making, not just checking with the grid operator, but making your own valid risk assessment based on grid conditions, then that is going to be a new challenge for the plant operators. I don't know any that can do it right now.

MR. KANG: This is Peter Kang from Office of New Reactors. As a plant operators, they are observing always the plant voltages, the grid voltages, or incoming voltages to the stations. If the voltage condition is going below what is the ranges and then they can call the grid operators to do some other actions like adding a capacitor bank to raise the voltages up high above the normal operating limits.

So I think this communication is very valuable. In the old days the plant operator has no controls. What you see is basically what you are going to get. But by having this communication

channels with a TSO, there is various way to remedy the voltage conditions or taking line outages and other generations in the system.

MEMBER SKILLMAN: There are some other issues related to this. Each of the alternators in the country has VAR limits on reactance. And one can be sitting dumb and happy thinking you are writing your generated voltage level and your frequency level and if you are not careful, you are moving into a reactive load situation that is adverse to the copper in the windings in your spanner.

And so at least my experience has been there was very top communication on what that VAR loading will be based on the load projection and that would cause the operator to go into the instructions for the machine and make sure that the machine was not going to be injured. So I would just offer there is more to this than just maintenance rule implications or another limit coming offline, whether it be a steam unit or a fossil unit or a nuclear unit. There are some very real issues pertaining to the safety of the electrical side that have to do with the communication with the TSO. And my experience has been that communication is bilateral. It is spontaneous and it is functioning.

MEMBER SIEBER: In fact they control VARs automatically.

MEMBER SKILLMAN: They control VARs because you can take your unit out on adverse VARs.

MEMBER RAY: I don't think that has anything to do with this, though, in my opinion.

MEMBER SKILLMAN: That's the communication with the TSO, Harold.

MEMBER RAY: I know but I am talking about the bullets underneath. And just the idea, for example, if you are going to use this as a way of plant configuration control, what information are you going to seek from the grid operator to do that?

You gave an example, which is a good example, of a weather condition. So I will grant that as a good example. Maybe that's all this applies to. But if you are talking about something else, like asking the grid operator how stable the grid is going to be today, that isn't going to get you anywhere.

MEMBER SIEBER: He can tell you how stable it is right now.

MR. MATHEW: Let me clarifying something.

MEMBER RAY: Well you're planning to take an outage tomorrow on your diesel generator. Go ahead.

MR. MATHEW: Let me clarify some more

aspect. For example, you know, the grid operators typically do contingency analysis for a periodic basis. Some of like PJM does every half an hour, so ten minutes, you know, things like that. So when they run the contingency analysis, they are always looking at the nuclear power plants to see if that trips, do they have enough offsite power, voltage, and frequency.

MEMBER RAY: Yes, I ran a grid. I understand how it works.

MR. MATHEW: Yes, let me complete it. The main thrust of the communication is if the transmission system operator, the grid operator, by looking at the contingency analysis determines that nuclear power plant doesn't have enough voltage and frequency, then according to NUC-001 procedure, he is supposed to notify the reactor operator. So reactor operator really look at this tech spec and say hey my offsite power is inoperable. He is going to declare limiting condition operation, which is that is the whole crux of the discussion.

MEMBER RAY: You are suggesting that the plant operator can determine that the availability of offsite power is inoperable?

MR. MATHEW: Yes, based on grid operator

telling them if your plant trips, you don't have enough voltage and frequency. Then he has to determine whether the offsite power is operable per the tech specs.

MEMBER RAY: Well, yes. Again, I understand or he can have an hands off day because the load is such that -- Well all right. I'm not going to get anywhere here so I'll be quiet.

MEMBER BROWN: Can I -- I just wanted to ask one question. On slide 7 you said you added to the discussion in summary --

MS. RAY: Yes.

MEMBER BROWN: -- under the period of continued -- Did you do that after the January 12th version that you issued to us?

MS. RAY: No, we have not added that in yet.

MEMBER BROWN: Oh, you are going to?

MS. RAY: Yes, we will be doing that.

MEMBER BROWN: Okay. All right. I don't disagree with that.

MEMBER SHACK: We were just looking for it, that's all.

MS. RAY: Oh, sorry.

MEMBER BROWN: yes, I didn't remember it

when I read the slide.

MS. RAY: It was based on the comment we received --

MEMBER BROWN: Okay.

MS. RAY: -- after we submitted the draft.

MEMBER BROWN: That's good. I don't disagree with it. So I'll recheck it.

MS. RAY: Slide 11. Information on passive plants was added to Revision 1 such that passive and evolutionary plant designs will be evaluated on a case-by-case basis, since they have different power sources. Next slide.

MEMBER SHACK: There's a sentence in that discussion of passive plants that really grates on me. These non-safety related diesel generators do not require any technical specification requirements because they are treated under regulatory treatment of non-safety systems. While I'll agree they don't have any tech specs and they are under written, the because is a little peculiar. You could just say that they are not under tech specs and they are treated under and leave out the because.

MEMBER SIEBER: It should not be because. It should be although.

MS. RAY: We can take that back and make

that revision.

MEMBER SHACK: Then the next sentence says they perform risk-significant functions and therefore candidates for regulatory oversight but there is no suggestion that any regulatory oversight is needed. They were candidates. You disposed the need for --

CHAIR ARMIJO: Is it a threat, an overhanging sword or what?

MEMBER SHACK: It is clear that you are discussing the evolutionary plant designs on a case-by-case basis. You may want to add that sort of a comment to the passive plant paragraph to make sure that the case-by-case also applies for the passive plants.

MR. MATHEW: That's a good comment.

MS. RAY: We will make that change.

MEMBER CORRADINI: We can edit their whole document, if you are feeling up to it.

MS. RAY: Slide 12. Revision 0 and Revision 1 discuss operational restrictions based on the intent of GDC-17. For meeting the LCO, Revision 1 is more specific in terms of voltage, capacity, and capability. Next slide.

Slide 13. For the period of continued operation during the loss of required electric

sources, licensees should evaluate the safety significance to prevent the further degradation of the electric power sources. Licensees may continue operation at power or initiation of orderly shutdown. Next slide.

Slide 14. An orderly shutdown is if the tech spec LCOs are not restored within the completion time limits. Revision 1 also adds clarification such that the nuclear power plant may return to rated power if the tech spec LCOs are restored during shutdown. However, if grid conditions worsen, a manual trip may be needed. Next slide.

Slide 15. This table defines the levels of power system degradation. Revision 0 defined five scenarios and Revision 1 defined seven. The first scenario in Revision 0, 1 AC power source included information on offsite and on-site sources. This was separated into two separate levels for Revision 1. Revision 1 also added an extra level of one inverter less than the LCO, which is the last one. Next slide.

Slide 16. The regulatory physicians are to ensure that when electric power sources are less than the LCO, the nuclear power plant is in a safe operating mode. Revision 1 also states that the tech specs are the prevailing document if there are any

inconsistencies between the Reg Guide and tech specs. Revision 1 also includes information regarding coordination between the grid operator and the nuclear power plant and finally that post-trip voltages should be verified. Next slide.

Slide 17. Level one is when the offsite AC sources are one less than the LCO. There is an associated risk for a loss of offsite power and the regulatory position states that power operation may continue up to 72 hours. Revision 1 removes ramp down rates and also states that a shutdown would be in accordance with tech specs.

MEMBER SKILLMAN: Let's go back to slide 10.

MS. RAY: Yes, slide 10.

MEMBER SKILLMAN: Please. I've learned to listen to Harold and when I ask a question about slide 10.

I would wonder if industry experience and if plant operators' experience are dependent on their distance from the TSO headquarters, wherever that might be. California is a huge state. Pennsylvania on the East Coast is teeny by comparison. So maybe Jack's and my experience was in a very small parochial geographical area, where Harold's is more vast. And

if there isn't something in this portion of the Reg Guide that should recognize the connectivity between the site and the location of the TSO and how that exchange occurs my sense is that there is something in what Harold is communicating. Maybe some operator, some nuclear power plants and the grid operator are very aligned or geographically close enough that there is a very tight bond, whereas in others, the geographical area is so vast that same connection or that same amount of communication doesn't fit.

The question is, should this recognize that there may be some regional differences in how that communication occurs. I would sure like to ask you to consider that. And with that, I am good to go back to slide 17, unless there is more discussion.

MR. MATHEW: We can probably frame that question to our counterparts in NERC and FERC.

MEMBER RAY: I mean I think the examples that you gave of things that could happen that the plant operator should be aware of are very valid. I mean, I understand.

If the post-trip offsite voltage in the switchyard is projected to be below the minimum required for operable offsite power, then that ought to be taken into account for sure. I was asking,

1 though, whether this expected the nuclear plant
2 operator to have some awareness of the likelihood of
3 a loss of offsite power, for example, or an outage on
4 the transmission lines that he is connected to because
5 that is the inference that I got from him.
6 And that implies something which, as Dick
7 says at least in the west, is that is not even in the
8 cards. You don't call up the Cal ISO and say what is
9 the chances today of this transmission line going down
10 or loss of offsite power or whatever.
11 MEMBER STETKAR: But Harold, the Cal ISO
12 does know, you know, 2:00 in the afternoon on a
13 weekday in August or September --
14 MEMBER RAY: They call you and say hands
15 off. I know that.
16 MEMBER STETKAR: -- that there is a higher
17 likelihood than 2:00 on a weekend afternoon in
18 October.
19 MEMBER RAY: I lived with that all my
20 life. And actually they call you up and say tomorrow
21 is hands off. All right. You cancel all maintenance.
22 MEMBER STETKAR: I think that's all they
23 are talking about.
24 MEMBER RAY: If that is all they are
25 talking about, fine. That is not what I read into it.

MEMBER STETKAR: They are talking about a quantitative probability that there is a --

MEMBER RAY: I read into it an obligation.

CHAIR ARMIJO: I read a lot more into it, too.

MEMBER RAY: I read into it an obligation on the part of the plant operator and I do know plant operators and they are clueless. But they pick up the phone and the operator says we are having a heavy load tomorrow, hands off. You say cancel all maintenance, hands off. That's it. But you don't expect the plant operator to go find out what the stability of the grid is and feed that to his PRA people and say what is my risk profile tomorrow, I will take the diesel in or out. I mean, we are kidding ourselves if you think that is going to happen. At least from where I'm used to.

MR. MATHEW: Hopefully they will only ask the logical question.

MEMBER SKILLMAN: Let me apologize and let's go back to slide 17. I'm sorry.

MEMBER BROWN: I've not been a grid operator, okay, other than in ship, which have little bitty compact electrical -- but the way the Reg Guide reads, I mean, it's got stuff in here that says to

satisfy the maintenance rule the operator, NPP, should know the grid's condition before taking a risk-significant piece of equipment out of service and should monitor it for the time it is out of service.

That sounds like a reasonable idea to call somebody up and what's going on. Should we do this or not?

The next paragraph. To perform meaningful and comprehensive grid reliability about evaluations, it is essential for the NPP licensee to communicate to the TSO before and periodically during the performance of any grid risk-sensitive activities. In other words, I need power, I'm doing stuff. I mean, I didn't get your flavor.

MEMBER RAY: I mean, I can read it. I just read into it something different than you say. All I can say if you call up the Cal ISO and say exactly what you just now said, they will say I don't know what you are talking about. Did I tell you that you had to have hands off tomorrow? No. Well the all right, go about your business and quit calling me.

(Laughter.)

You know, so because -- No, no. The grid doesn't operate the way you are suggesting it does, that there is some daily or hourly probability of loss

of power in some portion of the grid and they can just tell you what that is.

But I have taken way too much time here. Let's just forget it and go on. They'll do whatever they are going to do, I guess.

MEMBER SKILLMAN: Slide 17. There we go.

MEMBER BROWN: I was just trying to, in response to your follow-up question point out that I don't think you have to worry about whether it is California or Pennsylvania. I understand your point about being vast or small but the way I read this, and I admit I am not a commercial operator and never have been, that I thought they had a lot of specific comments that hey before you do stuff in my plant, make sure I've got power available and I'm not going to get shortchanged by something else that is going on that we don't know about. And that's the way I read it. So that is I am just trying to point out that the I thought the words said that. I'll stop right there.

MEMBER SIEBER: Yes, grid characteristics change within five minutes.

MEMBER BROWN: Oh, yes. And you can't help that.

MR. MATHEW: Actually as far as we are concerned, after issuing the NUC-001 by FERC, it made

a lot of communication experience easier because it is required in a standard that everybody has to follow. So we don't have any issues.

MEMBER RAY: That's right. I agree with that. And that is why the people at the plant don't need to do what I hear some people saying they are expected to do. But let's stop. I'm not going to convince anybody, I know.

MS. RAY: Slide 18. Level two is when the on-site AC power sources are one less than the LCO. Revision 1 adds the intent of GDC-17 such that efforts should be made to restore the on-site AC source and verify that the offsite source can accommodate shutdown. The regulatory position states that power operation may continue for up to 72 hours if the redundant diesel is tested and/or assessed within 24 hours.

MEMBER STETKAR: Sheila, refresh my memory. I was searching here but I was trying to also listen. The Reg Guide -- Doesn't the Reg Guide always say that if the guidance in the tech spec is different then these times the tech spec trumps this?

MS. RAY: Yes, that is correct.

MEMBER STETKAR: Okay. That's why I am always having problems with these numbers because I'm

not aware of a plant that doesn't have tech specs.

In other words, if these numbers are less restricted than the tech specs, the tech specs govern.

MS. RAY: Yes.

MEMBER STETKAR: If these numbers are more restrictive, do these numbers govern or do the tech specs govern?

MR. MATHEW: Always the tech spec you follow the plans.

MEMBER STETKAR: That's why I have a problem with why do we need numbers in a Reg Guide if the tech spec always governs, regardless of whether the tech spec is more or less restrictive than these numbers. Because I don't know of any plants that don't have tech specs. With this level of specificity in them.

MEMBER BROWN: Don't the tech specs have to be developed based on some guidance? And where would you go for the guidance?

MEMBER STETKAR: The standard tech specs.

MEMBER BROWN: I would go to the Reg Guides.

MEMBER STETKAR: No. There are standard tech specs.

MR. BURKE: The standard tech spec bases

refers to this Reg Guide for the numbers.

MEMBER BROWN: I understand that but I'm saying at some point there has got to be a standard established from which some tech spec Reg Guide or some tech specs are developed.

MEMBER STETKAR: Well but what John said is relevant. The standard tech spec, the current standard tech spec bases do refer to this particular Reg Guide.

That gets back to my original question about the whole basis for the --

MR. MATHEW: The regulatory --

MEMBER STETKAR: Okay, go on. Go on.

MR. MATHEW: The regulatory requirement is 50.36. That is a regulatory requirement for all plant tech specs. Right, Carl?

MR. SCHULTEN: I'm Carl Schulten, Tech Spec Branch, NRR. You know 50.36 governs the tech specs. NUREGs 1430 to 1434 are the standard technical specifications. They are really models. And the Reg Guide may be referenced in the back in the bases but that does not necessarily mean the licensee would adopt that Reg Guide as part of their licensing basis. It's a voluntary thing.

MEMBER STETKAR: Thanks.

MS. RAY: And the next slide. Slide 19. Level three is when the offsite system is not available or has inadequate capabilities. However, the on-site system remains available. The regulatory position states that power operation may continue for up to 24 hours and if one source is restored, level one is applicable. Next slide.

Slide 20. Level four is when there is a loss of redundancy in the offsite and on-site power system. The regulatory position states that power operation may continue for up to 12 hours, if there is sufficient capacity and voltage on the offsite system and there is a likelihood of restoring one source within 12 hours. However, if one source is restored, either level one or level two is applicable. Next slide.

Slide 21. Scenario five is when the on-site sources are two less than the LCO and the regulatory position states that power operation may continue for up to two hours unless one source is restored, in which case level two is applicable. Next slide.

Slide six. Level six is when there is no redundancy in the DC sources. For passive reactors, the battery should be monitored so they can perform

functions for long durations. The regulatory position states that power operation may continue up to two hours. If one source is restored, there are no restrictions. However, otherwise there would be a shutdown in accordance with tech specs. Next slide.

This level is new to Revision 1 is a lack of required redundancy in the inverters. The regulatory position states that power operation may continue for up to 24 hours.

MEMBER STETKAR: And this is strictly in the context of AC instrument converters or currently operating plants. It would not apply to an inverter that supplies an integrated protection safeguards actuation and control function for a new plant. Is that correct? Okay.

MS. RAY: Next slide and this is the end of my remarks.

MEMBER BROWN: Except for the last one, all those times were the same as what was in, I'm trying to that's my memory, is the original, except for the addition.

MR. BURKE: That addition is in the standard tech specs.

MEMBER BROWN: I was hoping but I didn't ask that. Thank you.

MEMBER SIEBER: Do any of the members have questions of the staff?

(No response.)

MEMBER SIEBER: Are there any other persons here in the room that might have questions for the staff or comments to make?

(No response.)

MEMBER SIEBER: Okay, if not, I would like to thank you very much. When I first started on this assignment, I thought it was simple and learned that it is not a simple assignment. It turns out to be very complex but I think the staff has done a very good job.

And I also appreciate the fact that you have considered our comments from the subcommittee meeting and as follows and incorporated them. So it has been a good working relationship to get to this point. So with that, Mr. Chairman, I turn it back to you, sir.

CHAIR ARMIJO: Okay, I guess we have covered all the questions. No other questions?

Well I think it is a good time, even though we are a little early, we can have a break now.

(Whereupon, the proceedings went off the record at 2:08 p.m.)

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

Status Update on Implementation of the NTTF Recommendations

February 9, 2012

Background - Schedule

- SECY-11-0137 placed 21 of the NTTF recommendations into three tiers, identified six additional issues for consideration and provided the staff's proposed approach and schedule for issuing Tier 1 Orders and 50.54(f) letters within 6 to 8 months of Commission approval
- SRM-SECY-11-0137 approved the staff's paper without significant schedule modification except in accordance with direction as provided in SRM-SECY-11-0124:
  - 24-30 months for SBO rulemaking with an ANPR
  - Strive to complete and implement lessons learned within 5 years – 2016
- Recent events, stakeholder expectations and input have caused the staff to reconsider its proposed approach and schedule for Orders and 50.54(f) letters
- The staff has modified our approach and is accelerating the schedule to provide the Tier 1 Orders and 50.54(f) letters to the Commission on February 17, 2012

NRC 2012 Appropriations

- **Section 402 - All hazards:**

  The Nuclear Regulatory Commission shall require reactor licensees to re-evaluate the seismic, tsunami, flooding, and other external hazards at their sites against current applicable Commission requirements and guidance for such licensees as expeditiously as possible, and thereafter when appropriate, as determined by the Commission, and require each licensee to respond to the Commission that the design basis for each reactor meets the requirements of its license, current applicable requirements and guidance for such license. Based upon the evaluations conducted pursuant to this section and other information it deems relevant, the Commission shall require licensees to update the design basis for each reactor, if necessary.

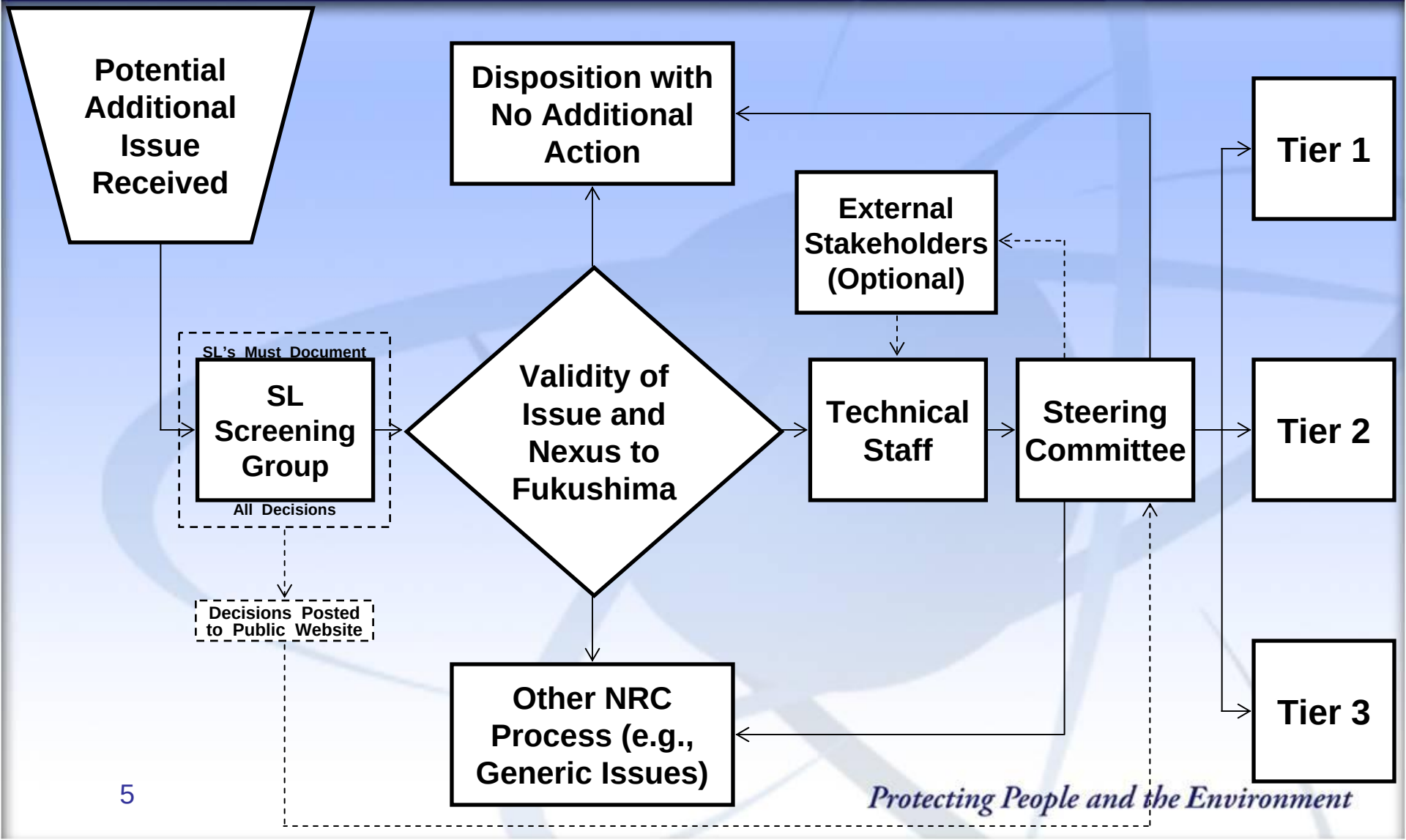
- **Accelerated Schedule:**

  …The conferees direct the Commission to implement these [Tier 1] recommendations consistent with, or more expeditiously than, the schedules and milestones" proposed by NRC staff on October 3, 2011. The conferees direct the Commission to maintain an implementation schedule such that the remaining recommendations (not identified as Tier I priorities) will be evaluated and acted upon as expeditiously as practicable. The conferees request that the Commission provide a written status report to the House and Senate Committees on Appropriations on its implementation of the Task Force recommendations on the one year anniversary of the Fukushima disaster.

ACRS Recommendations

- **The staff developed a process for reviewing stakeholder recommendations to ensure a disciplined approach was applied for identifying lessons learned from Fukushima**
- **ACRS provided its recommendations to the Commission and staff in letters dated October 13 and November 8, 2011**
- **All ACRS recommendations have been reviewed and prioritized**

Reviewing Additional Recommendations



ACRS Recommendations

- **The staff incorporated the following ACRS recommendations in its Tier 1 actions:**

ACRS Recommendation	Staff Response
• ACRS Recommendation 1(b)—"Actions related to NTTF Recommendation 2.3 should be expanded to assure that the walkdowns address the integrated effects of severe storms as well as seismic and flooding events." • ACRS Conclusion 2—"Tier 1 recommendations should be expanded to include the additional immediate actions recommended in our October 13, 2011, report, regarding flooding hazard reevaluations, integrated walkdowns, station blackout, boiling water reactor (BWR) hardened vents, shared ventilation systems, hydrogen control and mitigation, spent fuel pools (SFPs) and integration of onsite emergency actions."	NTTF Recommendation 2.3 will be expanded to assure that the walkdowns address the integrated effects of severe storms as well as seismic and flooding events in light of the ACRS recommendations. This expansion of NTTF Recommendation 2.3 will have no net impact on the proposed staff resources stated in SECY-11-0137, "Prioritization of Recommended Action To Be Taken in Response to Fukushima Lesson Learned," dated October 3, 2011.
• ACRS Recommendation 1(c)—"Actions related to NTTF Recommendation 4.1 should be expanded to include issuance of an advanced notice of proposed rulemaking and requiring licensee to provide an assessment of capabilities to cope with an extended station blackout (SBO)." • ACRS Recommendation 2(a)—"Performance-based criteria to mitigate and manage an extended SBO should be considered as an alternative to the specific coping times proposed in Recommendation 4.1."	NTTF Recommendation 4.1 will be expanded to include an advanced notice of proposed rulemaking (ANPR) and performance-based criteria for an extended station blackout (SBO) in light of the ACRS recommendations. This expansion of NTTF Recommendation 4.1 will have no net impact on the proposed staff resources stated in SECY-11-0137. Additionally, the Order associated with NTTF Recommendation 4.2 does include performance-based criteria for SBO coping times.

ACRS Recommendations

- **The staff incorporated the following ACRS recommendations in its Tier 1 actions:**

ACRS Recommendation	Staff Response
• ACRS Conclusion 1—"Rulemaking activities related to strengthening of SBO mitigation capability should be expedited."	NTTF Recommendation 4.1 will be accelerated as a result of the Commission's decision in Staff Requirements Memorandum (SRM)-SECY-11-0124, "Recommended Actions To Be Taken Without Delay from the Near-Term Task Force Report," dated October 18, 2011. The staff will designate the SBO rulemaking as a high-priority rulemaking with a completion goal of 24 to 30 months. This acceleration of NTTF Recommendation 4.1 will have no net impact on the proposed staff resources stated in SECY-11-0137.
• ACRS Recommendation 1(d)—"Actions related to NTTF Recommendation 5.1 should also be applied to BWR plants with Mark II containments."	NTTF Recommendation 5.1 will be expanded to include to BWR Mark II containments in light of the ACRS recommendations. This expansion of NTTF Recommendation 5.1 will have no net impact on the proposed staff resources stated in SECY-11-0137
• ACRS Recommendation 1(f)—"Information should be requested from licensees regarding current plant-specific spent fuel pool (SFP) instrumentation, power supplies, and sources of makeup and cooling water." • ACRS Conclusion 5—"Staff Tier 1 Recommendation 7.1-2, 'Develop and issue order to licensees to provide reliable SFP instrumentation,' should be reconsidered. Schedules for SFP instrumentation improvements and other modifications to the SFP should be informed by quantification of the contribution made by SFPs to the overall plant risk."	NTTF Recommendation 7.1 and the associated SFP instrumentation Order were enhanced in light of the ACRS recommendations. Information was gathered from all available resources regarding current plant-specific SFP instrumentation and was used to inform the associated Order on an overall plant risk-based approach. This enhancement of NTTF Recommendation 7.1 will have no net impact on the proposed staff resources stated in SECY-11-0137.

ACRS Recommendations

- **The staff incorporated the following ACRS recommendations in its Tier 2 actions:**

ACRS Recommendation	Staff Response
• ACRS Recommendation 1(a)—"Actions related to NTTF Recommendation 2.1 should be expanded to include an expedited update of the applicable regulatory guidance, methods, and data for external flooding to ensure that outdated guidance and acceptance criteria are not used in the reevaluations."	NTTF Recommendation 2.1 will be expanded to include "other external hazards" in light of Section 402 of the Consolidated Appropriations Act, 2012 (Public Law (PL) 112-74) and the ACRS recommendations. "Other external hazards" will include seismic, tsunami, flooding, and other external events that are within the licensing basis for each plant. This expansion of NTTF Recommendation 2.1 is a new Tier 2 item and will have an additional 12.8 full-time equivalent (FTE) impact on the proposed staff resources stated in SECY-11-0137.
• ACRS Recommendation 1(f)—"Information should be requested from licensee regarding current plant-specific SFP instrumentation, power supplies, and sources of makeup and cooling water." • ACRS Conclusion 5—"Staff Tier 1 Recommendation 7.1-2, "Develop and issue order to licensees to provide reliable SFP instrumentation," should be reconsidered. Schedules for SFP instrumentation improvements and other modifications to the SFP should be informed by quantification of the contribution made by SFPs to the overall plant risk."	NTTF Recommendations 7.2–7.5 will be enhanced in light of the ACRS recommendations. Information will be gathered from all available resources regarding current plant-specific SFP power supplies, and sources of makeup and cooling water, and will be used to inform the associated Orders on an overall plant risk-based approach. These enhancements of NTTF Recommendations 7.2–7.5 will have no net impact on the proposed staff resources stated in SECY-11-0137.

ACRS Recommendations

- **The staff incorporated the following ACRS recommendations in its Tier 3 actions:**

ACRS Recommendation	Staff Response
• ACRS Recommendation 2(e)—"Selected reactor and containment instrumentation should be enhanced to withstand beyond-design-basis accident conditions." • Conclusion 4—"Tier 2 recommendations should be expanded to include the additional actions recommended in our October 13, 2011, report regarding enhancement of selected reactor and containment instrumentation, and the need to proactively engage in efforts to capture and analyze data from the Fukushima event."	A new action on "reactor and containment instrumentation withstanding beyond-design-basis conditions" will be developed and added to the Tier 3 items that the NRC will take in response to the Fukushima lessons learned.
• ACRS Recommendation 1(e)—"Discussions with stakeholders should be initiated regarding near-term actions for additional hydrogen control and mitigation measures in reactor buildings for plants with Mark I and Mark II containments."	The NRC staff's Tier 3 actions associated with NTTF Recommendation 6 will include discussions with stakeholders.
• ACRS Recommendation 2(b)—"Recommendation 6 should be expanded to include a requirement for BWR plants with Mark I and Mark II containments to implement combustible gas control measures in reactor buildings as a near-term defense-in-depth measure."	The NRC staff's Tier 3 actions associated with NTTF Recommendation 6 will be enhanced to include the implementation of combustible gas control measures in reactor buildings.

ACRS Recommendations

- **The staff incorporated the following ACRS recommendations in its Tier 3 actions:**

ACRS Recommendation	Staff Response
• ACRS Recommendation 2(c)—"Recommendation 6 should be expanded to include an assessment of the vulnerabilities introduced by shared ventilation systems or shared stacks in multi-unit."	The NRC staff's Tier 3 actions associated with NTTF Recommendation 6 will be enhanced to include vulnerabilities introduced by shared ventilation systems or shared stacks in multi-unit sites.
• ACRS Recommendation 1(g)—"Actions related to NTTF Recommendation 8 should be expanded to included fire response procedures." • ACRS Recommendation 2(d)—"Integration of onsite emergency response capabilities envisioned by Recommendation 8 should be expanded to include fire response procedures."	The NRC staff evaluated how to appropriately integrate the fire response procedure into a licensee's onsite emergency response cabibilities and determined that the fire response procedures would be best considered with the agency's Tier 3 actions associated with NTTF Recommendations 3.
• ACRS Conclusion 3—"NTTF Recommendation 10.2 regarding evaluation of the command and control structure and qualifications of decision makers should be initiated in parallel with Tier 1 activities related to integration of onsite emergency actions."	The NRC staff's Tier 3 actions associated with NTTF Recommendation 10 will be enhanced to include command and control structures, and qualifications of decision-makers.

ACRS Recommendations

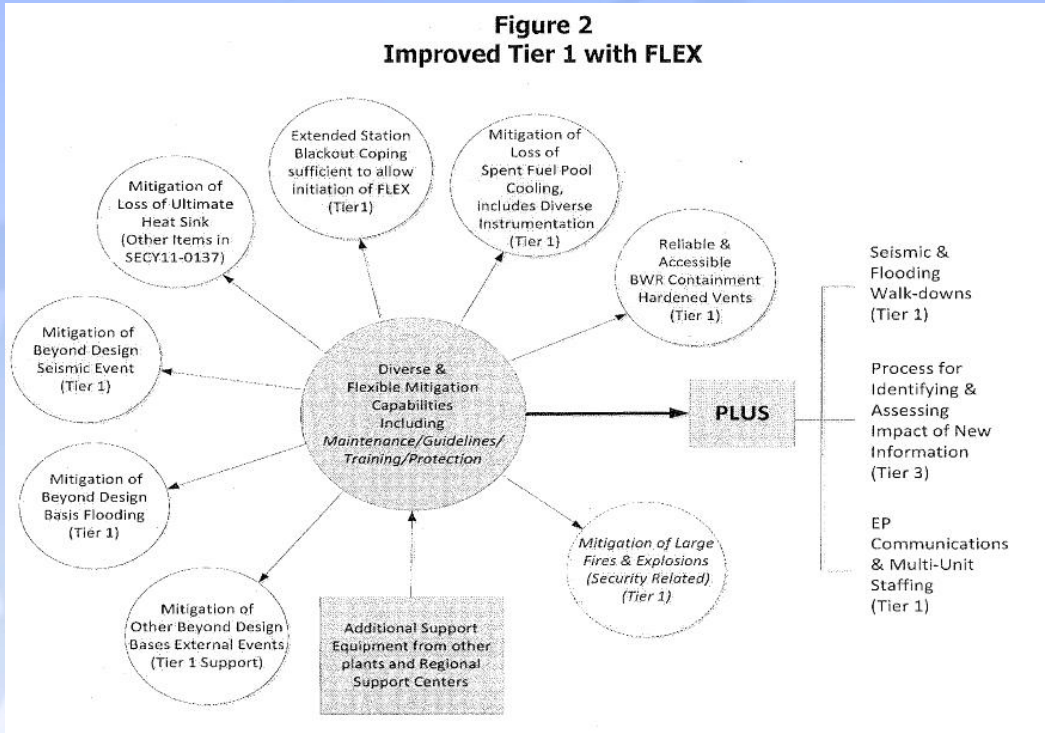
- **The staff will address two ACRS recommendations through other NRC processes or programs:**

ACRS Recommendation	Staff Response
• ACRS Recommendation 2(f)—"The NRC should proactively engage in efforts to define and participate in programs to capture and analyze data from the Fukushima event to enhance understanding of severe accident phenomena, including BWR melt progressions, seawater addition effects, hydrogen transport and combustion, and safety systems operability."	NRC staff in the Office of Nuclear Regulatory Research (RES) are currently working on capturing and analyzing Fukushima data to enhance the agency's understanding of severe accident phenomena.
• ACRS Recommendation 3—"Licensing actions requiring the granting of containment accident pressure (CAP) credit should be suspended until the implications of post-Fukushima containment pressure control measures are understood."	The staff determined that CAP credit will continue to be reviewed on a case-by-case basis.

- **Next steps regarding the ACRS recommendations include:**
  - **The paper scheduled to be delivered to the Commission on February 17, 2012, will have an enclosure with the staff's response to the ACRS recommendations**
  - **The staff is preparing a letter to the ACRS documenting the results of review**
  - **The staff plans to publish the screening/prioritization of the ACRS, and other, recommendations on the NRC's public web-site**

Staff Assessment of FLEX

- December 16 – NEI provided a letter outlining the industry's proposed diverse and flexible approach (FLEX) for mitigating the effects of severe natural phenomenon
- The staff believes FLEX may provide an acceptable methodology for developing enhancements in accordance with the NTTF recommendations for beyond design basis events
- However, the staff believes that the specific enhancements must demonstrate both strengthened and flexible approaches that are inspectable and enforceable



Six Additional Issues – SECY-11-0137

- Staff reviewed and prioritized the 6 additional issues in SECY-11-0137:
  - Filtration of containment vents
    - Preamble to the Tier 1 Orders on reliable hardened vent systems will identify filters as an issue under consideration
    - Policy issues will be presented in a Commission Paper in July 2012
  - Instrumentation for seismic monitoring
    - Addressed by NRR action outside of the Fukushima lessons learned process
  - Basis of emergency planning zone size
    - Tier 3 – Current approach is adequate, validate with Level 3 PRA effort results
  - Prestaging of potassium iodide beyond 10 miles
    - Tier 3 – Current approach is adequate, validate with Japanese radiological studies
  - Transfer of spent fuel to dry cask storage
    - Tier 3 – Current approach is adequate, validate by SFP scoping study
  - Loss of ultimate heat sink
    - Tier 1 – Considered within Recommendation 2.1, 2.3, 4.1 and 4.2 actions
    - Tier 2 – Considered within action on other external hazards

Current Tier 1 Activities

2.1 – Seismic and flooding reevaluations

2.3* – Seismic and flooding walkdowns

4.1* – Station blackout rulemaking

4.2* – Mitigating strategies for beyond design basis events

5.1* – Reliable hardened vents for Mark I and II containments

7.1* – Spent fuel pool instrumentation

8.0 – Integration of emergency procedures rulemaking

9.3 – Enhanced EP staffing and communications

(* - modified or enhanced since SECY-11-0137)

Recommendation 2.1

- **Seismic and Flooding Reevaluations:**
  - **Request:**
    - **Licensees will be asked to perform and provide the results of a reevaluation of the hazards at their sites using present day NRC requirements and guidance and identify actions that are planned to address vulnerabilities. The results will determine whether additional regulatory actions are necessary (e.g., ordering plant modifications).**
  - **Timeline:**
    - **Within 180 days following issuance of the 50.54(f) letter each licensee is requested to submit a risk assessment approach, including acceptance criteria.**
    - **Site responses will be prioritized, however, all site hazard reevaluations will be expected within 3 years.**

Recommendation 2.3

- **Seismic and Flooding Walkdowns:**
  - **Request:**
    - **Licensees will be requested to develop a methodology and acceptance criteria and perform walkdowns. We expect any performance deficiencies identified would be addressed by the site's corrective action program.**
  - **Timeline:**
    - **Licensees will be asked to confirm that they will be using the walkdown procedures jointly developed by the NRC and industry or provide an alternative within 90 days for flooding or within 120 days for seismic. Within 180 days after the NRC endorses the licensee's procedure, the licensees will be asked to provide the results of the walkdowns.**

Recommendation 4.2

- **Mitigating Strategies for Beyond Design Basis External Events:**
  - **Requirement:**
    - **The Order requires a three phase approach for mitigating beyond design basis external events. The initial phase requires the use of installed equipment and resources to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities. The transition phase requires providing sufficient, portable, onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.**
  - **Timeline:**
    - **Implementation guidance (ISG) issued by August 31, 2012**
    - **The licensees shall submit their plans to the NRC within 60 days of entry in to Mode 1 following the first refueling outage issuance of the ISG**
    - **Full implementation to be completed no later than two refueling cycles after the issuance of the ISG or December 31, 2016, whichever comes first**

Recommendation 5.1

- **Reliable Hardened BWR Vents:**
  - **Requirement:**
    - **BWR Mark I and Mark II containments shall have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following beyond design basis events that result in the loss of active containment heat removal capability or prolonged SBO. The hardened vent system shall be accessible and operable under a range of conditions, including a prolonged SBO and plant conditions resulting from inadequate containment cooling.**
  - **Timeline:**
    - **Implementation guidance (ISG) issued by August 31, 2012**
    - **The licensees shall submit their plans to the NRC within 60 days of entry into Mode 1 following the first refueling outage issuance of the ISG**
    - **Full implementation to be completed no later than two refueling cycles after the issuance of the ISG or December 31, 2016, whichever comes first**

Recommendation 7.1

- **Reliable Spent Fuel Pool Instrumentation:**
  - **Requirement:**
    - **All operating reactors shall have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of the following pool water level conditions by trained personnel: 1) level that is adequate to support operation of the normal fuel pool cooling system, 2) level that is adequate to provide substantial radiation shielding for a person standing on the spent fuel pool operating deck, and 3) level where fuel remains minimally covered and actions to implement make-up water addition should no longer be deferred.**
  - **Timeline:**
    - **Implementation guidance (ISG) issued by August 31, 2012**
    - **The licensees shall submit their plans to the NRC within 60 days of entry in to Mode 1 following the first refueling outage issuance of the ISG**
    - **Full implementation to be completed no later than two refueling cycles after the issuance of the ISG or December 31, 2016, whichever comes first.**

Recommendation 9.3

- **Enhanced EP Staffing and Communications:**
  - **Request:**
    - **Licensees will be requested to provide an assessment of current communications and equipment used during an emergency to ensure that power is maintained during a large scale natural event.**
    - **Licensees will be requested to provide an assessment of the staff needed to respond to a large scale natural event and to implement strategies contained in the emergency plan.**
  - **Timeline:**
    - **Written responses expected within 90 days**

Recommendations 4.1 and 8

- **Station Blackout Rulemaking:**
  - **Path Forward:**
    - **SRM-SECY-11-0124 directed the staff to "initiate the rulemaking as an advance notice of proposed rulemaking (ANPR) rather than a proposed rule"**
  - **Timeline:**
    - **ANPR is in concurrence and is expected to be issued by March 2012**
    - **Commission directed that SBO rulemaking be completed within 24-30 months**
- **Emergency Procedures Integration Rulemaking:**
  - **Path Forward:**
    - **Staff will publish an ANPR and hold a public meeting during comment period**
    - **Results of ANPR will be incorporated into a regulatory basis and proposed rulemaking activities**
  - **Timeline:**
    - **Rulemaking will follow the timeline contained in SECY-11-0137 and be completed in 2016**

Next Steps

- **February 17th – Provide Commission with a notation vote paper on issuance of Orders and 50.54(f) letters**
- **March 9th – Issue Orders and 50.54(f) letters, assuming Commission approval by March 2nd**
- **After March 9th – Continue stakeholder interaction in support of any necessary guidance development**

BACKUP SLIDES

Other Recommendations for NRC Action

- **Tier 2 Recommendations – Could not be initiated in the near term due to resource or critical skill set limitations**

- **Tier 3 Recommendations – Require further staff study to support a regulatory action**

Planned Notation Vote Paper

- **Contents:**
  - **Cover memorandum**
  - **Planned enclosures**
    - **Proposed Orders (policy)**
    - **Proposed 50.54(f) letters (information)**
    - **Resolution of Additional Issues (information)**
    - **Resolution of ACRS Additional Recommendations (information)**
    - **PRA methodology for Recommendation 3 (information)**
- **This paper will also serve as the staff's 6-month update in accordance with SRM-SECY-11-0137**
- **The staff plans to provide a notation vote paper on filtered vents and the Tier 3 Recommendations in July 2012**

Background - Stakeholder Meetings

- Public Meeting: NTTF Review of NRC Processes and Regulations – July 28, 2011
- Public Meeting: Obtain Feedback on NTTF Recommendations – Aug. 31, 2011
- Public Meeting: NTTF Report – Short Term Actions – Sept. 14, 2011
- Public Meeting: NTTF Report – Prioritization of Recommendations – Oct. 11, 2011
- INPO Steering Committee Meeting – Nov. 18, 2011
- Commission Meeting with ACRS – Nov. 29, 2011
- Public Meeting: Implementation of NTTF Recommendations – Dec. 1, 2011
- Industry/NRC Joint Steering Committee Meeting #1 – Dec. 1, 2011
- Public Meeting: Fukushima Impact on EPR Design (AREVA) – Dec. 7, 2011
- Public Meeting: NTTF Recommendation 9.3 Implementation – Dec. 12, 2011
- Public Meeting: NTTF Recommendations 2.1 & 2.3 Implementation – Dec. 14, 2011
- Public Meeting: NTTF Recommendation 5.1 Implementation – Dec. 15, 2011
- Public Meeting: NTTF Recommendation 7.1 Implementation – Dec. 15, 2011
- Public Meeting – NTTF Recommendation 9.3 – Jan. 9, 2012
- Industry/NRC Joint Steering Committee Meeting #2 – Jan. 13, 2012

Background- Stakeholder Meetings

- Recommendation-Specific Public Meetings
  - Recommendation 5.1 – Reliable Hardened BWR Vents: January 17, 2012
  - Recommendations 2.1 and 2.3 – Seismic and Flooding Reevaluations and Walkdowns: January 18, 2012
  - Recommendation 4.2 – Mitigating Strategies for Beyond Design Basis Events
  - Recommendation 9.3 – EP Staffing and Communications: January 19, 2012
  - Recommendation 7.1 – Spent Fuel Instrumentation: January 19, 2012

United States Nuclear Regulatory Commission

Protecting People and the Environment

Regulatory Guide 1.93
Availability of Electric Power Sources

ACRS Full Committee Meeting
February 9, 2012

Sheila Ray
Division of Engineering
Office of Nuclear Regulatory Research

Background

- Regulatory Guide (RG) 1.93, Rev. 0 was issued in December 1974.
  - Limiting Conditions for Operation (LCOs) Actions and Completion Times were incorporated into the Standard Technical Specifications (STS) (NUREG 1430-1434)
- RG 1.93 was revised for the following reasons:
  - To incorporate lessons learned from the 2003 Northeast Blackout and Generic Letter (GL) 2006-02, “Grid reliability and the impact on plant risk and the operability of offsite power.”
  - To address the impact of deregulation and its influence on offsite power
  - To include information regarding passive reactors

Background

- Applicable to single and multiple unit plants
- Consistent with STS
- This RG applies to the existing regulations.
  - Lessons learned from the March 2011 Fukishima event are still being investigated and will be incorporated in a future revision of the RG.

Background

- On August 14, 2003, the largest power outage in U.S. history occurred in the Northeastern United States and parts of Canada.
- Generic Letter (GL) 2006-02, “Grid reliability and the impact on plant risk and the operability of offsite power”
  - The staff identified issues as a result of considering the August 14, 2003, blackout event.

Background

- Staff began revising RG 1.93 to clarify the staff position for acceptable operating procedures and restrictions if the available electric power sources are less than the limiting conditions for operation (LCO).
- DG-1244 was issued in September 2010 for public comment.

Revisions based on ACRS Subcommittee

- Use direct quote of GDC 17
- Added clarification to Part B (Discussion) regarding inverters
  - The inverters are the safety-related inverters from the safety-related batteries to 120 or the 125 volt (V) safety-related buses. The function of the inverters is to convert and transfer power from DC (safety-related batteries) to AC (120V or 125V safety-related buses). The 120V or 125V safety-related buses are used for control power and instrumentation of circuits
- Use of orderly shutdown instead of immediate shutdown.
  - An orderly shutdown is per “normal” operating procedures.

Revision to be incorporated in Section B (Discussion)

- Additional clarification regarding completion times (Under Operational Restrictions, Period of Continued Operation)
  - "In summary, in order to provide a reasonable level of confidence in safety, the period of continued operation is based on 1) the necessary time to perform corrective maintenance, 2) the capacity and capability of the remaining electric power sources, and 3) the low probability of a design basis accident occurring during this period."

Regulatory Guide 1.93

GDC 17

- Design Criteria for onsite and offsite electrical power systems
- For NPPs not licensed in accordance with GDC in Appendix A of 10 CFR Part 50, the applicable design criteria are provided in the updated final safety analysis report.
  - Added to RG 1.93, Rev 1

Revisions to Rev. 1 – Part B, Discussion

- Grid-Risk-Sensitive Maintenance
  - Grid reliability evaluations should be performed as part of maintenance risk assessment, as required by 10 CFR 50.65(a)(4), “Maintenance Rule”
  - If degraded grid reliability conditions exist or are forecasted to exist, during maintenance activities, licensees should consider rescheduling such activities to limit the risk.
  - If there is an overriding need to perform the maintenance, licensee should consider alternate equipment protection measures and compensatory actions to minimize the risk.

Revisions to Rev. 1 – Part B, Discussion

- Communication with TSO
  - Allows NPP operator to understand changes in the grid that can affect plant operations and the operability of the plant's offsite power system
  - Enables NPP operator to obtain up-to-date information on existing and projected grid conditions to maintain a current and valid risk assessment and manage possibly changing risk

Revisions to Rev. 1 – Part B, Discussion

- Passive Plant Designs
  - May not require multiple power sources since passive safety-related systems are used for core cooling and containment integrity
  - If offsite power is not available, nonsafety-related diesel generators should be available for plant functions.
  - If offsite power or a diesel generator is inoperable, the licensees should make every effort to restore one of them within a reasonable time frame.

Revisions to Rev. 1 – Part B, Discussion

- Operational Restrictions

1. Meeting the LCO
   - Rev 0 – when all electric power sources required by GDC 17 are available
   - Rev 1 – when all LCO-required electric power sources are determined to be operable in accordance with TS, at required voltage and capacity as well as capable of withstanding N-1 contingency

Revisions to Rev. 1 – Part B, Discussion

- Operational Restrictions

2. Period of Continued Operation
   - Rev 1 includes conditions during loss of required electric sources that operation at power can continue for a limited time, not to exceed completion time per TS rather than implement an orderly shutdown
   - Decisions should be based on evaluation of safety significance
     - Prevent further degradation of electric power system or jeopardize plant safety
   - Continue operation at power
     - Use period of continued operation to restore power sources and prepare for orderly shutdown
   - Orderly Shutdown
     - Commence shutdown in parallel with efforts to restore inoperable power sources

Revisions to Rev. 1 – Part B, Discussion

- Operational Restrictions

3. Orderly Shutdown
   - Rev 1 allows for termination of the shutdown and return to rated power if the TS LCO is restored during the shutdown
   - Rev 1 added a caution that if grid conditions worsen, a manual or automatic trip is desirable.
   - If compliance with TS LCO not restored within completion time, initiate orderly shutdown
   - Licensee should take all actions to improve the inoperable or degraded condition, if the resources are available

Revisions to Rev. 1 – Part B, Discussion

- Levels of Power System Degradation
  - Rev 0 defines 5 scenarios and Rev 1 defines 7 scenarios

Number of Sources Less than LCO	
Rev 0	Rev 1
One AC power source	One Offsite AC power source
	One Onsite AC power source
Two Offsite AC power sources	Two Offsite AC power sources
One Offsite and One Onsite AC power sources	One Offsite and One Onsite AC power sources
Two Onsite AC power sources	Two Onsite AC power sources
One Onsite DC supply	One Onsite DC power source
	One Inverter

Regulatory Positions

- To ensure that NPP is in safe operating mode whenever the available electric power sources are less than TS LCO.
- Continued power operation contingent on TS and the following:
  - Reliability, availability, and capability of remaining sources
  - Required maintenance activities does not further degrade the power system or jeopardize plant safety
  - Continued compliance with required actions in TS
- New to Rev 1:
  - If there is any inconsistency between RG and TS, the TS shall be used
  - Coordination between NPP operators and transmission entities
  - Accuracy and conservatism of post-trip voltages predicted by online grid analysis tools should be determined after each actual trip

Regulatory Guide 1.93

Scenario 1: Available Offsite AC Power Sources are one less than LCO

- Offsite Power system has no redundancy
- Risk associated with loss of offsite power is compounded by:
  - Ability to quickly restore offsite sources would be lost
  - Remaining offsite circuit could be susceptible to the same cause
  - Consequential trip probability of a number of generating units would be higher.
  - Availability and capability of offsite power system could be affected
- Potential common cause failure, as a result of fire, ice storm, or similar event

- Regulatory Position
  - Power operation may continue up to 72 hours, provided that subsequent single failure would not cause total loss of offsite power
  - Otherwise, shut down in accordance with TS

Regulatory Guide 1.93

Scenario 2: Available Onsite AC Power Sources are one less than LCO

- Loss of redundancy of onsite power source to mitigate effects of an event
- One emergency diesel generator (EDG) is inoperable or available onsite supply does not have sufficient capacity
- GDC 17 intent (added to Rev 1):
  - Avoid risk associated with shutdown
  - Minimize risk by limiting exposure time

- Regulatory Position
  - Power operation may continue up to 72 hours, provided that redundant EDG is tested/assessed within 24 hours to be free from common-cause failure or verified operable per TS
  - Otherwise, shut down in accordance with TS

Scenario 3: Available Offsite AC Power Sources are two less than LCO

- Offsite power system is not available or has inadequate capability
- Onsite AC system remains available and is not degraded

- Regulatory Position
  - Power operation may continue up to 24 hours if it appears likely that at least one of the offsite sources can be restored within 24 hours
  - If one offsite source is recovered within 24 hours, power operation may continue and not exceed 72 hours, as per Level 1
    - If no offsite source is restored within the first 24 hours, within 6 hours bring unit to hot shutdown for BWR (Mode 3) and hot standby for PWR (Mode 3) or as specified in TS

Regulatory Guide 1.93

Scenario 4: Available Offsite and Onsite AC Power Sources are each one less than LCO

- Loss of individual redundancy in both offsite and onsite AC power sources
- Susceptibility of power system to single bus or switching failure could cause all emergency power to be unavailable

- Regulatory Position
  - Power operation may continue up to 12 hours if it appears likely that at least one of the affected sources can be restored within 12 hours and the grid capacity and voltage are such that a subsequent single failure would not cause a loss of offsite power
  - If either source is recovered within 12 hours, power operation may continue and not exceed 72 hours, as per Level 1 or 2
    - If no source is restored within the first 12 hours, the unit should be shutdown

Regulatory Guide 1.93

Scenario 5: Available Onsite AC Power Sources are two less than LCO

- Two EDGs inoperable or insufficient capacity to mitigate the effects of an event in one unit and safely shutdown other units
- Licensees should evaluate the risk associated with continued operation and shutdown (grid instability and LOOP)
- Coordinate with TSO to accommodate plant shutdown

- Regulatory Position
  - Power operation may continue up to 2 hours
  - If only one onsite AC source is recovered within 2 hours, power operation may continue and not exceed 72 hours, as per Level 2
    - If no source is restored within the first 2 hours, the unit should be shutdown per TS

Regulatory Guide 1.93

Scenario 6: Available Onsite DC Power Sources are one less than LCO

- Available DC power sources do not have required redundancy
- Subsequent degradation in onsite AC or DC system could jeopardize plant safety
- Passive designs depend heavily on DC power systems – 72 hour batteries; licensee should critically monitor required functions

- Regulatory Position
  - Power operation may continue up to 2 hours
  - If affected DC source is restored, unrestricted operation may resume
    - If not, shutdown the unit per TS
  - Licensee should monitor required functions and take necessary actions (cross connect a supply or shed optional load) to ensure safe shutdown

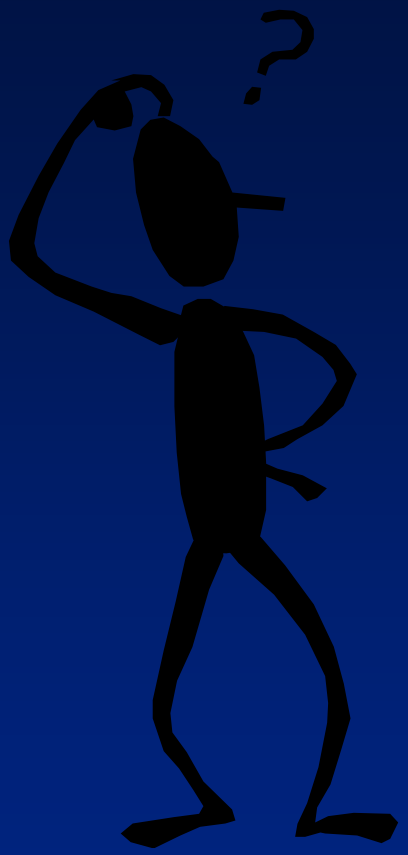
Regulatory Guide 1.93

Scenario 7: Available Inverters are one less than LCO

- Available inverters do not have required redundancy
- Subsequent single failure of another inverter could cause a reactor trip

- Regulatory Position
  - Power operation may continue not to exceed the 24 hour time period specified in the TS
  - If affected inverter is restored, unrestricted operation may resume
    - If not, shutdown the unit per TS

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



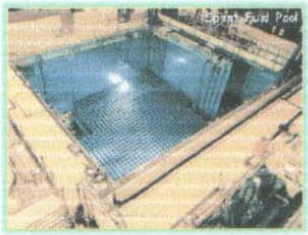
QUESTIONS?

U.S.NRC

Investigations of Zirconium Fires during Spent Fuel Pool LOCAs

Overview

- Cooperative agreement between NRC and twelve foreign countries.
- Sandia National Lab is performing the experiment.
- Two test phases to be completed over a 3-4 year period.
- Validate severe accident codes for whole pool LOCA analyses.
- Phased experimental approach.
  - Study physical phenomena separately
    - Provide input parameters to accident codes.
  - Examine nature of Zircaloy fires in prototypic assemblies
    - Validate codes predictive capability.
    - Develop mitigation strategies.



Spent Fuel Pool

U.S.NRC

SFP Experiment Objectives

- Provide full scale thermal hydraulic and zirconium ignition data for severe accident code validation under air flow conditions:
  - Gas flow conditions
    - Spent fuel pool complete loss of coolant accident (LOCA)
    - Complete loss of water during refueling
    - Dry cask storage performance
    - Air ingress during late stages of core melt-down
  - Prototypic components
    - Eliminate scaling arguments
    - Represents fuel design intricacies
  - Code validation
    - Closely coupled into experimental design
    - Pre-test (Blind) and post test code data is compared to experimental results to ensure code adequacy

Initiative for the Licensing Review of Instrumentation and Controls (I&C) for the mPower Small Modular Reactor Design

Ian Jung, Chief
Instrumentation and Controls Branch
Division of Engineering
Office of New Reactors

Dan Santos, Senior Technical Advisor
Division of Engineering
Office of New Reactors

Sushil Birla, Senior Technical Advisor
Division of Engineering
Office of Nuclear Regulatory Research

Objective

- To provide an informational briefing on an innovative framework for the licensing review of I&C for the mPower Small Modular Reactor (SMR) design

Expected Outcome

- Achieve early cognizance and understanding of the initiative (e.g., background, goals, key areas, challenges, status, and path forward)

- Provide and discuss framework details and plans for future interactions with ACRS

Note: The staff is not seeking an ACRS letter at this time

Agenda

- Background
- Lessons Learned
- Goals
- Challenges
- Status and Schedule
- Summary

Background

- Licensing reviews of I&C have been a significant challenge from the perspective of both safety demonstration and schedule/resources for all design centers for new large light water reactors

- The Office of New Reactors Division of Advanced Reactors and Rulemaking has begun to develop design-specific review standards (DSRS) for integral pressurized water reactor (iPWR) designs beginning with mPower

Background

- The NRO I&C staff has recognized that the DSRS development and timing of the projected licensing applications provide a great opportunity to incorporate the broad set of I&C lessons learned

- The staff has initiated this innovative approach for chapter 7 to revise the staff guidance for mPower (and beyond) so that a more effective and efficient licensing review can be achieved

Goals

- Improve the safety focus of the staff reviews by ensuring an applicant has sufficient licensing-basis details presented in their licensing application to clearly demonstrate that the applicable regulations are met and key design principles are addressed

- Improve the efficiency of the reviews by eliminating unnecessary information from being docketed and reviewed, and by improving guidance to avoid unnecessary or repeated requests for additional information (RAIs)

Key Lessons Learned #1

The structure of the current Chapter 7 SRP uses a system-based structure (e.g., Reactor Protection System, Interlock Systems, and Data Communication Systems); however, new and advanced reactor I&C designs are highly integrated and platform-based

Key Challenge: Repetitions of same requirements and issues in each subsection have caused unnecessary duplication of review effort and in any one section, an incomplete safety finding without reviewing all other applicable sections

Current SRP, Chapter 7: System-based Approach

	7.2 - Reactor Trip System	7.3 - Engineered Safety Features Systems	…	7.9 - Data Communication Systems
Regulations	50.34(f)(2) 50.55a(a)(1) 50.55a(h)(1) 50.62 52.47(b)(1) 52.80(a) GDC 1 GDC 2 GDC 4 GDC 10 GDC 13 GDC 15 GDC 19 GDC 20 GDC 21 GDC 22 GDC 23 GDC 24 GDC 25 GDC 29 IEEE 603-1991	50.34(f)(2) 50.55a(a)(1) 50.55a(h)(1) 52.47(b)(1) 52.80(a) GDC 1 GDC 2 GDC 4 GDC 10 GDC 13 GDC 15 GDC 16 GDC 19 GDC 20 GDC 21 GDC 22 GDC 23 GDC 24 GDC 29 GDC 33 GDC 34 GDC 35 GDC 38 GDC 41 GDC 44 IEEE 603-1991	…	50.34(f)(2) 50.55a(a)(1) 50.55a(h)(1) 50.62 52.47(b)(1) 52.80(a) GDC 1 GDC 2 GDC 4 GDC 13 GDC 19 GDC 21 GDC 22 GDC 23 GDC 24 GDC 29 IEEE 603-1991

Current SRP, Chapter 7: System-based Approach

	7.2 - Reactor Trip System	7.3 - Engineered Safety Features Systems	…	7.9 - Data Communication Systems
Areas of Review	• Design basis • Diversity and Defense-in-Depth • Independence • ITAAC • Quality assurance • Single-failure criterion • Setpoint determination • System testing and surveillance • Use of digital systems	• Design basis • Diversity and Defense-in-Depth • ESF control systems • Independence • ITAAC • Quality assurance • Setpoint determination • Single-failure criterion • System testing and surveillance • Use of digital systems	…	• Control of access • Diversity and Defense-in-Depth • EMI/RFI susceptibility • ITAAC • Independence • Performance • Quality assurance • Reliability • Single-failure criterion • System testing and surveillance • Use of digital systems

Key Lessons Learned #2

In the current SRP Chapter 7, which is detailed and voluminous, the safety/risk-significant requirements and guidance for design are scattered, repeated, and mixed with programmatic and process requirements

Key Challenge: The staff reviews have been lengthened and made more difficult. For example, the staff's focus on the most important aspects of the design has often been distracted by having had to untangle the shortcomings and to address all aspects listed in staff guidance including issues of low significance or areas that are programmatic/process-driven in nature

Key Lessons Learned #3

The current staff guidance is not structured to the design's clear demonstration of the fundamental principles of a good I&C system design such as redundancy, independence, deterministic behavior, and diversity as well as simplicity

Key Challenge: It has posed additional work and licensing review challenges to the staff and the applicants as changes to the licensing documents, RAIs, additional interactions were needed to address the principles through the various phases of the licensing process including interactions with the ACRS

Key Lessons Learned #4

The intent and application of Design Acceptance Criteria (DAC) and Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) for digital I&C are not well understood across all stakeholders

Key Challenge: It has caused significant staff and applicant efforts to reach an adequate resolution regarding the use of DAC causing lengthened licensing reviews and distractions from important safety issues. The proposed DAC/ITAAC language did not often meet the intent causing iterative interactions with the applicants

Framework

- Restructure the existing guidance
- Develop integrated hazards analysis approach
- Define scope and level of detail of the information to support licensing findings
- Leverage third-party assessment of safety-system software development processes

Restructuring of Guidance

- Restructure the guidance to reflect the integrated platform-based I&C design
- Consolidate the guidance to achieve “one issue, one review, one place”
- Restructure the guidance to emphasize the fundamental design principles: redundancy, independence, diversity, determinism, and simplicity
- Incorporate the Multinational Design Evaluation Program (MDEP) generic common positions
- Incorporate latest guidance (e.g., Regulatory Guides and Interim Staff Guidance)
- Incorporate other lessons learned applicable

Table of Contents for mPower DSRS

- 7.0 Overview of Review Process
- 7.1 Fundamental Design Principles
  - 7.1.1 Overall Architecture
  - 7.1.2 Independence
  - 7.1.3 Redundancy
  - 7.1.4 Determinism
  - 7.1.5 Diversity
  - 7.1.6 Simplicity
  - 7.1.7 Evaluation of Integrated Hazard Analysis
- 7.2 Systems Design
  - 7.2.1 Safety Systems
  - 7.2.2 Information Systems
  - 7.2.3 Control Systems
  - 7.2.4 Other Systems

Table of Contents for mPower DSRS

- 7.3 System Characteristics
  - 7.3.1 Quality
    - 7.3.1.1 Development Process
    - 7.3.1.2 Equipment Qualification
    - 7.3.1.3 Other
  - 7.3.2 Reliability and Integrity
  - 7.3.3 Interlocks
- 7.4 ITAAC
- 7.5 Additional Regulations

Integrated Hazards Analysis Approach

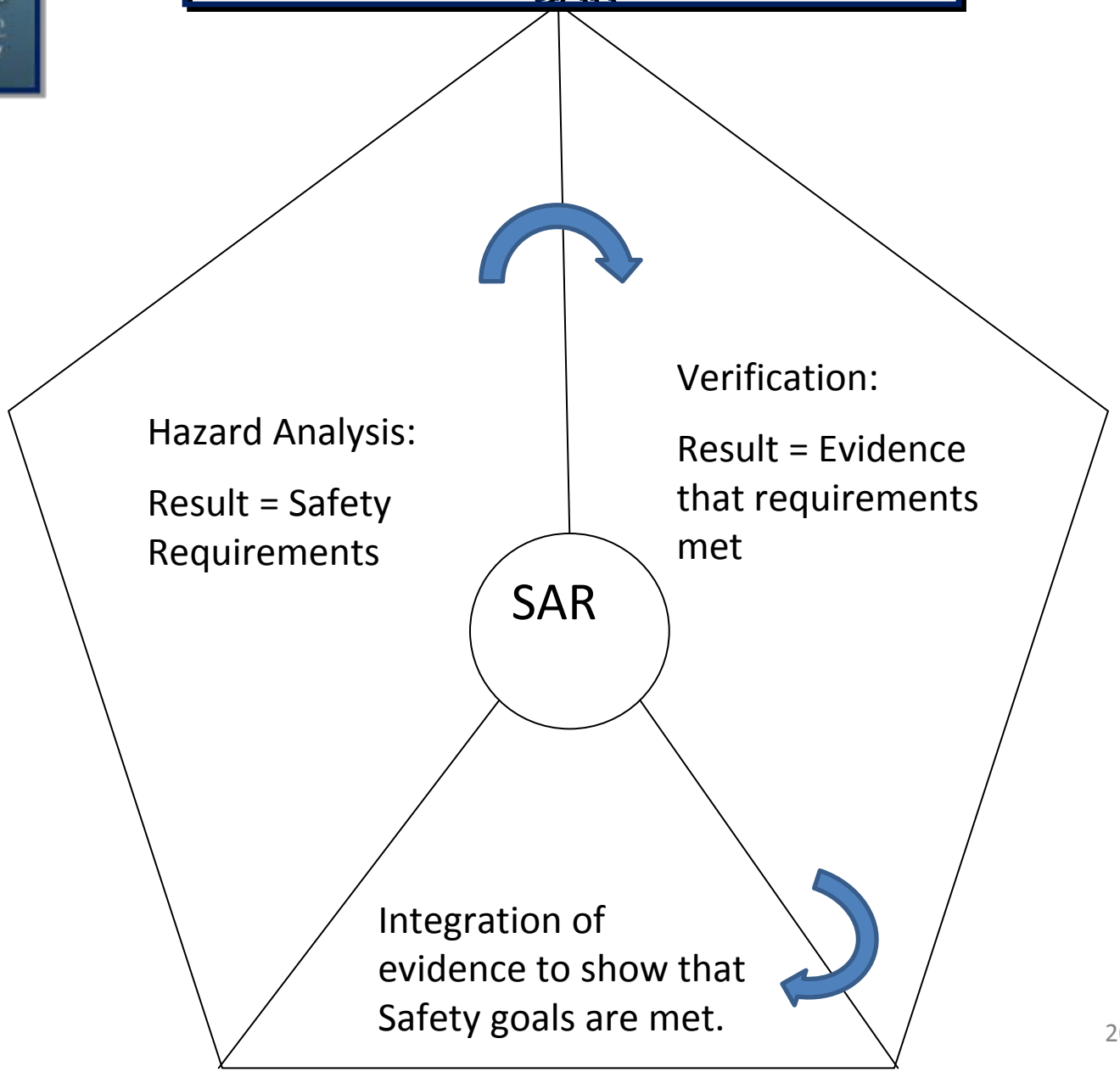
- For external hazards (e.g., fire; flood): mature
- For I&C hardware: mature techniques exist, e.g.,
  - Fault tree analysis (FTA)
  - Failure modes and effects analysis (FMEA)
- Hazards contributed by engineering activities
  - Requirements
  - Architectural design
  - Software
- Related items scattered and disjointed in SRP

Integrated Hazards Analysis Approach

User need request from NRO to RES

- Develop technical basis to evaluate I&C hazard analysis
  - Support identification of issues early in project
  - Integrate key considerations, e.g.,
    - Redundancy
    - Independence
    - Defense-in-depth and diversity
    - Determinism
    - Simplicity
- Suggest how to integrate in the DSRS

Hazard Analysis in relation to SAR



Scope and Level of Detail of the Information to Support Licensing Finding

- Common understanding between the staff and licensee on the scope and level of detail needed to reach reasonable assurance of safety findings and the information that needs to be part of an applicant's licensing basis
- Necessary ITAAC description language and corresponding mapping to licensing basis, including traceability to fundamental design principles
- Verification of implementation of the licensing basis and safety findings through inspection

Leveraging Third-Party Assessment

- Opportunity to leverage mPower I&C vendor experience with the use of Capability Maturity Model Integration (CMMI) framework for other mission critical/safety critical applications

- Enabling of NRC staff to better focus its reviews on safety/risk significant areas and establishment of required processes as opposed to ensuring a vendor has the capability to follow their committed processes (an inspection function)

Leveraging Third-Party Assessment

- CMMI is a process improvement framework not the process itself. It complements some of the existing development processes by providing best practices but in some areas this is not sufficient. Therefore, the staff needs to ensure there is sufficient information in the licensing basis as well as any applicable ITAAC to support the licensing/safety finding
- Based on the success of this initiative, the NRC staff will explore other third-party frameworks and how to integrate third-party certifications into the licensing reviews

Challenges

- Collaboration with applicant
- Workload/schedule
- Necessary level of integration among framework areas
- Development of the framework in such a way that it could be applied to other small, advanced and existing reactors

Other considerations

- Technical consistency across offices
- Generic applicability of the lessons learned and the mPower DSRS
- Schedule and scope for future SRP (NUREG-0800) revision

Status and Schedule

- The staff has been working closely with B&W and its vendors and holding public meetings
  - The staff will continue interactions with the stakeholders
- The staff plans to have the draft DSRS in place for public comment by late 2012
- The staff will closely coordinate with the ACRS for future interactions

Summary

- Licensing review of I&C has been a significant challenge from the perspective of both safety demonstration and schedule/resources for all design centers for new large light water reactors
- The staff has started efforts to address the lessons learned for increased effectiveness and efficiency
- This initiative is multi-faceted and challenging but is an opportunity not to be missed
- It is ongoing while working closely with internal and external stakeholders

Industry Response to Fukushima Accidents

ACRS Meeting
February 9, 2012

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Scott Bauer, NEI
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NUCLEAR ENERGY INSTITUTE

Industry Objectives

- Prime focus – continued safe operation of the existing fleet
- Understand the root cause and lessons learned from Fukushima
- Prioritize actions and strategies that provide the greatest tangible safety benefit first
  - Focus on prevention of fuel damage (core & spent fuel pool) and containment integrity

U.S. Industry Integrated Plan
The Way Forward

- Seven elements
  - Maintain existing safety and plant performance (INPO)
  - Developing and disseminating lessons learned from the Fukushima accidents (INPO)
  - Improve effectiveness of U.S. industry response plan (INPO/NEI)
  - Strategic communications and policymaker outreach (NEI)
  - Responding to regulatory actions (NEI)
  - Support of international organizations (INPO/EPRI/OGs)
  - Technical support and adjustments to R&D priorities and programs (EPRI/OGs)

NEI

U.S. Industry Actions to Date

- Verified equipment, procedures and staffing are capable of mitigating extreme events
- Assessed effectiveness of reactor operator training
- Assessed the steps necessary to extend complete loss of AC power coping capability
- Evaluating the use of equipment and supplies located at offsite facilities to provide rapid emergency response capability
- Ordering & installing additional portable mitigation equipment

External Events

- Technical resource limitations
- Focus scope on Fukushima related issues
- Need for prioritization
- Common understanding on walkdown and seismic assessment guidance
  - Lead plant(s) to validate new guidance and common understandings
- Other external events (ex-seismic and flooding)
  - Screening process

Seismic

- Proven evaluation (GMRS) guidance
- Walkdown guidance being developed based on preliminary industry inspections
- Recognized margin
- Potential assessment approaches, if necessary
  - Seismic margins
  - Seismic PRA
  - Deterministic evaluation

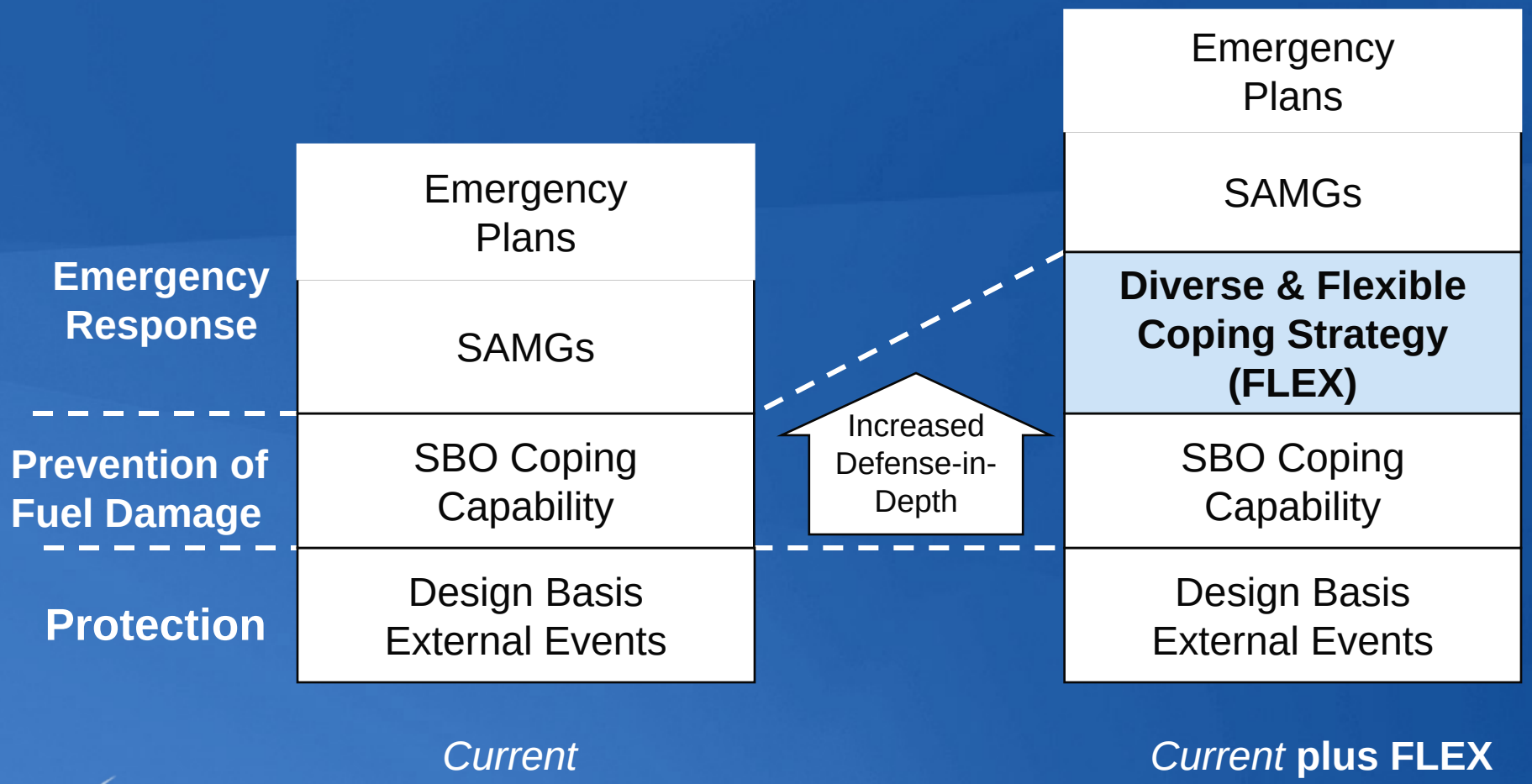
Other Tier 1 Activities

- Emergency Response
- Spent Fuel Pool instrumentation
- Accident and transient procedures and guidelines
- Additional contingency equipment to assure continued core and spent fuel pool cooling and maintenance of containment
  - FLEX (strategies and portable equipment)
- Hardened vents -- BWR Mk I and Mk II containments

Diverse and Flexible Coping Capability (FLEX)

- Additional layer of safety for beyond design bases external events to prevent fuel damage
- Focuses on maintaining key safety functions
  - Core cooling, containment functions, SFP cooling
- Multiple supplies of power and cooling water
- Portable equipment reasonably protected
- Symptom-based guidance and instructions
- Programmatic controls
- Offsite support centers

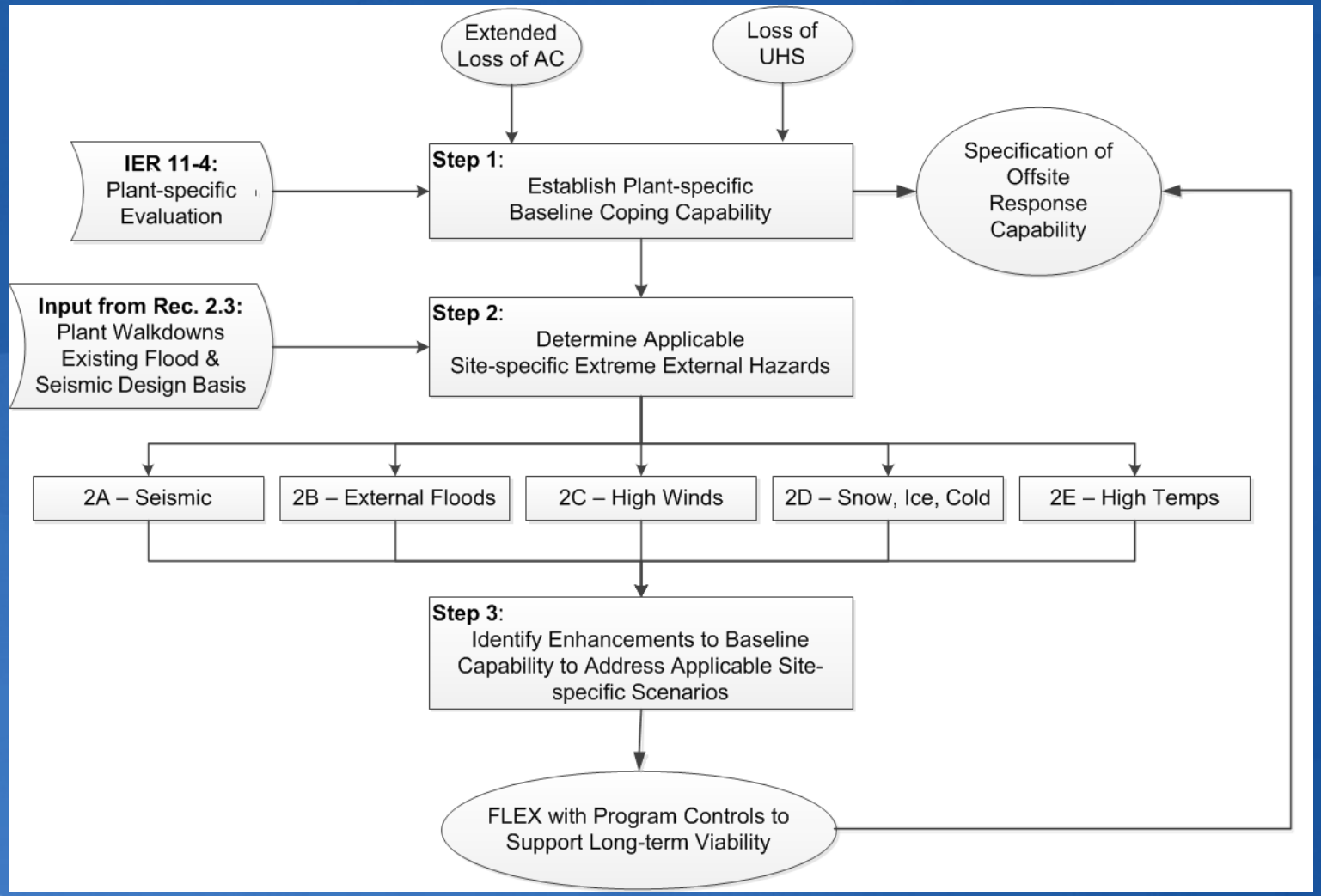
Diverse & Flexible Coping Capability (FLEX)



FLEX Relationship to Tier 1 Recommendations

- Effective implementation of FLEX requires close coordination with other activities
  - 2.1/2.3 – Seismic and Flooding Design Bases
  - 4.1/4.2 – Station Blackout/B.5.b
  - 5.1 – BWR hardened vents for containment
  - 7.1 – SFP monitoring
  - 8 – EOP/SAMG activities
  - 9.3 – ERO staffing and communications

Potential Implementation Guide Outline



Potential FLEX Equipment Examples

Onsite Response

- Diesel driven pumps (High capacity and high pressure)
- Suction, discharge hose, strainers, pipe fittings
- 480v DG or 600v DG
- 120/240v DG
- Cables
- Air compressors & nitrogen bottles
- DC power supplies
- Fuel supplies & transfer equipment
- Communications equipment

Offsite Response

- Closed loop cooling system:
- 4 kv and 6.9 kv DG & equipment
- RP Equipment
- Commodities including food & water
- Provision for Diesel Fuel resupply
- Makeup water treatment supplies
- Portable lighting
- Containment berms
- Dewatering pumps
- Water filtration/demineralization

Challenges

- Ensure industry and NRC remain focused on safe operations
- Shortage of technically qualified resources to perform analyses, reviews and walkdowns simultaneously
  - E.g., Seismic and Flooding
- Numerous task interdependencies
- Plant modifications generally require two refueling outages to implement
  - Need two full operating cycles to plan, design, procure and install Fukushima Tier 1 related modifications

Summary

- Industry taking action to enhance safety
- Early tangible safety benefits -- FLEX
  - Increases defense-in-depth & safety margins
- Greatest concern is viability of Recommendation 2.1
- Assessment of subsequent potential actions should consider enhancements from other implemented Tier 1 actions
- Guidance under development
  - Start regulatory interactions soon after issuance of orders/Section 50.54(f) letters

The Way Forward

U.S. Industry Leadership in Response to Events at the Fukushima Daiichi Nuclear Power Plant

NEI® NUCLEAR ENERGY INSTITUTE

INPO®

EPRI ELECTRIC POWER RESEARCH INSTITUTE

June 8, 2011

1. EXECUTIVE SUMMARY

The earthquake and tsunami in Japan on March 11, 2011 and subsequent nuclear accident at Tokyo Electric Power Co.'s Fukushima Daiichi nuclear power plant have resulted in worldwide attention toward nuclear energy safety. The leadership of the U.S. commercial nuclear industry is dedicated to gaining a deep understanding of the events at Fukushima Daiichi and to taking the necessary actions to improve safety and emergency preparedness at America's nuclear energy facilities.

The Electric Power Research Institute (EPRI), Institute of Nuclear Power Operations (INPO), and Nuclear Energy Institute (NEI), in conjunction with senior utility executives, have created a joint leadership model to integrate and coordinate the U.S. nuclear industry's response to events at the Fukushima Daiichi nuclear energy facility. This will ensure that lessons learned are identified and well understood, and that response actions are effectively coordinated and implemented throughout the industry. This must be accomplished while electric companies continue to ensure that the safe and reliable operation of commercial reactors is our highest priority. This effort will not diminish the independent roles of the industry support groups, such as the role of INPO to promote the highest levels of safety in U.S. commercial reactors, as actions are taken to fulfill their missions.

An important and integral aspect of the industry's response is the awareness and involvement of the industry's many stakeholders, including industry vendors, architect-engineering companies, industry owners' groups and national consensus nuclear standards organizations. This will ensure that the interests of each stakeholder group are considered, understood and communicated to the public and policymakers.

A comprehensive investigation of the events at Fukushima Daiichi will take considerable time. Yet, there is also a need to act in a deliberate and decisive manner. Recognizing this, America's nuclear energy industry is taking action based on a preliminary understanding of the events. The industry's response is structured to ensure that emergency response strategies are updated based on new information and insights learned during subsequent event reviews.

Separately, the U.S. Nuclear Regulatory Commission (NRC) is conducting an independent assessment and will consider actions to ensure that its regulations reflect lessons learned from the Fukushima events. The industry's response will ensure that the NRC and industry remain informed of each other's respective activities so that any new regulatory requirements are implemented in the most efficient and effective manner.

This strategic overview describes how the industry will approach this challenge and is intended to serve as a reference point for the future. It articulates strategic goals and key stakeholders for the industry's integrated response. In addition, this overview describes the respective roles and coordination of industry organizations in managing the discrete elements of a comprehensive U.S. industry response plan.

2. STRATEGIC GOALS

The primary objective is to improve nuclear safety by learning and applying the lessons from the Fukushima Daiichi nuclear accident. In response, the U.S. nuclear industry has established the following strategic goals to maintain, and where necessary, provide added defense in depth for critical safety functions, such as reactor core cooling, spent fuel storage pool cooling and containment integrity:

1. The nuclear workforce remains focused on safety and operational excellence at all plants, particularly in light of the increased work that the response to the Fukushima event will represent.

2. Timelines for emergency response capability to ensure continued core cooling, containment integrity and spent fuel storage pool cooling are synchronized to preclude fuel damage following station blackout or challenges to the ultimate heat sink.

3. The U.S. nuclear industry is capable of responding effectively to any significant event in the U.S. with the response being scalable to support an international event, as appropriate.

4. Severe accident management guidelines, security response strategies (B.5.b), and external event response plans are effectively integrated to ensure nuclear energy facilities are capable of a symptom-based response to events that could impact multiple reactors at a single site.

5. Margins for protection from external events are sufficient based on the latest hazards analyses and historical data.

6. Spent fuel pool cooling and makeup functions are fully protective during periods of high heat load in the spent fuel pool and during extended station blackout conditions.

7. Primary containment protective strategies can effectively manage and mitigate post-accident conditions, including elevated pressure and hydrogen concentrations.

8. Accident response procedures provide steps for controlling, monitoring and assessing potential radiation and ingestion pathways during and following an accident, including timely communication of accurate information.

3. GUIDING PRINCIPLES

To achieve our strategic goals, the industry has established principles to guide the development of its response actions. These principles will be used to guide the resolution of issues and plant improvements and will ensure that a consistent expectation is established for incorporating lessons into the operations at each site. The strategic response actions will be designed to:

1. Ensure equipment and guidance, enhanced as appropriate, result in improvements in response effectiveness, using a diverse, flexible and performance-based approach for beyond design bases activities

2. Address guidance, equipment and training to ensure long-term viability of safety improvements.

3. Develop response strategies that are performance-based, risk-informed and account for unique site characteristics.

4. Maintain a strong interface with federal regulators to ensure regulatory actions are consistent with safety significance and that compliance can be achieved in an efficient manner.

5. Coordinate with federal, state and local government and their emergency response organizations on industry actions to improve overall emergency response effectiveness.

6. Communicate aggressively the forthright approach the U.S. industry is taking to implement the lessons from the Fukushima Daiichi accident.

4. STAKEHOLDERS AND DESIRED OUTCOMES

The industry's strategic goals will be achieved by proactively engaging a variety of stakeholders.

General Public

The industry will ensure that the general public is well-informed of the collective approach in response to the Fukushima accidents. Special attention will be paid to engaging stakeholders (residents, elected officials and other stakeholders) immediately surrounding nuclear energy facilities to maintain confidence in their plant's continued safe operations and ability to protect public health and safety.

Employees

The industry will provide information to its employees to understand the operating experience from Fukushima as part of their training to execute their jobs with excellence and be advocates for nuclear safety.

Emergency Response Organizations

The industry will continue to communicate and cooperate with federal, state and local emergency response organizations and government entities to ensure that emergency response plans reflect the lessons learned from the Fukushima Strategic Response Plan. These organizations include, but are not limited to, state and local police; fire officials; health officials/paramedics; federal, state and local governments; and transportation companies. Interactions will be focused on increasing confidence in the industry's and local government emergency preparedness programs.

Industry

Utilities, industry vendors and owners groups, architect-engineers, manufacturers and companies and organizations involved in the nuclear fuel cycle, working as a collective worldwide industry, will continue to strive for operational excellence. These actions and goals will continue the ongoing contribution to the legacy of safe, reliable, environmentally responsible production of electricity at nuclear energy facilities. The industry will work with all interested parties to ensure the benefits of nuclear energy for future generations.

Regulators

The industry will maintain relationships with federal and state regulators to ensure the industry participates in the regulatory process and can effectively implement any regulatory changes.

Technical Partners

The industry will continue to collaborate with technical associations and organizations to ensure information is disseminated and understood by all interested parties so that the benefits and positions of nuclear energy are appreciated and support the industry's long-term objectives.

Policymakers and Opinion Leaders

The industry will proactively communicate lessons learned and industry actions such that policy and opinion leaders at the local, state and national level recognize the proactive, unwavering industry response to the Fukushima accident. The industry will continue to focus on improving confidence in the safety of U.S. nuclear energy facilities and assuring support for industry legislative proposals and programs that enhance safety.

International Community

The U.S. nuclear industry will interact with international nuclear energy companies and organizations to compile and assess recommendations and actions for applicability to U.S. facilities and to make the international industry aware of U.S. improvements.

5. LEADERSHIP MODEL OVERVIEW

The nuclear industry has successfully demonstrated the ability to identify and manage the response to various issues in a coordinated manner. Under normal circumstances, the structures are in place to successfully coordinate the response to significant issues among key industry groups. For the response to the Fukushima event, however, there is a need for a greater level of coordination with the number and complexity of potential issues that are identified by each of the key industry groups. As a result, we have developed a coordinating framework for the development and execution of actions in response to the lessons of the Fukushima event.

The leadership model is based on the following elements:

- **Organization** – clear division of responsibilities among the involved parties. An industry steering committee will provide strategic direction and oversight. Ownership for analysis and execution will be organized around the industry's seven building blocks based on the type of issue being addressed.

- **Event Response Process** – each industry organization (*see chart on page 9*) is responsible for identifying issues, plant and process improvements, and regulatory reviews of the Fukushima events. Issue descriptions, including action plans and recommendations, will be developed to implement improvements. The steering committee will approve the actions and designate an industry organization and building block to lead and implement the action to resolution.

- **Issue Action Plans** – action plans with schedules and resource management tools will be developed and executed for each issue within its assigned building block.

- **Strategic Response Plan** – all issues assigned to the seven building blocks constitute the nuclear industry's response. The action plans will be summarized by building block to form the strategic response plan.

- **Execution Oversight and Status Tracking** – each industry organization and its building block(s) will regularly report the status of all issues to the steering committee.

Building Blocks

The leadership model is organized around seven areas called building blocks. Building blocks are temporary organizations created to develop and execute action plans for issues assigned to them by the steering committee. Building blocks led by an individual assigned by the industry organization will consist of assigned managers and designated personnel from the industry organizations, utilities, and suppliers. Building block oversight is provided by the steering committee, lead industry organization, and the assigned steering committee sponsor.

The seven building blocks along with the lead organization(s) and focus are identified below:

1. **Maintain Focus on Excellence in Existing Plant Performance (INPO):** focus on continued performance improvement of U.S. reactors.

2. **Develop and Issue Lessons Learned from the Fukushima Events (INPO):** focus on comprehensive analysis of the Fukushima event and that lessons learned are applied to the U.S. nuclear industry and shared with the World Association of Nuclear Operators (WANO).

3. **Improve the Effectiveness of U.S. Industry Response Capability to Global Nuclear Events (INPO/NEI):** focus on identified lessons learned from the U.S. industry response to the Fukushima event, allowing for more effective integrated response to future events.

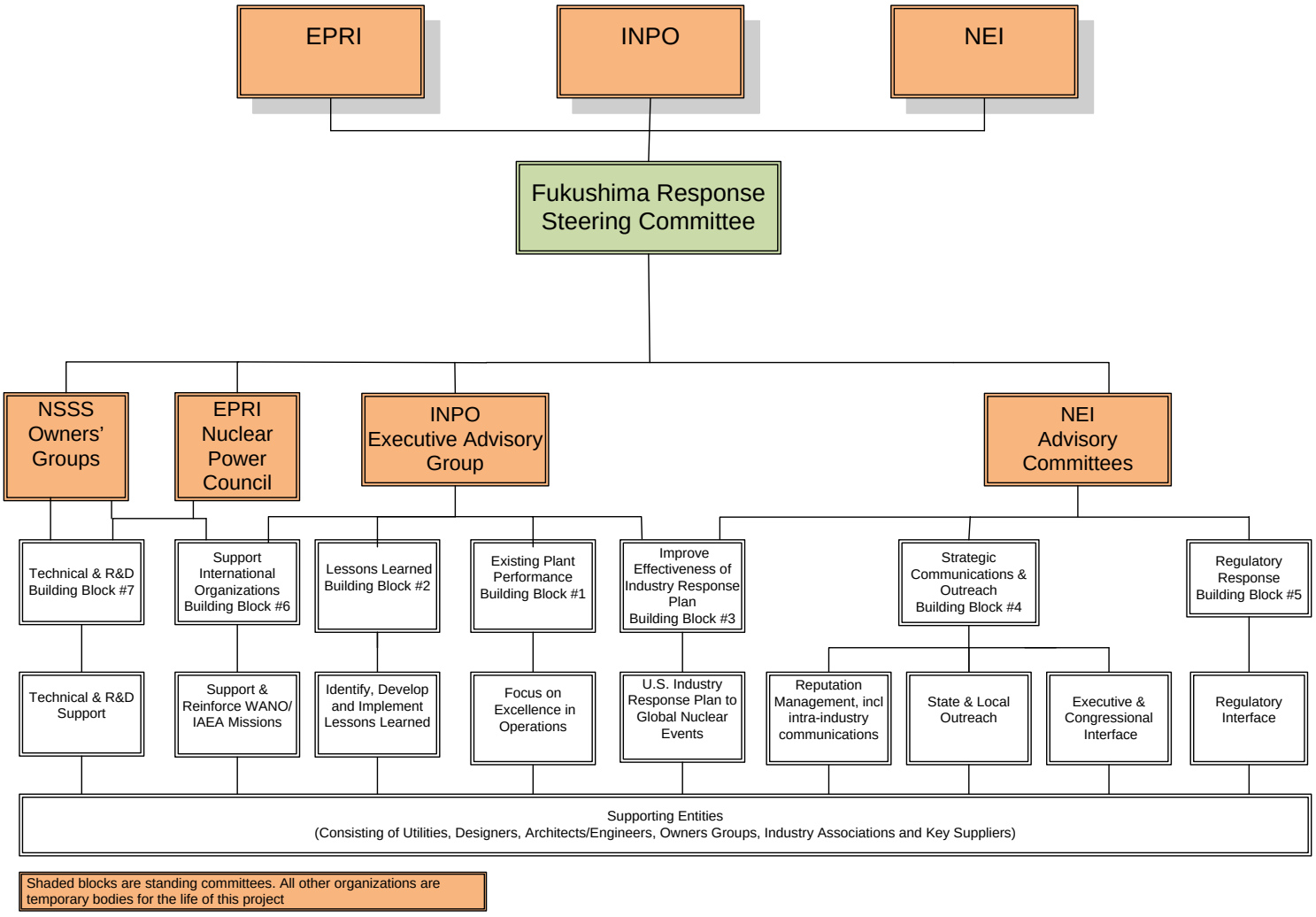
4. **Develop and Implement a Strategic Communications Plan (NEI):** focus on managing the industry's strategic communications and outreach campaigns to recover policymaker and public support for nuclear energy.

5. **Develop and Implement the Industry's Regulatory Response (NEI):** focus on managing the industry's regulatory interactions and resolution of applicable industry regulatory issues from the incident.

6. **Participate and Coordinate with International Organizations (INPO/EPRI):** focus on ensuring the results from international investigations are captured and effectively used to inform actions with the other building blocks.

7. **Provide Technical Support and R&D Coordination (EPRI/NSSS Owners' Groups):** focus on existing technical solutions and research and development activities and deliverables necessary to address recommended actions of this plan.

Each building block will be supported by nuclear and, in specific instances, non-nuclear industry organizations and companies, where specific technical, operational or other expertise is required.

6. LEADERSHIP RESPONSE ORGANIZATION AND BUILDING BLOCKS

The leadership model structure involves many industry participants and is outlined below: