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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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FUKUSHIMA SUBCOMMITTEE

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WEDNESDAY

MAY 6, 2015

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ROCKVILLE, MARYLAND

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

COMMITTEE MEMBERS:

STEPHEN P. SCHULTZ, Meeting Chairman

RONALD G. BALLINGER, Member

DENNIS C. BLEY, Member

CHARLES H. BROWN, JR. Member

MICHAEL L. CORRADINI, Member

DANA A. POWERS, Member

HAROLD B. RAY, Member

PETER C. RICCARDELLA, Member

MICHAEL T. RYAN, Member

GORDON R. SKILLMAN, Member*

JOHN W. STETKAR, Member

ACRS CONSULTANT:

WILLIAM J. SHACK

DESIGNATED FEDERAL OFFICIALS:

KATHY D. WEAVER

WEIDONG WANG

ALSO PRESENT:

EDWIN M. HACKETT, Executive Director, ACRS

PHIL AMWAY, Exelon Nuclear

CLINTON L. ASHLEY, NRO/DSRA

RAJENDER AULUCK, NRR/JLD

SCOTT BAUER, NEI

JAMES BONFIGLIO, AREVA

ERIC E. BOWMAN, NRR/JLD

RANDY BUNT, Southern Company

MARK A. CARUSO, NRO/DSRA

PAUL DRIEHAUS, Exelon Nuclear

HOSSEIN ESMAILI, RES/DSA

BRYAN FORD, Entergy Nuclear

JEFF GABOR, ERIN

NAGESWARA R. KARIPINENI, NRR/DSS

TIM KOLB, NRR/DIRS

STEVEN P. KRAFT, NEI

WALT LEE, TVA Nuclear

ROY LINTHICUM, PWROG RMSC

JOHN B. MCKIRGAN, NRO/DSRA

MILT MURRAY, NSIR/DPR

NICK PAPPAS, Palo Verde

MARIE A. POHIDA, NRO/DSRA

MICHAEL POWELL, Palo Verde

WILLIAM D. RECKLEY, NRR/JLD

TIMOTHY A. REED, NRR/DPR

JEFFREY S. SCHMIDT, NRO/DSRA

BILL WILLIAMSON*

DAVID YOUNG, NEI

*Present via telephone

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

(8:30 a.m.)

CHAIRMAN SCHULTZ: Good morning. This meeting will now come to order. This is a meeting of the Advisory Committee on Reactor Safeguards Subcommittee on Fukushima. I am Steve Schultz, Chairman of the subcommittee. Members in attendance are Harold Ray, Dana Powers, John Stetkar, Dennis Bley, Mike Ryan, Ron Ballinger, Charlie Brown, and Mike Corradini.

We also have former ACRS Chairman, Dr. Bill Shack at this meeting as our consultant on this matter.

The purpose of today's meeting is to review three draft regulatory guides and the NEI technical reports that support the proposed rule for mitigation of beyond design basis events.

During our previous subcommittee and full committee meetings, we did not have the opportunity for detailed interaction with the staff or industry on these documents. So, we plan to do that today. As shown on the agenda, we will be discussing each regulatory guide separately.

Later today, we will shift gears and discuss with the staff and industry the final versions of the interim staff guidance on reliable hardened

containment vents for BWR Mark I and Mark II designs and the related NEI supporting document.

The full committee requested that the staff provide these completed documents to this subcommittee for our review at this meeting.

This meeting is open to the public. The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Rules for the conduct of and participation in the meeting have been published in the *Federal Register* as part of the notice for this meeting.

The subcommittee intends to gather information to analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the full committee.

Ms. Kathy Weaver is the Designated Federal Official for this meeting.

A transcript of the meeting is being kept and will be made available as stated in the *Federal Register* notice. Therefore, we request that participants in the meeting use the microphones located in the meeting room when addressing the subcommittee. When recognized, first identify yourself and speak with sufficient clarity and volume so that you may be readily heard.

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

I do understand that there may be individuals on the bridge line today, who are listening on today's proceedings. To effectively coordinate that participation in this meeting, we will be placing the incoming bridge line on mute, so that those individuals may listen in. At the appropriate time, later in this meeting, we will provide the opportunity for public comments from the bridge line and for members of the public in the audience.

We also have another telephone line that is set up for additional NEI staff to participate in answering ACRS members' questions, if needed during the meeting. If you are on this line, please keep your phone on mute at all times, when not addressing the committee. It is very sensitive here and all your background noises will transmit over this line.

I also remind us all in the meeting room to turn off our communication devices, so that there are no interruptions during the meeting.

For the subcommittee members who were not present yesterday, we have to inform you that there is a new protocol for providing individual committee

responses. These microphones are now set so that they may be turned off when not in use. There is a button on the bottom of your microphone. Please turn off that microphone now after the green light is showing. And when you want to ask a question or make a comment, turn it on and speak your piece.

We will now proceed with the meeting and I will call upon David Young of NEI to open the presentations today and to introduce the first panel for the discussion.

MR. YOUNG: Thank you, Dr. Schultz. Good morning, everyone. My name is David Young and I am the Senior Project Manager of the Emergency Preparedness Department at NEI and with me are Walt Lee, Paul Driehaus, Roy Linthicum, and Phil Amway.

We appreciate this opportunity to provide an overview of NEI 14-01, 13-06, and 12-01 and answer your questions concerning these guidance documents.

As you are aware, the NRC staff has proposed to endorse all three guidance document sin Draft Regulatory Guide DG-1319.

With us in the audience and on the phone lines are some of the industry members who helped develop this NEI guidance, several of whom are current or former licensed operators.

So, we will begin with NEI 14-01 and I am going to turn it over to Phil Amway to get it started.

MR. AMWAY: Good morning. My name is Phil Amway from Exelon Corporation. I will be walking us through the NEI 14-01 discussion. As Dave had said, there are members of the PWROG that are both on the phone line, I believe we have Bill Williamson on, who is on the Emergency Procedures Committee for the PWROG. Also in the room with us, Randy Bunt, who is also a member of the PWROG. I may ask them for assistance in clarifications and answering questions that the ACRS committee may have related to 14-01.

We will start off. 14-01 is the Guidance Document for making sure that our various procedure classifications are properly integrated, that they are cohesive, they are effective, and they are usable for the operators in responding to events.

The purpose of 14-01, it addresses the recommendations for developing the command and control structures that are necessary to ensure that we an appropriately mitigate and manage beyond design basis accidents, including severe accidents -- design basis events, including severe accidents.

There are a number of topics in 14-01. We are going to pay particular attention to the

integration portion but it also does address the requirements for the SAMGs and the command and control structures for beyond design basis events. It is important to note that the elements, the major structural components of this procedure classification and structure are already in place. We will go through those various procedure classifications throughout this presentation. But there are enhancements that need to be implemented as part of NEI 1401 to make sure that that integration is there and the appropriate level of guidance is available to operators and the ERO staff when responding to the beyond design basis events that occur.

So, that is the overview of 14-01. The integration certainly has been a topic of discussion at past ACRS meetings and I have seen it not only in the context of this combined rulemaking, beyond design basis event rulemaking, but it has also come up as a topic of discussion in some of the other subcommittee meetings, such as hardened vents and FLEX and things of that nature, just because of the very nature that we are going to implement post-Fukushima actions using procedures. So, that is a very important component of post-Fukushima actions.

In developing the approach in 14-01, it has

involved a number of groups of stakeholders, including the BWROG and PWROG. And within those organizations, it also includes licensed operators in the various facilities in developing that guidance documents.

Licensees --

MEMBER STETKAR: Phil?

MR. AMWAY: Yes.

MEMBER STETKAR: When you say licensed operators, people currently licensed operating plants?

MR. AMWAY: Both currently licensed and former licensed. That is correct.

MEMBER STETKAR: Thank you.

MR. AMWAY: Yes. The licensees, themselves, have been involved in various ways. We are speaking here of licensees in general, which would include engineering, training, that type of thing.

Also, NEI, in developing the actual guidance documents, and EPRI, in the form of developing underlying analysis in the evaluations that support these products.

It reflects NRC requirements and guidance and it considers the extensive operating experience that already exists.

The structure that we have in place has been used in actual past plant events. The framework

itself that we have in place is sound. But we do acknowledge and the reason why we are doing this activity on integration is because there are enhancements that can be made.

This slide here, I just bring this up here because it is something we are all familiar with. This comes out of both 14-01 and NEI 12-06. For the purpose of discussion today, this is really showing the hierarchy of the procedure structure that exists and the addition of the various procedure classifications that have been added post-Fukushima, primarily, the FLEX Support Guidelines.

This note down at the bottom that says, in addition, the BWROG has developed Technical Support Guidelines in the support to SAMGs. That was true at the time. There has been work within the PWROG. I will ask Roy Linthicum to explain some of the work that is ongoing within the PWROG to develop those TSGs, also to support PWR SAMGs.

MR. LINTHICUM: This is Roy Linthicum from the PWR Owners' Group. From our perspective, when we started working on this integration effort, we actually formed a joint committee from both the combined between the BWROG and the PWROG. And one of the lessons we learned in looking at their guidance was that they had

some good guidance. These Technical Support Guidelines that help enhance -- provide some of the technical basis for the SAMGs. And we felt that that was something that we were missing and could definitely learn from.

So, as part of our effort to enhance our SAMGs and to combine the three different NSSS-type SAMG documents into one consolidated set, we also included the development of these Technical Support Guidelines for our utility members as well.

MEMBER CORRADINI: Can you give an example of this?

MR. LINTHICUM: I will ask Mike Bonfiglio. He was much more involved in that development. I think he could provide a better example. There is a microphone up here.

CHAIRMAN SCHULTZ: Right over here, Mike. Thank you. And just introduce yourself before you speak. Thank you.

MR. BONFIGLIO: Is this working?

CHAIRMAN SCHULTZ: Yes, it is.

MR. BONFIGLIO: Okay, so I am a very short guy. I am Mike Bonfiglio. I work for AREVA. I represent the Pressurized Water Reactor Owners' Group. It is kind of important to note I am also an ex-SRO for

both Westinghouse and Babcock and Wilcox designed plants.

My department is involved in developing what we are calling an enhanced Severe Accident Management Guidelines that takes the three vendor-type from PWRs, the three vendor-type Severe Accident Management Guidelines and we basically pulled the best practices out of all three and came up with an enhanced document that now applies to all three pressurized water reactor vendors. So, we are going to have a common guideline document to provide the underlying basis for the utilities to develop their plant-specific Severe Accident Management Guidelines.

During the efforts where we were trying to decide what is the best way to go about things, we were meeting with Jay Liter and Bill Williamson and other folks from the Boiling Water Reactor Owners' Group and they said we have got this technical support guideline that provides background information for the TSC staff and for the Ultimate Decision Maker that is going to be making the decisions associated with severe accident progression and what is the best strategies to take and the reason to take it.

So, we have taken their example and integrated it into our enhanced product, which is

actually out in draft form. And our first set of validations is being performed at Byron Station this week.

MEMBER CORRADINI: So, can you give me a more specific example of what you found on the BWR side that you have now incorporated --

MR. BONFIGLIO: Well, we didn't take the actual guidance. We took the example of you having the support document because --

MR. LINTHICUM: I think the question, Mike is, an example of a TSG.

MR. BONFIGLIO: Yes, so we have TSGs that contain essentially the calculational age that provides the information to the TSC staff if the instrumentation in the control is not operating properly, for example.

So, you would assess plant conditions, compare the instrument readings and it provides a method of determining which indication is your most valid and which path to follow relative to the strategy that you need to implement to protect the containment or slow the progression of the accident.

So, we have a TSG that assesses the operability of instrumentation. We have a TSG that actually supports methods of getting water into the

containment and the decision process for when to do it because sometimes it may not be the best thing to do. So, it provides background information for that.

MEMBER CORRADINI: So, if I could say it back to you so that I understand it. So, in the past, this was vendor-specific or didn't exist at all in terms of a specific procedure. And now with these, the technical support center would essentially go through -- one of the members of the TSC would go through some sort of calculation to make sure if I had this agreement and instrumentation consistency, which one would I tend to want to believe more than another?

MR. BONFIGLIO: Correct. It provides an assessment capability to determine, based upon benchmarking other plant conditions, which of the instrumentation or which path is the appropriate path to follow.

MEMBER CORRADINI: And this is independent of brown and yellow, orange, or red?

MR. BONFIGLIO: Well, the TSGs or the Pressurized Water Reactor Owners' Group are applied to the Severe Accident Management Guidelines, which would be the top --

MEMBER CORRADINI: Oh, okay. So, in theory, you won't have inconsistency before you get out

of orange and into red.

MR. BONFIGLIO: I would not be using the TSGs until I got into the Severe Accident Management Guidelines.

MEMBER CORRADINI: Okay.

MR. BONFIGLIO: There are symptom-based, not that it is determining plant conditions and making decisions, outside of the TSGs that are part of the current structure. We didn't want to disturb the current structure because there is thousands of hours in training related to that.

MEMBER CORRADINI: Sure.

MR. BONFIGLIO: So, we left the existing structures for the three vendors in place and enhanced the Severe Accident Guidelines to be applicable to all three vendors.

MR. YOUNG: And in an upcoming slide, we are going to highlight that transition point.

MEMBER CORRADINI: So, one last question, just so I get it. So, the TSGs is mainly connecting -- helping in the connection to the red box.

So, in all of these up to, I assume, the red but not including it, you are using a simulator or some calculational tool to develop an accident signature that you would use as kind of like a tabletop

what if to train.

MR. BONFIGLIO: Yes, that would be for training purposes up through the Emergency Operating Procedures, the full scale simulators that are at all utilities are fully capable of providing the simulation and --

MEMBER CORRADINI: Up through the Emergency Operating Procedures.

MR. BONFIGLIO: Yes, up to the EOP. Once you get to core melt progression, simulator modeling tends to fall apart.

MEMBER CORRADINI: Okay.

MR. BONFIGLIO: It is also kind of important to note that in the Pressurized Water Reactor Owners' Group, the TSGs are only using the Severe Accident Management Guideline documents because our existing structures we thought was adequate; whereas, in the BWR Owners' Group, it is part of their EOP.

So, they actually review the TSGs wherever they felt it warranted.

MEMBER CORRADINI: Okay, thank you.

MR. AMWAY: Okay.

MEMBER BLEY: Just let me pursue that last statement just a little. If things somehow demanded it, I would assume, I would hope that they could still

access those procedures, if it made sense.

MR. BONFIGLIO: Oh, absolutely, yes. If the symptoms present themselves that you need to go to the Severe Accident Guidelines, you would go there and use all the tools that are available to you at the time.

MEMBER BLEY: Okay.

MR. BONFIGLIO: And what we considered the TSGs are really a tool for the decision makers to enhance their ability to make the decisions during a very difficult situation.

MEMBER BLEY: Okay but even before other decision makers have responded, if things had deteriorated quickly, I am still thinking the operators could take advantage of that.

MR. BONFIGLIO: Oh, absolutely. Yes, absolutely they will use whatever tools are available to them when the conditions present themselves that would require it. Yes.

MEMBER BLEY: And they will be trained on that aspect.

MR. BONFIGLIO: Absolutely, yes.

MEMBER BLEY: One other, just a curiosity for me. At least one of the three vendors has EOPs that are very, very different from the others.

MR. BONFIGLIO: That is correct.

MEMBER BLEY: Whatever led to that doesn't really affect this.

MR. BONFIGLIO: No.

MEMBER BLEY: Everybody thinks this is going to work fine.

MR. BONFIGLIO: I represent the vendor that is different. I own the Babcock and Wilcox tech basis document. My department maintains it. There is really not as much difference between the approach that is taken by the Babcock and Wilcox fleet and was taken by the Westinghouse and CE fleet, it is just that go directly to the symptom-based guidelines out of the trip procedure without having any interim procedures. There is no E1, E2, E3 series of procedures for them to run through. They just diagnose the same symptoms based on the same events. So, the transitions --

MEMBER BLEY: And if things are weird, they can patch things together, which is even closer to these other procedures.

MR. BONFIGLIO: Yes, absolutely.

MEMBER BLEY: Okay.

CONSULTANT SHACK: Just out of curiosity, what are you trying to indicate between the solid and the dashed arrows?

MR. AMWAY: And you are referring to right

here, the solid and dashed arrows. What that indicates is that the FLEX Support Guidelines are really support procedures could be to either EOPs, Emergency Operating Procedures or Severe Accident Management Guidelines where they are actually called out. Like within the severe accidents, it may tell you to preserve this function, go do this section of an FSG to make sure that -- it actually gives you the step-by-step details of how to restore that function or to maintain that function.

EDMGs and FLEX, the dashed line there shows that the EDMGs are built as a separate -- I mean it was built in response to B5B 50.54(hh)(2) Loss of Large Area Stations and it has both a -- and you will see it in the next slide but a command and control structure component to it. It also has specific methodologies of how to go out and supply makeup to the RPV, how to protect containment, things of that nature. Where, if you are in the EDMGs, you have those methodology procedures but you may also benefit by using a FLEX Support Guideline.

Maybe the thought process behind the EDMG methodology procedure won't work in a specific application but the FLEX Support Guideline will. So, there is that freedom to be able to use the FSGs to

support the EDMGs.

CONSULTANT SHACK: Are people really doing the EDMGs to take advantage of the fact that they now have the FLEX equipment?

MR. AMWAY: They are certainly looking at that, yes. And so there may be some adjustment there to -- and I expect there will be some adjustment to the original EDMG procedures that will now take the benefit of the FLEX capability because it is better. I mean it is pre-engineered it is ready connection points, things of that nature.

MR. LINTHICUM: I think it is possibly one of the enhancements that folks could identify when going through the guidance in NEI 14-01. In doing that integration assessment, this could be one of the enhancements you would pick up.

MEMBER STETKAR: Is one of the enhancements just getting rid of the EDMGs completely? Why do you need yet another set of procedures to confuse the operators?

MR. AMWAY: Well, I would answer that as the EDMGs are specifically built for Loss of Large Area Station due to fire or explosion.

MEMBER STETKAR: They are built for a presumed stylized assumed set of regulatory compliance

conditions that was negotiated with the staff but is an artificial condition, at least operating plant. We had to deal with a lot of artificial regulatory conditions that we thought were absolutely absurd. I use that term a lot.

Now, that we are taking a holistic, flexible strategy toward dealing with things outside of the procedures, why do we need to constrain ourselves to these artificial rules?

MR. YOUNG: I think you have already provided the answer. It is regulatory compliance.

MEMBER STETKAR: Why doesn't the industry try to address this in a holistic sense rather than saying oh, we are not going to attack that because that is a regulatory compliance issue?

MR. YOUNG: But in the Guidance Document, we have to write it towards the regulatory -- the requirements in place. So, that is the way the guidance document is written.

MEMBER STETKAR: I will ask the staff about that.

MEMBER STETKAR: I would hate to be in a control room sometime where I was in trouble because somebody wrote confusing procedures for regulatory compliance.

MR. YOUNG: I think we are going to talk about this in just a minute.

MEMBER STETKAR: Okay.

MR. YOUNG: I don't think it is confusing as maybe --

MEMBER STETKAR: It sounds confusing and it reads confusing. So, I hope that --

MR. YOUNG: We'll talk about it.

MR. LINTHICUM: But there is another aspect of the EMGs, which actually I think goes to your point, is it also addresses a loss of the control room function.

It covers lots of command and control because you don't have your control room anymore and provides diagrams on how to do that.

MEMBER STETKAR: Okay but so do some of the fire procedures. Control room abandonment under my normal fire response procedures address that, too.

MR. LINTHICUM: Well, it doesn't address the loss of command and control. It doesn't address the fact that your operators may all be dead.

MEMBER STETKAR: It addresses control room abandonment.

MR. LINTHICUM: But your control room staff is still available.

MEMBER STETKAR: Okay.

MR. LINTHICUM: So, we have a slide that will go into that.

MEMBER STETKAR: Okay.

MR. AMWAY: If you liked this slide, you will love the next one.

MEMBER STETKAR: I'm looking at the next slide and I am trying to sort it out. So, I am hoping you guys are.

MR. AMWAY: Before we leave this slide, this slide really was here to show, I mean as it has been to explain the context of integration in the past. It really didn't -- I don't think it necessarily did an adequate job to show that. And we are looking at this more in term of the hierarchy until get to the next slide.

But before I leave it, I just want to point out that if you go for the green progression all the way to the top, the general operating procedure are there, your day-to-day startup, shut down, normal operation of the system.

Your response procedures, something abnormal happens, brings in an alarm, the operator's response would be per the ARP. The APR is generally going to tell the operator go do a certain section of

your general operating procedure to address that event. Or it may have specific steps within the alarm response procedure for addressing that condition.

The next level going up is you have a broader event, most likely you are going to have multiple alarms come in because that is going to address things like it could be fire or flooding. It could be loss of feedwater flow, a sudden reduction of core flow, event type activities that happened that may also incorporate specific alarm response procedures and the general operating procedures in order to combat that situation.

Then the next step being the emergency operating procedures and that hierarchy exists and provides the command and control structure above everything else below and then, ultimately, the SAMG. So, that is really what we wanted to point out on this slide is to point out that hierarchy that exists and how that supports the integration.

And this is a new slide here that we developed to help explain the integrations piece. And so I want to really spend some time going through this chart to make sure we understand across the top you will see the strategy command and control aspects. We have the AOPs, EOPs, SAMGs, EDMGs across the top.

We list both AOPs and just some high-level things about this chart, you will see that there is AOPs listed in the vertical column and AOPs listed also in the horizontal. The rationale for that is because the AOPs could be a stand-alone response to an event that hasn't degraded to the point that you need to enter the EOP for the SAMGs. You can control the plant within the AOP. But within that AOP, it is going to have supporting sections within it that address the specific implementation methods for how to combat a loss of feedwater flow or a sudden reduction in core flow, those type of things. So, it is all built into that one procedure. You follow it. It may have kick outs to lower tier procedures, such as your normal operating procedures. Let's say you go to this section in your operating procedure and reset the full controls coming back or something of that nature. And so that is how the AOP structure works.

The APOs also address things like the fire and the flooding and, as was mentioned, the control room abandonment procedure. That is an AOP.

MEMBER STETKAR: So these are really not the hierarchy that you showed on the previous slide because we have events where the operators -- fire events, real fire events where the operators are using

the fire response procedures, which are characterized in here as an AOP and the EOPs, in parallel, not as a hierarchical structure.

MR. AMWAY: But your EOP is still going to have a hierarchy over the AOP actions. Because your EOPs are going to address the things like control core cooling, control containment integrity, control the spent fuel pool.

MEMBER STETKAR: And we have events from real fires with people, because they have been using these procedures in parallel have been overloaded and have taken the responses that indeed did not follow all of the EOP guidance because they were overloaded because they were using two sets of procedures in parallel. And they were focusing on what they determined at the time was the more severe threat which either was a real fire or, in some cases, only a perceived fire but they didn't know whether they had a fire or not.

But the fact that they were confused is they were not operating in this hierarchical structure that you showed on the previous slide. They, indeed, were operating in two sets of procedure in parallel and trying to decide which set of guidance they should use to address what they perceived at the time as the most

difficult problem to the plant.

So, it is not that hierarchical structure that you showed in the real world. And I would ask you why you keep presenting it that way because we know, we have actual operating experience from real fires and things that looked, to the operators, like a fire, where they indeed were using sets of procedures in parallel. If you do the post-event interview with the operators, yes, the shift technical advisor was using his own things and because they didn't have the right indications, he wasn't even in the control room part of the time.

MEMBER BLEY: And it doesn't really help to say I wouldn't have done it that way or maybe they shouldn't have done it that way. It made sense to them at the time to do what they were doing.

MEMBER STETKAR: And they were focusing on what they honestly believed was the worst problem in the plant and taking appropriate actions for that particular condition.

MR. YOUNG: Is there a particular example you have of that that you have got in mind?

MEMBER STETKAR: Yes, the H.B. Robinson fire event, loss of offsite power at I think it was Millstone.

MR. YOUNG: We did a pretty detailed review over the last couple of days and I am telling you, we are not seeing integration of fire response procedures as being any kind of precipitating cause in that event. It wasn't listed in the AIT report. It wasn't listed in any of the NRR reports.

I mean I am just giving you the facts. That is what it says.

MEMBER BLEY: We won't have a debate. We can have a debate but the AIT report I read certainly pointed out the situation that was set up because of that.

MR. YOUNG: We just looked at it yesterday but all right.

MR. AMWAY: I understand the point that if there is confusion between whether I follow an AOP or an EOP is going to lead to problems. But I will tell you that the entire training program of licensed operators over a 22-month period does exactly that in terms of teaching the operators how to execute AOPs in parallel with EOPs.

EOPs are purely symptom-based type of procedures. You have a trip. You have a low reactor water level, specific defined entry conditions, you are in the EOP.

The AOPs are more of an event-based type of procedure where you get a sudden reduction of core flow, a fire, a flood, a particular event that drives you to enter that AOP. There is going to be a cross-over because in responding to the event, you may have a reactor trip or you may have some other EOP entry condition that is going to drive you to enter the EOP.

MEMBER CORRADINI: So this is not an area that I understand very much at all. But what John is asking is true that I could get into some of that which then the operator is going to have two sets of books in front of him and say that I have to deal with the event here but the way you are describing it, the EOPs, which are more symptom-based about controlling function in these three areas, containment, core, and spent fuel would come in then?

I am still trying to understand. Let me ask my question differently.

So, is it true that I would be in a situation where I would have two sets of books in front of me?

MR. PAPPAS: I would like to -- Phil, if you don't mind, can I try that?

MR. AMWAY: Yes.

MR. PAPPAS: My name is Nick Pappas. I am

a loaned employee at the NEI. I am a shift manager at Palo Verde.

And to address a situation as you bring up, assuming we have a fire, we have a set of fire strategies, fire procedures. If I compound that with a reactor trip, let's say caused by the fire or just happened to have concurrent with it, the control room supervisor will assign one of the board operators to implement the fire strategies which will give direction, say in this zone you may lose this equipment; you may have these spurious actions. That is written from the worst case everything goes bad.

He is going to run his Emergency Operating Procedure through his safety function checks and standard post-trip actions with a designated operator.

Before assigning an individual to that fire protection procedure, fire strategy procedure, he is going to be communicating with the control room supervisor. And he may say close Valve X or you may lose control of Valve X; do you want me to shut this equipment down or start this equipment up.

It is not an independent satellite operation going on. There is a central point of control that goes on with that and concurrently, certainly, there is potential EAL levels, et cetera and

these all, there is no real way, as a user, I would want to have a procedure that says operate Valve X and, oh by the way, if you have a fire consider these things. I couldn't lift the procedure to use it.

I believe that, and no offense to my brothers at Robinson, if I really look at that as a user, there were some very bad decisions made, contrary to some expectations and some procedures they had in place.

Now, I don't know how you can stop that but I don't believe that procedure integration with the fire procedures would enhance that. Right now, I believe, the training we get to say you have a fire in this area and you have a concurrent event really prepares people pretty well for how to dole out and prioritize the actions needed.

I will leave it there.

MEMBER CORRADINI: Okay.

MEMBER BLEY: You know I would agree with everything that was just said if you had said we expect them to do this and that. Saying this is what they will do is contrary to at least four or five historical events. And the easiest thing in the world is to say those guys were dumb and we are smart but it happens. And if you are not looking at that record and thinking

about it as you build these, I think that is a gap.

MR. AMWAY: And I agree. I mean we are not here trying to say those guys were dumb and we have nothing to learn because all of us, through that Robinson event, have gone back and made changes to procedures and training programs to address those gaps to make sure that -- and as Nick suggested or said, and that is exactly right, we do the same thing on the BWR side, we will assign an operator to an EOP procedure while the control room supervisor maintains the command and control through the EOP. But it is not that they are separated, where the CRS is marching down his procedure, the board operator is marching down his and they are not talking to each other. They need to be aware of what each other's actions are doing in parallel to the board operator knowing that his actions could impact the EOP performance and the CRS recognizing that the set of actions that he has in his EOPs, some may or may not be available because of the AOP condition.

You know fire is one specific example of that. If it impacts the safe shutdown area for Division 1 and he is going and executing his EOP actions for RPV makeup, you know he is probably not going to be relying on Division 1 systems for RPV makeup. He would want to go to Division 2 and prioritize that in

his list, even though the EOPs say here is all your list of available systems. He has to be knowledgeable to plant conditions at the time to know which ones he should be implementing to execute the strategies outlined in the EOPs.

MEMBER CORRADINI: So again, asking from kind of a position of not understanding details. So, the lessons learned from what the events that John and Dennis are discussing, have there been changes in the interplay between the AOPs and the EOPs because of those?

MR. AMWAY: I would say in some respects, yes. I mean because I have also written procedures in my past and you always want to be, when you are developing a procedure, not just focusing on what that procedure does but also its interaction with other procedures, whether they be AOPs to make sure that it has the necessary links within it to know that there could be impacts with performance of other procedures. You don't want to have a procedure that says do this set of actions that is totally contrary to any of the other procedures classifications.

So, it is not one particular action fixes everything. It is a combination of how you are going to train those operators on the procedure, how you write

them.

MEMBER CORRADINI: I understand that but I guess I am asking kind of specifically given these sorts of historical events, has the way in which the AOPs and the EOPs interwoven changed because of what was learned from those events?

I mean I don't know enough to ask anything more specific. So, that is why I am kind of curious.

MR. BONFIGLIO: This is Mike Bonfiglio again from AREVA. I think the answer to your question is not specifically. In other words, we didn't make mass changes to the structure of the AOPs and EOPs and the way things are interfaced.

What we did look for was gaps in guidance. For example, the Robinson event, one of the things that led to the significant over-cooling was a gap in the guidance for isolating the secondary plant when you didn't have power to the valves in that.

There was a step that said look at this but the guidance for how to deal with that valve not having power wasn't there. So, the operators just moved on. They let them go. They ignored the over-cooling event that was going on. It was the underlying problem in that event.

So, we are looking for the gaps in

guidance.

MEMBER STETKAR: I'm sorry. They had an overcooling going on but they also had no component cooling water going to their reactor coolant pumps, which is also of general concern.

My whole point is that as long as you keep focusing on specific events and specific conditions -- oh, well, we fixed the procedure and told them to oh, check overcooling. That is a very microscopic approach to life. And we retrained those operators at that plant to look at overcooling. That is a very reactionary, microscopic event-driven approach to life, rather than stepping back and saying is there a better way that we can give guidance to the operators, rather than focusing then on the minutia of things that we have discovered by actual events and fixing that particular condition. That is why I focused on the details.

And I don't see that. I hear responses of people saying well, we fixed up that procedure because yes, they had this overcooling event and we are going to fix up their procedure to make sure that if they do not have power to those valves, then they should do something else because we have discovered that for a particular event.

MR. YOUNG: I think we will have some additional discussion. We have a slide coming up specifically on the fire response procedures.

MEMBER STETKAR: Let me ask you one thing in this sense because we are going to get limited on time here. What bothers me about all -- you have heard my ranting about this.

But if I now look back at 14-01, in Section 2.5, you say FSGs provide strategies for mitigating the effects of an extended loss of AC power, ELAP, consistent with NRC staff-endorsed guidance, the development of FSG strategies assumed that there were no independent, concurrent events, including the postulated fire.

Okay. And then later you say, for example, the emergency response organization positions holding Ultimate Decision Maker authority could have guidance for selecting the appropriate strategy and then determining the priorities and actions necessary for implementation.

So now, if I am an operator in a plant and I have a fire and I have EOPs, and I have FSGs, and I have fire response procedures and I don't have that emergency response organization because I am in the control room, now what do I do? Because I now have

another set of guidance that I have to figure out what I should use because that guidance specifically doesn't apply for fire conditions.

MR. YOUNG: Well, I think what we are saying there is to make sure that you have the right rules of usage so you can look at the event at the time, what is going on, and make the proper decision because there is no balance on the permutation, the combinations you could get of the event, the consequences, the fire.

MEMBER STETKAR: There isn't, if you think of it in very event-specific conditions, such as an ELAP can only occur from a beyond design basis external event --

MR. YOUNG: But that's not the way they are written.

MEMBER STETKAR: -- that results in loss of all AC power and access to the ultimate heat sink. That is a very, very stylized condition, such as the EBMGs are very stylized conditions. Such as many of the fire response procedures, if you have a Train A condition, is a very stylized response.

MEMBER BLEY: I think we are going to go on and on. I mean they are lining up over here. We have said this in letters and I don't think we ought

to keep going on this.

MEMBER STETKAR: No.

MR. YOUNG: I'm hoping maybe if we get to the next couple of slides, we get into the specific guideline sets, maybe some of that will shed a little more light on some of the things you are asking.

MR. BONFIGLIO: I think it is kind of important to note, though that just because the Guidance Document said the FSGs are only applied in a given set of conditions doesn't mean that that is the way they were actually integrated into the procedures.

MEMBER STETKAR: That would be great. I think you have to appreciate --

MR. BONFIGLIO: So, for example in the EOP, when I recognize a challenge to a function and the FSG is the best way to restore that function, the EOP directs the use of the FSG. If that is all you have available to restore that function, it will direct you to use it.

MEMBER BLEY: We haven't seen it all. But when you see a statement like that, I have seen cases where somebody would say oh, we can't do that because it says this here.

And in the rush, you might not -- once in a while everybody says oh, you are right and they go

ahead. I think we need to get rid of the potential confusion.

MEMBER STETKAR: I think you have to appreciate a little bit of our perspective because, quite honestly, this is the first opportunity we have had to look at the actual implementation guidance.

We have seen very early drafts. We have seen the picture a few times. But until you actually look at the implementation guidance and think about the words and, as Dennis said, how those might be interpreted in practice, you start to raise some of these questions.

Now, indeed, it may be true, if we had the opportunity to look at the actual FLEX Support Guidelines SAMGs, and have a better sense of how they are integrated, some of these concerns might be alleviated. And we haven't had that opportunity, certainly. The only thing we have seen is the implementation guidance.

MR. PAPPAS: I just want to follow-up on one statement. You are very right when you say we have addressed the overcooling event as one very microscopic change. However, industry-wide, following these events, people went back and ensured we had kick outs as a prior to restoring a bus, ensure it is cleared from

faults, et cetera. That sort of thing went industry-wide, as well as training. So, it wasn't they did it wrong and we wouldn't do it again. There were changes, not just in that facilities case but there were industry-wide changes. We took the lessons learned and ensured our procedures were adequate to cover that in the future. That is all I have.

CHAIRMAN SCHULTZ: Thanks for the comment. So, back to you, Phil.

MR. AMWAY: Okay. I am going to maybe move to the next slide. Here we go.

All right, FLEX Support Guidelines. They are implemented under the control of the respective EOP or AOP. That depends on the plant mode or condition. This is where we get into the system-based aspects and, hopefully, to address the concern that we understand that FSGs were developed in response to a very stylized sequence of events and how you get there. But the actual implementation of those FSGs, they are written to address those things but certainly does not restrain them from being used in conditions that maybe similar but not exactly to the stylized scenarios for the ELAP loss of ultimate heat sink but would still be useful in maintaining the particular strategy within the AOP or the EOP to address the plant event or condition that

exists at the time.

MR. YOUNG: And so, Phil, just to beat your point home, if you were looking at an EOP, you are not going to see an entry step that says have you had a beyond design basis external event.

MR. AMWAY: That's correct.

MR. YOUNG: That's not --

MR. AMWAY: It is going to say maintain RPV water level between top of active fuel and some value. Use systems in detail E1. And it is going to list in a priority try to use your installed systems. If they are not available -- and it is just a bulletized list.

So, the operator is going to go and he is going to circle, feed, and condensate. Oh, I don't have power to that; not available. What's next?

ECCS systems, no power; not available. FLEX Support Guideline. Oh, okay, that is portable pumps. It is time to start deploying those FLEX pumps.

So, it is not predicated on the fact that did he get in there because of an ELAP, is the ultimate heat sink available. Those are things that he is going to have to evaluate and assess to determine what is the best water source to use in that application but it is not that he has to filter into a very defined condition in order to be able to use that equipment. If it makes

sense for him to use it for that particular event, he is free to use it.

It can also be employed through the SAGs or SAMGs. You know we have the same -- the plant is designed the way it is designed. You have the equipment you have. And it is there to use, for the operator to use, if needed, to respond to the event and respond through the SAMGs as well.

It could be used in other cases as defense-in-depth or certainly understanding that the FLEX equipment is there to support other conditions. It could be through the EDMGs, where your EDMG strategy or mitigation method doesn't work but your FLEX does. And as a procedure writer, you are going to look at, when you are developing the FSGs, you are going to look at the FSG and the EDMG and there might be a consolidation effort there that is worthwhile that serves both functions. It doesn't necessarily have to mean that that is a totally separate pump, a totally separate connection point. It may serve both functions.

And it is a natural progression, as a procedure writer, to try to do that, to minimize the number of procedures an operator would have to use and go to in responding to a particular event.

So, I think you are going to find out that the actual implementation of how we implement 14-01 is going to be toward making sure that the procedures are streamlined and able to be used and to allow whoever is making the decision to use those procedures has the guidance they need to determine what is applicable.

MEMBER BLEY: Phil, I have a question. I kind of am in the same place John is, since we haven't seen anything and you guys know more about what is there. But as you begin to exercise these and try them out and see how they work, I hope as you put together scenarios for the operator you think really broadly and don't bring them the ones exactly for which this was made to fit right and you come up with something that you hadn't been thinking about when you wrote them and try it against some unusual things and things with multiple things going on, the way INPO is pushing people to do things now.

MR. AMWAY: Right.

MEMBER BLEY: To see how they work when isn't exactly what you designed them to do is coming at people.

MR. YOUNG: Yes, I agree. That is the appropriate to how we would want to do the training drills and exercise to make sure that they are

challenged in their decisionmaking and can flow through it and select the right path.

MEMBER CORRADINI: So, I will ask a question here that maybe is not the right place to answer it and you pick where you want to answer it. You don't have to go back. So if I go back to the cartoon in the red box, so as I move up the chain in my mind the uncertainty of the accident signature gets wider and wider, as I move up the chain. And when I get to the red box, the accident signature could be wide-ranging.

So the question is, do the Severe Accident Management Guidelines, which are the way you have it cartooned in, essentially sends us various places, whether support guidelines or FLEX guidelines, et cetera, et cetera, are they sufficient robust or how they are exercised so that if I have a wide range of accident signatures I still get a response that is not contradictory or I might want to go in one direction with a certain accident signature and a totally different direction with another accident signature? Has that been tested out?

And you can wait, you don't have to do it now, but I am curious how you think that through. Because it seems to me there could come a time that I

do a calculation, I assume these are all calculations, that the calculation sends me in this direction but the uncertainty is such that it might send me in a totally different direction of action.

MR. AMWAY: And I think you are raising a very good point and I think that they do exactly what you say. As the uncertainty increases, as you go up that ladder, if you will, and that is why the EOPs and the SAMGs are symptom-based so that if I do have a containment high temperature condition or over-pressure condition, it will prioritize for you how to address that, based on what the SAMG assumes is progressing at the time.

It asks you a series of questions across the top related to RPV control of how long or to what degree have I lost adequate core cooling. Have I been able to maintain it? Have I been able to maintain it above top of active fuel, above bottom of active fuel? Have I been able to maintain it above core debris retention values? Do I have none at all? Do I expect the PRV to be breached?

And you constantly assess those conditions while you are in that SAMG and the strategies that are associated with each of those questions and answers support that particular aspect. You know if I expect

to be able to retain fission products within the reactor vessel, my sequence of actions is different than if I think that the RPV has been breached.

In terms of where I am going to control containment pressure, am I going to control it at pressure suppression pressure or am I going to control that primary containment pressure lift?

MEMBER CORRADINI: So, I will ask my question again a different way and then we can stop.

So the two things that pop in my head that are things that could create large uncertainty in how I respond would be hydrogen generation amount and where I put the water. So, I might decide to put the water here, where I should have put it there because the accident signature I calculate tells me I should put it there but the uncertainty is I could have or should have put it somewhere else. I might turn off sprays when I want to turn on sprays. This sort of stuff is what is kind of going through my mind.

Somewhere in today I am looking for some warm and fuzzy feeling that all of this has been somehow considered.

MR. LINTHICUM: Yes. So, in development of our enhanced SAMGs, one of the key aspects that we have is before you take an action you need to determine

what you expect the response of the plant to be, validate that you are actually getting that response, and if you are getting a different response, then it recognizes that the accident isn't progressing as you thought, or you are not getting water where you think you are getting it, or the core is not where you think you are and you need to reassess where you are at.

MR. AMWAY: Well, we haven't addressed the training aspect of that but we do recognize it is something we need to consider as well.

MEMBER CORRADINI: Okay.

MEMBER BALLINGER: You have used the word select the right path just a minute ago. Is there a way in these procedures that allows the operator to select the right path, even if it is not part of any of these SAMGs? In other words, can the operator make a decision to go in a certain way that happens to be the right decision but it violates one or more of these guidelines? In other words, can he use his or her intuition and make a decision to go down a path, which turns out to be the right path but happens to be not one of these stylized sort of routes that you have in the procedures?

MR. LINTHICUM: From our perspective, we don't have stylized scenarios in our SAMGs.

MEMBER BALLINGER: Yes, maybe I used the wrong word.

MR. LINTHICUM: It is all function-based.

MEMBER BALLINGER: Okay, function-based. All right, I used the wrong word. Nonetheless.

MR. LINTHICUM: Right, so we have our evaluators and decision makers in the SAMGs as you progress into the accident. That is exactly what they are looking at is they are trying to decide what the best course of action is. And the guideline is a guideline. It is not a procedure.

MEMBER BALLINGER: Okay.

MR. AMWAY: Your division between procedures and step-by-step performance versus a guideline, or here is what you consider but if there is an alternate strategy that is applicable, by all means use it, is between that EOP, SAMG threshold.

MEMBER BALLINGER: Okay.

MR. AMWAY: Okay because the EOPs, while you are in the EOPs, you have adequate core cooling. So, your cooling geometry is intact and it is much more easily defined.

As Mike brought up, as you go up that ladder, the uncertainties broaden, all the EOPs are still pretty focused in terms of as long as I have had

adequate core cooling, I can assure that the plant containment and integrity is going to be maintained. It is when you exit out of there, and particularly when you get into the SAMGs, that is why you exit all of the EOPs. And then you enter the SAMGs because your strategies change and your underlying assumptions change in terms of what the condition of the plant is at that time.

Okay, this next slide deals with the SAMGs. And again, they are symptom-based. And as I stated, before you enter the SAMGs, you do exit all the EOPs, you enter the SAMGs. The condition that you do that is an indication of inadequate core cooling. And the way that this determined, there is a specific definition for core damage that you are looking for or it is the sustained inadequate core cooling, means you are not able to maintain the water level at a point in the reactor vessel that would make sure that the core cooling is assured. Once that decision is made and it is very clear within the BWR space, and I would assume it is or will be in the PWR space, when it is very clear, you get down to the bottom of your EOP, it says if you are unable to restore and maintain adequate core cooling, exit all EOPs, enter SAMGs.

And the basic function of the SAMGs is to

arrest the progression of fuel damage because by that time, if you have had the sustained loss of core cooling, it is safe to assume that you have had some level of core damage at that point. So your SAMGs, you are going to take actions to stop that progression. It is going to try to maintain your containment function as long as possible and minimize any offsite releases that you have.

The SAMGs still may direct specific AOP actions, FLEX Support Guidelines, EDMGs as applicable as a means of implementing various strategies within the SAMGs.

MEMBER POWERS: When you speak to arresting core damage, what is the technical basis that you use for deciding that you can, in fact, arrest core damage?

MR. AMWAY: I would say the biggest parameter is how much flow can you get to the reactor vessel. Okay, so when I exit the EOPs, I already know I haven't maintained adequate core cooling. So, it is somewhere between maybe I have minor clad perforation all the way to I have got ex-vessel core debris. And that is how the SAMGs are structured so when you first make the entry, the first question you ask is do we expect that the reactor pressure vessel is breached?

Well, if I have just entered, I have just left the EOPs and entered the SAMGs, there hasn't been enough time for that accident to progress.

And then the next series of questions is a sequence set, where the next question is can I restore or maintain water level above top of active fuel. Well, to do that, your reestablished core submerges, you are going to stop the accident progression at that time.

MEMBER POWERS: Can I ask you a question? I am asking you what is the basis by which you say I can stop the accident progression at that time.

MR. AMWAY: That is what the minimum debris -- the MDRIR is what we call it, minimum debris retention injection rate is based on being able to provide enough flow to stop the accident progression. And if there is anybody here that wants to amplify that but that is the typical value we use. And if we can maintain above that rate, we should be able to stop the progression.

MEMBER POWERS: How do you come up with that rate? I am making --

MR. AMWAY: It is an underlying calculation for the plant.

MEMBER POWERS: What I am thinking of is

I certainly submerged debris at TMI and didn't arrest the accident. I am certainly seeing core tests in which we flood a fuel at some level to damage and can sometimes quench it, sometimes not so much. And I am just asking what of this experiential base that we have, how do you conclude that in a general situation like this, in fact, will arrest the damage? I mean how do you decide on the flow rates and things like that?

MR. AMWAY: Well, the flow rate --

MEMBER POWERS: Well it may be a simple question. You may say I took a value that balanced heat generation rate and water boiling rates or something like that. I am not being critical. I am just asking the question.

MR. AMWAY: Right.

MEMBER POWERS: I used the MAAP code or something like that.

MR. AMWAY: I mean it is a calculation that looks at time since shutdown, the KA curves and input. How much more it takes, I don't particularly know but the thought is if you can maintain above that rate, you should be able to stop it. But it doesn't necessarily mean you stop evaluating continued degradation within the SAMGs. And that is the backstop, if you will, that even though I established that minimum flow rate, I am

still taking actions with in the SAMGs to improve the condition of the plant and recover water level and control the containment, such that if it doesn't and my conditions continue to degrade, I am continuing to evaluate that within the SAMGs, I preform other actions.

MEMBER POWERS: I have always been curious how I would react, were I operating a plant and I increased the water flow in on a damaged core, and I promptly saw all of my radiation indicators just scream out. I mean they would just peg out. And the hydrogen detectors would just go crazy at this point. And I think my natural conclusion would be, gosh, I have just made a mess out of what was a bad situation already. Wouldn't I? That would be my guess.

MEMBER CORRADINI: Assuming you believe the instrumentation.

MEMBER POWERS: What I am driving at is your statement I am trying to improve the condition of a plant. And that may be a very hard thing for somebody to know that he is actually improving the condition of the plant when he is taking an ad hoc action like this. I mean, he is following the procedure and every indication he has got from just sound for one thing, from radiation monitors, hydrogen detectors, has just

gotten worse.

Do you think operators are prepared for that?

MR. LINTHICUM: Well I think it is part of the training we give on to the SAMG evaluators. First before you took that action to restore flow, you would assess what you think is going to happen. Once again, if it is unexpected, you would have to go back and figure out why.

Again, someone could have a big pressure spike in your RCS. When you added water, you increased the reserve water reaction. That is what is driving things. Maybe you breached the RCS at that point.

And then you would have to adjust your actions now to address the containment response. And then you have to go back and validate your instrumentation.

MR. YOUNG: And in those guidance sections, you will have pros and cons that are listed there for consideration by the evaluators.

MEMBER CORRADINI: But let me ask this question more pointedly. I thought you were going to answer his question in a different way but you didn't. So, I am just going to ask it.

So, I assume that you at least tuned this

to TMI, which is for BWR Owners' Group, if I add the water, if I lose cooling and I go through the thing, I exit the EOPs and I go into SAMGs and I am there. And you said all these box questions. The first box question is can I restore core cooling. I assume there is some sort of counter that says at 10 minutes, yes; at 20 minutes, yes; at 30 minutes, eh; at 50, you are screwed. Retreat, worry about the containment.

And I am curious that you actually kind of tuned this to TMI. Was it tuned to something that occurred? That is what I thought you were going to answer Dana.

MR. LEE: If I could, this is Walt Lee with Tennessee Valley Authority.

Again, I think the basis that you may be looking for is the Technical Basis Reports that EPRI provided, their extensive reviews of actions and occurrences from our actual events that have occurred in the industry and formed the basis for the SAMGs, the technical basis now, working with vendors to ensure that the specifics of a particular design are addressed in taking the information from the TBR and applying that to the SAMG calculational aids, provide us with the information that we need to determine what the flow rate would be necessary to arrest core damage.

MEMBER POWERS: I guess what I am asking you is do you, in these procedures -- say you have concluded that you have got a damaged core and you are going to add water at this point and expect a really violent situation here and don't stop adding water at this point.

I mean just because things got really bad, if you have seen --

MR. AMWAY: So, your concern really is when operators turn water back off, if they saw a spike in radiation, a spike in containment pressure and temperatures, and things of that nature.

MEMBER POWERS: And it would be unbelievably noisy.

MR. YOUNG: Yes, I agree.

MEMBER POWERS: It is not going to sound good. It is not going to look good. But it is still the right thing to do.

The question is, does the guy pull leather and say well, gee -- because your simulator doesn't simulate the noise.

MR. YOUNG: Right.

MR. LINTHICUM: The simulators don't go into that space anyway.

MEMBER POWERS: The calculations are very

sterile. They don't begin to communicate.

MR. AMWAY: And that is one of the reasons why the SAMG strategy in this initially when you get in is to maintain containment pressure below PCPL is because when you do initially establish that water flow, you are going to get a lot of steam production. You are going to see pressures come up. You are going to see hydrogen generation to set you up to be able to maintain below PCPL either after the vessel breaches or you do have that water reaction from the initial injection flow until you turn it and quench it.

CHAIRMAN SCHULTZ: So, Phil, continue on to answer the question. Does the operators take any other action than continue to add water?

MR. AMWAY: Yes, there is nothing in the SAMGs that would direct them to stop adding water.

MR. LINTHICUM: So, the expectation is that they would continue to add water, unless directed by the TSE to stop adding water.

MR. GABOR: If I could offer a comment. Jeff Gabor, ERIN Engineering.

One of the authors of the recent Technical Basis Report, EPRI Technical Basis Report, the first thing, and I think I heard this echo that we are not -- there is never guidance provided to determining

water flow. The indication is always to put water on core in a breach.

I think what Mike is saying is that the expectation or the expected consequences will change with time. And those are discussed in the TBR, as pointed out before. There are pros and cons when we get into severe accident space and we get into the uncertainties. There are always pros and cons for the actions that we take and those are clearly discussed in the TBR as well.

But what we want to do is we are going to put water on but we want to understand what the consequences are going to be and be able to deal with those consequences, be it that containment -- be prepared for perhaps large hydrogen concentrations in containment are already addressed in the severe accident management based on the symptoms of high hydrogen concentrations and there is actions that we take for that.

So, we would never not put water on and the TBR never recommends that but it does identify the pros and cons and the consequences of doing that at certain points in the accident.

MEMBER CORRADINI: So, can I ask my question to you, Jeff?

So, from the standpoint of TMI as an example case, you have run through this that nothing will change in terms of how you would address it, based on timing. It is always vessel first and then, at some point, you would, again based on I am assuming top box questions, you would retreat to put the water somewhere else? You know what I am asking?

MR. GABOR: Yes, I do.

MEMBER CORRADINI: Maybe I am asking it incorrectly.

MR. GABOR: No, I do. And Phil and maybe Jay Liter can support this as well.

Within the TBR and the guidance provided in the TBR and within the Severe Accident Guidelines, we are always watching full. We are always watching the containment and we are watching the RPV and we are taking appropriate actions to deal with both of those things. So, it is never a situation where I have to pick and choose.

For example, when I am trying to recover the core, I am also paying attention to containment pressure. As Phil pointed out earlier, if I progress to a point where I expect the core to come ex-vessel, I am going to prepare my containment for that as well.

So, it is never a one or the other.

MEMBER CORRADINI: Okay, thank you.

MEMBER POWERS: So, Jeff, the question I am asking I guess is I have gotten into a point where I am worried about both my fuel and my containment, just as you outlined. And now all of a sudden, I am seeing an enhanced threat to my containment. And it caused me pause.

I mean you have got a good strategy, just keep adding the water. But I am now asking about the implementer and is he prepared with these sufficiently to understand this could be a very exciting event. This could be a real exciting event. And they will air it in the control room. They will see it.

MR. AMWAY: And I agree and I think to the extent that the operator training program goes, they are also going to have the benefit of an emergency response technical report staff that is helping coming alongside the operator to provide them guidance.

MEMBER POWERS: Well, I wonder if the technical support staff have ever seen the core experiments and things like that.

MEMBER BLEY: I think the key here, or at least a possible key is that the training ought to include some warnings that you are not going to like what you see when you carry out these actions. You had

better be prepared to live through it because you are going to lots of things telling you to undo what you just did.

MR. AMWAY: I agree.

MEMBER BLEY: And without that, you never know what a guy is going to do. Even with that, you are not quite sure if it really gets scary enough.

MR. LEE: When the SAMGs were implemented, we had to create a new word, phenomenology, okay, so we could teach them all the things you needed to know about what we think is going to occur when you have an event where you have lost the core. And when you enter SAMGs, you assume the core damage has occurred, period. Your real goal is to protect the next barrier, which is the containment.

MEMBER BLEY: It is one thing to see that rationally. It is another to at least have some warning that this is going to scare the daylights out of you and you are going to get things that tell you not do what you just did.

MR. LEE: It is a specific, a great example of what you are talking about is, in a PWR where I have containment pressure that is rising and the guidelines tell me to turn off sprays, to allow pressure to remain high. Okay, one of the reasons that I might want to

do that is to keep hydrogen under control. So, there are some things that are taught and provided in the guidelines and the clarifying actions in the guidelines for the user that is not going to use these all the time to be made aware of when he is there to address these types of actions.

So, they very are well laid out. Again, you may be in multiple SAMG strategies at the same time, addressing different aspects. Basically, the evaluation teams are directed to determine which strategies could be implemented based on the criteria of that strategy being needed.

An example would be if my reactor coolant pressure is still high and RCS is still somewhat intact, even though I am in a SAMG condition, I want to decrease that pressure so that if I do have a vent with the fuel and I do have a release of that fuel to the containment, that it is a low pressure release to keep it from going to the containment wall structures to prevent damage.

So, those are the types of actions that are built into the SAMGs. They are quite detailed but they are positive-negative. You have to be -- the decision maker has to weigh whether or not this particular strategy, the positives outweigh the negatives to make a decision. So, they are very complicated from that

particular standpoint.

MEMBER RAY: Dennis, we have been talking about procedures but you just touched on something that I think is going to be discussed, not now but at some point, and that is training. How this training on these procedures that we are talking about here affects the training that traditionally is done to make sure we don't get into these conditions in the first place. That is a big issue in my mind, anyway. And I just want to make note of it here and say we have got to have a discussion about that because we can't undermine the training that is required to operate the plant safely because we are now focused on simulating the effects of a beyond design basis accident.

On the other hand, you have got to have training on the procedures or the procedures aren't of any value.

And so how the overall training program, I used to be on the accrediting board side, so I am thinking about this, how that is going to be accomplished is something I just want to make note needs to be talked about but this isn't the place to do it.

MEMBER BLEY: I agree with you and I will just throw in I always look back at events. Real things have happened. I've talked to people who have had them

happen to them. I know at least three are in my head of events where people did what afterwards they would say was the wrong thing but they did it because they had been biased by some recent drills that they did, that were under particular conditions. The thing that happened wasn't under those conditions, so it behaved differently. So, they actually had a training bias built in that caused them not to see what was going on. And that is the kind of thing we are worried about.

Now, if we over-train -- not over-train. If we get a mindset on these, maybe you don't pay attention to weird looking stuff when you don't expect weird looking stuff. I agree with you.

MR. AMWAY: And I appreciate that comment because I had the same concern. I mean we have the operator plants every day and the design basis and that is where we want to keep them. And that is where our training focus typically is.

Before I leave the topic of SAG, SAMGs, I just wanted to give an opportunity either to Jay Liter or Bill Williamson, if there was anything else you have. You know we have discussed it a lot. I think we are okay but before we move on, it was either Jay or Bill has some comment from the EPC side with respect to SAMGs before we move on.

MEMBER CORRADINI: Are they physically in the room?

MR. AMWAY: Jay is in the room and Bill is on the other line.

MEMBER CORRADINI: You may have to turn on the line.

CHAIRMAN SCHULTZ: No, their line is open --

MEMBER CORRADINI: Oh, okay.

CHAIRMAN SCHULTZ: -- if they open it.

MS. WEAVER: Well, we had to shut it down because it --

CHAIRMAN SCHULTZ: I hear them now.

MR. AMWAY: Bill Williamson, are you on?

MR. WILLIAMSON: I'm on the line, if I can get through.

CHAIRMAN SCHULTZ: You are through. If you would like to make a comment, go ahead. Now is your time.

MR. WILLIAMSON: I just wanted to address very briefly the question that came up before. As Jeff Gabor said in the Technical Basis Report is guidance on restoring flow to an overheated core. That guidance has made it into the Plant-specific Technical Support Guidelines and that is part of the training; that you

would not turn it off but you would expect to see an increase in pressure due to steaming and increase in hydrogen generation. And so it provides some recommendations based on what happened at Three Mile Island. They think about 5,000 gallons per minute was what stopped the accident sequence there. And so it gives something you are shooting for controlling injection when you come in to control the pressure transient and the hydrogen generation. But the guidance is such that you would not tell the operator to turn off the flow because he sees that he might limit the flow somewhat but we are training him to see what is expected.

If you look at the sequence of events on Fukushima Daiichi Unit 1 on March, I think 24th, 25th, you see where they restored injection to an overheated core or core debris and that is when they got a pressure rise and got some other indications. And they controlled that by limiting the amount of flow that was in there and the conditions were controllable. So, I wanted to just point that out.

One other thing I would point out is we are, indeed, looking at training and how to make sure it does not impact the operator's normal training but how to make sure that the evaluators and the decision makers

and the implementers do have the procedure network and do have the training that they need to accomplish this, should they ever find themselves there.

And I will -- that is the end of my comment.

CHAIRMAN SCHULTZ: Thank you for your comment. I will turn it back to you, Phil, to move forward. Thank you.

MR. AMWAY: Okay, next is the EDMGs. The real point of this slide is just to make it clear that the EDMGs really have two components to them. The first component is when the loss to the normal command and control structure exists such that the control room staff is unable to implement the EOPs, that the EDMGs can provide that structure for the initial response for whatever operators remain to bridge that gap between the staff that is there available to respond to the event until the offsite organization is established and can transition back to the normal structure within the EOPs or the SAMGs.

The other aspect of the EDMGs is the actual how-to procedures on how to mitigate or to implement the specific mitigation strategies in terms of use this portable pump connected to this specific location. So, there is that dual aspect of the EDMGs that exist and that is why we say that the EMDGs can also be used

in support of the SAMGs or the EOPs.

Flooding response procedures, we have touched on this a little bit but they are, typically, an AOP is what directs the specific flooding strategy and response actions. It can call out and use FLEX Support Guidelines response to a flooding event. And also these additional procedure classifications are being added in response to the flooding hazard reevaluation in terms of being able to have alternate mitigation strategy guidelines or Targeted Hazard Mitigation Strategy Guidelines. This is something that currently does not exist within that framework now. But as the ongoing efforts to resolve the flooding hazard reevaluations, these strategies and procedure guidelines will be developed to be able to respond to the hazard reevaluations.

Dave, did you want to say anything more about the flooding?

MR. YOUNG: No, I think that is the right characterization, yes.

MR. AMWAY: Thank you.

Fire response procedures, again, these are typically driven by the EOP framework. They have a variety of support procedures. The fire response procedures, and I am thinking mostly in terms of

Appendix R-type fire events, that they are very specific in terms of specific fire areas, how to contain the fire within a specific targeted area and to preserve key safety functions using alternate trains that are not impacted by the fire.

The importance here is that when you get into a beyond design basis event, the fire is not necessarily going to behave in a manner which you wrote that specific fire procedure.

And so now that we assume well, we get into an Appendix R fire event that all the equipment in a particular area is damaged, we have the potential for multiple spurious actuations. So, we try to isolate that equipment and contain that fire within a particular fire area, use our alternate strategy to maintain the safety function, shutdown safety functions.

Beyond design basis event, it may or may not plan out that way. I mean there may be equipment that is unaffected in that particular fire area or the actions defined in the fire procedure to isolate that area may contradict what you would want to do on a FLEX support guideline.

You know if you isolate it to a particular area, the fire response procedure tells you to

de-energize Bus X and you count on Bus X for your FLEX mitigation strategy, then you have got a decision to make in terms of am I going to execute the fire procedure as is or am I going to modify the response to that fire procedure so that I can successfully implement the FLEX Support Guidelines. And that is where the -- whether that be within the control room or the ERO response organization in their response to an event to be able to be provided the tools that they need to know what strategies are available, what the functions of those strategies and guidelines are, and to make the appropriate decision in terms of executing the specific fire procedure or to implement the FLEX Support Guidelines to respond to beyond design basis event.

And so we see that there are definitely some improvement opportunities within there and it is also called out in what was referenced earlier, Section 2.5, which talked about providing the ERO alternate decision maker with the guidance they needed to be able to make those type of decisions and recognizing what those guidelines are, what the strategies are, and how they might be modified in response to a beyond design basis event.

MR. YOUNG: And so that would be the purpose of that 2.5 to go and take a fresh look at this

and make sure you have got the right guidance that will get you where you need to be.

MEMBER STETKAR: Phil, do you know -- and I don't -- I do for the NFPA-805 plants but for the Appendix R plants, are there any Appendix R plants that still have the station blackout response to Appendix R fires, where you actually de-energize all AC power with the idea of possibly rebooting it?

MEMBER BLEY: So-called SISBO.

MEMBER STETKAR: SISBO. Sorry, I couldn't remember. Thank you, Mr. Acronym. Self-induced station blackout. Are there any?

MR. AMWAY: Yes, and the plant I most familiar with is an Appendix R, the plant I was licensed on was Appendix R. We did not have that but what I would like to do is Jay is here, he has experience with another BWR.

MEMBER STETKAR: Because of the timing, the last time I asked this the answer was yes, we think there may be one or two but that was a couple of years ago.

MEMBER BLEY: Originally, there were only like half a dozen, I think.

MEMBER STETKAR: Yes.

MR. LINTHICUM: There are a couple I know

of that are transitioning away from that --

MEMBER STETKAR: Away from that.

MR. LINTHICUM: -- but I can't tell you for certain if there is any left.

MEMBER STETKAR: Thank you.

MR. AMWAY: So, this last slide really is our conclusion as it relates to 14-01 and procedure integration. I certainly appreciate the robust discussion we have had here. I think that has been a value to both the effort going forward and also to the industry.

But in concluding, I would like to just point out that the way we see it and the way we wrote 14-01, there are certainly enhancements that need to be made to improve that integration and usability across the different procedure groups that we have but the existing framework itself, in terms of the AOP, SAMG, EOP, EDMG structure is sound, it is based on multiple decades of experience.

We do have a robust process in place to incorporate lessons learned from specific events, such as H.B. Robinson and others, that we do go in and modify aspects within that framework but we see this more as an enhancement opportunity to improve that versus you either put another layer of procedures in or to make

substantial changes to the existing structure.

We do validate the current approach frequently. It is in a combination of training drills and exercises and we also do post-event reviews, where we do go back and look at operator response to specific events and how they implemented the procedures and are there any shortfalls or gaps within those procedures that hinder your event response capability.

And we feel that in concluding trying to shift the focus into a broader change effort in the area of procedure integration has limited additional safety value and that time is best spent in other areas of post-Fukushima response.

So with that, I will conclude pending any questions.

MEMBER STETKAR: Phil, I have one. And it actually bridges 14-01 and 13-06 but it is not addressed in either set of slides. So, I will bring it up here. And it addresses some of the things we have been talking about a little bit and that is the Ultimate Decision Maker. There are many statements in 14-01 and 13-06 regarding the Ultimate Decision Maker and we addressed some of the things we were discussing before. It says the Ultimate Decision Maker should have the authority and capability for direction of an action not contained

in or contrary to procedures or guidelines, if it is determined the action will provide greater protection to the public health and safety. A nice statement.

The UDM is able to direct changes to a preplanned prior response strategy, if necessary, to support implementation of an accident or an event mitigation or management strategy.

So, the UDM has 13-06, it says the UDM has overall direction on the implementation of the EOPs, FSGs, EDMGs, and SAMGs for a unit or set of units.

If I look at the requirements for being an Ultimate Decision Maker, I read things in 14-01 that says following the transfer of the Ultimate Decision Maker function to an ERO position holder located outside the control room, for example in the technical support center, the support staff assisting with strategy and evaluation and selection should include at least one member who holds an active SRO license or has successfully completed an SRO licensing or certification program in the past applicable to the affected on-site units.

If I look at 13-06, it says for the UDM qualification requirements should be developed for the positions performing this function. These requirements should ensure that each UDM qualified

individual has sufficient technical understanding and leadership ability to make timely and informed decisions, during a beyond design basis event or severe accident.

So, I wanted to get those quotes on the record. I don't read anything that says that the Ultimate Decision Maker, not a staff member, but the person who is making the decisions, needs to hold an active senior reactor operator license for the unit, an active, and has undergone training, both procedural training and simulator training for that unit.

And if the answer is yes, the Ultimate Decision Maker must have those requirements, I will be really happy. If the answer is no, I am really curious why not.

MR. AMWAY: Okay, and I will start that. And Dave, if there anything else you have to add after I am done, please add it.

But the initial event response, the Ultimate Decision Maker is going to be the shift manager. He is the one there. He does have an active license.

MEMBER STETKAR: Absolutely.

MR. AMWAY: At some point, when the ERO is staffed, that alternate decision maker is going to

transition, most likely out of the control room to a member of the ERO that has the qualifications as you described, either a current or past SRO license or certification --

MEMBER STETKAR: I'm sorry, the words say the support staff assisting the strategy evaluation should include one member. It doesn't say the Ultimate Decision Maker has to -- so, be careful because, again, I am reading the words.

MR. AMWAY: Yes.

MEMBER STETKAR: So, I am asking you if I, John Stetkar, suddenly become the Ultimate Decision Maker, am I required to have an active SRO with training on the procedures and simulator training keeping my license up to date? And that is a simple question. Yes or no?

MR. YOUNG: So, the answer is no to the first part, you don't need to be licensed, and yes to the second part, you have to be trained.

MR. AMWAY: And before --

MEMBER STETKAR: Okay. Now, why don't you have to be licensed and up-to-date on the simulator for that plant?

MR. YOUNG: Because you are going to have a support staff member who will have a current or a past

license supporting them.

MEMBER STETKAR: And you are allowed to override I, then, as the Ultimate Decision Maker need to take the input from all of these people and I can make the decision. And I am required to make the decision. And I tell the license shift supervisor in the control room turn off that pump. And the license shift supervisor says wait a minute, this guy doesn't have a license. You know, should I do that or is he then just automaton?

MR. YOUNG: Yes, so I believe there has already been NRC interpretations in the past about how command and control responsibilities can flow up the chain to the senior level licensee person. So, this isn't any different than any other decisions that have to be made.

MR. AMWAY: So, to answer the concern, the shift manager is still in the control room and I see it more as a collaborative effort, in terms of even though that Ultimate Decision Maker authority gets transferred to a member of the ERO outside the control room, they are still communicating and determining the appropriate course of action for the plant.

Yes, he has the title Ultimate Decision Maker but he still -- it is not that the licensed staff

becomes the hands of the Ultimate Decision Maker, we will do anything you tell us, there is still an opportunity there for interaction and discussion in the technical decisions and the approaches of the taking.

MEMBER BLEY: So, I just have to relate back a couple of years ago in the Navy but I am on watch in the Navy. My boss didn't get effectively licensed on that plant. He took it over but he was licensed as an engineer for all Navy plants but he was the only one who could give me a direct order to do something I didn't want to do. But I could either refuse it and say you have got to put somebody else here because I think that is wrong or I would say I am going to write in the log and I am doing this because you ordered me to and I disagree. And I wonder about the guy who is the licensed guy in the plant when he thinks he is getting bad guidance.

And I just don't know. The civilian structure doesn't quite have the same kind of formalisms that let you deal with that, I don't think.

MR. AMWAY: And I think it does.

MEMBER BLEY: Okay.

MR. AMWAY: Because I mean having been there and I have a Navy background as well.

MEMBER BLEY: Yes, so how does it work?

MR. AMWAY: But that has been done.

MEMBER BLEY: I wanted to hear that.

MR. AMWAY: The shift manager was directed to do something and they push back. It is no different whether you are in an event with an ELO Ultimate Decision Maker giving guidance or a long line in senior management would direct me to say we want to keep the plant online and the SRO says no, it has got to come down.

I mean that is their function is they are the license holder for that plant and they have the responsibility for protecting public health and safety, even when that is contrary to what they are being directed by although senior but not licensed member of the plant staff. I don't see it as being any different.

MEMBER STETKAR: Well, tripping the plant, you tend to use things from sort of what I would call routine events. Tripping the plant when the SRO or the RO feels that stability is threatened is one thing. Turning off containment spray when you think the containment is in trouble or de-energizing buses or re-energizing buses when you think that that might be a bad idea, given the trajectory, it is already a very, very bad day of the plant is something very, very

different.

And sitting in the control room as the licensed people responsible for that plant, hearing guidance from an external source, who you know doesn't have the same qualifications and training that you do, can at least be a source of potential delays, confusion, additional discussion and you may not have a lot of time for that delays and the confusion and the additional discussion. And that is the concern.

It is, in some sense, actual training and experience but it is also the optics to the people in the control room who know that they are, ultimately, responsible, unless, as Dennis said, there is some formal mechanism that says you have it. I don't have it anymore. It is your job.

MR. PAPPAS: I would like to address that also from an on-shift perspective. You may get a contrary or contrary to what you think is an appropriate action certainly in design beyond basis events, something your EOPs are not particularly guiding you with. But I think every shift manager would push back, at least get the understanding of why it is that you want me to turn off containment spray. And in fact, that conversation is going to take place. We are not hands for somebody outside the control room. We still

have responsibility and ownership of the unit.

Not only will that shift manager have that dialogue, he is now going to have the dialogue with three other license holders and they would have that responsibility and want to understand why something is being done that they may feel is contrary to what they see on their indications or your training, their current EOP guidance.

So, it is, as Bill said, a collaborative effort. There is going to be understanding before an action is going to be taken, especially one that would appear to be contrary to the goodness of the plant.

MEMBER STETKAR: Thanks. I'm not sure you identified yourself.

MR. PAPPAS: I'm sorry. Nick Pappas.

MEMBER STETKAR: Thanks, Nick.

CHAIRMAN SCHULTZ: Do we see that happening in drills and exercises ERO activation drills and exercises, that interaction between the control room and the ERO decision maker?

MR. AMWAY: Having participated in those, absolutely, I can tell you.

CHAIRMAN SCHULTZ: At every plant?

MR. AMWAY: Without a doubt.

MR. LEE: If I could, this is Walt Lee.

When we implemented Rev. 0 of the Westinghouse, SAMG Owners' Group Guidelines, one of the lessons learned that drove us to move them to one was the fact that we found that in the implementation where we had limited details taught to some of the staff members in the control room, when the edicts came down from the decision maker in the TSC, they were hesitant, like we have been talking about, to implement that guidance blindly because it was contrary to all the things that they live with in EOP space. Some of those things are contrary to actions you would take in EOP space.

The fact that we had moved to SAMGs was important for them to realize but also we added tools into the guidance so that the TSC is creating basically a work order. Okay, here is what I want you to do and here is why I want you to do it.

And then the discussion with the ops representative or the decision makers between the control room and the TSC had those -- were to have those discussions and have clear direction on what they were doing, why they were doing it, and what the negative aspects of doing it might be and what they should be monitoring to ensure that the action they took, what they think actually had results, and that the results that they got were not contrary to the negative and the

positives that they were expecting to see.

So, all of that is built into the guideline structure itself to ensure understanding.

MEMBER BLEY: I want to put two things on the table. I don't really want to discuss them but I just want to -- I am saying them for you guys, so you think about this.

One is, I have been watching drills in a number of places. And some places the shift manager or whatever they call him, is very much engaged with everyone. And Phil, I don't think you are agreeing with what I am doing but why not. Help me out here. And really listening to everybody.

Others still have a little bit of that I am the boss. Yes, I hear you but do what I say. So, that is still out there some, various guy-to-guy, woman-to-woman, plant-to-plant.

The other things is, and I won't name the plant because I learned about this from people there and should not identify the plant, but an the event that got pretty serious and lots of people came to the control room, including the VP nuclear was there in the control room and several other advisory people. And they got to a place where the guys said next step I am going to do I think will cause A, B, and C to happen

and nothing else. Does everybody agree? And all of them, including the senior management said yes, that is right, do it.

He did it. D also happened, which turned out not to be very good. He ended up losing his license. Everybody else was like I didn't do it. That gets around. That is why I am concerned about this kind of stuff.

MR. BONFIGLIO: This is Mike Bonfiglio. I just kind of want to add to the question relative to the shift managers in questioning what is coming in. I think without a doubt the training and exercises supports the shift managers having a questioning attitude and making sure they understand what they are doing before they do it, without a doubt.

Having been a shift manager for 11 years and seeing a lot of them, I have been contract training for a long time in the industry and seen a lot of utilities, how they train and exercise their people, and without a doubt, they are building that questioning attitude into the control room staff.

MEMBER BLEY: I like to hear that. When I, in various roles, dealt with people in the plant, especially the training folks, and talked to them, and they tell me that our guys never do that. So, you know,

I think what you are thinking about are the guys you like best. We used to have a guy that if he was on watch, I couldn't sleep too well. And all of a sudden, I say, oh, Joe, well, maybe not everybody would do it this way.

MR. BONFIGLIO: Yes, and also to add relative to where we are with the Severe Accident Guidelines, the reason we are going to the Enhanced Severe Accident Management Guideline in the PWR world is because we recognize this analysis paralysis think that we ended up because the guidance was not clear enough and was not really providing enough of the benefit-consequence information to the staff to allow the control room to even be informed of why the TSC is recommending what they are recommending.

So, the new revision to the Severe Accident Guidelines that we were actually validating the first round this week at the first Westinghouse plants is designed to address that analysis paralysis issue and provide the background information for the guidance, along with the guidance, as well as benefits and consequences of the actions that are being taken.

MEMBER STETKAR: I will just ask one last and it is a rhetorical question. I don't want an answer. We are running late.

But what is the downside of not requiring the Ultimate Decision Maker to have an active SRO license that he or she keeps up to date?

I hear a lot of things about yes, there is going to be good discussion. But I don't quite understand what the downside of actively saying no, that is not required.

MR. YOUNG: And part of that, you limit your pool for site emergency directors.

MEMBER STETKAR: Oh, well.

MR. YOUNG: Well, you asked the downside. That is the downside. But we have very qualified individuals. We have a very good support staff. They have great leaders and they call the right decisions. So, to exclude them from that wouldn't seem to be very --

MEMBER RAY: John, we should talk about this further later, when it is not critical because of the time frame. Because I have an answer for you but I don't want to go into it now. I mean it is maybe not a satisfactory answer but it is a response.

CHAIRMAN SCHULTZ: Phil, we are in-between now the NEI Guidelines, our documents, so we are going to take a break now and return at 10:30. The same panel will continue. We are a little bit

behind the schedule that we advertised but we knew that this was going to be an important discussion this morning.

So, we will break until 10:30.

(Whereupon, the above-entitled matter went off the record at 10:16 a.m. and resumed at 10:30 a.m.)

CHAIRMAN SCHULTZ: We're ready to start. We're back on the record. The next discussion is on NEI 13-06 and we will move right into it.

Dave? Walt? Thank you.

MR. LEE: I am Walt Lee with Tennessee Valley Authority and I will be talking on NEI 13-06 guidance relative to the enhancement of emergency response capabilities for beyond design basis events and severe accidents.

I am going to address some aspects of the regulatory basis for different areas of recommendation 8 and also recommendation 4.2 and 9.3.

There are four specific areas that are addressed in 13-06 and the first one in section 2 is multi-unit or multi-source data assessment. And this area talks to the implementation of this that was to be completed at the end of last year. And we have a few that are still completing that in 2015.

But this allows us to perform dose assessment for all units that the site might have and all release points that the site might have, including the spent fuel pool. So, we can get an aggregate look at the dose to the public and take appropriate protective action recommendations based on that dose release. This is one of the areas that was determined to be less than fully implementable at Fukushima. So, it was an aspect that the industry took on and has completed.

The next Section 3 of the document talks to training enhancements utilizing the SAT-like process per 10 CFR 55.4 and ensuring that the aspects of a SAT process to include analysis of the jobs needed to be done, training materials, objectives, the delivery methods and frequency, as well as evaluation techniques and the revision of the training based on performance through the evaluation process are all in place.

And it also talks specifically to ensuring that you are maintaining a balance or an appropriate balance between your design basis training and your beyond design basis accident training.

It does talk somewhat to the Ultimate Decision Maker, as we already talked about earlier this

morning but it references most of the aspects and traits of the Ultimate Decision Maker back to 14-01, as we discussed.

The third area in 13-06 talks to facilities and equipment and the fact that there is training that is required for the new equipment that has been placed on the site in a protected manner and also includes satellite phones and things like that for communications in the 9.3 recommendation.

Lastly, and probably the one that we will talk about the most is the beyond design basis event response drills. Specifically, sets up and describes the demonstration capabilities for effective integrated use of accident mitigation and management procedures and guidelines and sets and focuses on ensuring that the developers of the drill and exercise scenarios are going to build them such that we do exercise transition between strategies that are to be demonstrated and the processes of selecting the best strategy, as we talked about in SAMGs as well as EDMGs.

It does talk specifically to attributes. And some of the key attributes that it talks to is the inclusion of making sure that you are working this with your emergency response organization and using your normal EP procedures. This is not a new group. This

is the same ERO that you have on-site all the time or you all in an augmented fashion and that the EP groups should be involved in that to ensure that you get the high quality drills, just as you do in the radiological emergency preparedness program.

It talks to allowances for combining the drills with other drills. So, you may not just run a beyond design basis drill but you may run a normal radiological emergency preparedness drill and then be able to add on, tack on to that a strategy that you wouldn't normally use and demonstrate the capability to use that, something that comes out of one of the other areas or you may have a mini-drill at the end of the scenario, after you have got your ERO in place, where you do a time jump and it talks about how time jumps are helpful but also warn you, clearly, that time jumps are hard to manage.

And then it also talks about all the normal aspects of how you should ensure that you include those members of the organizations that support you. They don't necessarily have to play but it is important for you to go ahead and look at inviting your offsite response organizations to play, so that they understand the differences between the design basis and the beyond design basis integration of their plan with your plan.

It talks about simulator usage and the fact that simulators may not be modeled to demonstrate and be useable for all aspects of beyond design basis. We talked a little bit about that earlier but it goes on to make sure that you take your best estimate actions towards developing the paper drill scenario, if you will, and ensuring that you are utilizing scenarios that your ERO to train on all the units that are affected whenever possible.

From a drill standpoint, again, there are multiple objectives that has an appendix, which provides a complete list of objectives that have been worked with INPO's PO&Cs and also list a mitigation strategy list. And mitigating strategy is one of the requirements, one of the types of drills and there are four specific types of drills that are talked to.

One of those is for you during the eight-year cycle following mitigating the damage rulemaking implementation, you should demonstrate your capability to utilize strategies. But it also says that if you have a strategy, for instance, to fill the steam generator using your portable pump and you have that as a strategy that exists in your SAMGs, as well as you EDMGs and in your FLEX, that if you demonstrate it for one, you don't need to demonstrate that strategy

again for each one of those strategies you have in each one of those different guideline sets.

So, that is some good healthy guidance that has been added to 13-06.

The other three types of events that specifically calls out that you will complete during your eight-year cycle is an AOP or EOP, depending on how you set up your procedures, transition from a scenario to a FLEX scenario. And you would demonstrate that FLEX scenario through the time period where you had Phase II actions that needed to be completed and your limited access of your ERO staff back to your site. Typically, that is six hours, unless you have come up with some other value or have substantiated that with some technical basis.

It also, during that FLEX drill, makes sure that you go through the steps that are necessary for you to request the Phase III FLEX equipment from the NRRC, the Regional Response Center.

So, again, that Phase III, those actions are not actually saying you need to have the equipment delivered from Memphis or Phoenix but that you would make sure that your processes for requesting that are done. There have been other demonstrations of the capability of the RRC to activate and to deliver through

pilots that have been conducted. And I know there is a national level exercise in July where that is also going to be demonstrated at a very high level.

MEMBER STETKAR: Walt, let me interrupt you for just a second because I am going to have to leave in about ten minutes and you have raised a couple of things that I wanted to ask about.

One is these drills. If I read the guidance, the guidance for the drills, to me, indicates that the various types of guidance are drilled on in what I call a pair-wise function. In other words, there is one drill that tests transition from the EOPs to the FSGs. There is another drill that tests transition to the SAMGs. There is a third drill that tests transition to the EDMGs.

And the boundary conditions that are set up, for example, for the SAMGs, it explicitly says the drill would begin with conditions that are degrading into those requiring a transition into the SAMGs. What I don't see is really an integrated drill that looks at conditions that begin and looks at integration of the FSGs, the SAMGs, the EDMGs, for example, a fire or I hang up on fire. Something serious.

How does the drill process examine whether all of those things fit together, not paralyze but fit

together as they would expect to be exercised in a real-world, evolving scenario?

MR. LEE: I will attempt to answer part of the question. David, jump in at any time if you feel the need to.

I'm a scenario builder from way back, an SRO for 20 years, Navy nuc but I have been building drills and running drills for a long time. And again, the SAMGs, the criteria, every apocalyptic event that we have results in a new set of guidelines and we have already talked about that. So, how do they integrate with each other?

Again, they are event-based but you would transition. And I am going to take an example. For instance, let's talk with the FLEX, since that is the latest set of guidelines that we have. So, the event that we are talking about here could result in the fires that you talked about several times during this meeting. It could result in damage to equipment that we are not aware of. So, it is a very varied type of scenario.

So, most radiological emergency preparedness scenarios are going to run down that same line. You are going to have an event. In this particular case, we are going to assume it is an

external event that causes damage. You have got equipment that is broken so, you are taking actions to return that equipment and you ultimately determine that you have a loss of all AC condition and you are not going to be able to restore it with your normal conditions.

That is the first drill that is described in 13-06 that we just talked about. And we would transition into the FLEX procedures from the EOPs, with the EOP still guiding our actions in FLEX space to implement strategies that would, hopefully, prevent us from going to SAMGs.

If all of the FLEX equipment that we have fails and we still go to SAMGs, it was a really, really bad day.

Most of the events that drive us to SAMGs now, where we don't implement FLEX, for instance, I can't shut down the core and I am in a high-powered ATWT condition and I melt the fuel well before he may even have an RCS leak. I have damaged the fuel and I have exceeded my design basis so now I have entered beyond design basis conditions for SAMGs. That is one example.

So, that condition I don't have opportunity to prevent core damage using FLEX equipment and in the SAMG entry directly from the EOPs, once I

have exceeded and moved out of design and licensing space into the space of SAMGs, I go directly there. And that is what the next drill that is talked about in the 13-06 documents, making sure that you do use that process.

Now, if I was in a FLEX condition, my first scenario and things weren't working, there may be other strategies in SAMGs that would allow me to add water. Water is always good. But the issues is that if I did not have core damage in FLEX -- if I have core damage in FLEX, then I need to go to SAMGs and SAMGs then shifts over to the mindset of protecting the containment. So, final barrier to release of fission products. So, the restoration is not there.

So, again, the Ultimate Decision Maker, I believe, does have -- would have the knowledge and training necessary to move from one to the other, if it actually became necessary.

MR. YOUNG: Well, and I think that the drill guidance is developed to recognize the boundary conditions for the different guideline sets. But the key is, you are going to see the transition from E to C between those different guideline sets that are going to be in play.

So, you are going to start in the EOPs.

You have a bad day, ELAP, you go into FLEX. You are going to do that transition. You are going to implement your FLEX Support Guidelines.

We should be successful in doing that. That is going to prevent core damage and that drill should end with a successful demonstration of FLEX capabilities.

So, if you are going to come back for your next drill, you can set things up to initial conditions, something happened 12 hours ago. You have got FLEX in place. Maybe you had your second seismic event, a second flood, whatever it could be. Now FLEX is disabled. And as you read, that one quote you read from the 13-06 guidance, you are bringing the players to the point where the conditions are starting to drive entry into the SAMGs. So, there is that transition you are going to see out of the EOPs into the SAMGs.

So, it is meant to provide focus drilling on transitions between the guideline sets and, in some cases, without sitting there with 12 hours of dead time that you may see in a real event that just isn't going to be productive drill and learning time.

MEMBER STETKAR: Thanks. I have to get in one more question. You haven't actually answered my concern about drilling on integration of these

procedures, which ostensibly is the whole purpose of developing this framework because any bilateral entry into testing pair-wise transitions does not test any integrated response. It does not test an integrated response.

The footnote, in total, says for example, the beyond design basis, seismic event occurred several hours ago that resulted in implementation of FLEX strategies. A second beyond design basis seismic event, you are reading the same thing I was, occurred that impacted the ability to sustain one or more FLEX strategies and more hours of the lapse. The drill would begin, this is a SAMG drill, with conditions that are degrading into those requiring a transition into SAMGs.

I think if I were actually looking at how these procedures work together and how people use them, I would really like to see how the operators went through that process in an integrated sense.

MR. YOUNG: You will. You are going to see the transition into the EOPs into the --

MEMBER STETKAR: Pair-wise.

MR. YOUNG: All you are doing is cutting out the dead time of where the FLEX equipment failed and the heat-up took over, which could be four, five,

six, eight hours.

MEMBER STETKAR: And you are not doing that in real-time with the same operators. You are saying, John, today we are going to test on this transition. Here are the conditions that you must assume that happened and now we will start the drill. That is a much different condition than saying it is getting to be a really bad day. How am I going to use this integrated guidance?

I have an example this afternoon that will point that up but I need to run.

The second thing that you brought up, Walt, is this six hour magical response time that comes in in NEI 12-01, which I won't be here to ask about. The guidance in NEI 12-01 says it is okay to assume that you will have some -- I have forgotten the exact quote and I don't have time to look it up here -- but it is essentially limited site access during the 6- to 24-hour period. As I read a lot of the other guidance, that guidance seems to presume that limited site access means you have everybody available that you need at six hours. If that is not true, I would really like to understand that because a lot of the other guidance says according to NEI 12-01, at six hours, you will have offsite support that is adequate to perform whatever

functions you are looking at. And that, to me, is different than saying people might start to be able to get to the site at some time around six hours.

So, if the other guidance doesn't effectively take credit for the full complement of everybody that you need there at six hours, and that six hours is magical in some sense because you say that you need to get electric power back to some things within about eight hours to save the containment. I am curious how that six hours is interpreted in practice.

MR. DRIEHAUS: Well, I can speak to the staffing assessments. I'm Paul Driehaus. I'm from Exelon.

When we do our staffing assessments, we go, essentially, by the scenario that is developed in the integrated plan. That is the baseline we are looking at. It may be modified at a particular site, based on the kinds of conditions that have been reviewed since that time and some of the more specific event analyses that have gone in that interim period.

But essentially what we are looking at is with the minimum staff you have, can you perform everything you need to get done within that six-hour period and if you have anything that has got to be

started in order to successfully complete it beyond the six-hour period.

So, for example, if you have --

MR. YOUNG: Using only the on-site staff.

MR. DRIEHAUS: If for example you are going to have to start, say spraying your spent fuel pool at eight hours, you are going to have to start staging that equipment and aligning it and setting it up. So, we are working on the assumption that we are not counting on putting everything off that is beyond six hours until six hours and say the cavalry is going to come in and we will immediately have enough people to do whatever we want to. We are specifically trying to look at it from the standpoint of have we done everything that we need to do within that six hours to be successful, recognizing that we may get some additional people starting at six hours but certainly not assuming that we have a full complement of whatever we need at six hours.

MEMBER STETKAR: I'm glad to hear that but, again, as I mentioned earlier, all we have is the guidance and I can read words in the guidance, not in 12-01 or 12-06 but in other guidance, that seems to give me the indication that I can take full credit for anybody that I need, beginning at six hours from

offsite.

MR. DRIEHAUS: I can only speak to how we are approaching it. That's us.

MEMBER STETKAR: Okay, so that is part of my compartmentalization issues that a lot of other guidance that I have read points back to 12-01 and says according to 12-01, at six hours, we will have offsite support and we can take credit for that offsite support for the following functions, whether that is lining up an alternate source of AC power or whether it is getting portable pumps connected or whatever. The other guidance says that. According to the guidance in NEI 12-01, we can take credit for offsite support at six hours.

MR. DRIEHAUS: Just to be clear, what it says is ERO arrival -- arrival of ERO staff, emergency response organization staff. That is what 12-01 is talking about.

MEMBER STETKAR: That is what 12-01 is talking about. I'm talking about the other guidance that points back to 12-01 and the assumptions in that guidance about who and how many of these are available at the site at that six hours.

MR. LEE: 13-06, you are saying.

MEMBER STETKAR: Not 13-06 either but

13-06 addresses it peripherally. I don't have the one in front of me and I have to run here.

MR. LEE: One of the work activities in 12-01 was to look and see who is it. So, if you have limited access of six hours, who do you want to be there first. So, we assume you don't even have helicopter access until six hours.

MEMBER STETKAR: Look at 13-02 and, unfortunately, I am going to have to run because that is, in particular, the severe accident venting for BWRs and what assumptions are built in, in terms of what capabilities and functions you have available in the post-six-hour time period. And that points back to NEI 12-01 as justification for having those capabilities available. That was one area that I located and I know a couple of other places point back to 12-01 for the six hours. But that was the place where I had the biggest question about it.

MR. YOUNG: Well, at least the intent in 12-01 was that the emergency response organization members would be available at six hours.

MEMBER STETKAR: All of them would start to arrive.

MR. YOUNG: A significant number enough that you could support the implementation of the

strategies. All means everything but a significant number would arrive at the support implementation of FLEX strategies.

And in fact, there was information that had to be submitted in the 90-day response that licensees sent in that had done coordination activities with states, and locals, and whatever else to provide assurance or high assurance, reasonable assurance that you would get those folks there within six hours.

CHAIRMAN SCHULTZ: Well, is the facility fully operational? Has it been declared operational? What is the status of the facility in the interactions with the community?

MEMBER STETKAR: I'm going to have to leave.

MR. YOUNG: Well, that is a long-ranging question.

If you have an emergency operations facility offsite, then depending on how far it is away, you have that facility could be activated very shortly after the event occurred. So on-site the facilities themselves wouldn't be activated for quite some time but I think most sites have made arrangement to use alternate facilities at some distance away from their site as a staging area and a mustering area and those

folks could be up and running fairly quickly to provide some kind of technical assistance to the plant.

But again, back to John's point again, the 12-01 part, at least as Paul was speaking to, was at arrival of emergency response organization members to the site at six hours, based on the arrangements that folks negotiated or talked about with their state and local support agencies.

CONSULTANT SHACK: Well, what seems to be vague, though is the people start to arrive at six hours and everybody is there at 24 hours but it is kind of vague as to how many people are arriving say between six and eight hours.

MR. YOUNG: Yes, we had to write it a little bit like that because it does vary a little bit from site to site. It depends on what kind of arrangements you made with your state and local agencies. So, you have to write it a little bit --

CONSULTANT SHACK: Yes, but it sounds like additional staffing may be considered available beyond six hours consistent with 12-01. Well, how many additional staff and what additional staff when you are doing the thing is, I guess, where John was getting to.

MEMBER BLEY: Of course if they had this all spelled out in detail with say well, it really

depends on the specific events and the conditions there and why are you being so precise. I think it is an area that is kind of tough to predict.

MR. LEE: I can tell you, for instance, our analysis that we did assumed that at six hours, we had helicopter capability. Our utility has access to approximately seven helicopters at that time period and we looked at okay, so each one can carry five people comfortably and the pilot. So, who is it that you want to be on the first helicopters. Is it TSC staff? Is it maintenance? Is it electricians to restore electrical power? And it becomes dependent on the --

CONSULTANT SHACK: So all that comes up, actually, in your own integrated plan. The guidance is general and broad and that will then vary from site to site.

MR. LEE: Yes, and at 24 hours we assumed that we have been able to work with our local offsite organizations in the state, organizations to clear road. So, we now have the ability for people to actually drive to the site. And it is no longer a limited access from the aspect of helicopter flights and things like that.

MR. AMWAY: And that is how we handle the first two as well. We don't count on full ERO staffing

until 24 hours and their integrated plan or the development of their plans will develop time lines and the PSAs that we plan to do to make sure that we can install generators and pumps starting with the staff which we have, which is minimum staffing between start of the event and six hours. All that would have to be done within that time frame.

And we have been typically been looking at a similar scenario as TVA as far as having the helicopters coming. And typically assuming that the priority for getting people to the site is going to be the operator's RPs, maintenance technicians, electricians, in order to support whatever you might have to do in Phase II beyond the six-hour period but it is going to be phased, based on the logistics of trying to get those helicopters in the site. And we are trying to take that into account as we go through the staffing assessments and making sure that we are getting stuff done in that first six hours and any prep actions we need to start in those six hours so that when you can start getting people in, you know that even with a helicopter had time because you certainly can't land multiple helicopters at most of our sites, especially under these conditions. You would be getting enough people in to help you with for spelling some of your

operators who are probably --

MEMBER BLEY: Is everybody planning for the availability of helicopters, just in case we can't get in with vehicles? I know two of you have said that but I didn't know if that was general.

MR. DRIEHAUS: I can speak to Exelon that that is part of what we are looking at.

MR. YOUNG: I think people look at a range of helicopters, off-road military vehicles, if they have got a National Guard unit nearby. There is all kinds of things folks have looked at.

CHAIRMAN SCHULTZ: Paul, back to your comments related to training and then exercises also. You mentioned earlier the systematic approach to training and one of the pieces that you identified there was that we want to have the right balance between the training associated with plant operation, emergency procedure implementation, as compared to severe accidents and FLEX.

When one gets to the discussion related to the drills and exercise, you also mentioned there that there is at least thinking going on that in an exercise of the year, let's say, you would potentially have the opportunity to add elements associated with FLEX, associated with severe accident management as a part

of the drill or exercise, a what if and then move forward.

I would just like to say that I am glad to hear that and I think it is very important that we work forward to that balanced approach, not focusing whole heartedly year by year on the severe accidents but certainly integrating some aspect of it into the drills and exercises.

Training is one thing. The experience that one can get in working on the drill or exercise and then doing the post-job review is extremely important in addressing the types of things we have already discussed this morning to get people engaged and involved in understanding what a severe accident could look like, could be like, and what the response needs to be. So, I would encourage more focus in that area going forward, while maintaining that balance.

MR. LEE: And I would just like to make sure that the ACRS understands that we have been using SAMGs now since '91.

CHAIRMAN SCHULTZ: That's correct.

MR. LEE: And I can't speak for all utilities but all of the utilities that I have been involved with, we have always run a SAMG drill for each team so that if they were three teams rotating, that

that team has a SAMG drill every three years. If they were four teams, then they had it every four years. Right now, I have a four-team rotation. So, I do a SAMG drill for each site, each year.

CHAIRMAN SCHULTZ: Well, that is what I wanted to be sure, that we weren't leaving that behind because now we have this bigger and better thing associated with FLEX and integration with Severe Accident Management Guidelines, that we were leaving that behind but really building upon it.

MR. LEE: Yes. So, again, the structure of 13-06 talks to the SAMG drills, the FLEX drill, and to the EDMG that we had talked about, which is different. We now have a rulemaking, EP rulemaking for hostile action-based exercises once every eight years. But this is a different EDMG drill. This is the loss of command and control drill, potentially, you don't have to run that every time but it is, obviously, a very bad day if an event occurs where the normal command and control structure is no longer there and you need to utilize the EDMGs that provide the guidance to the individuals who may not be the normal commanders on-site. And in fact, they probably won't be. And they need to do some specific things to make sure your plant is put in a safe condition quickly until the

cavalry arrives in one to two hours to reestablish the normal command and control structure.

So, that is the other facet of the beyond design basis drills, which is extremely important to be able to show the events. Now, that EDMG drill could very easily go and be integrated into the demonstration of other types of drills, such as wouldn't really meld with a FLEX drill where I could use FLEX strategies and it could be easily melded with a SAMG, where I was unable to reestablish controls or shutdown the unit or multiple scenarios that you can drive.

MEMBER RAY: Well, you are using the word drills. I understand drill. Drills aren't the same as training but you need some training for drills. Could you comment on the training, not the drills but the training?

MR. LEE: Well, I will. I think drills are training but they are demonstration, they are an evaluation process for the results of your training. But SAMG training is a required training process already. There is FLEX training. Part of this process ensures that we are setting up the administrative controls to ensure that all the people that need to be trained for but new FLEX strategies in an appropriate balanced manner.

MR. YOUNG: And that process will be SAT-based.

MR. LEE: And it is all SAT-based. And then as I indicated before, one of the important parts of any drill is to critique or any training is an evaluation, whether it is an exam or a performance evaluation, a job performance measure, a DLA, whatever tools that you are using to ensure that performance is adequate, all of that has to be factored into the SAT process to ensure that any issues found in the evaluation process are evaluated as to whether or not additional training is needed, additional performance activities are needed, or whether or not procedural changes are required to ensure that an evaluated gap is closed.

MR. YOUNG: So actually, maybe to both your points, just maybe in close just to stress so both in the training realm and in the drill realm, so in training it is going to be the SAT-based process. It is going to have you into a systematic look at what these folks have to do and come up with the tasks that need to be trained on and so forth and then as well in the drill space.

So, we are not just going to leave SAMG sitting off to one side. In fact, there will be new

requirements in addition to the SAMGs for both FLEX and EDMGs, as well as a strategy equipment, use of the equipment that supports these implementation of strategies across all three guideline sets.

So, it is going to be a pretty robust series of actions to make sure that folks have the knowledge and skills they need to be successful and then go out and demonstrate that they can do it periodically, those drills will be critiqued; action items will get put back into the corrective action program, so you are getting that kind of continuous improvement. I just wanted to stress that as well.

CONSULTANT SHACK: Just out of curiosity, do the drills come at sort of the end of the training range? That is, if you train every four years, do you drill them four years after they have been trained? Do you drill them right after they have been trained and then they are sort of presumably -- there is no syncing.

MR. YOUNG: The guidance allows some flexibility there. It is interesting because Walt has not seen this yet. I have an EOP Working Group meeting this afternoon, where we will be talking about this. We have come up with some scheduling examples that sites could use to try to slot these drills in periodically through some of the already scheduled ERO drills to try

to make sure you are maintaining the skill sets over the eight-year period and yet not make it so onerous that you are detracting focus from let's say higher probability events, tube ruptures, LOCAs, those kinds of things.

So, we will have some scheduling examples that we think will try to strike a balance there when they plan these drills.

MEMBER RAY: Well you know, we have emergency plan drills forever. This is much bigger than that, of course. But, nevertheless, we had training in support of EP drill and that training was not part of licensed operator training. It was training but it was not part of what we did to maintain operator licenses.

Understanding that difference in how it is going to be carried forward is part of what we need to do. Not now, but I am just saying we need to understand it, ultimately, because like I say, many of us have done EP drills for 40 years and you do training for that, too. And there is a lot of people involved in that training, some of them part of the licensee's organization, some of them not. And how that kind of training that you do for EP drills, which are always evaluated very systematically and you identify things

that need more work and so on, how that compares to the training that we are all also familiar with that is involved in operating the plant is one of the things that will be of interest.

Again, I don't want you to try and answer it now because I think it would be --

MR. YOUNG: I was ready to pounce on that.

MEMBER RAY: I'm just saying I think you are in the midst of working that through but it is one thing that needs to be on the table for our understanding when you decided how it is going to be done.

MR. YOUNG: So let me just say, as part of the reactor oversight process, when you do drill and exercise performance indicators in the control room, I mean you have to evaluate their E plan implementation capabilities. That is just required. You have to critique it and put in the corrective action programs. I think a lot of that maybe has changed.

MEMBER RAY: No, what you are talking about, emergency plan that involves lots of people and, as I say, not even licensee employees but public agencies and stuff like that, training is conducted in that realm. So, there is sort of a continuum maybe that we are talking about.

What we are dealing with today is much more than what I am referring to. Much more specific, much more detailed. But nevertheless, it does involve people who are not part of the licensed operator training program, presumably, and that is what needs to be better understood. But again, I am not urging we do that now because I think we are in the midst of coming to decisions about that.

MR. LEE: Well, as far as the implementation process for FLEX, we already have identified that it goes, obviously, well beyond licensed operators. Maintenance, engineering, all have specific training. And even the people that don't necessarily receive that level of training, they needed to know about what their part of the FLEX program Phase III, receipt of equipment from offsite and things like that. So, the level of training is commensurate with the new skills and knowledge. And then the frequency of that training is what has to be evaluated, based on performance that we see coming out of drills to ensure that maybe the frequency of doing that training initially needs to be more than what we are starting with.

MEMBER RAY: Yes, and I think, again, as we have said earlier, not impinging, not having this

impinge upon the training that is so critical to the safe operation of the plant on a day-to-day basis is an important decision, how to make those judgments, how to evaluate them looks to me like still in the picture here. At least as best I can see it. It is not something that automatically falls out of what we have been talking about.

CHAIRMAN SCHULTZ: Thank you, Walt.

MR. LEE: That is all I have. Thank you.

CHAIRMAN SCHULTZ: Let's move forward to the next NEI document.

MR. DRIEHAUS: I'm Paul Driehaus. I'm from Exelon.

CHAIRMAN SCHULTZ: Thank you, Paul.

MR. DRIEHAUS: I am here to address NEI 12-01. Just as a brief overview, 12-01 was developed to assist in preparation of responses to the 50.54(f) letter that was dated March 12, 2012, specifically, the staffing and communications aspects.

So, it provides the recommended criteria to assess the staffing required for beyond design basis events -- external events, that resulted in extended loss of AC power and all on-site units. It also addresses the criteria to identify enhancements that could provide means to maintain communications during

an extended loss of AC power. And 12-01 was endorsed by the NRC staff in a letter dated May 15, 2012.

And some of the actions that have taken place to date, the communications assessments that were required in the licensee's responses for NEI 12-01 were completed. The actions to implement the enhancements identified based on the NEI 12-01 assessments are in progress.

For staffing, the Phase I assessments, which were based on the pre-FLEX capabilities, were completed and submitted in April of 2013, based on the NEI 12-01 requirements and the licensee's 60-day responses for the 50.54(f) letter.

The Phase II staffing assessments have either been completed or in-progress. Those staffing assessments include the FLEX capabilities. The timing is staggered based on the first FLEX implementation outage for the first outage tied to FLEX implementation outage at each site. And it is the first second refueling outage after February 28th of 2013.

MR. YOUNG: So, that is why some sites are complete and some sites are still --

MR. DRIEHAUS: Some sites are still in-progress.

Tied to that is a collateral duty analysis

from NEI 10-05, which was what was endorsed for use during rulemaking, when we had to reestablish the baseline EP staff in the E Plan, the licensee basis.

So, what we are doing is looking into the first six hours of minimum staff only and evaluating whether they can implement all of the required Phase I, Phase II mitigating strategies and also making sure that they can provide command and control for classification, notification, protective action recommendations and STA communications for the NRC, state, and local. Those are all functions that have to be able to be performed concurrently as part of that and 10-05 provides a framework for performing that collateral duty analysis.

Just to amplify a little bit on the post-six-hour question. At six hours, if you completed all of the required actions to power up your chargers, to establish a pump and injection flow path, and you have done debris removal, you are at a point there now you will have some people tied up. You will have someone tied up to refuel diesels. You will have someone tied up for that.

You will have people tied up to monitor the generators and pumps but you will have resources out of the MIN staff, or likely will have resources

available out of the MIN staff, at that point, who are available to continue to perform plant actions. That is what we have seen at Exelon, certainly, in our assessments.

So, I don't want it to appear that at six hours your MIN staff is still tied up performing those actions and no one is available on-site and the only people you have to implement, say the actions in 13-02, would be the people who are brought in via helicopter or military vehicle or whatever limited means you have to transport them. There will likely be, at least in all of the assessments we have done at Exelon, there are resources available from the onsite MIN staff at that point, to continue to perform operating activities.

CONSULTANT SHACK: Do you do this in conjunction with the Appendix E evaluations in 12-06, where you are doing the validation that sort of indicates that you can really do all this stuff in the time required?

MR. DRIEHAUS: So what we have done, since the assessments have to be done four months prior to the outage, we are going back as we do validation. At least for Exelon, we actually put a statement in our submittal that we are going to go and look at the

validation results.

CONSULTANT SHACK: Okay, so there is a connection between them.

MR. DRIEHAUS: If they change the staffing requirements, we are going to provide them our implementation letter.

MR. YOUNG: So if you made the assumption that X task took one hour and then you get the validation data, you will go back and look. And if it is less than one hour, you are good but if it is more, you may have to tweak.

MR. DRIEHAUS: Yes and there is some, for most of the staffing assessments, because in a lot of cases we didn't even have the equipment on-site at the time, you have to make your best assumption. And once you have the validation information to feed in, you can look at what you have got in your assessment. And typically, times will lengthen, sometimes may go up --

CONSULTANT SHACK: It would just seem to be strange that 12-01 didn't make any reference to Appendix E.

MR. YOUNG: Well, when 12-01 was written, 12-06 didn't exist.

CONSULTANT SHACK: That's true.

MR. YOUNG: So, we were the first one out

of the starting gate.

MR. DRIEHAUS: But we are tying the validation results to revisiting those assumptions with the first FLEX implementation at a site.

CHAIRMAN SCHULTZ: And we would encourage you to follow that feedback loop to assure that what you have done is where you think it ought to be and where it should be going forward.

I did want to -- the way it was presented, Paul, I just wanted to have you emphasize that this is an augmentation. It is not a new program plan but a re-look at staffing requirements because of new capabilities, FLEX capabilities in particular, that is being reexamined and rebuilt but there is a strong baseline based upon our emergency response capabilities that we have had in place.

MR. DRIEHAUS: Yes, I think that is an accurate characterization. You know we are, in some cases, relying on some security force members to augment those responses during that first six hours. That has typically been limited and certainly not at all sites. But that has also been an option for typically a short period of time during those six hours. And those would typically be to perform some -- to assist with some manual labor.

MR. YOUNG: Yes, we are starting with a very robust augmentation --

MR. DRIEHAUS: Absolutely.

MR. YOUNG: -- feasibility to start with just from all the existing requirements and guidance that have been out there for a long time plus the NEI 10-05 staffing analyses that were done for the EP rule compliance. And then this is like an extra layer, looking at some additional tasks.

CHAIRMAN SCHULTZ: We have the new FLEX capabilities.

MR. DRIEHAUS: Correct.

CHAIRMAN SCHULTZ: And that requires a different kind of look and capability and new training associated with it. Are there sets of drills or tabletop exercises that are associated with FLEX implementation that have been incorporated as you are seeing it?

MR. DRIEHAUS: So, when we are doing our staffing assessment, we are doing it in a tabletop and we will start at T-zero and we will walk through, based on the procedures existing at the time. And I haven't been privy to the development of the operator training to date but my understanding is that the operator training is also going to involve physically going out

and performing the tasks. We are going to be doing some operator training on the command and control aspects as well.

As far as integrating that, that is, I think the drills are really the end result of integrating all of those pieces.

CHAIRMAN SCHULTZ: Well, I was remembering back to some discussions we have had about how the process works in terms of determination of equipment needs, communications of those needs, and then follow-up evaluation associated with that process. And I would think that that would lead to a good opportunity for tabletop exercises to assure that people know what their roles and responsibilities are in that overall process and can exercise them rapidly, without thinking, in particular, about what they may or may not know at the time.

Any other discussion on this topic? This is the last opportunity we have with this panel. Hearing no other comments or explanation or questions, we will move to the staff recommendations.

CHAIRMAN SCHULTZ: Welcome.

MR. MURRAY: Thank you. Good morning. I'm Milt Murray and I am an emergency preparedness specialist for the Office of the Nuclear Security

Incident Response. I have been with the Agency since 2008 and prior to that I was in nuclear power, commercial nuclear power for many years.

CHAIRMAN SCHULTZ: Is your mike on? I'm just checking to see if your microphone is on. Is the green light on? Hit the green light. Hit the button on top -- on the bottom. I'm sorry.

MR. MURRAY: Tim Kolb, I will let him introduce himself.

MR. KOLB: Good morning. My name is Tim Kolb I am in the Operator Licensee and Training Branch in the NRR. I have been with the NRC since 2001. And previous to that, I have been a licensed SRO1 shift as a shift manager for a period of time also. So, that is my background.

MR. MURRAY: This morning, we are going to be discussing Draft Reg Guide DG-1319, which is an integrated response capabilities for beyond design basis events. I will be providing the discussion points on a couple of the documents, NEI 12-01 and NEI 13-06. And Tim will lead the discussion on 14-01.

The guidance currently is in a draft from and the plan, the final guidance to be completed and published in conjunction with the proposed rule later this year.

We are looking at endorsing the three NEI documents, the three you just heard about in this DG, NEI 12-01, NEI 13-60 and NEI 14-01 with some clarifications noted in 14-01.

NEI 12-01, as you heard previously, was endorsed by the NRC. It was prepared in response to the March 12, 2012 RFI letter that was sent to industry requesting information on staffing and the communications required for responding to a beyond design basis event.

Currently, 12-01, there is no requirement for reassessment and communications as part of the current rulemaking -- the proposed rulemaking.

The staff's position on 12-01 is we find that is provides and acceptable method to assess accident response staffing in order to meet the requirements of the rule and it also provides an acceptable method to assess communications capabilities related to the rule.

Staffing assessments were performed in the two-phase approach. As you heard Phase I they were completed April 2013, based on the pre-FLEX strategies, basically kind of dealing with the SBO-type events.

The Phase II staffing assessments, we have, I think, maybe a dozen that have been completed

so far and we have got maybe 20 some that are in process right now and the review process.

Communications, all of the communications assessments have been completed and there is no requirement to go back and do that as part of the -- to reassess communications as part of the rule.

That was it on 12-01, if no questions.

CONSULTANT SHACK: Is everybody, in their plans, providing a tie-back to the Appendix E or the 12-06 for the validation?

MR. MURRAY: To my knowledge, the majority of the plans we have reviewed so far to that level, yes. Once it is validated, they go back to look at it. If it has no impact on the plan, then they owe us nothing. If it does impact what they have provided to us, then they will resubmit that.

CONSULTANT SHACK: That is the majority.

MR. MURRAY: Right. Like I said, the ones we were -- we have got about 20 some that are in the pipeline. So, we haven't completed all of them yet but that is something we are looking for is that tie-back.

Moving on to 13-06, which is the enhancements to emergency response capabilities for beyond design basis events and severe accidents, again, the staff's position here is that 13-06 provides an

acceptable method to meet the emergency facilities and equipment requirements. Also, on this side here, acceptable method to meet the assessment requirements for multi-unit dose assessment.

Okay, recommended actions in the document. to support that staff position, implement any of the facility enhancements identified in the communications and staffing assessments, which we said the communications assessments are completed and the staffing assessments are ongoing.

To ensure that sufficient quantities of radiation, protective equipment and supplies are available to support the extended response effort for the augmented ERO to an event of this magnitude; ensure that programmatic controls are in place to ensure facility, equipment, and supplies are maintained in a state of readiness. And as you heard earlier, the contracts were things like just support to move the staff to ERO, to make sure that any supporting contracts are periodically reviewed.

The multi-unit dose assessment, as you heard there, with the exception of I think it was three facilities, everyone was in compliance with that capability as of December 31st of 2014. We have three other sites that are working towards compliance and

they should all be within compliance this year.

Again, 13-06 training drills and exercises, we feel that the document provides an acceptable method for meeting the training requirements and the drill and exercise requirements in 10 CFR 50.155, which is the proposed rule.

The training, going back to the document, training requirements in the document are based on the systems approach to training, as defined in 10 CFR 50.4, which are the five elements there related to that.

Guidance in the document applies to all the individuals that will be implementing any of the tasks associated with this, not only licensed operators but non-licensed operators, your HP staff, maintenance staff, anyone involved.

The industry has a well-established training program, like I said, based on the systematic approach to training or the systems approach to training.

There are several new knowledge and abilities are added to the current KA catalogues that address SAMGs. Those are knowledge of SAMG transition criteria and the knowledge of lines of authority during implementation SAMGs and some of the additional recommended actions in the training section of 13-06.

The programs should assess in trying to implement ways to perform the task under the expected adverse conditions, the more hands-on realistic approach to the training versus you know tabletop is good but trying to get better always learning from it, especially when we have an event we can learn from. And it also includes the position-specific qualifications that we heard about earlier for the Ultimate Decision Maker.

Drills and exercises demonstrates the capability to effectively integrate the use of your accident mitigation management procedures and guideline sets. You heard earlier about that. And that is one of the requirements or recommended actions within the document to make sure that that happens.

And the guidance retains the current exercise aspects, such as the use of the simulator to the extent possible; demonstrates all the guidelines set over the eight-year period; requires integrated use with EOPs and provides for drill and exercise critiques to be performed following these activities.

Additional recommendations in the document, it includes more than just a transitioning to an accident guidelines that you actually must demonstrate selection and use of the appropriate

strategy. Again, all the guideline sets must be demonstrated at least every eight years. And as we heard earlier, it is not part of the emergency preparedness schedule but it can be included into that by any exercise program. It can be part of the EP program scenario or done on its own, if choosing. It kind of gives the licensee flexibility there.

CHAIRMAN SCHULTZ: So with that flexibility, in terms of the NRC's oversight of the activities of each of the licensees, how is that intended to be monitored and evaluated by the NRC staff?

In other words, it is good to provide that flexibility and licensees have indicated they are prepared to take advantage of that and they understand that that flexibility is available to them but it does create an issue -- could create an issue about how that is going to be evaluated and monitored.

MR. MURRAY: It could. That is something we are still working on on our end.

CHAIRMAN SCHULTZ: We hope it is not just a checklist but a deeper evaluation associated with it.

MR. KOLB: Part of working that out is that there is questions coming in like when we observe these SAMG drills or EDMGs that could be a part of the license examiners could help out or it could be a resident that

actually monitors these exercises and drills and ensures that they are following the NEI guidance, as far as how it is played out to ensure that transitions are observed and they actually use the strategies.

So, we are trying to get that put into place as far as the actual inspection guidance on how to monitor that. But we foresee having experienced examiners or regional training for the resident inspectors to monitor those exercises and drills.

MEMBER RAY: Well, I think that gets to what I was talking about because at the end of the day, there is an impact here which people are going to address in different ways and that is understandable. There is flexibility, as you say. Certainly this isn't the same thing as licensed operator training. It extends way out to a lot of people involved.

And typically in emergency planning, of course, it is an observed event by the NRC. This is something new and finding out how it is going to be assessed and, therefore, how it will impact other things that are going on at the plant. It is something that I think we need to monitor, Steve, or do something to follow-up on. Otherwise, I think it is something that is premature to expect details on now but it is not unimportant and so we can just disregard it.

CHAIRMAN SCHULTZ: I agree, Harold.

MR. MURRAY: Okay, we'll take that also. Okay, next up is 14-01.

MR. KOLB: Okay, for NEI 14-01, this section really, in the NEI Guidance Document, talks about the procedure integration as far as the 10 CFR 50.155(b)(4). So, it addresses those requirements in Section 4 and the NRC is endorsing that process.

The main reason is it does have the appropriate transitions from as far as integrated response for procedure integration, they will have to demonstrate it through exercises and drills. They do have programmatic controls, guidance in the documents to monitor that procedure integration. So, we have looked at -- through their access to the portals that the industry has let us look at, we have looked at some of their SAMGs and how they transition from EOPs to SAMGs. We have had a look at that and it looks reasonable.

So, and their guidance, obviously has guidance that says EOPs and guidelines said the transition stuff is clearly identified. So, we think that guidance is appropriate.

As far as fire response procedures, the staff feels that we still don't need to include those

in the integrated response. The overall integrated response, we feel, is the part that 50.155(b), which covers the emergency procedures like the SAMGs, FLEX, and EDMGs and it also, for (b)(4) it talks about the integrated EOPs for those. And it also, for the overall integration, talks about that you have to have the appropriate staffing for (b)(5). And for (b)(6), in talks about having the command and control structure.

So, that overall integrated function is covered by those six sections in 50.155(b).

As far as fire protection being integrated into this response capability, there is many reasons why we feel it doesn't belong in there, mainly, and some of them we mentioned in the SOC, you could at least have a dedicated fire brigade. They are manned around the clock, 24 hours a day. The fire response, typically, once the fire brigade is dispatched and figures where it is at and what equipment is affected, they actually, the brigade leader is the one that directs how to put that fire out. His knowledgeable. He is a knowledgeable person that would let the control room know if it is going to affect certain equipment, safety-related or effect the shutdown capability of the plant.

They are required, the brigade does maintain communications by radio with the control room. So, the control room is up to speed on what they are doing and how they are progressing. They are able to EOP or EAL calls based on what the fire brigade is seeing or if they can't get the fire out in a certain amount of time, that is an activity, an EAL entry.

Other reasons is the EOPs and guidelines, they also address failure of equipment. So fires, if you don't put them out, obviously, some equipment is going to fail. So, the EOPs and other sets account for the failure of that equipment. And it may be you will have to implement another strategy but that is one of the reasons.

The fire drills, really, they are conducted regularly, typically quarterly. There are unannounced drills. There are announced drills. They try to implement realistic conditions sometimes like their training is involved that they have prior training where they have smoke in the area. So, they get trained on aspects they would see during a real fire.

So, that is the reason why we think it would be difficult to implement that type of strategies into an overall integrated process to account for all of

those different conditions and things that could happen during a fire. So, the staff feels it is appropriate not to integrate it into those procedure sets at this time.

MEMBER BLEY: Tim, before you go on, I am not going to rehash the discussion we had this morning except to say, as you heard from the industry, procedure, fire procedure a little different as you go plant to plant. Most plants that have had a big fire and significant event have pulled a guy off the boards to sit on the phones with the fire brigade. So, it affects the control room in more than just the ways you described. You heard what we had to say.

MR. KOLB: And that is true, however, the guy in charge in the control room is aware of that person being I wouldn't say sidelined but cognizant of where the fire brigade is at under those conditions. And you know if the control room supervisor needs to use that guy for something else, he could, obviously, do that, as long as they maintain control but he can make that decision.

MEMBER BLEY: Well, despite what is obvious, I would make the same recommendation to you I did to the other fellows. Look at all the fire events and all the analyses of those and all of the inspection

reports on them. There is at least four or five that you will find very interesting.

CHAIRMAN SCHULTZ: And also, Tim, understand that if there is the latitude for sites to develop things a little bit differently here and a little bit differently there, then that raises the attention that the NRC needs to put on to assuring that the decisions that are made on the selective basis site to site are, in fact, the right one.

MR. KOLB: Okay, we will look at the fire events in the past and see what could have been learned. We'll take a look at that.

The next section is for SAMGs. NEI 14-01 Section 3.2.2 and 3.2.3, which are principles of SAMGs and then the considerations for site-specific SAMGs we believe provide an acceptable method to develop, implement, and maintain SAMGs as required by 50.155(b)(3).

And the reasons why we believe that is because the guidance supports the SAMGs will be updated with the most recent version of the Owners' Group Guidelines and the Technical Basis Documents.

Once again, we have had access to the industry's SharePoint site and we have verified that they have incorporated lessons learned from Fukushima.

They have additional Canada high-level actions added because of that. So, we think those were appropriate from what we have seen.

Additional industry guidance, you know symptom-based guidelines they have clear entry conditions and transitions.

One other thing they do cover that they will have clear command and control for who is running these SAMGs, once they get into them. Typically, the SAMGs will transition to the Technical Support Center, when they get manned up. So, that is clearly identified who is going to be responsible for taking those actions.

So, that is some of the reasons why we believe the Guidance Documents are adequate.

The next one, command and control. Section 4 provides an acceptable method in combination with the existing ERO command and control structure guidance to meet the requirements of 10 CFR 50.155(b)(6). However, the guidance in NEI 14-01 is principally limited to the discussion on what the Ultimate Decision Maker does. So, we have provided that feedback.

The reasons why we are endorsing this document it the command and control structure is

already existing through the emergency response organization and this guidance does ensure that the Ultimate Decision Maker position is factored into that organization and they have ensured that they have clear expectations of what it is. When you are the Ultimate Decision Maker, you have to be qualified and trained.

Also the additional things for the Ultimate Decision Maker, there will be support staff helping that person make decisions. And I know you discussed it with the industry quite a bit on how that is going to happen and if they need a license and stuff. That is currently not in there to have an SRO but we believe that the people that are assisting that will be part of the technical support staff or the emergency response organization, they have those licensed positions, somebody there to help them make decisions. However, he is the Ultimate Decision Maker and will have the authority to make those decisions.

Incidentally, that is in alignment with the International Standards. They do that the same way. They specify there needs to be an Ultimate Decision Maker that ultimately makes the final decision. And the guidance, you know really the authorities and responsibilities are clearly defined for that position and for really all the other emergency

response organization positions.

So, once again, we feel that the guidance is acceptable. And that is all I have, if you have questions.

CONSULTANT SHACK: Steve, Dick Skillman has been listening in. I think he would like to make a comment, if it is open or we can open it up.

CHAIRMAN SCHULTZ: Do you know if he is on the public line, Kathy?

MS. WEAVER: I'll have to look.

CHAIRMAN SCHULTZ: Go ahead. Dick, if you are out there, and I presume you are, we are going to open up the public line in a moment. So, be prepared to make your comment or ask your question.

The line is open, Dick. Are you available?

MEMBER SKILLMAN: Colleagues, staff, NEI, good morning.

CHAIRMAN SCHULTZ: Dick Skillman, member of the ACRS. Go ahead, Dick, please.

MEMBER SKILLMAN: I have been with you every minute of the way. I tuned in at 0820, listened to the pre-conversation and have been with you every minute.

Thank you for this very thorough

presentation. I have got several comments I would like to make, if I may, please.

CHAIRMAN SCHULTZ: Proceed.

MEMBER SKILLMAN: Thank you. At 0927, Phil Amway communicated that there is a clear exit from the EOPs to the SAMGs. I believe it is on Phil's slide 8. I wanted to challenge the word exit. I wonder if Phil meant suspend versus exit. Having been the Ultimate Decision Maker, ED and ESD, I will tell you that the movement from the EOP into the SAMG is not a clearly defined transition and a Decision Maker may want to hang on that line, just in case the conditions allow reversal back into the EOP.

So my question is to Phil Amway. And that is, do you mean exit, as in your slide, or do you mean suspension until your next decision point?

CHAIRMAN SCHULTZ: Phil's at the microphone, Dick. Hold on one moment for a response.

MEMBER SKILLMAN: Okay, thank you.

MR. AMWAY: Good morning. This is Phil Amway and in response to the question being asked by Dick Skillman, I did mean exit the EOPs. And the only return path, at that particular point in time, would be after event recovery, not necessarily just the next decision maker.

We would proceed on with strategies, as defined in the SAMGs, with the intent not to go back and forth between EOPs and SAMGs, once that decision is made.

MEMBER SKILLMAN: Phil, thank you. I understand your answer. I will presume, then, that what you have expressed will be a matter of what Harold Ray said, an issue of training and drilling, so that there is no ambiguity in how that transition occurs.

MR. AMWAY: And this is Phil Amway, again, responding. Yes, that would be made clear in the training and drills and exercises, the transition between EOPs and SAMGs.

MEMBER SKILLMAN: Okay, thank you, Phil.

The second question I have is for Walt. At 1038 on slide 15, you don't need to go back to this, this is where Walt was talking kind of in a flow of consciousness about transition of command and control. And I would like to make a statement. And that is, unless that transition in command and control is rehearsed, and well-understood, and bought into -- rehearsed, well-understood and bought into, then the scenario that Dennis Bley pointed to is very possible. I don't say likely but it is possible. And that is where a senior individual, whether it is an officer of

the company or it is a very highly respected individual can have disproportionate impact on the decision makers in the heat of the moment. And that transition of who is on watch and who has got the CON needs to be very well endorsed; in other words, when you transition from EOP to SAMG, who really is the Ultimate Decision Maker, so at the point of the decision, the assembled group doesn't go in to quibble.

I agree with what Phil said, this would be a collegial decision. But I had two instances, one during the TMI2 event and one during the Pierce Nye event that brought you to New Jersey barriers in which the region actually attempted to exert command and control.

Now on top of an event that is emerging to have other decision makers, who are, quite candidly, very highly placed, creates a dynamic that the decision makers simply don't need. So, my point is there needs to be very clear understanding of who has relieved whom.

And I just offer those of you who have had licenses or for those who have been on naval ships or merchant ships, you understand very clearly when the words I relieve you and I stand relieved are spoken.

My final comment was at 1121. Paul was talking. Paul is from Exelon and he mentioned that in

some of the scenarios, they actually will take security personnel and use them as laborers. And I just want to ask a question. Who has got the gun? Who is on the watch for security? Does that transition somehow cause the security function, which at that time might be the most important time for security to be in place, to deteriorate the defense that security is intended to provide?

And with that, I will stop. I thank you for taking my comments.

CHAIRMAN SCHULTZ: Thank you, Dick. We appreciate your comments.

Other members of the committee, questions for the staff?

With that, we are going to move from the agenda a bit. We are going to close the meeting now and reassemble at 12:45, which was the reassembly time, and pick up on the next topic, which is NEI panel to address that at the outset.

So, with that, I will close the meeting and we will break for lunch.

(Whereupon, the proceedings went off the record for a lunch break.)

CHAIRMAN SCHULTZ: I'll call the meeting back to order and have us come back on the record as

we begin the next topic, which is the industry's document support Reg Guide 1301. That's NEI 12-06. And I'll turn the discussion over to Scott Bauer from NEI to begin the presentation from the industry.

MR. BAUER: Okay. Thank you, Mr. Schultz and thanks to the ACRS members for this opportunity.

So we are going to talk to you today about a few topics and where the status is on issuing Revision 1 to NEI 12-06. And then we'll talk a little bit about the Draft Guide, one comment we have on that at this point in time. But I'd like to start by answering a question that Mr. Shack asked earlier about the staffing analysis and the reevaluation of that when you get to the validation stage or implement what's going to be Appendix E of 12-06 and ask Bryan Ford from Entergy and Mike Powell from Palo Verde to talk about what they've done at that validation step.

MR. FORD: Yes, so when you get to the validation step, what you end up doing is going through and looking -- can you perform the activity, how long does it take? And from that we have not had to really change our staffing study so much as we've needed to go back and improve what our plans were. We've either had to go pre-stage additional hose so that the person could do it in the timelines. We've in at least one

case went and did more tornado missile analysis to make it so that he had more water available. So we realize that we have to stay within our staffing study or change the staffing study, and that's part of what we're validating.

CONSULTANT SHACK: Yes. No, I mean that's a fair approach.

MR. POWELL: And I'm Mike Powell. I'm the Director of Fukushima Initiatives for Palo Verde. In our case when we did the validation, we followed the NEI Guidance, but we took it and did something additional. We built a P6 schedule using the P6 scheduling tool. And allowed us to confirm that the resources that we identified as being needed in the staffing study were the right resources and that we didn't need additional resources. It also helped us to identify margins in our deployment. So we could not actually assess that we had some extra hours of margin in our strategies and our deployment than the staffing study credited us for.

CONSULTANT SHACK: Yes. No, I guess there will be some questions about margins when we get to Appendix E.

MR. BAUER: Okay. So NEI 12-06, Rev. 0 was issued in August of 2013, and obviously the plants

have been using that for two years during the implementation phase, or almost two years. In the course of that time a number of issues have come up with implementation, so we've written like 30-plus frequently asked question answers. We've resolved more than a dozen what we call generic topics. I'd call them generic issues, but the NRC already has a Generic Issues Program, so generic topics that were identified. And I'll talk a little bit about those issues. And now with the development of the rulemaking, we've essentially incorporated those frequently asked questions and the generic topics into 12-06, Rev. 1, in addition to some other changes that we made to basically conform it to the rulemaking.

One of the big issues facing us right now is what to implement or how to update this document to deal with the reevaluated flood and seismic hazards. So we have developed an Appendix G, or Appendix Golf to the document that deals with the reevaluated flood hazard that was submitted to the NRC a couple weeks ago and is undergoing review. There's going to be a series of public meetings in the next couple months to look at that and then to come to agreement on the correct content for this, how to deal with the reevaluated flood hazard. The reevaluated seismic hazard is not

anywhere near that level of completion. We're in formative discussions just about how to even approach the reevaluated seismic hazard. So that would eventually be Appendix Hotel or H for the document. And I'll talk about that some more.

So some of what I had just mentioned is on this slide. The main objectives of the Revision 1 were to conform it to the proposed rule, eliminate all the references to the orders. And then one of the things we found as we went through this two years of implementation and as the plant's implemented we noticed there were a number of issues that were being identified by the NRC in their audits as alternatives. Typically that occurred where people were putting FLEX equipment in place, pre-staging it or installing it in the plant. So we made some changes to the document to basically allow for that.

And then I mentioned the generic topics. Some of those were we have new guidance in there on the shutdown modes, a new section that deals with how to deploy FLEX or implement FLEX requirements for the shutdown modes, battery calculations, now to do extended battery calculations. One of the things that was identified early on was in order to understand the sequence of events for a FLEX event or an extended loss

of AC power or loss of normal access to the ultimate heat sink the plants need to run some sort of a code to understand how the plant responded. So typically they were running their thermal hydraulic codes, CENTS for CE plants, NOTRUMP for Westinghouse. So we got into an issue of, well, are those right applications? Can they be useful as applications?

So we ended up going through some interchange with the staff on how to properly endorse the use of those codes for those cases. So we ended up writing typically an owner's group white paper, and then the staff endorsed that through some document. So all of those documents are now listed in a new table that's in the Section 3.2.1.13 of the document.

Maintenance. One of the questions we'll talk about I'm sure in this session is the maintenance rule application. We have pretty much stayed the course on maintenance rule with regard to maintenance rule is not applicable to B5B equipment or EDMG equipment, or SAMGs. So there was a public meeting April 19th, I think, to basically agree to a path forward to accept the FLEX equipment from the maintenance rule.

But what we had done was we developed a maintenance guide under EPRI's cognizance, and that was

reviewed by the staff and approved. And so that's listed in this topical list of things that have been -- the generic topics that have been dealt with. And then we're using maintenance templates prepared by EPRI for all of the different equipment to make sure we have a consistent process for doing maintenance and demonstrate the reliability and availability of the equipment.

And then there's a number of entries in this table for reactor coolant pump seal leakage issues, some Westinghouse original seal issues, shield seals, Flowserve seals. So there's a number of resolutions that have been developed about how to deal with seal leakage during the sequence of the ELAP event. And so we put those resolutions into this table. It's really just kind of a reference table. So it just lists the PWROG topical, for example, and then the ML number of the document that endorsed that. And we do foresee adding an entry to that table to deal with the maintenance rule.

So we submitted a proposed revision, NUMARC 93-01 for NRC endorsement. And that's being evaluated. They're going to revise a Reg Guide, so it's probably going to take two years for that to happen. But in the near term something is going to be

posted into ADAMS agreeing essentially that FLEX equipment is accepted from a maintenance rule and we'll endorse that, or we'll list that endorsement in --

CONSULTANT SHACK: On that table where you see openings with no entry for like an ML number, that means it's still an open issue?

MR. BAUER: Yes, sir.

CONSULTANT SHACK: Okay. And that's up to the Rev. 1C version that we have. That's the most recent?

MR. BAUER: No, it was actually Delta. And how there's a version that we're working on that -- what I call the final. Appendix G, Appendix H, the reactor coolant pump seals and NOTRUMP code are the things that we're lacking to basically say 12-06 Rev. 1 is done.

CONSULTANT SHACK: That's sort of the big gaps that I see in there.

MR. BAUER: Yes. So since that revision there's been a number of people who wrote topicals on the reactor coolant pump seal issues. There's a PWROG topical on the NOTRUMP issue and we're just waiting for NRC endorsement of those documents.

CHAIRMAN SCHULTZ: Given what you've just

said, Scott, you're still comfortable that you can state that changes have in fact been presented in public meetings? That is, you just described a number of things that are --

MR. BAUER: Right. So we've had three public meetings.

CHAIRMAN SCHULTZ: -- happening on the fly.

MR. BAUER: Yes, we've had three public meetings where we've gone sequentially through all of these changes.

CHAIRMAN SCHULTZ: Right, the last one being the middle of April.

MR. BAUER: And I've been keeping track in a table of everything that we've addressed in the public meeting and what the delta is. And we're talking now about having another public meeting probably mid/late-May to basically come to a final -- basically say here's what we have.

CHAIRMAN SCHULTZ: That's really what I wanted to hear. That sounds fine.

MR. BAUER: Yes.

CHAIRMAN SCHULTZ: Thank you.

MR. BAUER: Yes. And that public meeting would also deal with probably the first round of

questions on Appendix G for reevaluating flood hazards. So we're probably going to put all that into one public meeting.

The other changes we made is we've added the validation guidance that we had developed for the industry to use, and we've added that as Appendix Echo to the document. And then; and I'll talk about this more in a few seconds here, about Appendix Foxtrot was the guidance for how to apply the document to an AP-1000 plant.

What we originally did there was -- I'm really giving the whole presentation here on one side. What we originally did there was we went to Appendix Foxtrot and said, well, how do we make this generic for any new design? So we originally went in and genericized it. We basically pulled all the AP-1000-specific stuff out, tried to make it a generic appendix for new designs. And then in one of the public meetings we were asked to revert it back to the AP-1000-specific. And that's why Appendix Alpha of the DG has been developed. The NRO staff wanted to develop their own guidance. So that just hit the street. It's -- and we were --

CONSULTANT SHACK: But somewhere it says you're going to incorporate that when it's eventually

done.

MR. BAUER: That would be the goal. So --

(Simultaneous speaking)

CONSULTANT SHACK: -- whether that will --

MR. BAUER: Yes. I'll talk more when I get to the slide I'm at. I've probably given the whole presentation here in --

CHAIRMAN SCHULTZ: Let's hold on that, but we're very interested.

MR. BAUER: Yes.

CHAIRMAN SCHULTZ: Go ahead.

MR. BAUER: I understand. So here's the remaining issues to deal with. The generic questions on reactor coolant pump seals and NOTRUMP code, maintenance rule resolution, and Appendix G and H. So that's really what we have left to do to basically declare 12-06 Rev. 1 done.

Let me say one other thing on that, though. So 12-06 has -- if there's 100 changes in there, 5 of them deal with a rule change and 95 of them deal with the stuff we put into it to address things we've identified in the last 2 years of experience with the document. So one of the things we're talking about with the staff is trying to proceed with an earlier revision getting issued with those 95 changes and then

separate out the 5 that need to go along with the rulemaking package, mainly to give the plants that are implementing this year and the ones that implement in '16 the benefit of having all that guidance that is currently FAQs and white papers and stuff, have it all assembled in one location for them to benefit from that. So I think if we end up moving forward in a shorter time frame to put Appendix G into the document, that would be the time that we would try to incorporate all these other changes without the rulemaking ones.

So Appendix G, I'll just give you a brief -- I think we've talked to you before about this, but it gives four paths for mitigation of a reevaluated flood hazard. Go to the next slide and we can look at it, because you've seen this picture. So one is use FLEX as is. One is to modify FLEX for any new conditions that exist. The third is to use an alternate mitigating strategy. In this case we basically start with -- instead of staring with an extended loss of AC power and loss of normal access to the ultimate heat sink, you start with the reevaluated flood hazard and you say what conditions does it create at my plant, and then start with that set of consequences to develop the mitigating strategy. And then the fourth is the targeted hazard mitigating

strategy for cases where the flood is significant and you may need to do something out of the normal or open containment hatches and let the flood go in, that type of thing. And the Appendix G was submitted to the NRC on April 27th for their review.

Okay. Draft Reg Guide. Like I said, we have one issue with the Draft Reg Guide. Eric and I have talked about this. I'm pretty sure we're on the same page on this issue. But in the 12-06 original document we did -- so an extended loss of AC power is defined as loss of all your AC sources with the exception that you still have the AC power that comes from buses that are fed by station batteries through inverters. So we call that vital AC instrument power. So that power is still available at the beginning of the event. The way the Reg Guide, or the Draft Guide got written, it would appear that that is not the case, and that would be a significant change to the rule, the rules that everybody built FLEX off of.

So there are provisions, however -- and I think this is where the difference lies, there are provisions in 12-06 for dealing with some issues associated with loss of vital AC instrument power. For example, we do have the remote capability to manually and remotely start the turbine-driven aux feedwater

pump, RCIC pumps, or isolation condensers. And also, we have a provision in there for being able to read instruments locally near a containment penetration. So there are provisions in there if you were to lose instrument power, but we do not assume a loss of that instrument power at time zero in the event. And we did not analyze the event with that as an assumption. So we just need to make sure the Draft Guide doesn't imply that that is a starting condition.

CONSULTANT SHACK: The Draft Guide talks about contingencies, which is not a word that you find anywhere in 12-06. Maybe it's a question for the staff, what they mean by "contingent." I mean, you talk about your baseline capability. Then in the table you indicate that you can in fact start these things manually, which gives you a different capability, really. And yet you never take any credit for that. And I assume that you're not going to do any validation that you can actually do the black start. Is that what you're trying to avoid?

MR. BAUER: No. No, I think -- and I'll let the plant guys in the room talk about this a little bit more because they'll know better than I do, but most of us are required to have that black start capability for those pumps or condensers of whatever already. So

we already validate that we can do that.

MR. FORD: Okay. Well, everybody went as part of B5B -- from a boiler that one of the things we did was make sure that RCIC could be run without DC power. And I know that they have something similar for their turbine-driven system.

MR. POWELL: Yes, we've actually demonstrated the manual operation of the turbine-drive aux feed pump without DC power. And we've taken a video of it; use it in a training exercise. Manual operation of the atmospheric dump valves in the turbine-drive aux feed pump is a job performance measure that's repeated at a certain frequency for the auxiliary operators, at least at Palo Verde.

MR. BAUER: So we're really taking credit for something that we already have in place on that. Being able to read the instruments at or near a containment penetration is some new capability that the plants have had to develop as part of this implementation of FLEX. And that was evaluated as part of the audits the NRC did, as well as the ERRVs that INPO did. They looked at that issue.

MR. FORD: But we haven't necessarily built our staffing plans for that we have to go reconfigure these instruments --

MR. BAUER: Right.

MR. FORD: -- to use them versus the instrument we're crediting.

CONSULTANT SHACK: So there's what we call the stylized scenario that we built the FLEX strategies to deal with, or mitigating strategies to deal with. And then there were other things we stuck in the tool box to basically say, hey, if this happens, you have this capability. If this happens, you have this capability. So we did add some other things.

CONSULTANT SHACK: Is there any reason to believe that the inverters are any more robust than the other equipment you assume is going to be lost if one of these scenarios? I mean, is there a particular reason why you picked a scenario where you would lose all of the AC except the inverters?

MR. FORD: Well, and I guess because the inverters are coming off the batteries themselves. That's the real issue.

CONSULTANT SHACK: But the equipment itself --

MR. FORD: Shake it around.

CONSULTANT SHACK: -- shake it -- yes, for beyond the design basis event that you assume you're losing lots of other stuff. Why not the inverters?

MR. BAUER: Yes, there's a lot of --

CONSULTANT SHACK: Okay. There's no rationale.

MR. BAUER: Well, there's a lot of things in the document. We assumed all the -- the switch gear is still available even though you lost AC sources. So again, the initial conditions or boundary conditions are established, were established because -- somewhat around this is what we could mitigate without significant -- in the time frame we've got to deal with to give us the capability of how a loss of power and a loss of flow -- and we can provide strategies to provide flow and provide power. I mean, if a large wall of water went through our plants, we couldn't deal with it probably any better than Fukushima deal with it.

So there were limits of what we could do under the FLEX strategies, and we realized going forward we would -- we evaluated -- I know that we evaluated flood and seismic hazard. And now under the plants that we did the ESEP -- expedited seismic evaluation? Enhanced seismic evaluation? But to basically look at double the SSE capability for the components used in the FLEX strategies. So we have done that one piece for the seismic piece for the plants

that screened into that.

But, yes, the starting conditions were what they were. That's what we all agreed to at the beginning.

MR. FORD: So that answers part of your question, is that we have went and looked for the plants that weren't able to screen out for the seismic hazard. We have went and looked at two times the SSE for robustness of the plant equipment that we're crediting to support our FLEX strategy, a subset of equipment. There was a cap put on it when we started the ESEP because we're trying to do too many things in parallel to necessarily make everything fit together well. So the ESEPs were started well before the GMRSs came out, so they were capped at the time. So our interim thing was done at --

(Simultaneous speaking)

MR. BAUER: Okay. Any other questions on that subject?

MEMBER STETKAR: Yes, kind of. And I don't know quite when to ask it because it's part of this how all the pieces fit together question. I understand, I think I understand the assumptions that you've built into 12-06 and the strategies under 12-06. If I then put my boiling water, BWR Mark I and II hat

on and look over to NEI 13-02 for things like severe accident water addition. I see guidance that says, well, you can hook up your water addition source to an existing plant system through valves that might be AC motor-operated and normally closed, and that's okay because you can assume that you have a minimum of six hours available to get power back to those valves and still have enough time to inject into the vessel at a de-pressurized condition and save the containment.

My question to them, them being part of you, is that -- well, you know -- and they assume you don't have any turbine-driven RCIC pump at time t0, which is physically possible. It might not work or it might be out of service for maintenance when the event occurs. So if these are flexible strategies, you should be flexible for that.

My question is what is the philosophy here? Is the philosophy that I give up on the core because I don't have to have power available for those two normally closed valves into the RHR system until six hours? And then for six hours I've melted the core.

MR. FORD: I think we'll let Randy --

MEMBER STETKAR: We're going to phone a friend here.

MR. FORD: Yes.

(Laughter)

MEMBER STETKAR: I mean, I wanted to ask it here because this is the front end of the process. And I asked it in previous meeting we had kind of looking back from the back end of the process.

MR. FORD: So let me answer the front end. And I think that he can answer the second piece to it better. The 12-06 or FLEX or mitigating set of strategies supports containment, but only assuming there is no core damage. So it has been designed with its set of boundary conditions that it works within, and that does not include getting to core damage.

Now, for those situations where you're outside of those bounds, I think that that's being looked at as part of the water management strategies that we're working on. Is that right?

MR. BUNT: This is Randy Bunt with Southern Nuclear in the BWR Owner's Group.

What we've done is we stylized a scenario, because that's what was given to us in the order. That stylized scenario -- and I know this isn't exactly the way you want me to answer the question, but I'm trying to work through the pieces here. It's stylized. And we said if you weren't able to get it any sooner than this time period, would you still be able to protect

containment, because that's where we saw the order criteria driving us.

Now, we agree that you need to do that as quickly as possible. And likely you know you have an injected water from time equals zero and you know your long-term action is going to get connections between those components to get the water in. You would prioritize either getting the power back or going and opening those valves before you lost accessibility to containment. And that direction has been added to 13-02 to say do not put inherent delays in and you should facilitate getting your water addition installed as quickly as possible.

MEMBER STETKAR: I think what I'm; quite honestly I mentioned this in the previous meeting, concerned about is that people are making decisions based on all of these pieces of guidance. So for example, if I have a plant that's located on a fairly -- I don't know if there are any of these examples, but this is a Gedanken experiment. If I have a plant that's located on a fairly broad flood plain and I decide to locate my portable emergency generating equipment six miles away up on a hill in a facility that I happen to have that's robust enough against seismic events because I know that I won't need it for at least six

hours according to the venting strategy to save the containment, that then imposes a functional physical limit on my ability to actually get that equipment to the point where it can power those valves and open then to get water into the reactor vessel.

And if I'm an operator faced with those conditions, I might be frustrated by that because people have made decisions about where to locate the equipment according to guidance for mitigating flooding responses and they look at these different timing criteria that come out of these different guidances. Yes, I might want to get that equipment there really fast, but if somebody has put it far enough away under conditions where I have to go through about 12 feet of water to get it from point A to point B, I'm going to have a problem.

MR. FORD: And you're pointing out one of the things that we've struggled with when we've been siting our buildings today for FLEX.

MEMBER STETKAR: Yes. No, that's --

MR. FORD: Because you have this range of hazards --

MEMBER STETKAR: Yes.

MR. FORD: -- and each one of those hazards could push you to put your buildings in a different

location. Because you put it right up next to the plant, well, now the event that affected your diesels or whatever has a bigger chance of affecting it also.

MEMBER STETKAR: And your decisions are based on considerations like that, which are nice physical functional -- in the context of whatever -- the guidance, the technical guidance. And in this particular instance I read the save the containment guidance as saying I don't need to worry about hooking up that power supply for at least six -- I've got as much as six hours available. It would be good if I could get it at zero, but I can figure out where I'm going to locate that equipment as long as I can demonstrate that I can get it there within six hours. And I can still save the containment.

MR. BAUER: The Mark I and Mark II plants still have to comply with the EA-12-049 Order, so they have to have the capability to use the vent to prevent core damage. So I'm assuming they're going to have --

MEMBER STETKAR: But prevent core damage presuming that RCIC is running. Presuming that RCIC is running.

MR. BAUER: That is true.

MEMBER STETKAR: Okay.

MR. FORD: And so when we go to implement Phase 2 of the Vent Order and we have the additional requirements for water strategies that we have to meet, that will then add another set of timing and equipment restrictions on me. And I don't know that I'll be able to use my FLEX equipment to perform those functions or not. It all depends upon my current setup.

MEMBER STETKAR: Let's talk about --

MR. FORD: So I have to look at the times.

MEMBER STETKAR: Let's talk about something specific. You need a 500-gallon-a-minute low-pressure pump to put water in to save the containment. Initially 500 gallons. You can throttle it back to 100 gallons or whatever. The analyses that have been done for the representative plant says I can save the containment even though I have no injection starting at t0. No water going in at t0. I can still save the containment as long as I vent the wetwell, hook up water injection so that I've got water going in to either the drywell or the reactor vessel; and it's preferred to go into the reactor vessel for a lot of reasons, but that my water addition flow path can be through let's call it two normally closed series motor-operated valves into the residual heat removal system, which is a nice way of getting water in. And

it's okay to do that even though they're normally closed AC motor-operated valves because I don't need to get power to those valves for at least six hours.

Now, that's all for saving the containment.

MEMBER CORRADINI: Can I ask a question?

MEMBER STETKAR: Under --

MEMBER CORRADINI: May I just clarify one thing?

MEMBER STETKAR: Yes.

MEMBER CORRADINI: I thought Randy's comment to you when you said this the first time was is that from what we heard two or three weeks ago to now there's been a change, I thought, in 13-02. I get all these numbers mixed up in my head. That it's not six hours necessarily. More it's soon as practical. I thought that's what you said.

MR. BUNT: That's correct. That is in 13-01, Rev. 1. 13-02, Rev. 1.

MEMBER CORRADINI: So that's the only thing I want to correct you, John, is I think Randy indicated they tried to be responsive to our worry.

MR. BUNT: In Section 1, on page 5 or 6 or so there's criteria that says -- there's a new paragraph that talks about the series starts at t=0 and you should be able to not create design elements or other features

that create an undue burden and you should be able to do it as quickly as practical. But the analysis gives you a basis on where you can't get past and still protect it. So it's our stake in the ground where you don't want to go further than and we want you to take into consideration when you're doing your design and all that you consider when you're putting it in the right location and you're balancing all the different consequences that you pick consequences that give you the best solution path.

MEMBER STETKAR: Your Rev. 1 is dated April 15, like the one that I read?

MR. BUNT: Yes.

MEMBER STETKAR: Okay.

MR. BUNT: Should be a --

MEMBER STETKAR: I read all of that. That's all general good guidance, but if I'm thinking about what I need to do is I need to make sure that I can get the power within six hours. It doesn't say that I need to get the power to save the core.

MR. BAUER: Right, so I think we need to be careful here that we're talking two separate issues here.

MEMBER STETKAR: But, see, that's my whole point is that if this is diverse and flexible guidance

to the operators under extreme conditions, in my opinion, my personal opinion, it ought not be parsed up this way, that we have this guidance for FLEX under 12-06 that has this set of assumptions built into it. And then we have this set of guidance under 13-02 --

MEMBER CORRADINI: Rev. 1.

MEMBER STETKAR: -- Rev. 1 for saving the containment that has this other set of assumptions built into it, because the world might not work under either sets of those assumptions, that there is some likelihood, non-trivial measurable likelihood that RCIC will not work at time t0. It's not guaranteed that it won't work, but it's not guaranteed that it will work.

MR. FORD: And I think that you're getting that because the NRC and the industry has tried to do things as expeditiously as possible. And as a result, you're getting -- piece A is done while piece B is being done three years now.

MEMBER STETKAR: Bryan, and I'm glad you said that. I mean, that's what I'm getting to. And unfortunately from my perspective as an ACRS member, we've also received a lot of these indications kind of piecemeal. And quite honestly, until I sat down and read the six or seven current revisions of the NEI

reports and started thinking about how they worked together with one another, I hadn't necessarily drawn those connections. So it's not clear to me who's tying the stuff together.

I get with the fact certainly I would like to get it as soon as possible, but if somebody has made some actual physical decisions that means that the quickest I can do it is within four hours, which is well under the six-hour time window, but maybe not so good for the core, because the guidance has been developed under different sets of assumptions, that says, well, maybe now we've gotten to the point where the guidance is being actually really developed, both from the industry's perspective and from the staff's perspective. It's a time to start thinking about how all those pieces really fit together, not just saying, well, we developed this and we developed this and --

(Simultaneous speaking)

MEMBER BLEY: I don't think anybody disagrees with the way you've gone to this point. I don't know how else you'd do it.

MEMBER STETKAR: Right.

MEMBER BLEY: But it seems like we're at a point where --

MEMBER STETKAR: To tie these together.

That's right.

MEMBER BLEY: -- integration ought to mean something.

MR. BUNT: And when we were writing 13-02, we did work on a lot of that integration, because if you look at 13-02, it leverages and builds on 12-06 and utilizes some of those functionalities. But it says you have to go the next step in saying that you can make sure that you can do that function with a gap release and events that can happen because of core damage. So there was some intelligence that went in to integrate them so that your operators wouldn't be training on two different types of diesels. They wouldn't be training on two different types of configurations. There was a lot of work to determine if there could be some synergy between the two so that from a training and everything else sensitivity -- and we understand the other issue, but it is a balancing act between where you put it to address which hazard and not put so much equipment that they have no capability to utilize the equipment either.

MEMBER STETKAR: It is. And I'll tell you that until I read 13-02, which has the -- and the revised has a little softening up front, but it says, well, specifically you don't need to get power to -- it's okay

to have normally closed power-operated valves for which a source of motor power is not available until six hours after the initiating event. Until I read those words, it didn't sort of trigger how all of the stuff fit together. Because when I read 12-06, it all sounded okay in the context of 12-06. You understand what I'm saying?

MR. BAUER: Yes, the question I would ask Randy is it would seem to me like the starting condition of no RCIC available, six hours, is probably the conditions under which you had to design the severe accident capable event. It's not the defining the sequence. It's the defining here's the conditions for which you need to design this vent.

MEMBER STETKAR: That's the vent, but the water -- it's not the vent. It's getting the water in.

MR. BAUER: Right. Okay.

MEMBER STETKAR: It's not getting the steam out. It's getting the water in.

MR. BAUER: Yes.

MEMBER STETKAR: And in particular, in that part it says --

MR. BAUER: It's not a water addition, yes.

MEMBER STETKAR: -- that it's okay to hook

it up to a flow path that has normally closed valves that need some sort of -- some mode of power. Could be AC power. Could be air or anything. But it would typically be AC-powered valves. And that you don't need that source of mode of power for -- it's you can have up to six hours to get that for the most limiting analysis for the representative plant that was done and still have confidence that you can save the containment in the sense that containment temperatures won't exceed, whatever it is, 545 I think is the number.

MR. BUNT: Yes, so the containment stays below its temperature limits --

MEMBER STETKAR: Right.

MR. BUNT: -- and that if you got the flow at that time and you had the worst case or the most limiting case analysis going forward, you would be there. So there's a lot of variabilities that go into that. And we did pick some values to build the cases off of and also to leverage the information that we already had for the 12-06 and the storage locations. And the intent there was -- what we did with writing that was to leverage the 12-01 guidance that you mentioned before is that ERO staff starts showing up at six hour and fully staffed at 24.

MEMBER STETKAR: Right. Yes.

MR. BUNT: We credit extra people, but we don't credit everybody there at six hours.

MEMBER STETKAR: Well, you credited enough people to do whatever needs to be done to get the pumps connected for the water addition and the power supplies connected to get the valves open. So however many bodies it takes to do that --

MR. BUNT: Correct, which is the same assumptions that are there for FLEX and 12-06.

MEMBER STETKAR: It's by definition you have all of the -- you have enough people to do whatever needs to be done at six hours.

MR. BUNT: You have the right quantity, the right skill set of people that short showing up within six, and you're fully staffed at 24, which is consistent with 12-01.

MEMBER STETKAR: Thanks.

MR. BAUER: Thanks, Randy. I think. Okay. We ready to move on to Appendix Alpha?

MEMBER STETKAR: Yes. Oh, yes. Don't look at me. I'm done. If I'm ranting, take that as a indication to move on.

(Laughter)

MR. BAUER: Understand. Okay. I already mentioned kind of the genesis of Appendix Alpha

to DG-1301. Now we're not talking about 12-06. We had the Appendix Foxtrot in 12-06 to deal with the AP-1000 plants, which the order applied to. We tried to make that generic as the answer to deal with the new reactors going forward. The other option we had looked at was building an appendix for every different type of design. And so, we opted to try to on a generic approach. And then at one of the public meetings we were asked by the staff to revert Appendix Foxtrot back to AP-1000 only and that they were going to develop some guidance for the new reactors. So that's the genesis of Appendix Alpha.

Right now I really can't give you a read on what we think of it. I looked at it myself. I said, okay, the New Reactors Team at NEI and then the industry really needs to take a look at this. So it's been farmed out to them. We are starting to collect comments. And I think the next step personally; and I think this has been discussed with some of the new reactors folks in the room, is to have a public meeting to talk about Appendix Alpha and what the going forward approach is.

When we do a agree on the contents of Appendix Alpha, or finalize that, then we would plan to take that and incorporate it into 12-06 so that the

Reg Guide could just endorse what's in 12-06. That would be the plan.

So there's second slide on this, right?

So right now again, we're just in the process of collecting comments on that. So at this point I can't really give you any feedback.

CHAIRMAN SCHULTZ: So in this case; I mean, it's interesting wording here, the intent is to interact sufficiently with the staff so that you -- this is a hoped-for result that you could incorporate it into 12-06 when comments are resolved at the same time that the Reg Guide has been developed and published?

MR. BAUER: Yes.

CHAIRMAN SCHULTZ: The Draft Reg Guide has been --

MR. BAUER: Yes, I mean, I --

CHAIRMAN SCHULTZ: But you're --

MR. BAUER: -- have full confidence we'll get to a point where we'll agree on the content of this and then move it over into 12-06. The other option would be the industry would write their own guidance, put it in 12-06 and then the Reg Guide if need be would --

CHAIRMAN SCHULTZ: I only commented on it that way because this is one area where it's good to

know where things stand between the industry document -- we knew that nothing was provided by industry here, but we were not aware of what that meant in terms of discussions that industry had had with the staff related to this and where you were intending to go. So this is helpful.

MR. BAUER: Yes, like I said, the existing industry guys took a look at Appendix Alpha and says this isn't our strong point here, so we need to farm this off to the New Reactors Team at NEI. And so AREVA and others are looking at this right now to say what does this mean to us and what are our comments? We'd like to engage with NRO staff in a public meeting to work through the issues that are identified.

Next slide. The last topic I have to talk about is this maintenance rule issue. Again, I think I've told you most of this. The point is and the reason for the April 19th public meeting was to meet with the NRC staff to talk about an exception to the FLEX equipment from the maintenance rule similar to what's in there for SAMGs and EDMGs. And I think we've agreed on a path forward on that.

Now the reason we can do that is because we have developed in Section 11.5 of 12-06 a maintenance program for the FLEX equipment that's based on this EPRI

guidance document, which I mentioned was endorsed by the staff and is listed in that table on 3.2.1.13 of 12-06. And we have EPRI maintenance templates that we're using that have been developed specifically for each type of equipment and are being implemented at the plants.

I don't know if either of you want to talk about the templates and where you are on those.

MR. POWELL: This is Mike Powell from Palo Verde. We're just now implementing the templates. We're starting to do our first round of maintenance. Unit 1 was the first unit at Palo Verde. That was implemented last fall. We just completed implementation of the orders on Unit 2. So we're starting to see our first round of maintenance activities.

Similarly, the National SAFER Response Centers who were declared operational and functional last October, we're starting to complete our first round of maintenance cycles and looking at what are the lessons learned from doing the maintenance for the first time using the templates. There's been several industry phone calls where we've shared some of the information. And we're keeping EPRI plugged in through -- Marty Bridges is the contact at EPRI that

we're relaying information to.

MR. BAUER: And I think when you're at Palo Verde on the 19th I think you'll be able to see a lot of this activity. You'll be talking to the people when you go for the tour of the storage facility there that actually do the maintenance on that, that maintain the equipment.

CHAIRMAN SCHULTZ: But at this point, Michael, what you're referring to is that you're getting feedback as to how the templates are working in their implementation?

MR. POWELL: That we may need to structure items. And as we gain experience and time, we'll look at can the frequencies for some of the maintenance be extended? Is there a rational reason for doing that? And we'll share that across the industry.

MEMBER RICCARDELLA: Mike, big picture what is the difference between these templates and the maintenance rule just from a 30,000-foot perspective?

MR. POWELL: The templates take credit for the standby nature of the equipment. They factor in what kind of environmental conditions the equipment may see, so whether it's extreme heat in Arizona or extreme cold in a northern state. How the equipment is stored. It looks at how frequently how you -- say if we take

a generator, how frequently should you hook it up to a load bank and test it under load? Such simple things as on the trailers and the equipment that have tires how frequently you need to rotate the tires so you don't get a memory in the tires, move the trailers in and out, that sort of thing.

MR. FORD: This is Bryan Ford. Another way to say it is that the EPRI templates tell you what maintenance to do. While the maintenance rule is a monitoring and risk assessment setup, it doesn't tell you what maintenance to do. It tells you to balance your maintenance and unavailability as you track and control and take action based upon that. So in this case we actually defined out the industry, here's the maintenance you're going to do.

MR. POWELL: Better said, Bryan.

MR. FORD: Thank you.

MEMBER STETKAR: But you're describing these templates are the maintenance procedures that I would have for a turbine-driven aux feedwater pump. Fine, I've got those. But the maintenance rule is supposed to identify that that's a piece of equipment important to safety, and therefore I must have confidence that it's reliable and available, the maintenance being part of that, the testing being

another part of it. So trying to draw the analogy between the templates that tell me what maintenance I ought to do: make sure the tires are pumped up or make sure that my turbine starts up when I want it to start up is not really addressing the issue I thought that Pete was looking for -- is what assurance to these templates give that indeed the equipment will be available and reliable, that somebody says, yes, we ought to go kick the tires once every e months rather than once every 16 years?

MR. BAUER: Right. So the document that's referenced in 12-06 is a guidance document for how these templates are developed. And that was reviewed and endorsed by the staff. And then EPRI developed these templates with industry committees that basically took all the vendor documents and developed the templates and provided them to the sites so that we'd have consistent maintenance being done. And so that's where the periodicity and what type of maintenance and all that is decided in that maintenance template.

MEMBER STETKAR: The templates have the periodicity built in them?

CHAIRMAN SCHULTZ: It's a directive maintenance program that's been developed.

MEMBER STETKAR: Okay. I missed that I think in part of the discussion.

MR. POWELL: One of the things to make note of, when EPRI started developing the templates, they would bring in like all the portable pump manufacturers and have essentially what I would call an expert panel and solicited industry feedback and said what's the right frequency to change the oil? What's the right frequency to test the pump? What soft parts -- what's the frequency -- do we need to -- and all those activities are specified in the templates.

MEMBER STETKAR: I personally am less interested in the activities, because how I make sure that a valve opens and closes, what I need to do to do that, make sure the packing isn't too tight or something like that, that the minutiae of making sure that the things works. I'm interested more in the frequency at which those activities are performed, functional testing and preventive maintenance frequencies such that I have assurance that when somebody goes out to use it, it's actually there. I mean, if I'm doing all of these good preventive maintenance things but only doing them once every seven years, that may not provide me very good assurance that it's going to be available.

So I'd be interested how EPRI came up with

the periodicity of those different events considering what may be plant-specific and site-specific needs for the equipment itself.

MR. FORD: Well, as he was saying, they gave us recommendations based upon the temperatures the thing saw, the amount it was used. So they gave us a range of frequencies based upon different service conditions.

Now you can with technical justification modify those, but basically using their expert panels they've laid out the maintenance frequencies.

MEMBER STETKAR: Thanks.

MR. POWELL: When you all come to Palo -- we can go through some plant-specific examples for the equipment we have.

MEMBER STETKAR: That would be good, if you had them, Mike.

MR. POWELL: We can do that.

MEMBER STETKAR: That would be good.

CHAIRMAN SCHULTZ: Is the process for these -- for gaining an exception, is that laid out in the guidance, in the template program process? I was with you until you said, oh, and then exceptions can be granted, or given, or determined by a licensee.

MR. FORD: I don't remember reading what

the guidance says. I do know that we have changed one frequency and they've put together an engineering report that went through. Here's our basis for it and the temperatures and here's what we consider the impact. I don't remember what drove that.

MR. BUNT: This is Randy Bunt again. What EPRI did in their structure was they used the PM template structure they use for equipment reliability and followed that same process to come up with the expert panel to develop the right frequencies and the right test patterns. You bring plant experience, operating experience and manufacturer experience. And then there's a formal process that most plants use; I know at our plants we use it, that this PM process will still go into that allows you to change or adjust frequency based on specifics uniquenesses about your plant. And that is a formal process that it would feed into your PM program that components that are maintenance rule still do at our sites. So we have one PM program primarily.

And that's how this process is going to be worked in our sites to get those extensions or those changes. But the program and the documents and the templates that were developed by EPRI were generic and went out to everyone. And that's the structure. And

it was built the same way we built other ones, because we were building on an experience base that we had on how that was done from a PM standpoint.

MEMBER STETKAR: Yeah, Randy, just out of -- and this literally is a curiosity. I'm not trying to lead you anywhere. You mentioned that that PM process applies for -- I thought you said equipment that's not covered by the maintenance rule. If I have a -- I'll call it a valve or a pump; I'm trying to be not very specific, similar pieces of equipment that are either under the maintenance rule or not under the maintenance rule, how would the PM frequencies or the types of activities that you perform be different if a piece of equipment is now under the maintenance rule?

MR. BUNT: Typically it wouldn't -- your evaluation would be based on that component and the functionality of that component --

MEMBER STETKAR: Yes.

MR. BUNT: -- and the importance of that component to its purpose in life.

MEMBER STETKAR: Right.

MR. BUNT: There were templates that were made up by EPRI for the big program. There's like close to 300 of them. Some of them are power poles -- are some that they have maintenance programs in them.

So it varies from all sorts of components. That's why I said some are maintenance rule, some aren't. Then you look at that and say based on where I am -- if you're at a very cold environment, your maintenance on your power poles may be different than it would be if you're in a southern environment. So, but the template is going to be structured the same way based on these parameters and the importance of that piece of equipment to serve its function. And typically you'll be able to find your crit (phonetic) nature of it so that you can then decide how much margin I'm able to use in developing that, at a very high level.

MEMBER STETKAR: Yes. I guess I'm not communicating very well. Let me take two four-inch AC motor-operated double-disc gate valves, one of which is out in the secondary side of the plant and is not subject to the maintenance rule because I've done my screening, the other of which is subject to the maintenance rule because I've determined that it is important to safety. They're both AC motor-operated, double-disc, four-inch gate valves.

Now how would the way that I approach preventive maintenance, either the types of maintenance that I do or the frequency of that maintenance, or the frequency of testing, be different

if that valve B is under the maintenance rule as opposed to valve A, which is not under the maintenance rule? That's what I'm trying to get at.

MR. FORD: Let me take a shot at that. The PMs themselves are not influenced as to whether or not the component is under the maintenance rule. You set the PMs based upon the function of the valve is at a high-critical, low-critical. What is its function? Now many of those same features that define whether or not it's a high-critical component that you do all of this maintenance on also overlapped with the criteria that would decide whether or not something is in the maintenance rule.

So just because it's in the maintenance rule or out of the maintenance rule doesn't really define the PMs. The maintenance rule has you set goals for unavailability, for failures based upon previous history, based upon the risk of the component, and then monitor to see whether or not the equipment is meeting those goals. And if not, take action to address it. But in and of itself it doesn't really drive what PMs you do and what PMs you don't do.

CONSULTANT SHACK: But it could drive how long it could be out of service.

MR. FORD: It could impact that and then

it would push you to take corrective action if it exceeded those. Now, out of service times I've seen in general in the maintenance rule are fairly long. So where I've seen people exceeding their maintenance rule criteria has generally been in failures and things like that.

MEMBER STETKAR: But under the maintenance rule, under this reliability, if I keep extending my analogy here with my two valves, A which is not under the maintenance rule but has a set of PMs, and B which is under the maintenance rule but has the same PMs, at least initially going in. There's no reason to believe that they should be different. If I observe degraded performance on valve B, that it's not meeting its reliability criteria, I may need to either test it or perform that PM more frequently for that valve B, but I don't on valve A because I don't monitor its reliability. So it stays the same as it always was in life, right? Or am I --

MR. BAUER: You monitor its reliability. You just don't take the actions under the maintenance rule that you would take. I mean, if the reliability --

MR. FORD: We do have a responsibility to monitor outside of the maintenance rule for repetitive

events and take corrective actions. So if I saw valve A, that is a safety-related great valve, having problems and that same problem could affect other components, whether they're in the maintenance rule or not; you know, it all depends upon what the issue is, you would potentially take extent of condition actions. But that all depends on what the condition is.

So the maintenance rule is a way to monitor for whether or not equipment is meeting established performance thresholds. I mean, that's what it does.

MEMBER STETKAR: Thank you.

MR. BAUER: That completes our presentation pending any further questions.

CHAIRMAN SCHULTZ: Other questions from the Committee?

(No audible response)

CHAIRMAN SCHULTZ: I'd like to go right straight to the NRC presentation then. Eric?

MR. BOWMAN: Well, good afternoon. I'm Eric Bowman. For those of you that don't know me, I'm a special advisor in the Japan Lessons Learned Division. I was the author of the Mitigating Strategies Order and one of the points of contact on the recent SECY for the proposed rule for the mitigation

beyond design basis event. So I'll be talking about the Draft Guide 1301, which we propose to issue in a final form in conjunction with the publication of the proposed rule.

To my right Clint Ashley from the Office of New Reactors. He'll be speaking specifically on Appendix A which provides the guidance for new reactor designers for meeting the proposed section of the rule, 50.155(d) for design features for new reactors.

The current status we're in, Draft Guide 1301 is in a preliminary draft form. It's not yet final. As you heard from the Industry Working Group, or the industry panel, NEI 12-06 is not yet finalized. We're awaiting the development of Appendices G and H for the flooding and the seismic reevaluations. Most of the rest of the changes have been entered into NEI 12-06 in order to account for the lessons learned and the implementation of the Mitigating Strategies Order, as well as to make some adjustments for use as a basis for Regulatory Guidance for the rulemaking.

The Draft Guide itself builds on what we issued on 2012 as Interim Staff Guidance JLD-ISG-2012-01, taking into account, as I said, the lessons learned as well as the Staff Requirements Memorandum on COMSECY-14-0037 on the evaluation of the

flooding hazard.

I set up the presentation to just run through the staff positions, which are in general clarifications of what is in NEI 12-06. It's been slightly differently than things were in the Interim Staff Guidance. I tried to align it more closely with what the requirements in the order, or in the proposed rulemaking are rather than the way that the Interim Staff Guidance was. The staff position 1.1.a was on the development of the baseline capabilities.

"Baseline capabilities" is the term that's used in NEI 12-06 in Sections 1 to 3 for the capability of the plant to maintain core cooling, containment and spent fuel pool cooling capabilities given the initial conditions and assumptions that are contained within that particular set of guidance. We believe that the baseline capabilities that would be developed following NEI 12-06 will provide an acceptable method to meet the requirements of the proposed order.

Three other staff positions in Section 1.1. The maintenance of the strategies. I've carried forth the staff position that was in the Interim Staff Guidance. I've have discussions with Scott Bauer in the industry as well as public stakeholders on what is meant by that. That particular paragraph might be

interpreted by some to mean that there needs to be a continuous maintenance of the duration for which a licensee can maintain the functionalities.

What's really intended in that paragraph is to highlight the differences between the regulatory requirements that are in the station blackout rule, 50.63, and what was in EA-12-049, the Mitigating Strategies Order, and proposed to be carried forward into 50.155(b), which is -- under the station blackout rule there was a requirement to establish a capability to withstand and recover from a station blackout of a specific duration, but it was only to do that once.

We included the requirement in the order and we're proposing to include it in the rule that the mitigating capabilities need to be maintained throughout the life of the plant. So for example, if a licensee were to come into compliance; just to take a PWR example, with original equipment, reactor coolant pump seals, and later change out the seals for low-leakage seals, they would have to readjust their strategies to account for the changes in the coping durations that would result from the lower leakage.

Then paragraph C and paragraph D in that section discussion that we consider the use of best estimates for the analyses that were underlying the

strategies as being appropriate and that the validation of the strategy for feasibility is described in Appendix E as acceptable.

Section 1.2 is the one that Mr. Bauer mentioned that he may have a concern with. I have discussed it with him. I believe that we are in the same place on the understanding of what should be understood from that. We may need to revise the wording. The intent is that the baseline capabilities that we talk about in Section 1.1 and that are talked about in NEI 12-06 Sections 1 through 3 are assuming maintenance of the core cooling and the other functionalities given the initial conditions and assumptions.

There are contingencies. And the use of the word "contingency" is carried forward from an earlier document that we had issued, a Supplemental Staff Guidance on the review. The manual start of the cooling systems, auxiliary feedwater, HPCI, RCIC or isolation condensers and the use of portable equipment such as multi-meters for getting instrumentation readings and also the provision of guidance on controlling equipment in the absence of control power are all included with NEI 12-06, but they are not something that we believe it's appropriate to have

included in the analyses because it would be speculative to determine when failures would occur in those equipments.

In our view, the initial conditions with an extended loss of AC power would start out requiring multiple failures to go to additional multiple failures beyond the multiple failures that would result in a loss of all AC power to include the loss of inverters, etcetera. It would be a little bit too speculative to compel the licensees to use as a basis for thermal hydraulics analyses, however, it is appropriate that they have tools in the toolbox, if you will, for what to do in the event that something goes wrong. If there is a failure that either prevents RCIC from starting or stops it from running, they should go and manually start or manually reset and restart the system.

The location where the contingencies are included is in the seismic section of the NEI 12-06. It's in Section 5.3.3, Subsection 1. And the manual start and manual run for the auxiliary feedwater and the RCIC and isolation condensers are in the -- as individual strategies within the Appendices C and D in NEI 12-06.

So as you were discussing earlier, the seismic could be something that would have a potential

to cause a need to use the contingencies, but we accept that their use as tools in the toolbox is the appropriate way of dealing with that potentiality.

Section 2, the guidance on the equipment quality and design we feel is appropriate as well as the guidance within NEI 12-06 on the provision of reasonable protection. The provisions on reasonable protection in NEI 12-06 are focused on the design basis levels of hazards as they existed at the time the order was issued.

There is, as a I mentioned before, Appendix Golf and Appendix Hotel to NEI 12-06. Appendix G we have received an initial draft of for comment and we are meeting with the industry on Appendix Hotel in order to fully develop how we will be looking to the industry for reasonable protection against the reevaluated hazards, but we are not ready to discuss that with the Committee at this time.

And the maintenance prescriptions in 12-06 that you just heard the industry speak of we believe to be acceptable.

MEMBER RICCARDELLA: Is it the plan to issue Draft Guide 1301 before we have completed Appendix Golf on the issue for comment?

MR. BOWMAN: The timetable we're on is in

the regulation process would have us issue it in conjunction with the publication of the proposed rule. So our schedule right now as of July 9th, we're meeting with the Commission on the proposed rulemaking. And sometime after that to receive direction from the Commission on any adjustments that may be needed on the rulemaking package prior to its publication. We are shooting for having a Final Draft Guide and a final underlying NEI document prior to then. So we will have something out there for comment.

As you heard earlier the flooding reevaluation portion is in a lot better shape than the seismic portion. We will at a very minimum have high-level discussions of what -- we may not have all the "I's dotted and all the "T"s crossed, but we will have an indication in order to allow stakeholders to understand what is meant by the requirements in the rulemaking so they can comment intelligently on the rulemaking and also to gather input on any adjustments we need to make in the guidance and perhaps come and dot the "I's and cross the "T"s on exactly how individual elements of the response to that particular portion would have to be accomplished.

Finally, the guidance on configuration control in NEI 12-06 is acceptable as well. And as I

discussed, we aren't ready to discuss the reevaluated hazards.

MEMBER RICCARDELLA: So you'll plan to discuss the reevaluated hazards with us before that July 9th date?

MR. BOWMAN: Again?

MEMBER RICCARDELLA: You're planning to come back and discuss the reevaluated hazards before that July 9th date?

MR. BOWMAN: If the Committee wants to interact further with us on that subject, we're of course happy to --

CHAIRMAN SCHULTZ: We don't have that scheduled. We haven't even seen it yet, I don't think. It doesn't exist.

MEMBER RICCARDELLA: Neither have I.

MR. BOWMAN: Okay. And with that, I'll turn it over to Clint.

MR. ASHLEY: Thank you, Eric. Good afternoon, Chairman and Committee members. As Eric mentioned, my name is Clint Ashley. I work in the Office of New Reactors. I was a member of a team that put together the Draft Guidance, DG-1301, Appendix A for new reactors.

This slide shows a portion of the proposed

rule that applies solely to new reactor applicants. And I won't read this rule out, but I do want to spend a little bit of time on the terminology that's offered here in this rule which is "design features," "coping durations" and "human actions." I think talking about this terminology now may help in the subsequent slides.

So when we talk about design features, it's the traditional structures, systems and components and their capabilities to maintain the key safety functions. Examples of design features that could be employed are diesel-driven or steam-driven pumps, as well as the capacity of water storage tanks or even electrical power supplies.

So when developing design features to meet the proposed rule, enhance coping durations and minimize realize reliance on human actions are necessary considerations that a designer needs to meet. So when we talk about enhancing coping durations, that means that the design features should increase the amount of time that safety functions can be maintained early in the event before there's a need to augment the plant equipment with portable equipment. And you'll see in upcoming slides that our guidance provides some quantitative performance criteria to meet this requirement.

To minimize the reliance on human actions means that the design features either prevent or reduce to the extent practical the need for operator actions again during sort of this initial phase of the event. The guidance for human actions is somewhat more qualitative in nature. For example, if you have a design that relies on operators to reposition dozens of breakers in order to enhance coping durations, the requirement is that the design features in that case would reduce to the extent practical the need for those operator actions.

So you could envision maybe having one breaker that would load shed or secure a number of other breakers that would tend to reduce the actions that would be required by the operator. That would be a design feature that could be employed. Or you could simply look at the capacity of your battery and whether or not there's a need to actually load shed it. So you could prevent the need for load shedding in that scenario.

MEMBER STETKAR: Clint?

MR. ASHLEY: Yes?

MEMBER STETKAR: I'll bring up my favorite poster child. You're probably anticipating it. I know of a new plant design, new plant, where their

coping strategy to extend the battery life is to de-energize everything in the main control room and require the operators to go to a remote shutdown facility that has alternate controls and displays that aren't nearly as robust as the main control room, and that's part of their strategy. Is that minimizing the need for operator actions?

MR. ASHLEY: With respect to this guidance I would not characterize that as something that we would view as meeting this sort of --

MEMBER STETKAR: Okay. Thanks.

MR. ASHLEY: However, it is guidance and it's one acceptable method. And I think you have to look at the context of that other scenario holistically to determine whether or not that's an acceptable approach.

MEMBER STETKAR: Thanks.

MR. ASHLEY: So the staff views -- the guidance provided in Appendix A does offer new reactor designer's performance criteria that vendors can use to design their plants to. And we'll talk more about this criteria in the upcoming slides.

This slide simply highlights the regulatory basis for the rule language that we just talked about. And we talked about in previous

sessions, current agency endorsed guidance is focused on the operating fleet and reflects the fact that operating reactors are constrained by existing structure, systems and components and the plant layout. However, without such constraints new reactor applicants have an opportunity to incorporate enhanced capability for mitigating strategies into the design.

And again, just to place emphasis on this, such design features should reduce reliance on and simplify the manual actions necessary to maintain and restore the key safety functions and allow more time to assess plant conditions and prolong the use of installed equipment as compared to the current operating reactors. This approach we feel is consistent with the policy statement on regulation of advanced reactors in which the Commission encouraged vendors to include certain design features into the plant design, and the most effective opportunity to so is during the design of those systems, structures and components.

There's other example on this slide with the approach taken for the aircraft impact assessment as well as the station blackout rule where the Commission directed the staff, or approved the staff's position to require an alternate AC source.

MEMBER CORRADINI: Can I ask a question? So the last speaker from the industry made a point of saying that this is AP-1000 only. Is this AP-1000 only?

MR. ASHLEY: No, NEI 12-06(f) --

MEMBER CORRADINI: I didn't think so. So I want to be --

MR. ASHLEY: -- is AP-1000 only. That's the industry guidance. This is the Appendix A of the Draft Guide.

MEMBER CORRADINI: Okay.

CHAIRMAN SCHULTZ: That's the industry guidance that is in the current document.

MEMBER CORRADINI: Okay.

CHAIRMAN SCHULTZ: NEI described the opportunity to enhance that.

MEMBER CORRADINI: I misunderstood. Sorry. Thank you.

MR. ASHLEY: Next slide, please. So, Dr. Corradini, this might better answer your question, or more satisfy you.

MEMBER CORRADINI: He's satisfied me, but go ahead.

(Laughter)

MR. ASHLEY: The purpose of this slide is

to communicate that Draft Guide 1301, Appendix A takes advantage of the significant body of work done for the operating plants and is applying that to new reactors. In particular, Draft Guide 1301, Appendix A refers back to the positions taken in the main body of Draft Guide 1301, which as Eric discussed, endorses NEI 12-06 with certain clarifications. And Appendix A adds clarifications as well, where needed.

Appendix A also provides guidance related to enhanced coping durations and human actions, which are areas that are not specifically addressed in NEI 12-06 due to the fact that paragraph D of the proposed rule is a fairly recent addition and is limited in its applicability.

So with that said, the approach on the remaining couple slides on Appendix A in this presentation is really trying to provide examples of where Appendix A guidance is different from the guidance that's provided in NEI 12-06, and by extension to the main body of Draft Guide 1301.

And I also think it's fair to say that the primary focus on Appendix A is really the initial phase, the Phase 1 response.

Next slide. So this slide highlights the Phase 1 response, or what's also referred to as the

initial response phase. And during this phase the guidance in Appendix A is focused on the design features or plant equipment. So it makes sense there will be differences between NEI 12-06 and Appendix A. That should be expected.

So regarding the first bullet, Appendix A's Phase 1 guidance relies on plant equipment from event initiation out to at least 24 hours. In contract, NEI 12-06 guidance does not specify performance criterion for the Phase 1 coping duration. The staff's reasoning for selecting this duration took into account coping information associated with certified designs and operating reactors. For example, the AP-1000 design and the ESBWR can cope initially for out to 72 hours with plant equipment. The ABWR design can cope out at least 36 hours initially. And operating plants in general have an initial coping duration of roughly four to eight hours using plant equipment.

So given this information, the team in New Reactors proposed that new reactor designs, in order to meet the rule, the enhanced coping duration aspect of the rule, should have an initial coping duration of at least 24 hours, where 24 hours is considered the minimum duration for the design feature capabilities.

And this coping duration does two things: First, it provides operators with ample time to implement the on-site portable equipment strategy; and second, establishing a time helps contribute to regulatory stability and predictability for advanced reactors with respect to the proposed rule.

The second bullet means that plant systems, structures and components or installed equipment are designed and qualified to perform their intended mitigation functions during and following the external event. And just as an example, what we're looking for is we expect the equipment that's responding during Phase 1 to be dynamically qualified.

The third bullet simply reflects that new reactor designs; and this shouldn't surprise anyone, will be reviewed using the current agency endorsed methods for hazard analysis. We're not anticipating any sort of reevaluated hazard approach for new reactor designs.

The idea with respect to the fourth bullet is to reinforce the expectation that Phase 1 structures, systems and components or installed equipment are protected from all hazards regardless of warning time. In contrast, NEI 12-06 does permit warning times. And so in essence, when you conform to

this position for new reactors, you retain the capability for plant equipment response to the hazard that results in an extended loss of AC power or concurrent with a loss of normal access to the ultimate heat sink.

The fifth bullet is with respect to the seismic hazard. And what we wanted to see is a similar level of protection for all plant equipment credited in the Phase 1 response. For the protection of safety-related SSCs a design cert applicant performs a PRA-based seismic margins analysis. That demonstrates that, in my words, a margin factor of 1.67 is achieved.

Appendix A seeks to apply the same factor to non-safety-related SSCs which are credited with maintaining or restoring the safety functions during Phase 1. So for example, if an applicant credits an non-safety-related diesel pump and its associated related water source in Phase 1, then the applicant should demonstrate that protection for the pump and water source will survive the site-specific hazard or GMRS, ground motion response spectra, times 1.67 with high confidence of low-probability failure.

For the sixth bullet NEI 12-06 does make mention of crediting a bunkered or hardened AC power

supply provided it is adequately protected from external events. Appendix A refers to this as a supplemental AC source and clarifies that it can be credited after eight hours. The basis for eight hours is considered to be an enhancement to the coping durations typically available in current designs and we think it allows for increased flexibility in the on-site response. And we also believe that you can design the supplemental AC source with minimal operator actions needed with respect to the early phases of the event. And I'll talk more about supplemental AC in a later slide.

And just on that last bullet, we would expect in Phase 1 that there would be minimal operator actions. And these actions would occur in protected locations.

Next slide. This slides highlights the Phase 2 and Phase 3 response. The first two bullets and the last bullet kind of identify some differences, and the third bullet is more of a clarification.

So with the first bullet we define the Phase 2 enhanced coping duration. It starts at 24 hours, or when the end of Phase 1 would occur; could be a little bit more than 24 hours, and extends out to at least 72 hours. The 72-hour duration is consistent

with advanced reactor capabilities. And many of the operating reactors that I've looked at they can easily carry out a portable equipment strategy out to 72 hours.

We believe this coping duration permits the plant to maintain safety functions with the on-site resources without the need to burden the local community that is likely struggling with its own disaster response. In addition, this coping duration provides again ample time for operators to implement the off-site equipment strategy. We also believe that specifying this time also creates regulatory stability and predictability for advanced reactors with respect to the proposed rule.

The second bullet conveys that Appendix A limits the options that are currently available in NEI 12-06 for storing on-site portable equipment. And we limit the options to either a safety-related structure or a structure designed for design basis wind hazards to include missiles. I believe NEI 12-06 also includes an option that permits crediting building separation. And for new reactors we didn't want to take advantage of that option. So we limit it to the two points on the slide.

The third bullet is more just motherhood and apple pie. There could be cases where plant

equipment is leveraged in Phase 2 and Phase 3 that may not have been leveraged in Phase 1. We just want to make sure that that's the intent and you know about that in advance, that it should be capable to function after the event.

And for the last bullet -- yes?

MEMBER POWERS: The question that caused me pause when I read it is I was thinking in terms of a rather extensive flood and the question of connections.

MR. ASHLEY: I'm not sure I --

MEMBER POWERS: Well, does the plant equipment have the capability to function after the external event? So if I have a very bad flood, might not connections not be capable of functioning after the external event?

MR. ASHLEY: Well, I think we were looking at more in the sense of it might not have to operate during the event, but that if you were going to credit it for functioning in Phase 2 or, 3 that external event didn't somehow invalidate your design. So obviously the flood would have to have receded to gain access to that connection. That connection should have been protected sufficiently so that you'd still be able to tie into that connection. I'm not sure if I'm getting

to the point that you were driving at.

MEMBER POWERS: Well, I mean, it's an assertion and a clarification. And you're saying, okay, I don't care how much mud comes in and things like that, you should be able to get to that connection.

MR. ASHLEY: If you're crediting a connection, then we want to see that it has a representative design basis associated with it.

MEMBER POWERS: I understand what your words mean now.

MR. ASHLEY: And for that last bullet we just view the off-site equipment response for Phase 3 would commence no earlier than 72 hours.

Next slide, please. So we talked a little bit about supplemental AC already. Really, I just want to identify the three other points on this. We talked about the eight-hour criterion and where that came from.

We also looked at supplemental AC being permanently installed, normally disconnected from the bus, diverse and independent source from the emergency AC source. And we also want to show that the distribution and the loads are required to have a similar level of protection against external hazards.

MEMBER STETKAR: Okay. Clint, now I'm

suddenly going to start talking again. I don't get this. This sounds to me like yet another person's emergency diesel generator. We've already established that the hazard has eliminated all of the emergency diesel generators that I have installed in my plant. So why won't it eliminate this one? In particular, I will quote from the guidance. It says that "the AC source distribution system and necessary load should be protected per Section 3.2 of this appendix."

Then I go to Section 3.2, and I will read two paragraphs. "SSCs relied on during Phase 1 should be protected to safety-related criteria; e.g., Seismic Category 1 and flood protection in accordance with Regulatory Guide 1.102, Flood Protection for Nuclear Power Plants, to be capable of performing the intended safety functions during and following the external event. SSCs and equipment relied upon during Phase 1 should be protected from all external events regardless of the warning time."

Sounds like all of my emergency diesel generators satisfy that criterion.

"For seismic events the applicant may propose an alternative approach to ensuring a level of protection consistent with a site hazard including a

safety margin to demonstrate that the overall high confidence of low-probability of failure is equal to or less than one percent at the site-hazard times a margin factor, GMRS times 1.67, which is consistent with that used in the plant design assessment."

But it sounds to me like as long as I put this diesel in and qualify it for Seismic Category 1 and meet the Reg Guide 1.102 flood protection, which I've already met for all of my safety-related diesels, which are already be definition failed by this external hazard -- by definition this one survives. Why is that and why does the staff accept that?

MEMBER RICCARDELLA: What's the meaning of "diverse?" Independent I guess is what you're asking. MEMBER STETKAR: I could argue that it's diverse because I used Joe's diesel that is a 6-cylinder diesel as opposed to Ralph's diesel that is a 16-cylinder. So you can argue diversity perhaps. Independent, not so much. But protected against the external hazards. The guidance just says that I need to protect it the same as the stuff that by definition was failed.

So I get having a portable diesel generator on a truck inside a shed someplace not in my emergency diesel building. I get that. I kind of like that

idea, personally. But I don't get yet another so-called super good diesel that is designed and protected exactly the same as my other super good diesels that are disabled. So I don't understand this. I honestly don't understand this.

If you said it shall be protected for a margin of two or three above the design basis earthquake, then I get it. But that's not what this guidance says.

MEMBER CORRADINI: In fact, I seem to remember with one particular new plant what proposed seemed diverse and seemed protected. They didn't get credit.

MEMBER STETKAR: Right.

MEMBER CORRADINI: So I also don't get it.

MR. ASHLEY: Well, let's see where I can take this. I understand the problem is provided to new reactors as far as the rule goes. I mean, it's deterministic. It's an extended loss of AC power which included the off-site sources of power as well as the emergency AC sources and your station blackout diesel.

From my perspective, this supplemental AC source was really in a sense targeted at more of that station blackout diesel which hadn't been traditionally protected through all of the external

hazards. So this supplemental AC source, again from my perspective -- and I would have to call on the Electrical Engineering Branch in the room to maybe speak to this more eloquently, but the station blackout diesel just doesn't have the type of protection. And so this diesel would bring forward that level of protection to the external hazard and it would also be diverse and independent.

MEMBER STETKAR: Let me draw an analogy on digital instrumentation control. We have a lot of angst about digital instrumentation control systems and -- I knew I'd wake up Charlie --

(Laughter)

MEMBER STETKAR: -- common cause failures, undefined common cause failures for which we require a diverse actuation system that is not reliant on the same software, that's perhaps analog that may be non-safety-related, but it's clearly diverse. This to me is just another piece of equipment that's designed to the same requirements. And I can call it a gas turbine, but if indeed I protected against the same seismic event, beyond design basis seismic event that by definition fails; and I don't care how many have, 12 other redundant diesel generators, why does this 13th piece of equipment suddenly win when those other

12 lost?

MR. BOWMAN: If I could chime in --

MEMBER STETKAR: I don't get it.

MR. BOWMAN: -- with some of the experience that we've had in the reviews of the operating reactors; this is Eric Bowman again, for specific hazards we have had experience with licensees proposing to install AC power sources that are protected to a great degree over the hazard. In particular, the flooding hazard. Some licensees, they've chosen to put generators on the roofs of their auxiliary buildings, in seismic structures that are missile-protected. And we have found that to be a good approach to the problem of what do you do if you get a design basis, or a beyond design basis flood because the top of their auxiliary building is, I don't know, 50, 75 feet above their design basis flood.

(Simultaneous speaking)

MEMBER STETKAR: -- has decided to put stuff in the basement because that was a good idea to protect it against seismic accelerations. Not so good for floods.

MR. BOWMAN: Right. Not a good idea for flooding though.

MEMBER STETKAR: Yes, so --

(Simultaneous speaking)

MEMBER STETKAR: -- for floods.

MR. BOWMAN: Right.

MEMBER STETKAR: Not so good for seismic.

MR. BOWMAN: Right. And in particular, one place for their design basis flood, they would not have been capable of dragging the generator on a trailer over because of the 12 feet of water, or whatever the depth of water was. So this was a good approach for that specific type of hazard. And we had discussed the option in the Advanced Notice of Proposed Rulemaking for the station blackout mitigating strategies rule of including a supplemental AC power source. I believe that that's where NRO came up with the initial idea for it. Bear in mind that this is just a draft set of proposed guidance for comment and the appropriate comment they might get is how much margin is enough margin?

MR. SCHMIDT: This is Jeff Schmidt. I was one of the team members. I just wanted to point out that the rest of the coping equipment from zero to eight hours is only qualified to the design basis. So having this qualified to be beyond -- some margin beyond the design basis didn't make any sense. Because if you're using plant equipment to cope, you've already lost the

battle in the zero to eight hours.

MEMBER STETKAR: Okay. That's a different issue, but if you want to discuss that, that's fine. If all of my switch gear falls done, I don't care if I have any diesel generators. I can have like zero diesel generators and it doesn't make -- so why does this one more buy me anything then?

MR. SCHMIDT: Well, part of the --

MEMBER STETKAR: You want to talk that way, then fine, let's have another --

MR. SCHMIDT: But that's --

MEMBER STETKAR: -- protected set of switch gear and a portable diesel to connect to.

MR. SCHMIDT: But that's true of all your plant equipment that you're using to cope --

MEMBER STETKAR: Yes.

MR. SCHMIDT: -- initially in both the new reactors and the existing reactors. One of the features of this supplemental AC was to reduce the associated auxiliary systems that might be needed to run this piece of equipment. So while you're not maybe reliant on as much of the auxiliary systems that may be at risk with this system as you would say your diesel generators that need component cooling water and other systems. It was supposed to be a simplified system.

Also, the distribution system, that's why we really put this last bullet in was to try to simplify the distribution system such that it would be potentially less at risk than your normal distribution that you'd use for your emergency diesels. So there are some features to this system that we would hope would make it more robust than say your emergency diesels.

MEMBER STETKAR: All of those support systems for my emergency diesel are protected against that Class 1 Seismic, Category Seismic 1. So just because I have less of them doesn't make the piece of equipment more reliable. It makes it more reliable for pumps not working and that sort of thing, but it doesn't make the equipment more reliable for the types of hazards that we're looking at here, beyond design basis flooding and seismic events that by definition, however they did it, took away all of my safety-related sources of power.

MEMBER CORRADINI: But can I ask John's question a little bit differently? Maybe I'm interpreting this incorrectly, so you correct me. If I have a new plant but it's an active plant and it kind of looks like current plants, which implies that it can't get past 8 hours, you're giving them a way out

between 8 and 24 hours. That's what I read this to be, that I'm allowing for a diverse quite robust; "robust" to be defined, system that takes me from 8 hours to 24 hours so I can get to Phase 2 comfortably without having to have the unique features of new plants that are already certified. That's my interpretation.

MEMBER STETKAR: Passive plants.

MEMBER CORRADINI: Passive plants that are already certified.

MEMBER STETKAR: Yes.

MEMBER CORRADINI: That's my interpretation of what I read here.

MR. CARUSO: Can I address that? Mark Caruso. I was on the team, too. And I mean, that's sort of getting at it, but I would say it differently.

MEMBER CORRADINI: Okay.

MR. CARUSO: We struggled with this issue, too, very much the team did. And I think the idea here was to not preclude that -- to not dismiss out of hand that there was nothing that someone couldn't think of and design that might satisfy, that might be useful like perhaps a pump, a separate pump, diesel generator connected together that's not connected to anything else that could be used. It's put in place. It's got a little power source. It's a pump. It's put in place

in the reactor building, whatever.

So the idea is to try and say here that it really can't be the same as the ones that you've all lost. You're right about that. That doesn't make a lot of sense. And perhaps we need some better guidance here that communicates that. I don't think we wanted to specify exactly what would be okay or not okay, but to provide guidance that said it's got to be better than those, but we're not going to preclude the designers from trying to think of something that might work in this case and be satisfactory.

MEMBER STETKAR: Mark, my point is as I read this it doesn't have to be better than those. It only has to be as good as those. It doesn't have to be better. It only has to be as good. It says that I have meet Seismic Category 1, and Flooding 1.102. That's as good as. It doesn't have to be better.

MEMBER BLEY: That's the words.

MEMBER STETKAR: Those are the words.

MEMBER BLEY: Yes.

MEMBER STETKAR: I read verbatim a quote.

MEMBER CORRADINI: Can I just clarify? I guess that the words that you read and the sense of the oral presentation are different.

MEMBER STETKAR: We can hear whatever we

want to hear. We read what we read and people respond to the written language in the guidance. I come from international experience where people have taken these issues to heart and installed bunkered hardened emergency power supplies in buildings that are going to survive the apocalypse, but they have specific design criteria for those buildings to provide substantial protection above and beyond the design basis of the plant for protection of that equipment with all of the independent connections and the other stuff that you want to do.

MR. ASHLEY: And in a sense --

MEMBER STETKAR: But that's not what this is saying.

MR. ASHLEY: Right, and in a sense those designs would prevent the extended loss of AC power.

MEMBER STETKAR: Right.

MR. ASHLEY: So we're given an extended loss of AC power and we're looking for some ability to provide an AC source at some point in time given the right protections and the right arrangement with the distribution system, everything protected. So it's a little bit different, but again it's only protected up to the design basis, as you've read. And we're not looking to add requirements to that.

MEMBER STETKAR: Well, and that's where I think I'm hanging up is that -- and I have to be careful here because I'm only a single opinion and I must be careful to characterize it that way. If the guidance said a permanently installed equipment system that is protected with a specified fixed degree of margin above my safe shutdown earthquake, or reevaluated safe shutdown earthquake or portable equipment that sounds like FLEX and things like that with adequate capacity, then I'd say, okay, we've got diverse, we've got flexibility, we've got the option to put in a lot of concrete and steel and things like that, but that's not what this guidance says.

MEMBER RICCARDELLA: What was that 1.67 factor you were discussing earlier? That's beyond design basis.

MEMBER STETKAR: It is, but that's again a quote from the paragraph. This is a quote verbatim, Appendix A of the Draft Guidance. For seismic events the applicant may propose an alternative approach to ensuring a level of protection." And that's what it gets into. But that's a paragraph that immediately follows the paragraph that says, "SSCs relied on during Phase 1 should be protected to safety-related criteria, Seismic Category 1 and" -- so it says I'm okay if I

protected to Category 1. I may, I have the option of coming in and proposing an alternative approach to say it's protected further than that, but I don't have to do that because I'm okay as long as I make it Seismic Category 1.

MEMBER BLEY: I mean the concern is a simple one. If we're putting in one more like the others that for some common causes failed, why are we making people do that? It doesn't gain them anything. If we're putting in something different that's somehow not going to fail to that same event, then that gets us something.

MEMBER STETKAR: But you ought to tell them that they need to do that, not just to say, well, you might want to think about this or you might want to think about that.

MR. ASHLEY: I think equipment that is designed to Category 1 will have this level of protection that we're talking about or margin.

MEMBER RICCARDELLA: But that's what I was getting at. You design to one level, but it can -- typically something that's designed for one level can survive something larger than that in a seismic margins analysis.

MEMBER BLEY: That's absolutely true.

And in the real world there's lots of examples of that, but the other two that we've already got are designed that way. So adding another one, if those have been failed, the earthquake was big enough to get them.

MEMBER STETKAR: I have a new plant, four trains of AC power, four redundant identical emergency diesel generators all designed, installed, constructed, maintained to Seismic Category 1. They all have that exact same margin because the same design people --

CONSULTANT SHACK: But as Pete says, it means that they have a low probability of failure at 1.67 times the SSC.

MEMBER BLEY: That's true, but they've already failed.

CONSULTANT SHACK: Right.

MEMBER STETKAR: But why do --

(Simultaneous speaking)

MEMBER STETKAR: No, wait a minute. Why is my plant more reliable --

MEMBER BLEY: But you need it if they haven't already failed with five.

MEMBER STETKAR: Why is my plant more reliable by definition if I put in a fifth one of those same things?

MEMBER RAY: Because the fifth one isn't located and connected the way the other four are.

MEMBER RICCARDELLA: And it depends on what you mean by diverse and independent.

MEMBER RAY: There's no requirement of that.

MEMBER BLEY: No, that's correct. I'm just making a statement. If it's different enough so that it will see a different earthquake, that's a clear point.

MEMBER STETKAR: It's located a mile-and-a-half away, or some place that's got better --

MEMBER BLEY: Somehow a better protected location.

MEMBER STETKAR: Yes.

MEMBER BLEY: So it's different acceleration.

MEMBER RICCARDELLA: It hinges on the definition of "diverse and independent."

MEMBER STETKAR: That's what we're talking about though, because if I read the words, I interpret these words as I could have a five-bay diesel generator building that's got my four emergency diesels in the first four bays, a fifth bay that's got my super

good diesel in it that's -- all the concrete -- and I won't even call it a diesel. I'll call it a gas turbine just to avoid the diversity thing. I'll call it a gas turbine. It's mounted all the same way, it's got the same mass, it's at the same level. Its wires run out of that building perhaps to a different set of switch gear that is again designed to that same safe shutdown earthquake. And why does that fifth bay by definition buy me more safety than the first four?

MR. McKIRGAN: So, Mr. Chairman, this is John McKirgan. If I could, I think we've gotten some good feedback from the Committee on this particular point. We're also anticipating a lot of healthy feedback from other stakeholders. And certainly not to cut off the discussion, but I think we understood the issue very well. And I think there's another slide yet that might also engender some good healthy discussion. So with your permission perhaps we could just move on.

MEMBER RAY: Maybe we can, but let's see. John, I think still I want to say I think there's an assumption here that as robust as your five diesels all are, the one we're talking about isn't vulnerable in the same way as the other four because it isn't just in a fifth compartment. Now, am I wrong about that?

MEMBER CORRADINI: No, I just think John's point is very simple. Just be specific as what the hell you want them to do.

MEMBER RAY: I understand, Mike, but the point is I just wanted to see if we were perceiving this in the same way or if we thought this was just one more of what you already have. I don't believe it is.

CHAIRMAN SCHULTZ: That's what we would like to see, but that's not how it's described in the guidance.

MEMBER STETKAR: It's not how it's described --

(Simultaneous speaking)

MEMBER BLEY: If you did what John said, you would meet the words.

MEMBER STETKAR: That's right.

MEMBER RAY: If you had a spare bay. You could just build one to have one.

MEMBER BLEY: Okay. All right.

MEMBER RAY: You could do that. So our problem then isn't with what we believe people are assuming here. It's with how it's described and what the requirements are.

MEMBER BLEY: Well, Harold, in various times in the past when we've talked to people, we've

had people tell us, no, they're going to make it somehow different. And we've had other people say it would be perfectly okay if it were exactly the same in Seismic Category 1.

(Simultaneous speaking)

MEMBER STETKAR: And in fact some people might argue that if they make it different enough, they might have to then justify to the stuff why making it different enough is okay. So it's okay to make it the same because the staff would accept something that's the same.

MEMBER BLEY: By the word, that's what it looks like.

MEMBER RAY: Okay. I get the point. I just wanted to make sure at least I understood, but that -- yes.

MEMBER CORRADINI: I was going to say, but I think your point at this point is fuzzy. And so somehow it seems fuzzy enough that it's got to be cleared up, otherwise I'm not sure where it lands.

MEMBER RAY: Okay.

MEMBER BLEY: We've also heard on many occasions on different things from analysis to equipment to making some changes that would be useful to perhaps a computer code to make it more up to date.

If I do that, it's going to take me six months to get it approved. And if I use a thing that's not appropriate but is approved, I'll get it done right away. And that's what I'm going to do. So we've got things that pressure us toward the side of the easiest way to get approval. And those things cost a lot of money and effort if you go outside of those criteria. And what we've seen here is something written down that we can't quite reconcile that it makes you do the things we're suggesting would be good.

MEMBER RAY: Okay.

MEMBER BLEY: But back to their point, I think we've talked about this a lot.

CHAIRMAN SCHULTZ: We're good to move on.

MEMBER BLEY: Thank you.

CHAIRMAN SCHULTZ: But we have set our expectation. I think that clear as well.

MEMBER BLEY: On behalf of members. individuals, yes.

CHAIRMAN SCHULTZ: Individual members, right.

MR. ASHLEY: Thank you for that feedback.

The NRC position for applicants for new nuclear power plants regarding shutdown and refueling modes is considered to be an enhancement to the guidance

contained in NEI 12-06. The probability of an extended loss of AC power concurrent with the loss of normal access to the ultimate heat sink occurring during any specific outage configuration was expected to be small, however, as seen in shutdown and full power probabilistic risk assessment for new nuclear power plants, shutdown core damage frequencies and the large release frequencies are comparable to full power core damage frequencies and large release frequencies. So therefore, we thought it was appropriate that the positions outlined in Appendix A apply to all modes, including the shutdown and refueling modes and applicants for new nuclear power plants should address shutdown and refueling modes at the design stage.

MEMBER STETKAR: Clint, I'm really glad you put that in there. I did have a question about some of the words in Section A. In particular it says, "The strategies should address any challenges to the containment function in all modes of plant operation in which containment is required to be maintained." That to me says that if I don't need to maintain containment for my normal Mode 5 or Mode 6, or whatever the heck it is, typical operational events, then I don't need to worry about restoring that containment function for my FLEX strategies. Is that correct?

MR. ASHLEY: I wouldn't view it that way. And Marie Pohida --

MEMBER STETKAR: The reason I asked the question is that's the way I read this.

MR. ASHLEY: Okay.

MEMBER STETKAR: And here again, if it's created a question in my mind --

MR. ASHLEY: Certainly.

MEMBER STETKAR: -- would people use this to their benefit to --

MR. ASHLEY: Certainly. And so --

MEMBER STETKAR: -- say I don't need to address those conditions?

MR. ASHLEY: We have Marie Pohida, who helped craft this section of the guidance.

Marie, did you hear --

MS. POHIDA: Yes, I heard the question.

MR. ASHLEY: Okay.

MS. POHIDA: This is Marie Pohida from the PRA Group in NRO. For the advanced PWRs, advanced light water reactors, many of them have added containment closure tech specs for reduced inventory conditions. So that would be one area where we would want to see that containment closure be maintained as a part of ELAP.

And for BWRs there has been no upgrade to tech specs in cold shutdown or refueling conditions. So in that respect, for ELAP for BWRs we'd have a containment closure capability only when containment is required to be operable. Does that help?

MEMBER STETKAR: No. And I haven't thought enough about all the scenarios, because I haven't -- I just stumble over the words here. The question that I have is if I have one of these beyond design basis events during a condition when I'm not required to have containment integrity for the normal reasons that I think about during a cold shutdown or an outage, are there conditions where I can get into trouble in the core because of loss of all AC power that would result in core damage where it would be good to restore the containment function by closing the containment? And people will say, well, I'm not required to have that capability because I can have all of my -- pick a designation -- AC power sources to work the crane to close the hatch. I don't need those during this condition because I'm not required to have them. Follow me?

MS. POHIDA: No, I'm actually following you. I'm trying to think. It gets a little sticky. For BWRs once you've removed the drywell head --

MEMBER STETKAR: Yes.

MS. POHIDA: -- which is part of primary containment, that would be a fairly difficult challenge to do given an ELAP situation.

MEMBER STETKAR: Yes.

MS. POHIDA: Okay? For PWRs it's a little bit different. What we want to do is when -- when a PWR is in reduced inventory condition, the timing to core uncovery and core damage can be fairly rapid. The PWRs have containment closure tech specs to button up the containment before steaming inside containment. So that according to this guidance they would have to maintain that capability following an ELAP event. Does that help you?

MEMBER STETKAR: A little bit, but not quite, because you talk about the timing and things. That's for the events that you've looked at, drain down events from Italy, for example. There are many other scenarios that can occur that are not drained out from Italy which can also get the core into trouble. The time might be longer. It's not going to be instantaneous. It's not going to be forever. And I don't know.

I'm only asking the question, because as I've said, I've not run through in my mind or even in

practice the types of scenarios that could get you in trouble and the timing of those scenarios under conditions when the tech specs don't require you to have the containment closed, whether it's PWR or BWR. And I don't know whether this caveat in here leaves any potential vulnerabilities that could be taken advantage of. I just don't know. I stumbled across that and it was kind of a funny-sounding thing. I get it from the point of internal events, at shutdown risk assessment stuff, but that's not what we're talking about here.

MR. ASHLEY: We'll have to take that under further consideration.

MEMBER STETKAR: And you're right, it it's onerous. I know I got to put the drywell head back on very quickly anyway. And I may not be able to move the equipment hatch back in place and seal it very quickly.

MR. ASHLEY: I think the focus here is on preventing core damage from occurring. And so in the sense that what Marie described with the BWR example, not putting the head back on doesn't really have any consequence.

MEMBER STETKAR: And I agree with that. I prefaced it by I'm really happy you put the guidance in that it has to apply to refueling and shutdown modes

that I need to make sure that I can keep the -- prevent core damage during those modes and that I need to think about the ability to restore the containment if it's not there. It's just a question of how far does that containment go?

MR. ASHLEY: That concludes my presentation slides there.

CHAIRMAN SCHULTZ: Are there questions or comments from the Committee on this topic?

(No audible response)

CHAIRMAN SCHULTZ: All right. With that, I'd like to move to the next topic before we break, So Steve and Randy, would you like to come forward and exchange places with the staff? We'll move into spent fuel pool instrumentation.

Steve, are you going to lead off or is Randy?

MR. KRAFT: I shall, Mr. Chairman.

CHAIRMAN SCHULTZ: Thank you.

MR. KRAFT: Very good. Thank you, Mr. Chairman. As indicated, I am Steven Kraft from the nuclear industry. You all might wonder why I called you together today. We wanted to see you again. We don't come here often enough.

MEMBER STETKAR: But it's so pleasant when

you do.

MR. KRAFT: Dr. Stetkar, I always look forward with great anticipation to sitting in the back of the room and listening to other people enjoy your --

(Laughter)

MR. KRAFT: -- and hoping you'll go overtime and leave us off the agenda altogether.

CHAIRMAN SCHULTZ: Didn't happen.

MR. KRAFT: No. I would note for general interest that we have not visited spent fuel pool instrumentation for quite a while, so it's not a bad idea to talk about it. And I am accompanied today by Randy Bunt from Southern Company. Randy and I have grown old together working on --

MEMBER BLEY: Just the last couple of years.

(Simultaneous speaking)

MR. KRAFT: -- past Fukushima. I used to be 6'5" with a full head of hair. I have pictures to prove it.

In any event, so let's move on. We have another session after this one, too.

One of the questions we got asked is had we revised the guidance NEI 12-06 for spent fuel pool

instrumentation since Rev. 1 was issued. And the answer is no. There's been no need to do so. You can see here from the status the dates have been provided. The important thing is at the bottom. At the end of 2014, 18 units have completed their installation of SCPI. At the end of the refueling outages in the spring, Randy, you were telling me you thought about half were done?

MR. BUNT: I think we'll be close to about 50 by that time.

MR. KRAFT: Yes, it tracks FLEX somewhat except that FLEX does have exemptions for a variety of reasons typically on the BWR side, the vent water and on the PWR side the RCP seals that don't affect this, and so people moving along. And fully all will be done by 2016.

There are three vendors involved, all radar-based technologies of one kind or another. And I would point out; and this is just an example of what happens when we get involved in these things, the initial staff informal over-the-phone estimate for the cost of installing at one unit was $250,000. I received a phone call one Saturday asking me that question. And after I stopped laughing, we went through some of the costs. It is now in the 3 to $5

million range per unit.

MEMBER BROWN: What do you expect from radar stuff? I mean, my God, you've got a -- there's a float and a hard set of wires going out to little red lights. I've done this for about 25 cents.

MR. KRAFT: Absolutely.

MEMBER BROWN: I'm being a little bit facetious, but --

MR. KRAFT: No, you're not being facetious, Dr. Brown. I am absolutely --

MEMBER BROWN: Everybody has to go high-tech instead of doing some very simple qualified --

(Simultaneous speaking)

MR. KRAFT: I'll tell you exactly what the problem was.

MEMBER BROWN: -- thing.

MR. KRAFT: First was --

MEMBER BROWN: Excuse me.

MR. KRAFT: First was -- yes, I plead insanity all the time. First was, frankly the requirements grew at the very last minute. There were uncomfortable discussions, I would say; Randy --

MR. BUNT: Correct.

MR. KRAFT: -- about seismic and shock and

vibration that we had to accommodate. And secondly, when the utilities began looking at these simplified technologies -- frankly, I'd like the camera WiFi'ed out to an iPad somewhere, tell you the truth. But no one wanted to attach anything to the pool liner. So once you've got a cantilevered unit over the water, then you're almost talking radar by definition.

So the question there became which ones would be applicable? Don't ask me to describe the technologies. I had to sign non-disclosure agreement with all three vendors and I don't know where I cross the line into technology I shouldn't talk about. But it is sufficient to say that they are, as Dr. Brown points out, very high-tech in their application.

Rev. 1 was endorsed by an ISG in 2012. There were six technical clarifications and exemptions. I believe this was the only ISG of the three that endorsed the initial guidance orders that had technical clarifications. And that was because there were items, as I referenced, particularly in seismic that we that we just simply didn't agree with. And while NRC has a right to impose requirements, we were not going to write them into our own guidance if we thought they were not appropriate, which doesn't mean that they should not be adhered to, of course.

The new rule will make this all generally applicable. And I will say that that's whereby hangs the tail at the end of this discussion where we do have some concerns, and of course this Reg Guide we're looking at.

When I looked at the ISG and the new Draft Guide; and I literally did on my desk with a ruler word-to-word comparisons because I was looking to see if I was missing anything, because a brief read looked okay, I found two differences that are worth mentioning. This first one is not nearly very important, but we referenced the -- to demonstrate reliability and the ease of change-out of the devices in NEI 12-02, that they needed to demonstrate -- I'm sorry. Back up. I'm saying that wrong. Reliability had to be demonstrated during the event. NRC staff comes back and says, no, no, during and following the event. I don't think that's too logical. Randy and I were talking about this yesterday. I --

MEMBER BROWN: Why would after the event not be common sense?

MR. KRAFT: Because I think it may have been a drafting error on our part. I mean, I've to go back in my memory.

MEMBER BROWN: Not in my thought

processes. We were having this discussion earlier. Months ago. Maybe a year ago. I can't remember how much long ago it was.

MR. KRAFT: And what -- I'm sorry.

MEMBER BROWN: I mean, why wouldn't you -- well, you saying following with the -- I read some words in the old 12-02.

MR. KRAFT: Yes.

MEMBER BROWN: It shall be required to be functional until additional off-site resources can be obtained. At some point you can have it off.

MR. KRAFT: That's correct. Once you've re-powered your existing systems, I suppose.

MEMBER BROWN: Well --

MR. KRAFT: But you said -- but we -- if following is a requirement, we did not pick up that change. And I have to say it may have been a drafting error on our part not picking up that change. But the important point here is not to argue that, but when you look at DG-1317, they went back to "during" and left out the "following," which I'm assuming was because of a redrafting error on their part. So it just needs to be fixed. No big deal to pick that up. I recommend the language from --

MEMBER BROWN: You're not arguing with

"following the event?"

MR. KRAFT: No. No, I'm just pointing out that there was a difference in the language.

MEMBER BROWN: During the event and after the event.

MR. KRAFT: Absolutely.

CHAIRMAN SCHULTZ: Any difficulty with the choice suggested?

MEMBER BROWN: I think the bottom line is where we want to be.

MEMBER STETKAR: On, no, this is the bubble a little bit. This on the other hand, if I can point out, just raising this view graph and discussing "during and following" versus -- those three words within different versions comes back to what I was reading before. People apparently hang on every nuance of every single printed word in each of these documents.

MR. KRAFT: If you like this one, wait until the next one.

MEMBER BROWN: It's a good example.

MR. KRAFT: We do hang on every word because every word is meaningful. And I remember being in meetings on these orders a long time ago where we questioned the inclusion of a paragraph and were told,

oh, it's boilerplate. And my answer was if it's boilerplate and has no meaning, remove it. It has meaning. The fact that the engineer didn't write it and the lawyer wrote it doesn't mean it deserves derision. It means it has meaning the engineer needs to understand.

So that takes me to the last slide and the last issue. We have a reference in our guidance about the use of -- I mean, we say commercial components throughout the document, which we wanted to be simple, off-the-shelf kind of technology. And we said commercial components shall -- we made it a shall. Now, this is about "shall," "should," "may." People who write language for regulations and guidance, words like "shall," "should," and "may" are very, very big deals, because they mean things. And to the point that the Committee are making, they mean different things to different people and get interpreted differently and then get used and abused in ways that are not okay.

So here, staff came back and said, no, no, no, we want -- it's a you may choose, may consider commercial; so it is a permissive, not a must, and you may choose safety-related. So it is a permissive, kind of an indication that maybe we'd like you to think about safety-related. However, look what they did when they

issued DG-1317. That second "may" became a "should," should consider safety-related.

So think about what we're doing here with this spent fuel pool instrumentation. Should have been simple, easy, beyond design basis. Safety-related requirements do not apply if you were out post-Fukushima at all. Why would you now apply them here?

Now you could argue it's a "should." When you put a "should" in a requirement, what happens is that at the plant level the modification engineer reads it as a "shall," because if he or she doesn't, he's arguing with an inspector as to why they made the choice they made.

CHAIRMAN SCHULTZ: And let me interrupt you just because I don't know. These are important points you're making. The only place I've seen these very clearly defined is in say an ASME standard where "may" doesn't mean much at all, "should" means we'd like you to, but you don't have to, and "will" means, yes, you're going to do it, or "shall" means you're going to do it.

MR. KRAFT: There is a --

CHAIRMAN SCHULTZ: But that's not regulation. I don't know what they mean in regulation.

MR. KRAFT: There is a memory I have from many years ago looking at some NRC document that said when the standard -- it may have been when I was on an ASTM Committee 40 years ago. When the standard says "may," "should," and "shall" the way you described it, it gets read as "should" and "shall." Now, I'm not speaking for NRC, but I remember reading something like. Certainly that's the way it gets interpreted. So this is regulatory creep.

And when you read this language in conjunction with the use by NRC paragraph, which are the future-fit requirements, not going to be imposed back on any current licensees, all good. But the moment you change the technology -- so 10 years from now we want to change these out, there's no technology, maybe technology that's easier to maintain, more reliable, whatever, you change the licensing basis, all of a sudden this may pop up as applying. So it is not consistent with principles of the regulation, all that stuff. And we recommend going back to the use of the language they had in the ISG.

So I was thinking we would capture this in a comment letter, except didn't I read on a slide earlier today that when the draft language is -- rule language is issued for comment, the Reg Guides come out

final? So there's no comment period?

Tim, what is that?

MR. REED: No, the Draft Guides come out final.

MR. KRAFT: I thought so.

MR. REED: The Draft Guides go from proposed rule to final.

MR. KRAFT: That makes sense. I thought I read somewhere in one of these slides that it would be the -- maybe it the Final Draft Guide. Maybe that's what that meant. That would be fine.

MEMBER BLEY: Steve, before you pick up all your stuff, if I understood you right, the reason all or many have gone to these radar systems for 5 million bucks, for God's sake, is they don't want any penetrations and they don't want any equipment dangling in the pool.

MR. KRAFT: They don't want a penetration or an attachment to the pool liner. Dangling over the pool you get stuck with when you do this -- by the way, I should say so I'm not misrepresenting and I don't get vendor calls tomorrow, the vendor prices costs are not that 5 million. It's the total job, 2 to 5 million. And I know you have some experience there.

MR. BUNT: Great. But it turns out that

when you look at all the criteria and all the conditions that have been applied through the negotiations and getting to the 12-02 Guidance Document, that to comply with that, the simple changes were not acceptable. They had components that would not give you the results that you were wanting. The bubblers were not acceptable when you looked at it.

MEMBER BROWN: But the accuracy of these was like plus or minus three feet or some God awful, terrible number. I mean, you could barely tell any concept of whether there was water in the pool or not. It could almost be drained before you knew it.

MR. KRAFT: Well, in fact I thought it was the opinion of the Committee in our verbal exchanges back two-and-a-half, three years ago, because the guidance and the order said you can do three discrete points and lights. Well, you can't buy level technology like that anymore. It's all continuous. So it's all continuous, so we did --

MEMBER BLEY: That's why we were saying why in the world are we specifying it that way? I guess the train has already left the station on this stuff, but some of the simpler stuff, although you might have something in the pool, if you have no DC or AC control power, or whatever is powering these systems, you could

still hook something up and get a reading, where with this radar thing you --

(Simultaneous speaking)

MR. KRAFT: No, there's battery backup. Have to have battery backup for each --

MR. BUNT: They install battery backup --

MEMBER BLEY: Will do it? Okay.

MR. BUNT: -- that has it. And then you have to have a second power source to it. That was also part of the criteria. And we chose the large span in the instrumentation because of the functionality in the slow-moving event that would be demonstrated by this. Basically it said when you're within the normal level and 10 feet above the pool, you wanted to have fairly reasonable accuracy. But then once you get past that you, you really just want to know am I -- is the water makeup I'm doing making progress? Is it going into the pool and not going out a hole, or is it going to a hole? So that's why that longer duration or bigger span was when you got closer to the fuel.

MEMBER BLEY: I think we probably understood that, but we were thinking almost anything you can get will do a lot better than that.

MR. BUNT: Correct.

MEMBER BLEY: You'd almost have to degrade

something to get that kind of --

MEMBER BROWN: And also, there was like one foot when you got down close to the top of the -- no --

(Simultaneous speaking)

MR. KRAFT: It got closer. It was more --

MR. BUNT: One foot for the first --

MEMBER STETKAR: It's one foot between what they call Level 1 and Level 2, and then 32 over the remaining 10 feet above the top of the --

MEMBER BROWN: Well, at the top it was a much wider band. As you got closer to the top of the fuel, it got tighter.

MEMBER STETKAR: No, it's exactly opposite.

MEMBER BROWN: Yes, and I thought that was idiocy, but that's okay also.

MR. KRAFT: Well, because you're going to start putting water in long before that point.

The other thing that's worth mentioning; and this is a piece of confusion that a lot of people have in our industry as well, is that the Spent Fuel Pool Instrumentation Order was not about adding water to the pool. It was about telling the decision makers whether you could ignore the pool or how to do something

with it. The fact that that same signal is informing mitigating strategies, whether you should turn a pump on or not, is not covered by this order. It's a different question. And again, words are important. That drives different requirements into different locations that we always get confused about. So I thought I'd just point that out, that it is really for a different purpose. If it was meant just to tell you level in the pool, it would have included mitigating strategies in the first place. And it wasn't.

MR. BUNT: And the reason that we did have the tie to the top was because it was for the decision makers so that you could determine is it really blow-off or is it a leak and a hole? So you need that early -- once you get to within 10 feet, it's like I already know that it's going faster and I need to put water back in. So I'm really just looking -- am I putting water in as fast as I'm losing it, or not? And that's why the bigger gap at the bottom.

MEMBER STETKAR: Do you, Steve -- and I know that you have to be careful about the designs, but I would assume that the designs that are actually being installed has the same resolution over the entire span, or are they actually tuned somehow to have different resolutions?

MR. KRAFT: No, no, my understanding they have the same resolution.

MR. BUNT: They have the same resolution, however, some of them as the water level changes and all, the resolution is going to change also because of the functionality of it. So you are going to have some difference in the calibration capability as it changes.

MEMBER STETKAR: Okay.

MR. BUNT: So that's part of it. But it's still much more refined than what's required.

MEMBER STETKAR: Yes, I was going to say I don't want to split hairs on the technology, but it's not the difference between an inch in one case and 12 feet in the other case.

MR. BUNT: Correct.

MEMBER STETKAR: Okay.

MR. BUNT: And we wrote the guidance early on because we weren't sure if there wouldn't be a simple float solution that might pass, a bubbler solution. But it turned out that for all the criteria we had with all the seismic and all the hydrology and everything else that it looked like that was the one that was driving more of the cost than the actual technology itself.

MR. KRAFT: One unit did a small test with a bubbler. And it was a PWR unit. And what happens is that the bubbler size is small enough that you played out the boron in the spent fuel pool and it clogs it up. So something really simple kind of got taken out of consideration. A lot of plants like bubblers. They're very used to them and really a good solution.

MEMBER BROWN: It plays up the boron?

MR. KRAFT: Yes, and it clogs up the little tubes.

MEMBER BLEY: No, it would do that. I mean, they use them a lot in chemical plants, but they work fine there if you don't have something that will play out.

MR. KRAFT: One unit did a test and that's what they discovered. And that OE went around the industry so people would stop looking at bubbles.

CHAIRMAN SCHULTZ: Other comments or questions from the Committee for the industry?

(No audible response)

CHAIRMAN SCHULTZ: We're going to hold the staff presentation on this topic until after a break. I'd like to take a break now. Off the record until 3:25.

(Whereupon, the above-entitled matter

went off the record at 3:10 p.m. and resumed at 3:26 p.m.)

CHAIRMAN SCHULTZ: We'll come back on the record with the staff presentation. Eric Bowman is going to make that presentation.

MR. BOWMAN: Thank you. This is Eric Bowman again, Special Adviser in the Japan Lessons Learned Division for those of you that don't know me. I'll be discussing the draft regulatory guidance on the wide-range spent fuel pool level instrumentation.

In this draft guide we propose to endorse NEI 12-02 Revision 1 as was done earlier in JLD Interim Staff Guidance 2012-03.

The current status of it is that we have a draft of the draft reg guide that we finalized and published in conjunction with the publication of the proposed rulemaking package.

The SECY number for the proposed rulemaking package is SECY-15-0065. It was delivered to the Commission on the 30th of April. It should be made public in about another week or so.

Our intention with the Draft Guide 1317 is to carry forward exactly the same clarifications that were made in the interim staff guidance.

We've heard NEI's and industry's comments on our staff positions in the draft guide as it compared to the interim staff guidance. And we'll take a look at that and see if it needs to be adjusted prior to publication.

CHAIRMAN SCHULTZ: Prior to publication as the final draft.

MR. BOWMAN: As the draft guide. The other two reg guides that we discussed here wouldn't be final regulatory guide until the actual publication of the final draft guide.

CHAIRMAN SCHULTZ: Right. Okay.

MR. BOWMAN: So that really concludes my discussion unless you have any questions.

CHAIRMAN SCHULTZ: No more detail than that. You enjoyed the break.

MR. BOWMAN: I did.

(Laughter)

CHAIRMAN SCHULTZ: I want to call on Tim Reed just to assure that -- what we said about this draft guide, it is the same for the others in terms of how the guides are going to move forward.

So, just thinking about whether the committee, the full committee would have the

opportunity to comment on the draft, on the guides.

We could comment now. We also have full opportunity to comment on the -- for the final draft rule.

So, could you comment on that? Just reaffirm that.

MR. REED: Yes. As Eric said and it's mentioned a couple of times today. The QFS regulation process is to publish draft guidance with a proposed rule, final guidance with a final rule.

That's what we're trying to do here. So, we're trying to get a complete set of draft guidance out with the proposed rule.

It's a little different than the proposed rule because the proposed rule as you all know is now with the Commission. That's something the Commission deliberates on.

The draft guidance is made available to them. But the real process thing is to put the draft guidance out with the proposed rule.

So now we have to try to time it if you will given we have a Commission on July 9. We're trying to figure out when we get that SRM, how long it takes us to revise the package, get it to the Federal Register.

That becomes a date if you will when I want to get all this draft guidance together at the same time so it goes out for comment.

And the committee has the opportunity of course, as well as everyone else, to comment throughout that process and into the final rule if you like. So, that's the goal here. Put out the draft guidance.

And I think it was Eric mentioned earlier, the whole intent here is to ensure that there's sufficient information to support the entire proposed regulatory framework so the stakeholders understand both -- we understand what we think is a simple way to comply with the rule, but also it tells you something about the rule provisions themselves.

And they really work back and forth. You get an opportunity to if you will resolve discontinuities between the proposed requirements and guidance that sometimes happen in proposed rules. So that's the idea.

So we're trying to follow our practice to the maximum extent possible. I think you're well aware we have some challenges in some of the reevaluated hazard guidance that we're trying to address.

CHAIRMAN SCHULTZ: Okay, thank you very much for the clarification.

MR. REED: Sure.

CHAIRMAN SCHULTZ: Well, the information and the clarification. I heard both. Thank you.

Any other comments or questions for Eric from members of the committee?

(No response)

CHAIRMAN SCHULTZ: So we'll make a quick change-out again. While you move from the table, Eric, and NEI comes up for the next discussion, just a reminder that we are shifting gears here now and moving away from the rule related to mitigating strategies and onto a discussion related to containment venting, hardened containment venting.

Again, as I mentioned in the introduction this morning, we wanted to hear from the industry and from the staff the information related to this topic.

And specifically -- Steve, you can move right up while Eric moves out.

When we met last the subcommittee heard a briefing from industry and from the staff. The full committee did as well.

We did not have available at that time the

final versions of the documentation that was produced as a result of those discussions. And so we wanted to have the opportunity to meet today and learn, having seen the final documentation learn from industry and from the staff were there any changes, any additional information that ought to be presented to the committee. And we wanted to have the opportunity for this, again, more detailed interaction.

So with that I'll turn the discussion to and introductions over to Steve Kraft from NEI.

MR. KRAFT: Well thank you, Mr. Chairman. Once again, we liked it so much 10 minutes ago we came back for more. My friends were jealous so I brought them with me this time.

Again, we are shifting to a discussion of the vent water guidance not included in the mitigating strategies rulemaking which just to clarify for our understanding.

I'm accompanied by people you have met before. This is Phil Amway from Exelon. Phil will take the primary lead in our presentation.

Phil as you know is the primary author of NEI 13-02 Rev 1.

Jeff Gabor from ERIN Engineering and Randy

Bunt from Southern. You've met these folks before.

I just would like to compliment the committee. When we came back from lunch we were two hours behind schedule. We are now not even a half hour behind schedule. So I'm happy to report that we are moving along.

CHAIRMAN SCHULTZ: Let's try to work on that a little bit.

MR. KRAFT: Since Dr. Powers said that I should remind everyone that at 7:30 this evening the puck will drop on Game 4 between the Capitals and the Rangers, and I am going to be home in front of my television set watching that.

CHAIRMAN SCHULTZ: All right. Well, that's up to you to keep us on schedule.

MR. KRAFT: Absolutely.

MR. AMWAY: Okay. So, really the focus of our presentation today is to update you on changes made to NEI 13-02 since last time we met on April 10.

During that last meeting we went through a number of changes to bridge the gap from draft 0E2 which is the original draft that you saw, to 0F4.

And then there were some additional changes made from 0F4 to Rev 1.

The progress that has been made since then. ISG-JLD-2015-01 was issued on April 30. We also issued 13-02 Rev 1 on April 23 in support of the issue of the ISG. That draft, or that revision now, not a draft, resolved the remaining NRC staff, ACRS and stakeholder comments.

And in the ISG there are no technical exceptions. There are some exceptions and clarifications, but none that will impact the technical implementation of the guidance contained in 13-02 Rev 1.

Some changes that we did make since the last time we met was we strengthened our discussion on the RPV addition point as the preferred source of water addition for SAWA strategies.

The goal there, or the rationale for that is that the RPV addition point reduces the impact of the uncertainties related to core relocation. We had discussed in the last meeting the potential that not all the core debris exits the reactor vessel. Some of it may hang up on components and structures between the bottom of the reactor vessel and the drywell floor. So we made a modification to that discussion and we'll see that in the next slide.

OIP templates, they will contain plant-specific details related to Phase II implementation. The specific details that we'll include in that OIP include such plant-specific details as spillover height, the freeboard volume and the water addition rate. The water addition rate, we had the generic values 500 gpm, 100 gpm reduced over time and we had the clarifications in there for plants that have RCIC systems, designed flow rates less than 600 gpm that we can use the 400 or 450 gpms that those plants are rated for, or the process of ratioing and scaling the flow rates based on a comparison of the plant that's implementing to the reference plant power level that was used in the generic guidance.

In terms of the EPRI technical assessments we just wanted to point out that the EPRI technical assessments supporting the CPRR rulemaking effort do not credit drywell sprays in terms of release reduction.

The use of drywell sprays is contained in the SAMGs where that's applicable and appropriate using sources that are not required for the RPV injection.

So, I mean just going back to our discussions this morning on procedures integration,

the SAMGs provide a set of response actions to plant events that are symptom-based, and that there are water addition sources that are available to do containment spray functions. They would be considered in addition to whatever water addition sources we are using to implement the SAWA/SAWM strategies.

The SAMGs when in that case limit the use of sources outside the containment because the philosophy of the SAWA/SAWM strategies is to preserve that wetwell vent path. So if we're doing water addition sources from external to the containment you're actually raising or contributing to raising that water level inside your containment and result in a loss of that wetwell vent sooner.

Before I move on to the next slide, Jeff, is there anything else you wanted to add on this particular one?

MR. GABOR: No, I don't have additional.

MR. AMWAY: Okay, very good. For the specific change that we made dealing with the RPV as the preferred addition source what I have in there is -- starting at limits the impact of modeling. That's the actual bulleted item that was added, but it's under the header of RPV water addition as the preferred

addition source.

And that's where we added the text that it limits the impact of the modeling uncertainties. So that is actually contained in the guidance in 13-02 Rev 1.

This is the other change that was made. We added this up front in Section 1.2, the concern being that our analysis shows that we can protect the containment even if we delay water addition for up to 8 hours.

The concern being is, well, why would we wait 8 hours. Why wouldn't we put the water addition in as soon as possible. And in effect that's what our procedures would drive us to do.

But we want to make it clear for the designers that are looking at implementing SAWA/SAWM that they do look and consider in their designs the early deployment of portable equipment used to support SAWA/SAWM.

Obviously the sooner you can get water added the better off your plant response is going to be and the sooner you can stabilize and arrest the core melt progression.

So we did add some guidance up in the front

to do those considerations. We will make sure that we reinforce that at the industry workshops coming up for those plant workshops for helping the licensees implement Phase II in their Phase II OIPs.

In terms of endorsement and NEI 13-02 we don't see any technical concerns with developing the Phase II OIP. We can use the guidance in 13-02 Rev 1 to implement the entire order that's both Phase I and Phase II.

The sections that weren't endorsed, we'll still use them as the industry. We feel that those are important, particularly in the area of the Generic Letter 89-16 commitment guidance. Because for the plants that are committed to 89-16 the requirements of the order certainly satisfy the requirements we did under Generic Letter 89-16 --

MEMBER BLEY: Remind me about 89-16.

MR. AMWAY: 89-16 was earlier guidance for putting in a hardened vent.

MEMBER BLEY: And it had issues.

MR. AMWAY: It certainly wasn't severe accidents. The way I see it, you know, it's a hardened vent. It's not severe accident-capable. All the requirements that are outlined in the order and

implemented through 13-02 would do everything that Generic Letter 89-16 would require and more.

So those are just steps for licensees through how to change their commitments from an 89-16 vent to an Order EA-13-109 vent.

MEMBER BLEY: Not to beat a dead horse, but this reminds me of our conversation in the last session.

I mean, years ago we said just put in a hardened vent. But the reason we put it in was to deal with severe accidents, to prevent them and also -- and we didn't do that at the time.

And that's why this stuff we were talking about, adding a machine that just looks like the other machines, eventually that's going to come back to bite us and cost us more. That's all.

MR. KRAFT: I'd have to go back and reread that letter about how the comparison between the requirements and the language. And also this was a voluntary matter that got turned into a Generic Letter so that is a different process to get there.

So the issue here is not the value of the 89-16 vent. The issue here is that we had actually asked NRC to rescind that requirement and they said no, we've never reviewed that.

So we had to offer a way through the regulatory steps you have to go through to get one commitment to convert it to the other.

Otherwise, we don't know what you'd end up in terms of inspection space. So it goes back to that problem you were talking about before.

MR. AMWAY: And lastly, the EPG SAG information. We certainly feel that that's important to have that background information for the licensees to review and consider.

Because we are going to have to procedures to implement SAWA/SAWM. That's going to be primarily done through changes to the SAMGs.

In terms of our next steps we will develop an industry template for Phase II similarly to how we did for Phase I. We do plan to conduct pilot plan development of the Phase II OIP. That will occur over the course of the summer.

We'll wrap that up with our workshop in the September time frame. That'll give October, November for the individual licensees to develop their own site-specific OIPs in preparation to submit the OIPs by December 31 of this year.

CHAIRMAN SCHULTZ: Phil, is there a

schedule for the workshop yet?

MR. KRAFT: We are contemplating September or early October to do that. It has to be scheduled in with the BWR Owners Group meetings through that same period.

But it would be in the Washington-Baltimore area. I think Weidong attended the last few so we'd expect attendance as well.

MR. AMWAY: In closing the work that's been done in NEI 13-02 Rev 1 and the supporting ISG, that reflects a significant work effort on the part of the NRC staff and the industry to provide the guidance necessary to implement Phase II of the order.

And we are at a point now where I think we're ready to take that to the individual sites and get ready for implementation.

MEMBER STETKAR: Before you get comfortable I've got two or three questions that I had.

I actually did compare them side by side so there are more changes than you highlighted.

In Rev 1 Section 4.1.1.2.3 there's a discussion about if you have a plant where you don't want to install let's say the 500 gpm makeup capacity, the nominal makeup capacity.

It used to say that SAWA capacity less than specified in 4.1.1.2.1 or 4.1.1.2.2 should be supported by plant-specific analysis demonstrating containment temperature can be maintained at or below 545 degrees Fahrenheit.

And I understand what that means. To me that says -- I don't do these things, but I understand some sort of analysis.

And now it says SAWA capacity less than that specified in 4.1.1.2.1 or 4.1.1.2.2 should be supported by plant-specific design, i.e., SAWA flow rate determined by scaling, a ratio of the plant thermal power rating over the reference plant power multiplied by 500 gpm. That's a linear scaling. It also appears when you have the 100 gpm minimum flow rate.

And my question was, because I don't do the thermal hydraulic stuff. Other folks do. Is are we sure that a simple minimum scaling to say, well, instead of having 3,000 megawatts thermal I have 2,000 megawatts thermal, that two-thirds times 500 gpm is good.

Corradini is nodding his head it's okay. Okay. I didn't know why it was necessary to insert that simplification in there instead of saying do an

analysis. There must have been some justification for it.

MR. AMWAY: And the reason why we did that. I mean, it would have certainly been acceptable to say in there you can do site-specific analysis. And a site can still do that.

What we were trying to do was to simplify it, understanding that there are much smaller BWRs with much smaller core sizes. And instead of having them to go figure out how to do their site-specific map analysis, determine the flow rates required, we could simply do the scaling. We know what the thermal power rating of the plant is and what the reference plant was. And you can just do a simple hand calc instead of a map analysis.

MEMBER STETKAR: I get the philosophy. Because I don't do these analyses myself. Corradini is sitting over there hammering on little calculators.

MR. GABOR: Let me add, there's one element to it that's in the very recently released EPRI technical report for CPRR.

And that is the ratio of the power to the containment volume. And it turns out that for our reference plant that was the highest power to

containment volume ratio of all the plants.

MEMBER STETKAR: That also helps me. Thanks.

MEMBER CORRADINI: But if I might just go back. I remember I tried this -- since you identified me -- the 500 gpm is well over shutdown decay heat.

MR. GABOR: Yes, it is.

MEMBER STETKAR: Oh yes.

MEMBER CORRADINI: So then given that the scaling seems what you would try to do instead of hold it.

There was something else though that I wanted to go back to in slide 3 which is -- could you explain to me -- so you point out staff's assessments supporting -- did not credit drywell sprays for release reduction.

Use of drywell sprays is considered in the SAMGs sources not required by RPV injection. So not the 500 gallons per minute?

MR. AMWAY: Yes, it would be a separate source. And we're -- and I don't want to mix up, because we are so tight in Phase II with the rulemaking. But there's a distinction between what Phase II of the order is doing and what the rulemaking is doing.

We're trying to prevent containment overpressure-related failures as part of the order where the rule is containment protection release reduction.

So, in no case are we trying to look at drywell sprays as part of the order as a means of release reduction. It would certainly be an alternate -- it would only be an alternate path for SAWA addition that if you for some reason can't go to the RPV you would go to the drywell.

MR. BUNT: The comment here -- this is Randy Bunt -- is that because we're preserving the wetwell vent for as long as we can that if we brought in a large volume of water through sprays that would counteract that method.

But if you're doing a circulation inside containment pulling from the suppression pool and discharging through the sprays and that's the benefit internal --

MEMBER CORRADINI: That's the method you're thinking of?

MR. BUNT: Correct.

MEMBER CORRADINI: Okay.

MR. BUNT: So that would be the thing that

would not be an external source, but you would still get some benefit from the spray functionality of that -- have that capability for our core spray or some other function.

MEMBER CORRADINI: Okay.

MR. AMWAY: We are working on changes to the SAMGs. I mean, because you can't get there with today's SAMGs with what we want to do with SAWA/SAWM.

MEMBER CORRADINI: So let me ask a question that was going to be to the comment period at the end of the day but I'll ask it now.

MR. AMWAY: Okay.

MEMBER CORRADINI: Would it benefit the committee to understand all this via some sort of tabletop demonstration to us? So we get a feeling of how you guys have figured out integration and we just don't -- may not get it?

I'm trying to look at some sort of demonstration at least in my mind so I understand how all these things integrate relative to a what-if.

MR. KRAFT: So, Dr. Corradini, we would never suggest the committee doesn't get anything.

MEMBER CORRADINI: Well, that's very kind of you, but let's just say this member sometimes gets

confused relative to all the procedures we talked about earlier today and this one, and how they all fit together.

MR. KRAFT: We are actually thinking about that. We've been talking -- early today we had a private conversation with folks from Exelon. We think we can work something out.

I will tell you in advance it has to be a closed meeting. And the reason for that is that there will be about showing you certain products that are only available to certain people because of the way the owners groups operate.

MEMBER CORRADINI: That's fine. I understand.

But I guess that I'm getting a little bit ahead. But the reason I kind of went back to this is we had brought it up when you guys were last here.

And I just don't -- sometimes I can't put this piece together with this piece. And it seems like some sort of demonstration or talking it through with us so we can ask questions as you go through the demonstration to me would be very helpful.

MR. KRAFT: We thought a tabletop in this room using creative use of the screens behind us might

be valuable.

MEMBER CORRADINI: All right. Thank you.

MEMBER STETKAR: We have, by the way, in terms of logistics for subcommittees there's no problem closing those. We can even close a full committee meeting.

We tend not to like to close full committee meetings, but because the subcommittee is nominally a committee of the whole anyway that's not an issue.

MR. KRAFT: Very well. We'll work with your staff on putting something together.

MR. AMWAY: Any other questions?

MEMBER STETKAR: I had one little nit. In fact, I'm not even going to bring that up. That's a nit.

But you're still okay. It's an issue I raised during the previous meeting about confirming the fact that you have SAWA flow by remote valve position indication rather than active confirmation of flow either through a flow rate or change in level.

You didn't change the guidance in that. The guidance still says that the remote valve position indication is a way to confirm it. And as an alternative you could actually measure flow rate or

change in level.

MR. AMWAY: Yes, we -- I guess we talked about that quite at length. And --

MEMBER STETKAR: I just -- I mean, it's something you did not change, and I just wanted to make sure.

MR. AMWAY: We don't want to get overly hung up on a single indication that we got SAWA flow where we want it.

I mean, we're looking at having instrumentation in the flow path that directly measures flow from the pump we use for SAWA, the remote position indication, the containment water level response. There's a variety of indications that we need to use.

MEMBER STETKAR: Except for the fact -- I'll bring it back to the fact that people look at each one of these words and hang on each one of them.

The quote is, "Verification of a functioning SAWA flow path can be obtained from local or remote valve position indication in the main control room remote operating station or some other severe accident evaluated location for remote-operated valves." Period.

"As an acceptable alternative approach is

using a combination of indicated pump flow and changing containment pressure and/or suppression pool level for validation of an open SAWA flow path."

So if I as a professional skeptic read those words it says all I need is remote valve position indication. It doesn't say what you said orally.

What you said orally is the combination of the two, but not in the sense of an acceptable alternative as all of the other stuff you mentioned.

MR. BUNT: The reason we put it in that order, or one of the reasons we put it in that order was that the other is an indirect measure by measuring suppression pool level. And also because that's the required instrument and that's going to be in the guidance to measure that level.

We wanted to say that we prefer you to have the other indications because you're going to have level.

So the real distinction here is the local flow rate out of the pump versus the indication of the valve's opening and valve positions.

But we are going to be measuring suppression pool level changes which will give us an indication of the water flow and also the pressure

inside containment.

MEMBER STETKAR: For someone who once had a manager at a nuclear power plant call me from an overseas location and apologize because he never realized that a valve indicating open could in fact be closed I'll note that valve position indication is probably the least reliable of everything that you mentioned.

And indeed, it's listed as the primary source.

MR. BUNT: Understood.

CHAIRMAN SCHULTZ: I think the comments are quite valid. And I'll just go back to what we discussed last, and that was the simple scaling approach associated with determining how one might evaluate a flow rate for other units.

And my first reaction to that was, well, why is that acceptable. And two reasons were provided as to why that was acceptable. And then I felt very good about it.

But what still concerns me is the same type of thing that John is saying and that is could someone read what is provided here and presume that this type of simple evaluation might be applied in other areas

where you're trying to decide what would be suitable for a smaller plant and go off and calculate something wrong without understanding that there are reasons why this is acceptable for this particular application.

You just have to be very careful how things are presented and how they might be interpreted.

Now, you're going to have workshops, you're going to have discussions with industry and making the application plant-specific. But I'd just caution that those are very important discussions.

MR. AMWAY: I agree. And I think to address the condition and verification of SAWA flow we tend to take that into consideration as we develop the industry template to make sure that we're getting plans that consider the other options as well.

Because there's another section in there that says we have to evaluate the logic of the valves to make sure that they'll -- to make sure that it's not getting inadvertently diverted from another flow path within the system. So that would help as well.

But I certainly take the point that we need to look at our containment response as well.

And the overall integrated plans would also have some guidance on what the language and the

procedures are going to be.

And our current thinking right now is that that will be monitoring the flow rates from a standpoint of looking at containment pressure and suppression pool level as a functionality about them.

CHAIRMAN SCHULTZ: Other comments from the committee?

All right. We'll then move to the staff presentation on the topic. Raj, welcome.

DR. AULUCK: Good afternoon, my name is Raj Auluck. I'm an NRC project manager in the Japan lessons learned project division within the Office of Nuclear Reactor Regulation.

With me today at the table are senior technical staff members from NRR, Mr. Nag Karipineni, William Beckley and from Office of Research Dr. Hossein Esmaili.

In addition, staff members from NRR and Office of Research who participated in the development of this interim staff guidance are also present in the audience and they are available to respond to any of your questions.

The focus of today's briefing is to respond to the ACRS member questions raised at the April 10 full

committee meeting, and on the recommendations and concerns noted in the ACRS letter of April 30, 2015.

Before we begin our presentation I will very briefly go over the status and schedule for the subcommittee's benefit.

As you know, NRC Order 13-109 was issued in June 2013 and allowed implementation in two phases. Phase I includes upgrading the venting capability from the containment bedwell to provide a desirable severe accident-capable hardened vent.

And Phase II includes installation of a reliable severe accident-capable drywell vent system or development of an alternate reliable containment venting strategy that will make it unlikely that we will need to vent from the containment drywell.

The implementation phases were also different. For the first phase it was the second refueling outage that begins after June 30, 2014, or June 30, 2018, whichever comes first.

And for Phase II no later than startup from the first refueling outage after June 30, 2017, or June 30, 2019, whichever comes first.

As more for the background, the ISG for Phase I was issued in November 2013. All overall

engineering plans were submitted by June 30, 2014 as required by the order. The staff has also issues the interim staff evaluations in all of them.

As on this slide, this talks about the Phase II development, the ISG. The draft ISG was issued for public comment on March 10, 2015. And it reflected the information provided in the NEI guidance 13-02, the Revision 0E2.

The ACRS subcommittee was briefed on March 30, 2015 where the staff also provided some updated information as a result of further discussions with industry held at the March 16 public meeting.

It was close to the subcommittee meeting. The meeting was originally scheduled much earlier but had to be postponed because of the snowstorm.

The public comment period ended on April 9. There were only two comments received. The ACRS was briefed, the full committee was briefed on April 10, 2015.

Based on the comments received at that time the NEI submitted the advice to Revision 1 of NEI 13-02 for staff endorsement on April 23.

This revision includes resolution of staff's concerns and comments.

The Phase II ISG was completed and approved for publication on April 29 and is expected to be -- is scheduled to be noticed tomorrow in the Federal Register notice.

And the next bullet is the containment protection and release reduction we're making a regulatory basis expected to be issued for public comment towards the end of this month.

And the scheduled date for ACRS subcommittee briefing is June 25, 2015.

As a last note, Phase II overall integrated plan submitted by December 31, 2015.

With these comments I will introduce Nag Karipineni who is a senior reactor systems engineer in the containment and ventilation branch in NRR to start the presentation on the technical side.

MR. KARIPINENI: Thank you. Since the issuance of Phase I of the ISG what we have done is to the NEI guidance add some FAQS and white papers. A significant amount of them is the white paper on the calculation of doses to the operators and the conventional gas control to the pipe.

The focus has been on the severe accident water addition and severe accident water management in

Appendices I and C, respectively.

The guidance for the drywell vent itself basically follows the guidance for the wetwell vent. So there's not a difference there in that regard, the temperature's still the same --

MEMBER CORRADINI: Can you speak louder, please?

CHAIRMAN SCHULTZ: Is the mike on?

MR. KARIPINENI: Thank you. Go to the next slide. Slide number 4. This slide we are showing you before is the temperatures in the containment with no water addition.

As you can see, the temperature goes up to 2,500 degrees Fahrenheit in the pedestal region. And as the levels go up in the drywell the temperatures vary from 1,000 to 1,500 degrees here.

What we have not presented is the next slide before to you which is the drywell temperatures for a Mark 2 containment analysis we have done.

And here also the pedestal region is as high as 2,500 degrees. However, the lower regions sort of vary from 500 to 800 degrees. And my understanding is it's because of the bigger volume that those temperatures are lower.

In any case, this is what we call the model 1 drywell vent.

MEMBER POWERS: I'm a little unclear about a couple of things. There's not a part of the Mark 2 that I'm familiar with that makes the distinction between lower and upper. So I don't know where the bound. I mean, I just don't know where you're calculating here.

DR. ESMAILI: We have some backup slides if you want.

MEMBER POWERS: I mean, just tell me.

DR. ESMAILI: Okay, so this is the upper reactor pedestal, this is right below the reactor. Up until the, you know, where the -- right there.

MEMBER POWERS: Okay. Above the operational flow.

DR. ESMAILI: Here is the reactor. Here is the lower reactor. So, one is the drywell pedestal. One is the wetwell pedestal.

MEMBER POWERS: Okay. So this is a calculation like for LaSalle or something like that.

DR. ESMAILI: For LaSalle.

MEMBER POWERS: But not Susquehanna.

DR. ESMAILI: Yes. But we have done some

sensitivities later on that we feel that would work.

MEMBER POWERS: I just didn't understand that.

And then I noticed for the upper reactor's pedestal you've got a bunch of spikes in the temperature here that don't correspond -- there's no corresponding spike anywhere else. So there's something special going on here.

DR. ESMAILI: There are different flow paths, Dr. Powers. There are, you know, at that point the drain line has failed so there is an opening between the upper and the lower reactor pedestal.

There's also flow going through the -- between the lower reactor pedestal and the wetwell volume. And these are very, very small volumes.

So, what you see here is that there are changes of the flow. Reversal of the flow between these volumes can change the temperatures inside these regions.

Most of the debris, of course, is sitting in the lower reactor pedestal because once the drain line fails it goes in there. But because of the flow through the drain plug. And how much is in there will be connected. You will see some of these.

The volumes are very, very small. You know, we are talking about maybe a couple of hundred cubic meters compared to maybe 4,000 in the wetwell and about --

MEMBER POWERS: It's just that you've got these spikes in there --

DR. ESMAILI: So they would be down, yes.

MEMBER POWERS: -- on one curve and no corresponding spikes or even minor deviations anyplace else.

DR. ESMAILI: Right.

MEMBER POWERS: I mean, that's kind of remarkable. Because there's a lot of enthalpy in those spikes. I mean, to go from 500 to 1,200 degrees Fahrenheit is a fair amount of enthalpy in anything.

DR. ESMAILI: Right. I can, you know --

MEMBER POWERS: No.

DR. ESMAILI: -- flow paths. There are multiple flows connecting the upper and the lower reactor.

MEMBER CORRADINI: Can I ask the same? Is this the upper drywell head or the whole pedestal region?

DR. ESMAILI: The red line is just right

below the reactor. It's the drywell pedestal.

MEMBER CORRADINI: Oh, so it's not the whole drywell.

DR. ESMAILI: No, no, no. It's just about a few hundred --

MEMBER CORRADINI: All right, now I get it.

DR. ESMAILI: So that volume that you see right before --

MEMBER CORRADINI: Where the blue box is.

DR. ESMAILI: Yes, right. Where the blue box is, correct. Right here. This one.

MEMBER CORRADINI: Okay.

DR. ESMAILI: And this is only, you know.

MEMBER CORRADINI: Okay, fine.

MEMBER POWERS: It looks like to me what they assume is that the whole core melt comes down. That all that structure below is either consumed or ignored or something. There's no hangup on there.

And what I'd note, it'd be interesting to see what happens if you throw a bunch of core debris on that upper structure. And it would be frozen, but it would be hotter than a pistol, and any of the water you would put in you would turn into steam and be just

heated up up there fairly hot. That would be an interesting calculation.

But you didn't do that calculation.

DR. ESMAILI: We didn't do that because we don't have the models. We are trying to put similar models into MELCOR. We don't have that.

But even in this case, this is no water. This is without water addition.

MEMBER POWERS: Yes.

DR. ESMAILI: So you still have a very, very hot debris that can radiate.

MEMBER POWERS: Yes, but no surface area. So you're living and dying on a very small heat transfer area to the gas.

DR. ESMAILI: Right. But it does heat up the atmosphere.

MEMBER POWERS: Oh, I bet it does. It's melting steel up there. You're getting steel coming down here, aren't you?

MEMBER BALLINGER: 2,800 degrees, you're done for.

MEMBER POWERS: Yes. They're probably just creeping it out and building it in. It's probably coming down on them and everything else. That's toasty

up there.

MR. KARIPINENI: So, if there were to be a drywell vent with no ventilation that would be the temperatures it may be looking at that. And at this point it's core number 1.

At this point there is no guidance in NEI 13-02 regarding an event like that. Let's go to the next slide.

Slide 6. That's the benefit of water addition at Mark 1 containments. You see that the temperatures vary from 400 down. A big reduction in the temperatures in the drywell.

And the next slide shows --

MEMBER POWERS: This is your 500 gallons?

MR. KARIPINENI: 500 gallons.

MEMBER POWERS: 500 gallon. So it's a pretty good flow.

MR. KARIPINENI: Yes. The next slide is for Mark 2's. A big water addition again. And you can see the temperatures again are below 400 which basically meets the earlier guidance we had in Phase I for that element which is 545 degrees.

And it also helps the leakage from CSX L1 (phonetic) reduce the leakage.

DR. ESMAILI: Can I say something? You brought this up about this temperature. You can see these temperatures, for example, the upper reactor category goes from 300 to almost 150. So there's large temperature variations.

And as I said, you know, because of this connectivity between the upper and the drywell -- upper and lower pedestal and the amount of water that can possibly accumulate.

You see that, for example, it heats up. And as the water accumulates it starts to cool the atmosphere. So there's lots of effects that are going on here. But in the end the temperatures are relatively low.

MEMBER CORRADINI: But just -- 18 hours or 16 hours, that's essentially material coming out of the vessel, I assume.

DR. ESMAILI: That is when the lower head fails.

MEMBER CORRADINI: Okay.

DR. ESMAILI: So you see the upper reactor, it shoots up.

MEMBER CORRADINI: Okay, fine.

MEMBER POWERS: How much metal is there in

that? I mean, how much of the clad in that debris that comes down?

MEMBER CORRADINI: Roughly. A lot or a little bit.

DR. ESMAILI: A lot. Because --

MEMBER POWERS: It doesn't have enough time to steam oxidize.

DR. ESMAILI: That's right. And you have a lot of time inside the vessel. So typically it takes about, you know, at least four to six hours. You are hanging this thing inside the vessel for about four to six hours before you can fail the lower head.

And even before that you have an additional two to three hours for you to -- so there's a lot of material that's coming down.

MEMBER POWERS: Do you get the upper internal?

DR. ESMAILI: No, we don't model the upper internals.

You know, the BWR SAR calculation that was from, like, two decades ago, that one predicted -- of course that was just pure metallic flow for the first two hours, one and a half to two hours.

MEMBER POWERS: Yes.

DR. ESMAILI: And even then that was only about maybe 15,000 kilograms, you know, approximately 50/50 zirconium and steel. So there was not much material coming down in terms of metals based on the old calculations.

MEMBER POWERS: Yes, but that particular metal does grievous things to your concrete.

DR. ESMAILI: Right, right. And just because of that we have done sensitivity calculations because we wanted to find out what the effect of the debris on the half-inch drain plugs, everything, is.

Because there are large uncertainties.

MR. KARIPINENI: Slide 8. This is Method 2 where you will have a drywell vent and also severe accident water addition.

The issues that we have in the draft ISG regarding the functional requirements for SAWA, they have been addressed now. And they are addressed as time-sensitive actions.

The equipment capabilities in various sections of the guidance sections 4, 5 and 6, and also Appendix I.

And we believe all the issues have been resolved and therefore conclude that there are no more

issues in this regard. Next slide.

This is Method 3 where you will have a wetwell vent. And the idea being preservation of the wetwell vent would preclude the need for a drywell vent.

The issues in the draft ISG again are regarding the functional requirements for SAWM and the ultimate containment heat removal system. Coping times, et cetera have been resolved.

They were also addressed as time-sensitive actions. And the functional requirements for both the heat removal and the severe accident water management.

The level of these requirements, functional requirements, have been divided in sort of three categories.

The first category is sustained operations for completed in seven days with the wetwell vent preserved for all the seven days. Therefore there is no requirement for any of the functional requirements for other systems like containment heat removal for that one case.

For the next case, sustained operations, there are seven days but the wetwell vent is only preserved for greater than three days in which case the guidance now contains the functional level description

for what that alternate heat removal system might be, for the staff to look at and agree with that.

The case 3 is again wetwell vent preserved for less than three days in which case the guidance states that there will be a detailed description provided for the alternate heat removal system with potential modifications that may be required to facilitate the containment heat removal system placement within that time.

Therefore, all the questions regarding Method 3 in the draft ISG are considered.

The comments, there were four comments, conclusions and recommendations in the ACRS full committee letter.

The first one of them is about the comments and open items identified in the draft ISG.

What we have done since then is we have taken care of all the open issues with the industry and the guidance has been modified as well as the ISG has been modified.

We also addressed all the public comments that came in as well as we considered all the comments that we have received from the ACRS and as we are describing what we have done on these things.

The second conclusion in the recommendation states that the guidance is a generic basis, and substantial work remains to be done.

And staff kind of agrees with that comment for the reason that details are not fully available to us in the OIPs on the vent systems yet. It is still open at this point.

But as the details come in as time goes we are looking and resolving all those, any questions we have with them.

It's the kind of thing because you've got 20 to 24 plants and everybody is designing the vent system a little bit differently. They're running through whether they have a final control valve or not to operate the system close and open.

There's many, many things in there. That's why it kind of looks generic, but using the OIP issues we will know exactly what they are doing given they were given four or five options in some cases, and which option they're following, and we can ask them the questions at that time.

CHAIRMAN SCHULTZ: I think you've captured our concern.

MR. KARIPINENI: Thank you. The ACRS

also noted that we haven't addressed at all your comments on Phase I, yet also concluded that some more attention needs to be given.

And basically what I have said before applies in this case also. As the OIPs come in we'll be looking at all of these things in more detail.

Last conclusion and recommendation was that water addition, all methods of water addition during severe accidents should be considered, particularly the diverse drywell sprays to take advantage of radioactive source terms during wetwell venting.

Our response to that is that we have assessed the pressure and end-pressure responses with these two primary water addition points and concluded that both of them would meet the requirements within the confinement of the outer.

And as we go in the last leg we'll get into a little bit more discussion. Hossein will talk about what we have done on the CPRR and whether or not that would meet some of your concerns, that it satisfies one of your concerns. We'll see.

The last slide. In addition, the conclusions and recommendations you made mentioned a

couple of concerns about the combustible gas controls and the radiological dose calculations.

We have the white paper on the combustible gas control system. That's given about five options for the licensees to follow.

We believe the active method such as the installation of a shut valve at the end of the vent line, or a continuous -- interrupting the vent line. They're rather easy for NRC also to approve.

But the one about the design so that you can -- the degradation possibilities of -- concerning reduced by the design, that's an area that will probably require a careful review if any licensees will come and want to take that approach.

We agree with that, but at this point that's all we can do.

Regarding the radiological doses we thank you for commending the work we have done since the last meeting. But still you express the opinion that a careful evaluation needs to be taken and we will definitely do that.

The three appendices give a very generic approach for the licensees to follow. Until we know exactly -- until they also know where exactly the pipe

vent is being run in the reactor building, where are the places where the operator has to go and take actions for flow panels, et cetera, until all those details are available they will not be able to tell also much more than what we have in the appendices right now. But we'll be waiting for that information.

CHAIRMAN SCHULTZ: So with regard to combustible gas controls you indicate that, yes, you agree there were many options that could be taken from the guidance document, and that you need to review those carefully.

And you also indicate that some would be easily acceptable and others would require additional consideration, perhaps more calculation and determination.

How is that being communicated and discussed with industry?

MR. KARIPINENI: In the meetings we have expressed the same thoughts many times.

CHAIRMAN SCHULTZ: In the public meetings?

MR. KARIPINENI: In the public meetings, that something of a design, a design of the pipes to preclude the possibilities of deflagration.

That would require a very careful review from a design exceptions in NRR, et cetera. We would need probably good experts to look into that area, the lengths of pipes are proper, and where are the vents, and what are the velocities, et cetera.

At this point we don't know how many of them would come and take that approach. We have a few OIPs that have said already that they will install a shut valve and at the end of the vent pipe. And we are very happy about that.

But there are a significant number of licensees haven't said anything about this yet.

CHAIRMAN SCHULTZ: Okay. Thank you.

MR. KARIPINENI: In conclusion we have met these 545 degrees. From the vent point of view I think we have come to a point the guidance is supportable and therefore the ISG, we think as it stands now it's good.

Regarding the concerns about the releases, et cetera, I would turn it over to Hossein to say a few words.

DR. ESMAILI: This is easy. So we acknowledge there are uncertainties and we also agree that the containment sprays can reduce source term.

I think regarding the containment spray,

you know, is that if the intention is to -- if you go to the recirculation that you were discussing, yes.

But initially you don't want to over-cool and over-fill the containment. So, the ability of the containment space initially would be somehow reduced if there is not enough flow going to the spray.

But we agree with these uncertainties.

And this uncertainty in progression, I think you brought this thing up last time. And we've been looking back at some of the analysis that was done by Oak Ridge. You know, this is around NUREG-1150.

And the question is that one of the important things was how long does it take for the bypass to occur. This bypass, it depends on what the design is. For example, from Limerick it's like about a half an inch plate that's slotted.

And Columbia, it's a little bit different. It's like perforated pipes.

But they did a careful study. You know, expert solicitation said that it takes about 20 minutes for this once the debris comes out.

Then Oak Ridge did some analysis to show that if indeed initially the flow is molten metal, zirconium and steel, there is a possibility that this

thing can actually crust up.

So they did a calculation of the cooling effect of the metal as it comes down and the ablation of the plate itself. But they acknowledged uncertainties.

So what we tried to do here is that we tried to address those two sensitivity calculations, knowing that there could be a different timing in terms of when this bypass occurs.

Severe accident behavior modeling is an area of active research, both in Japanese and South Koreans, actually. They are trying to look at this, what happened, especially in the lower plenum. I think they have some general idea of what's going on inside the core. You know, some aspect of the previous even PWR melt progression may be applicable.

Then there was BWR-specific experiments like XR2, you know, that was done at Sandia. And so anyway, so this is --

MEMBER POWERS: Well, XR2, just looking at whether you can go through a support plate.

The really crucial thing is how to bridge between the core test and where XR2 starts. We've got nothing. I mean, there's just no experiment at all.

DR. ESMAILI: I don't know if all the details of what the plans are. I think this is still an ongoing area that they want to look at.

What I can tell you is that as far as whatever is happening inside the vessel the containment pressures and temperatures for this order, not for the CPRR, the most relevant parameters.

So what we tried to do --

MEMBER CORRADINI: What are the most relevant parameters?

DR. ESMAILI: For the OW1 to make sure that you are below this 545.

So what we did was that, again, we did look at a range of uncertainties. Like at what point do you vent -- what time is the venting, the timing of the venting. What time is the, you know, you have the bypass, et cetera.

In our calculations you saw some examples of the drywell temperatures. This remains well below 545 degrees.

And comparing our reference Mark 2 and Mark 1 the drywell by itself has about 50 percent more volume. So it's a significant volume inside the drywell here in the Mark 2.

And again, last point, we are -- we have done some sensitivities in support of the CPRR rulemaking acknowledging all those uncertainties that were brought up before.

And timing of suppression pool is one aspect.

MEMBER POWERS: I mean, your concern is just what is the temperature going into that vent. I mean, that's the only thing you care about. So it's really just the amount of enthalpy you can put into the gas and hope the gas flow pathway is.

DR. ESMAILI: Correct.

MEMBER POWERS: So I mean, you can even do that almost artificially and whatnot. The stuff that we don't understand affects other things.

DR. ESMAILI: Correct.

MEMBER POWERS: Usually it's just how much heat, how much heat are you carrying to that pipe.

DR. ESMAILI: And you know, in water --

MEMBER POWERS: And you can't carry too much because it's gas. It can only be so hot.

DR. ESMAILI: So anyway, so we have done enough sensitivities trying to --

MEMBER POWERS: In the Mark 2, where does

the heat from the gas go? I mean, you're coming out hotter than a pistol. You're melting steel with your gas. And then it drops like crazy.

DR. ESMAILI: Express element you mean?

MEMBER POWERS: Yes. I mean, in your calculation there for the dry case your gas temperature between the pedestal region and your wetwell, the gas temperature drops a lot. Where's the heat going?

DR. ESMAILI: All the temperatures that you saw around 2,000, the reason it's that high of a temperature is because it's very small volume. So it really heats it up.

Some of the --

MEMBER POWERS: You're just mixing it out? I mean you just vent it into -- when you go into the wetwell airspace you're mixing with --

DR. ESMAILI: And then heat transfer to the -- so by the time it makes it to the wetwell, even without water addition actually --

MEMBER POWERS: Yes, I mean --

DR. ESMAILI: -- you have other addition. It's relatively cool. It's well below. You know, there's not that much difference I see between the drywell and the wetwell temperatures.

Because by that time if you vent there's not that much force for the flow to occur. So things are relatively, you know, quiet.

MEMBER POWERS: So there's just a mixing. I mean, you're really not putting it into any particular structure. You're just mixing it.

DR. ESMAILI: Well, we do model heat transfer to the pedestal wall. But I think mixing -- I mean, heat transfer to the surface of the water. But there's a lot of surface of water.

MEMBER POWERS: Yes, I guess there's a lot of surface.

DR. ESMAILI: Those are all taken into account.

DR. AULUCK: Dr. Schultz?

CHAIRMAN SCHULTZ: Other discussion or questions from members of the committee or the NRC staff on this topic?

Hearing none that concludes our presentations for today. What I would like to do at this point in time is open up the telephone line for public comments.

And while that's being opened I'd like to ask if there are any members of the public in the room

today who would like to make a comment for the benefit of the committee.

Seeing none here in the room I'll wait for a moment for the line to open. We understand that the line is open. If there are members of the public on the line if you could please indicate hello to us so that we know the line is open and that someone is out there to speak.

PARTICIPANT: Hello.

CHAIRMAN SCHULTZ: Hello. Okay, great. Are there members of the public who would like to make a comment for the benefit of the committee? If so, please introduce yourself and make your comment.

Hearing none from members of the public I'll turn to member comments and discussions. And Dick Skillman, are you on the line? Not hearing that Dick is on the line we'll move to the room.

Pete, comments related to today's discussions that you'd like to make?

MEMBER RICCARDELLA: About just this last topic or about the whole day?

CHAIRMAN SCHULTZ: About the whole day.

MEMBER RICCARDELLA: Well, you know, as I've indicated in my earlier comments that I have

concerns about the size of the passage of the FLEX.

I know the current document NEI 12-06 says that FLEX equipment should be stored in a structure that meets the plant's design basis for safe shutdown earthquakes. That's what it currently says.

Now, I understand that Appendix H is supposed to address that, but we haven't seen that yet and we're getting down to the wire. And that's the one area that I have a concern with.

CHAIRMAN SCHULTZ: Thank you. Harold, comments for today?

MEMBER RAY: Well, let me just try and encapsulate what I said earlier which I perceive as generally agreed upon, or by many anyway.

And that is that this is a necessary but a major impact. We're dealing now with what the requirements should be in some specific detail.

But there's remaining, I think, the question of how what we're talking about having to do fits in with everything else that exists in the industry.

And I don't mean to suggest that it isn't necessary that this occur, but how it occurs is I guess my main interest.

Others are I think properly focused on specific aspects of what exactly would be done in one area or another. But I just use the examples that I used earlier of, okay, we -- all of us who have been involved in commercial operations have dealt with emergency planning which is at one end of the spectrum, and with maintaining operator licenses which is at the other end of the spectrum when it comes to the rigor of training, the frequency of testing, and so on.

This fits somewhere in the middle, I think. I don't believe most of these requirements, if any of them, go to at this stage of the game anyway to what licensed personnel are examined for.

But there is at least some feeling that there will need to be a way of measuring the readiness of the larger group either to assume some status similar to a licensed operator, or otherwise maintain a level of training which significantly exceeds what's been required up until now.

And I do include of course the fact that people like STAs, for example, have been required to be trained in what they do until now.

But still and all what we're looking at here goes beyond that and includes a lot of folks to

implement it.

I know we plan to have drills. These are being conducted. There's lots of tabletops. Things have been mentioned here.

But I guess I take the longer view of, okay, 10-20 years from now what is the level of expertise to implement this. Because this is a very, very rare event that we're talking about.

And maintaining that capability over the long run is -- and how you achieve that is what I'm interested in. That's not what we're talking about today, but if there's some way that that gets captured in terms of something that needs to be addressed in the future more rigorously than I think is appropriate now I think that would be my input.

CHAIRMAN SCHULTZ: Thank you. Dana, comments for today?

MEMBER POWERS: I don't think I want to add anything in particular. What Harold raised as far as the level of expertise and the surprise people will have when some of these events, should they take place and how they react to it is an interesting question.

But again, as Harold says, we're talking about a 10^{-5} event. And how much you should threaten

your training capabilities to accommodate a 10^{-5} event is something that needs careful consideration.

CHAIRMAN SCHULTZ: John?

MEMBER STETKAR: Yes. First, I'd like to thank everybody, NEI, industry, staff has put together a lot of information. And I think it was really useful to try to digest all of this in this one-day session. It's a lot more effective I think than seeing it piecemeal. I really appreciate all the effort everybody put into the presentations.

I think in summary I'll come back to this notion of integration of the guidance, both in the sense of integrating the paper guidance that I'll characterize as the FLEX support guidance, and the SAMGs and the EDMGs. If you want to talk about fire, flooding procedures, all of those sort of things, to make sure that we're not somehow making life more complicated for the operators or decision-makers -- I include the offsite response organization as part of that decision team -- by fragmenting that guidance too much.

I mean that's why I think it would be very useful for us to see some examples of how that's really being developed.

And also the other part of the integration, a couple of the issues that I've raised, for example, assumptions that are being made regarding things like in the context of the BWR examples here of, well, we don't need to re-power a certain set of valves until eight hours because for the specific purpose of saving the containment we can demonstrate that that's adequate.

And yet, for the purposes of preventing damage to the core we have other assumptions that say, well, we don't even need to consider that water addition.

So, I think I'll leave it there. I'm a bit concerned that I'm not sure who from either the industry or the staff is looking at the integration from kind of that perspective.

CHAIRMAN SCHULTZ: Thank you, John. Dennis?

MEMBER BLEY: I too would like to thank everyone for good presentations and really good discussions.

My hope is as we see things in more detail all the things we've worried about today will not worry us anymore. I look forward to seeing things as they

come forward.

I echo many of John's thoughts, but we hear a lot of good things as well. So, thank you for the day.

CHAIRMAN SCHULTZ: Very good. Mike?

MEMBER RYAN: I'd like to just second the comments that John Stetkar and Dennis Bley made. I think you captured many of my own thoughts.

I want to thank all the presenters and folks that helped presenters to get all this material together for us. You covered a wide range of issues and gave us a lot of insights. That's hard work, pulling all that together, so we appreciate it. Thank you very much.

CHAIRMAN SCHULTZ: Ron?

MEMBER BALLINGER: This is probably the first case where I've been involved from the beginning until now. I've seen a very large progression in terms of with time. I think that's a tribute to a lot of the work that you guys in the industry and NRC staff has done.

And I think you'll make Game 4.

CHAIRMAN SCHULTZ: We have to wait for Charlie before we claim that we're going to make Game

4.

MEMBER BALLINGER: I would repeat what I said earlier, that I do think to help us understand how all this integrates as this seems to be the key.

Some sort of presentation or exercise that we can actually ask questions as you go through the exercise. I guess "tabletop" is the current word. But just some sort of exercise and see how this integrates would be very beneficial for me. Since I really am not totally clear on all these various procedures and how they fit together.

CHAIRMAN SCHULTZ: Thank you very much. I would like to also -- oh, excuse me. Bill Shack, our consultant. You're now recognized. Thank you.

CONSULTANT SHACK: Well, I just want to, again, appreciate all the discussions today. I think a lot of them I would echo the comments.

I would like to point out, I think there's a lot of improvements in NEI 12-06 which is the sort of basic document here.

A lot of clarity, a lot of additional stuff.

Appendix C I think is something that responds partly to what the ACRS asked for. John is

still unhappy. Compared to what there was before - nothing - it's a great improvement.

I'm looking forward to see Appendix G and H. I sort of echo, you know, that's been a problem all along with the whole mitigation scheme is how it really addressed beyond-design basis events and sort of Pete's discussion.

So I'm looking forward to Appendix H which again if it's still an unresolved issue. And Appendix G begins to address that for the flooding situation.

So I think we've made a great deal of progress. I think Appendix G and Appendix H are important things to address yet in the guidance. And I'd be interested in seeing how that works out.

CHAIRMAN SCHULTZ: Thank you, Bill. In closing I'd first like -- I had mentioned this morning Ms. Kathy Weaver who's been integral in putting together this meeting.

I did also want to recognize Mike Snodderly of the ACRS staff and Weidong Wang who also participated in these issues as well as bringing together the staff presentations and the NEI presentations before us today.

I too want to thank the presenters for the

work that's been done to bring forward each of these topics. I think we have heard excellent summaries and displays of what has been done not only over the last month since we last met but also a representation of what has been done over the past, as Ron said, it goes way back before he joined the committee in terms of getting us to where we are today.

My closing comments would certainly echo everything that the other members have said.

I would add that there are many aspects, especially in the mitigating strategies area, but there are many aspects of the overall rulemaking that we have not considered in our discussions today. We focused on some regulatory guidelines.

And we will have opportunities as the program moves forward to the draft final rulemaking activity to weigh in again in not only these issues but others as well.

With regard to the issues related to Mark 1 and Mark 2 containments we have the CPRR discussions coming up in our subcommittee meetings coming forward, and also full committee most likely happening at the end of summer.

So we'll be talking about these topics in

additional discussions. We look forward to that.

With that I'll move forward to close the meeting.

(Whereupon, the above-entitled matter went off the record at 4:49 p.m.)

Draft Regulatory Guide DG-1301 and NEI 12-06, Revision 1

ACRS Fukushima Subcommittee Meeting

May 6, 2015

Scott Bauer, Sr. Project Manager, NEI

Bryan Ford, Sr Manager - Regulatory Assurance, Entergy Nuclear

Michael Powell, Director Fukushima Initiatives, Palo Verde

NEI 12-06, Revision 1 Status

- Proposed Revision 1 to NEI 12-06 addresses:
  - Conformance to proposed rule
    - Elimination of references to Orders
  - Changes to incorporate NRC-approved alternatives
  - Generic topic position papers (>12 topics)
  - Frequently asked questions (>30 FAQs)
- Changes have been presented in public meetings

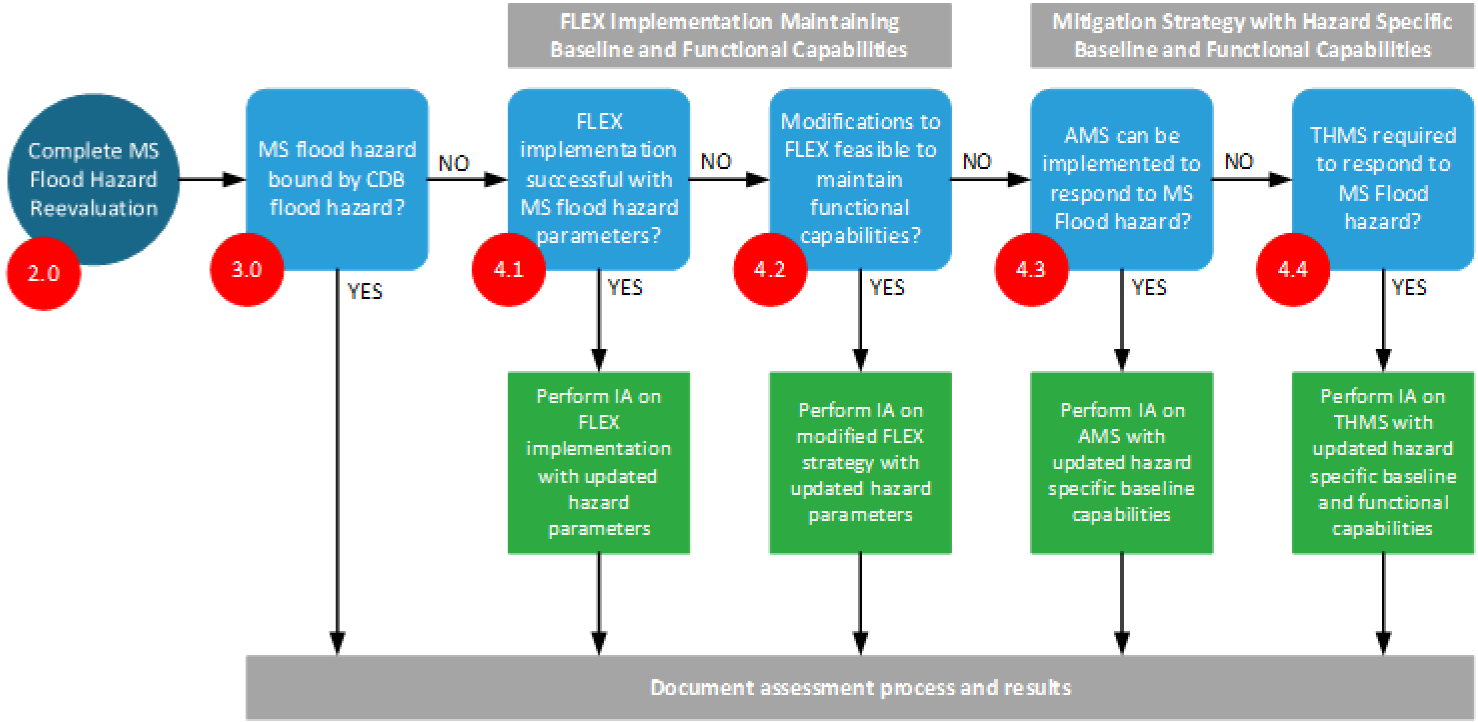
NEI 12-06, Revision 1 Status

- Remaining issues:
  - Generic questions on RCP seals
  - Generic question on NOTRUMP code
  - Maintenance rule resolution
  - Appendix G for addressing flood hazard reevaluation (has been developed and is undergoing review)
  - Appendix H for addressing seismic hazard reevaluation (in early stages of development)

Appendix G- Reevaluated Flood Hazard

- Provides four paths for mitigation:
  - Use FLEX as is
  - Modify FLEX
  - Develop an alternate mitigating strategy
  - Develop a targeted hazard mitigating strategy
- Submitted to the NRC on April 27, 2015

NEI 12-06 Mitigating Strategies Assessment



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Draft Regulatory Guide DG-1301

- Being evaluated by the industry
- One preliminary concern
  - Changes the description of an extended loss of ac power event to include loss of ac power to buses fed by station batteries through inverters (vital ac power)
  - This would introduce a substantive change from the guidance under which FLEX has been implemented
  - Loss of dc and vital ac instrument power was not considered in the sequence of event time lines
    - Guidance does have provisions for remote start capability for TDAFW or RCIC pumps and reading instruments locally but these are backup capabilities

Draft Regulatory Guide DG-1301, Appendix A

- Appendix A contains guidance for applicants for new nuclear power plants
- NEI 12-06 originally developed with a generic version of Appendix F to address application to new plants
- As a result of public meetings Appendix F reverted to AP1000 only
- NRO developed Appendix A for other new reactor designs

Draft Regulatory Guide DG-1301, Appendix A

- Appendix A is being reviewed by the industry
- Intend to incorporate it into NEI 12-06 when comments are resolved

Maintenance Rule Applicability to FLEX Eq

- Maintenance rule contains an exception for SAMG and EDMG equipment
- Same exception should apply to FLEX equipment
- NEI 12-06 addresses equipment maintenance in Section 11.5
  - Standard industry templates have been developed addressing specific maintenance and testing of FLEX equipment
  - EPRI maintenance guide for FLEX equipment endorsed by NRC as a generic topic

Draft Regulatory Guide DG-1319 (*Proposed New Regulatory Guide 1.228*) "Integrated Response Capabilities for Beyond-Design-Basis Events"

Milt Murray, NSIR/DPR

Tim Kolb, NRR/DIRS

May 6, 2015

Status

- Currently in draft form
- Final draft guide to be completed and published in conjunction with MBDBE Proposed Rule

DG-1319 "Integrated Response Capabilities for Beyond-Design-Basis Events"

Endorses NEI 12-01, "Guidelines for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities"

Endorses NEI 13-06, "Enhancements to Emergency Response Capabilities for Beyond Design Basis Events and Severe Accidents"

Endorses NEI 14-01, "Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents" with clarifications

DG-1319
"Integrated Response Capabilities for Beyond-Design-Basis Events"

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

NEI 12-01, "Guidelines for Assessing Beyond Design Basis Accident Response Staffing and Communications Capabilities"

- Previously endorsed by NRC for the March 12, 2012 RFI
  - Re-assessment of staffing/communications for the rulemaking is not required

- NEI 12-01 provides an acceptable method to assess accident response staffing in order to meet the requirements of 10 CFR Part 50, Appendix E, Section VII.1

- NEI 12-01 provides an acceptable method to assess communications capabilities in order to meet the requirements of 10 CFR Part 50, Appendix E, Section VII.2

DG-1319
"Integrated Response Capabilities for Beyond-Design-Basis Events"

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NEI 13-06, "Enhancement to Emergency Response Capabilities for Beyond Design Basis Events and Severe Accidents"

- EP facilities and equipment
  - NEI 13-06 provides an acceptable method to meet the emergency facilities and equipment requirements of 10 CFR Part 50, Appendix E, Section IV.E.2

- Multi-unit dose assessment
  - NEI 13-06 provides an acceptable method to meet the assessment actions requirements of 10 CFR Part 50, Appendix E, Section IV.B.1

DG-1319
"Integrated Response Capabilities for Beyond-Design-Basis Events"

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- Training
    - NEI 13-06 provides an acceptable method to meet the training requirements of 10 CFR 50.155(e)

- Drills and exercises
    - NEI 13-06 provides an acceptable method to meet the drill and exercise requirements of 10 CFR 50.155(f)

DG-1319
"Integrated Response Capabilities for Beyond-Design-Basis Events"

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NEI 14-01, "Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents"

- Procedure Integration

  - NEI 14-01, Section 2.4 provides an acceptable method and appropriate elements for meeting 10 CFR 50.155(b)(4) requirements for procedure integration
  - Fire response procedures not included in integration
    - Included in scope of NTTF Recommendation 3 (Tier 3)

DG-1319
"Integrated Response Capabilities for Beyond-Design-Basis Events"

- SAMGs

  - NEI 14-01, Section 3.2.2 (Principles of SAMGs) and Section 3.2.3 (Considerations for site-specific SAMGs) provide an acceptable method to develop, implement and maintain SAMGs as required by 10 CFR 50.155(b)(3)

DG-1319
"Integrated Response Capabilities for Beyond-Design-Basis Events"

- Command and Control

  - NEI 14-01, Section 4 provides an acceptable method in combination with existing ERO command and control structure guidance to meet the requirements of 10 CFR 50.155(b)(6). The guidance in NEI 14-01 is principally limited to the roles, responsibilities and authorities of an Ultimate Decision Maker (UDM).

Draft Regulatory Guide DG-1301 and NEI 12-06, Revision 1

ACRS Fukushima Subcommittee Meeting

May 6, 2015

Scott Bauer, Sr. Project Manager, NEI

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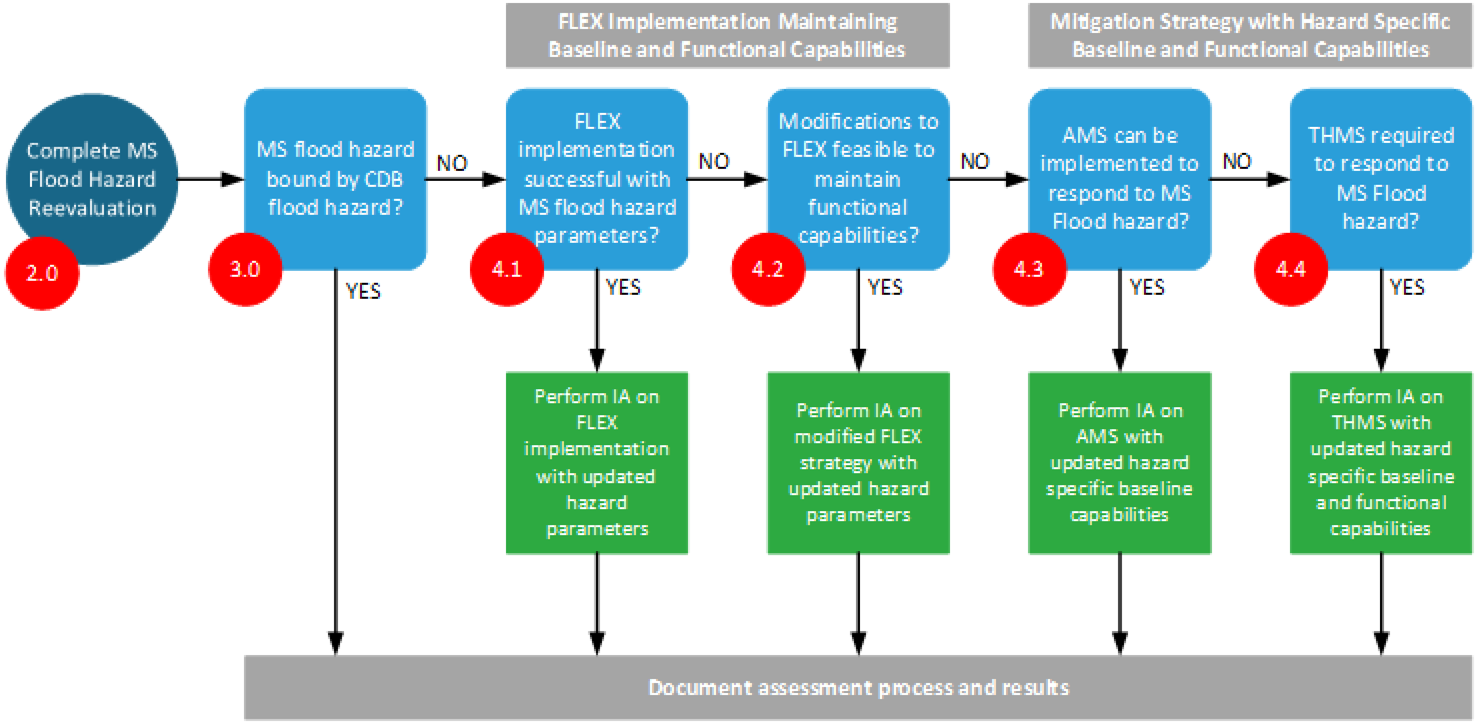

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Draft Regulatory Guide DG-1301 (*Proposed New Regulatory Guide 1.226)* Flexible Mitigation Strategies for Beyond-Design-Basis Events

Eric E. Bowman, NRR/JLD

Clinton Ashley, NRO/DSRA

May 6, 2015

Status

- In a preliminary draft form, pending finalization of industry guidance
- Final draft guide to be completed and published in conjunction with MBDBE Proposed Rule (SECY-15-XXXX)
- Builds on JLD-ISG-2012-01, taking into account lessons learned and SRM-COMSECY-14-0037

Staff Positions

1.1.a – Baseline capabilities developed following NEI 12-06, sections 1-3 provide an acceptable means for maintaining core cooling, containment and spent fuel pool cooling, but additional contingencies are necessary to mitigate the loss of all ac power. (See Staff Position 1.2.)

Staff Positions

1.1.b – Maintenance of strategies for modifications/equipment outages. Highlights the difference between 50.155(b) and 50.63.

1.1.c – Best estimates are appropriate for beyond-design-basis analyses.

1.1.d – Validation of strategy feasibility is appropriate.

Staff Positions

1.2 – Contingencies for actual loss of all alternating current power

- Manual start of AFW/HPCI/RCIC/IC
- Use of portable equipment to read instruments
- Guidance on actions without control power

Staff Positions

2 – NEI 12-06 guidance on equipment quality and design, as well as the provision of spare equipment, is appropriate to show the capacity and capability of the equipment.

3 – NEI 12-06 guidance on reasonable protection is acceptable.

4 – NEI 12-06 guidance on maintenance is acceptable.

Staff Positions

5 – NEI 12-06 guidance on configuration control is acceptable.

6 – Guidance on treatment of re-evaluated hazards not yet ready for discussion with ACRS.

DG-1301 Appendix A
Summary of 10 CFR 50.155 (d)

- Applicants for new reactors shall include design features in the plant design sufficient to
    - enhance coping durations and
    - minimize reliance on human actions

  to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities during an ELAP concurrent with a LUHS…

DG-1301 Appendix A
Regulatory Basis

- Applicants for new reactors have an opportunity to include design features in the plant design that enhance the mitigation strategies
- Consistent with:
  - Advanced Reactor Policy Statement
  - Approach for Aircraft Impact Assessments, Loss of all Alternating Current Power, and Fire Protection

DG-1301 Appendix A
Proposed Guidance

- Endorses NEI 12-06 with clarifications
- NEI 12-06 uses a three-phase approach
  - Initial phase or Phase 1
  - Transition phase or Phase 2
  - Final phase or Phase 3
- Enhancing Phase 1 is the focus for new reactor designs

DG-1301 Appendix A
Proposed Guidance – Phase 1

- Rely on plant equipment from 0 to 24 hours
- Capability to function throughout the external event
- Use modern design basis hazard analysis (e.g., flooding)
- Protection from all external hazards, regardless of warning time
- Include a safety margin for site seismic hazard
- Credit for supplemental ac after 8 hours
- Minimal operator actions at limited and protected locations

DG-1301 Appendix A
Proposed Guidance: Phase 2 and 3

- Phase 2: Use of on-site portable equipment and consumables from 24 - 72 hours
- Store on-site portable equipment in safety-related structure or within a structure designed for design-basis wind hazards; no option to credit building separation for tornado events
- Plant equipment and their connections have the capability to function after the external event
- Phase 3: Use of off-site equipment after 72 hours

DG-1301 Appendix A
Supplemental ac

- May be credited after 8 hours
- Permanently installed and normally disconnected from the bus
- Diverse and independent from the emergency ac source
- Supplemental ac source, distribution system, and loads need to show protection against external hazards

DG-1301 Appendix A
Shutdown and Refueling Modes

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- Mitigating strategies for shutdown and refueling modes should be addressed at the design stage
- Positions outlined in the DG-1301 Appendix A apply to all modes, including shutdown and refueling modes

Draft Regulatory Guide DG-1317 and NEI 12-02, Revision 1 Spent Fuel Pool Instrumentation

ACRS Fukushima Subcommittee Meeting

May 6, 2015

Steven P. Kraft, Sr. Technical Advisor, NEI

Randy Bunt, Mgr. Severe Accidents, Southern Company

NUCLEAR ENERGY INSTITUTE

nuclear. clean air energy.

SFP Instrumentation Status

- March 12, 2012 – EA-12-051 issued
- August 24, 2012 – NEI 12-02 Rev 1 issued
- August 29, 2012 – JLD-ISG-2012-03 issued
- February 29, 2013 – OIPs submitted
- End 2014 – 18 Units completed
- End 2016 – All units completed
- Three vendors – all radar based technologies

NEI 12-02 Rev 1 Endorsement

- Endorsed by JLD-ISG-2012-03 with six technical clarifications and exceptions.
- To-date implementation has been moving along successfully based on the existing guidance.
- MBDBE Rule will make EA-12-051 generally applicable
- DG-1317 (as Reg Guide 1.227) will apply

DG-1317

- Repeats clarifications and exceptions in JDL-ISG-2013-03 with two differences:*
  - Reliability demonstrated *during* event (NEI 12-02)

    Reliability demonstrated *during and following* event (JLD-ISG-2013-03)

    Reliability demonstrated *during* event (DG-1317)

  - Recommend using JLD-ISG-2013-03 language

* DG-1317 pg.6

DG-1317

- Commercial components *shall* be considered (NEI 12-02)

  Commercial components may be considered but licensees *may choose….safety-related…*(JLD-ISG-2013-03)

  Commercial components *may* be considered but the licensee *should consider……safety-related…*(DG-1317)

* Creates regulatory creep for future actions, especially when read in conjunction with "Use by NRC" (future-fit requirements)

  Inconsistent with "Reliability" Principle of Good Regulation

➢ Recommend eliminating or using JLD-ISG-2013-03 language

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

Draft Regulatory Guide DG-1317
(*Proposed New Regulatory Guide 1.227)*
Wide-Range Spent Fuel Pool Level Instrumentation

Eric E. Bowman, NRR/JLD

May 6, 2015

Status

- Final draft guide to be completed and published in conjunction with MBDBE Proposed Rule (SECY-15-XXXX)
- Implements JLD-ISG-2012-03

Staff Positions

NEI 12-02, Revision 1 is acceptable with clarifications from JLD-ISG-2012-03:

3.4 – Shock and vibration qualification

3.4 – Seismic design/installation per IEEE 344-2004, sections 7, 8, 9, and 10 or similar industry guidance.

NEI 13-02 Rev 1
Industry Guidance to Implement
EA-13-109

Advisory Committee on Reactor Safeguards

Fukushima Sub-Committee Meeting

May 6, 2015

BWR OWNERS' GROUP

NUCLEAR ENERGY INSTITUTE

Update from April 10, 2015 Meeting

- Issued JLD-ISG-2015-01 on April 30, 2015
  - Issued NEI 13-02 Rev 1 on April 23, 2015
    - Resolved remaining NRC staff, ACRS and stakeholder comments
  - No technical exceptions or clarifications to NEI 13-02 Rev 1 guidance

ACRS Conclusions/Recommendations[1]

- Industry response to ACRS recommendations
  - Preference for RPV addition point strengthened
    - Reduces impact of uncertainties related to core relocation as water will follow debris
  - OIP template will include plant specific details to evaluate Phase 2 strategies
    - For example, spillover height, freeboard volume, addition rate based on scaling of reference plant power, debris pathway
  - EPRI technical assessments supporting CPRR did not credit drywell sprays for release reduction
    - Use of drywell sprays is considered in SAMGs using sources not required for RPV injection
    - Proposed SAMGs limit use of sources from outside containment in order to preserve wetwell vent path

Ref 1: Final ACRS letter on JLD-ISG-2015-01, April 30, 2015

Changes Since Last Meeting

- Strengthened basis for RPV as SAWA preferred addition location in Section I.1.2.1.1
  - [RPV water addition] Limits impact of modeling uncertainties related to mode of vessel breach and extent of debris spreading.

Changes Since Last Meeting (Cont'd)

- SAWA early deployment considerations added to Section 1.2
  - The analysis performed to support the SAWA/SAWM strategies established timing for specific accident sequences (e.g., RCIC failure at T=0, 1 hour to core damage, 8 hours to establish SAWA flow) that conform to the reference plant in Reference 27. **<u>Licensees should ensure procedures and designs consider the early deployment of portable equipment to facilitate expedited water addition and to repower needed equipment and instrumentation such that no unnecessary delays in deployment are introduced into accident response</u>. <u>This expectation is to encourage licensees to take reasonable actions to minimize SAWA equipment deployment times</u>**, but is not intended to drive licensees to modify existing or construct additional structures for SAWA equipment storage, or to choose alternate SAWA connections points from those used to support Order EA-12-049 compliance
  - Reinforce during industry workshops for Phase 2

Endorsement of NEI 13-02

- No technical concerns for developing the Phase 2 OIP
  - Can be used to implement the entire Order
- Sections not endorsed will still be used by the industry in support of the Order implementation
  - Generic Letter 89-16 commitment guidance
  - EPG/SAG information
    - Emergency Procedures Committee is drafting changes supporting SAWA/SAWM strategy

Next Steps

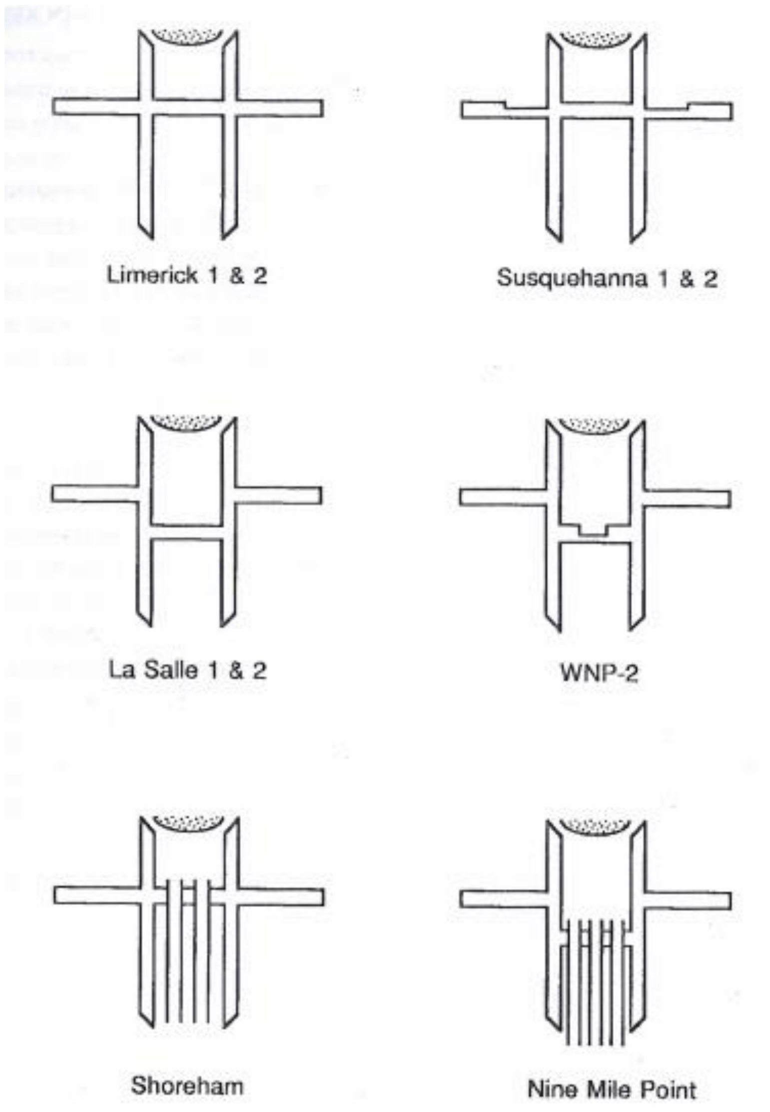
- Develop industry template for Phase 2 OIP
- Conduct pilot plant development of Phase 2 OIP (Mark I and Mark II plant)
- Conduct industry workshops for Phase 2 OIP development
- Submit Phase 2 OIPs by December 31, 2015

NEI 13-02 Rev 1 and JLD-ISG-015-01 reflect significant work by the NRC staff and industry to provide the guidance necessary to implement

EA-13-109 Phase 2

BACKUP

Mark II Cavity Design



Ref: NUREG/CR-5623

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Protecting People and the Environment

Advisory Committee on Reactor Safeguards

Mark I and Mark II BWRs
Containment Venting Systems Guidance
for Phase 2 of Order EA-13-109 and
ISG JLD-ISG-2015-01 (NEI-13-02, Revision 1)

May 6, 2015

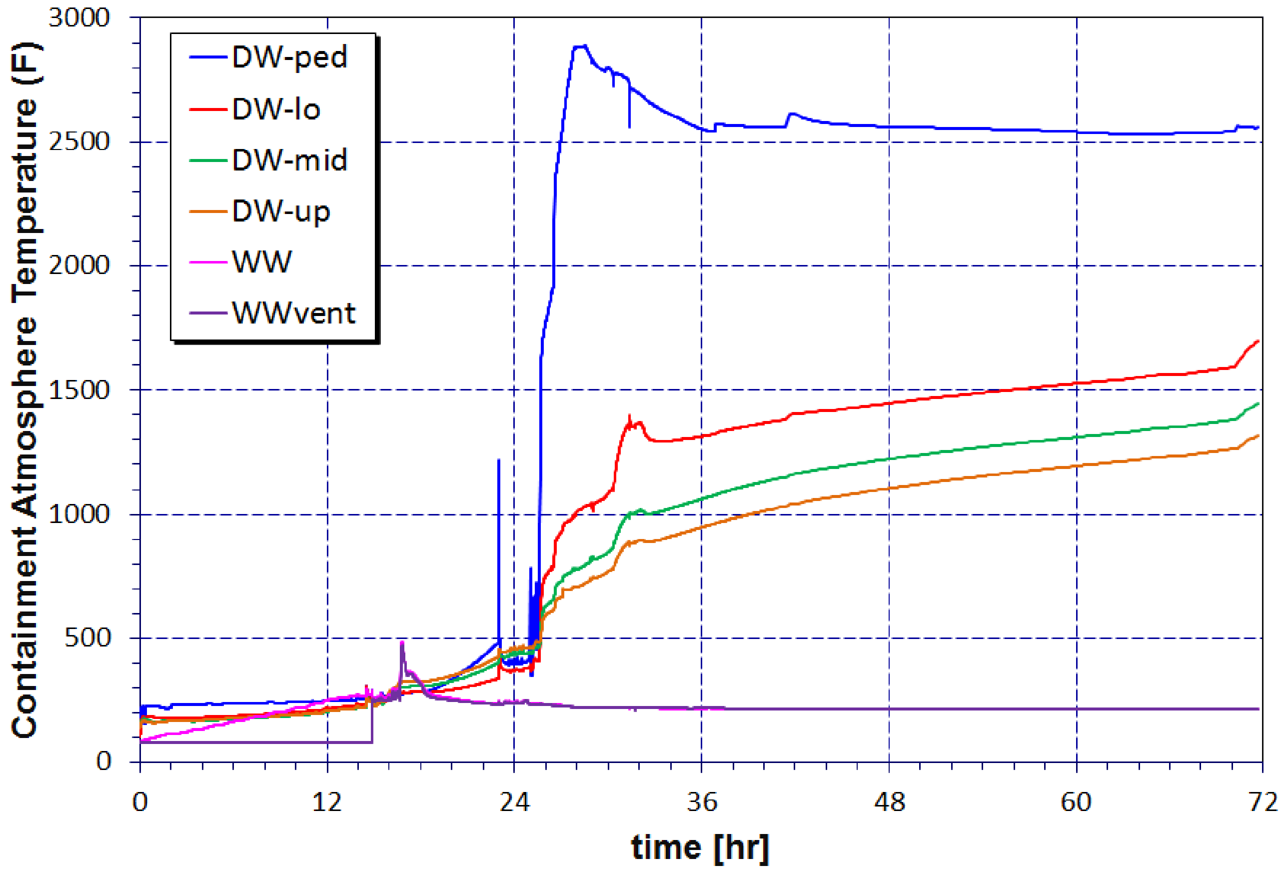
Order EA-13-109
Phase 2 ISG Development

- Draft ISG issued for public comment – March 10, 2015
  - (NEI 13-02 Draft 0E2)
- ACRS subcommittee meeting – March 20, 2015
  - (supplemented by NEI 13-02 Draft 0F4)
- Public comment period ended – April 9, 2015
- ACRS full committee meeting – April 10, 2015
  - (supplemented by NEI 13-02 Draft 0F4 and added change table)
- Phase 2 ISG issued – April 29, 2015
  - (NEI 13-02, Revision 1; dated April 23, 2015)
- ACRS subcommittee meeting – May 6, 2015
- *Draft CPRR Regulatory Basis issued for public comment – May 2015*
- *ACRS subcommittee meeting on draft CPRR Regulatory Basis– June 25, 2015*
- Phase 2 Overall Integrated Plan Submittals – Dec 31, 2015
  - (supported by template development in Summer 2015)

Order EA-13-109 Revisions to NEI-13-02

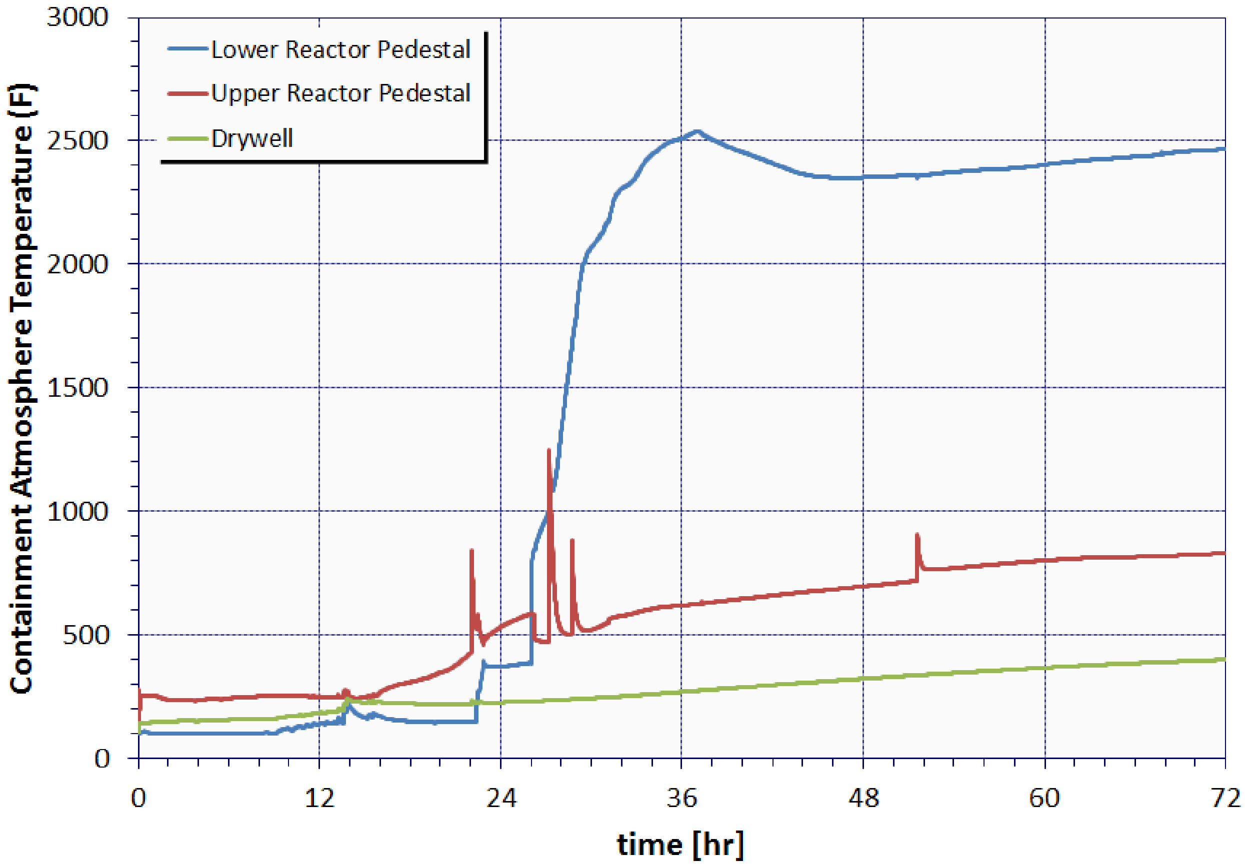
- Updates
  - Flammable Gases (App H & HCVS-WP-03)
  - Evaluation of Doses and Source Terms (APP F & G, HCVS-WP-02)
  - Appendix A (Glossary of Terms)
  - Instrumentation Capabilities
- Phase 2 Focus
  - Severe accident water addition (SAWA)
    - Appendix I
  - Severe accident water management (SAWM)
    - Appendix C

Evaluation of Drywell Temperatures
(Mark I without water addition)



Mark I Containment Gas Temperature with no water addition

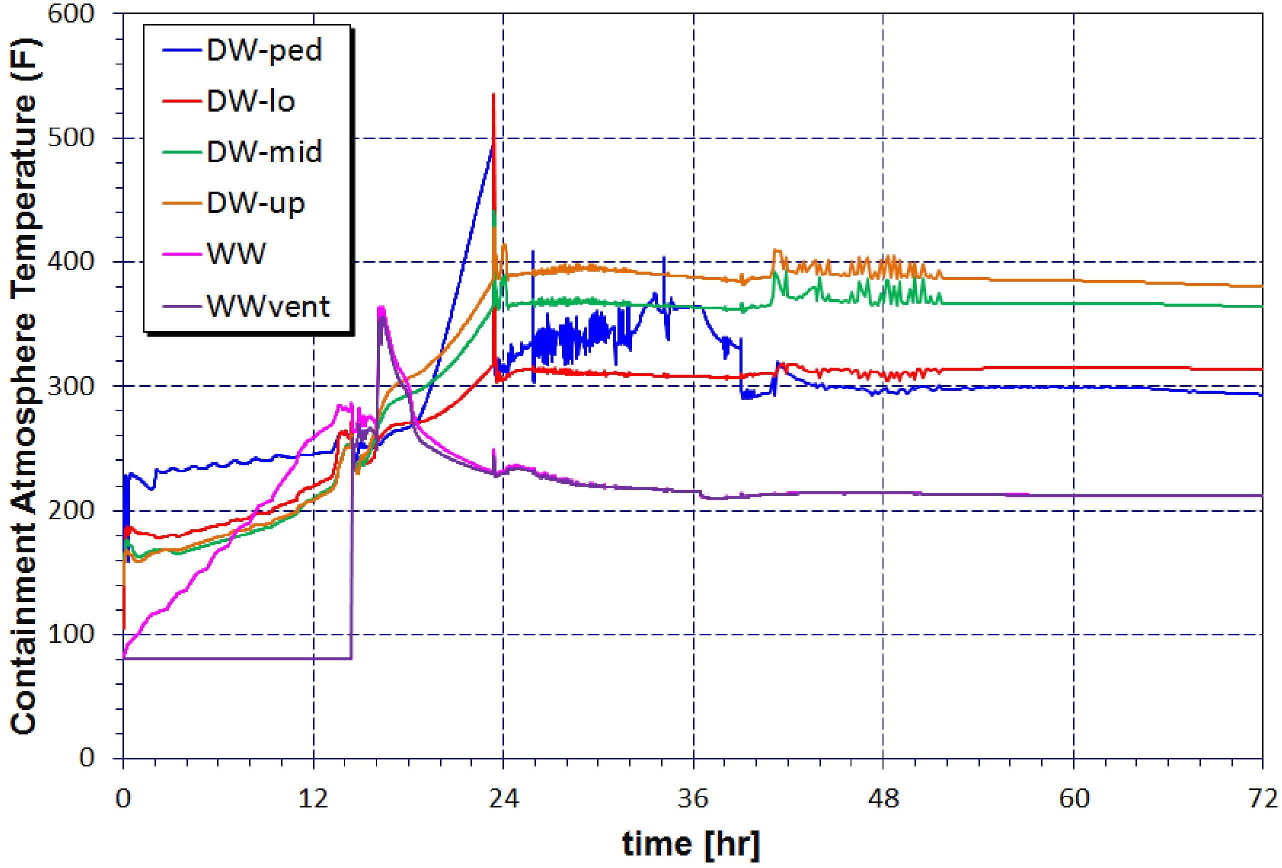
Evaluation of Drywell Temperatures
(Mark II without water addition)



Mark II Containment Gas Temperature with no water addition

Evaluation of Drywell Temperatures

(Mark I with water addition)

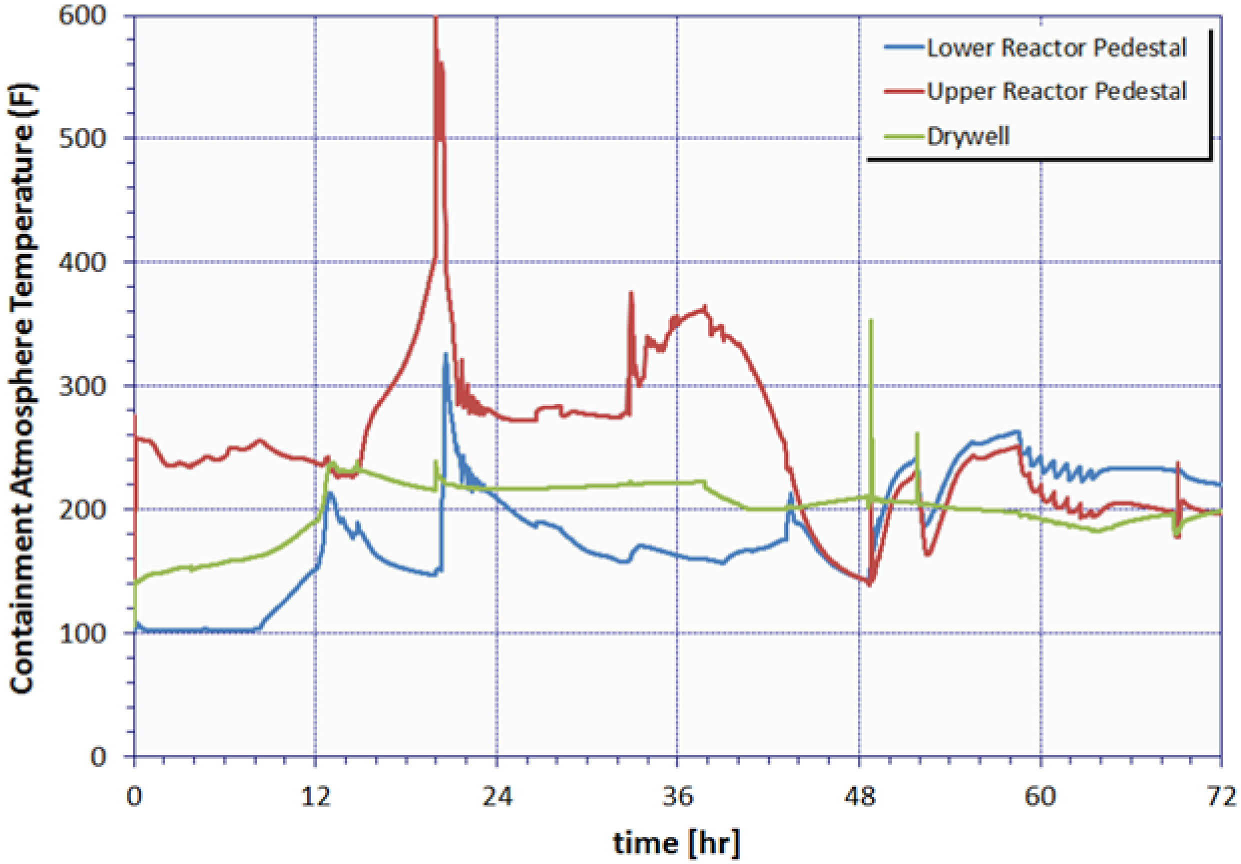


Mark I Containment Gas Temperature with water addition

(SAWA/SAWM - SAWA only shows similar behavior/temperatures)

Evaluation of Drywell Temperatures

(Mark II with water addition)



Mark II Containment Gas Temperature with water addition

(SAWA/SAWM - SAWA only shows similar behavior/temperatures)

INTERIM STAFF GUIDANCE JLD-ISG-2015-01

Resolution of Issues in Draft ISG – Method 2

- Issues in Draft ISG
  - Clarify functional requirements for SAWA provisions
- Resolution: Industry added discussion to NEI 13-02, Rev.1 regarding functional requirements for SAWA to address time sensitive actions and equipment capabilities
  - Section 4, "Design Considerations"
  - Section 5, "Programmatic Controls"
  - Section 6, "Operational Considerations"
  - Appendix I, "Severe Accident Water Addition (SAWA)"
- Issues in final ISG
  - None

INTERIM STAFF GUIDANCE JLD-ISG-2015-01

Resolution of Issues in Draft ISG – Method 3

- Issues in Draft ISG
  - Clarify functional requirements for various SAWM approaches and coping times
- Resolution: Industry added discussion to NEI 13-02 regarding functional requirements for SAWM to address:
  - Sustained Operations (> 7 days) With Wetwell Vent
  - Sustained Operations (> 7 days) With Wetwell Vent for > 3 days with functional level description of alternate heat removal capabilities
  - Sustained Operations (> 7 days) With Wetwell Vent for < 3 days with detailed description of alternate heat removal capabilities
- Issues in final ISG
  - None

April Full Committee Meeting Conclusions and Recommendations

1. Address comments and open items identified in draft ISG before issuing JLD-ISG-2015-01
   – Addressed Comments, Final ISG Issued on April 29, 2015
2. ISG and NEI 13-02 provides reasonable guidance on a generic basis. Substantial work remains to evaluate, justify, and implement the plant-specific designs.
   – Additional information via template for overall integrated plans (OIPs) and then staff review of plant-specific OIPs

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April Full Committee Meeting Conclusions and Recommendations

3. The staff addressed issues from Phase 1 reviews. Additional attention required during review of plant-specific hardened containment venting system designs.
   – Additional information via template for overall integrated plans (OIPs) and then staff review of plant-specific OIPs
4. All methods of water addition during a severe accident should be considered, including drywell sprays, to take full advantage of reductions in radioactive source terms during wetwell venting
   – Assessed pressure/temperature response and coordinating with containment protection and release reduction (CPRR) rulemaking

April Full Committee Meeting Concerns

- Regarding combustible gas controls, ACRS concerned that guidance may be too general
  - Additional information via template for overall integrated plans (OIPs) and then staff review of plant-specific OIPs
- Regarding evaluation of radiological dose, ACRS noted careful reevaluation of doses needed
  - Additional information via template for OIPs and then staff review of plant-specific information supporting OIPs

April Full Committee Meeting Severe Accident Modeling Uncertainties

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- Staff acknowledges:
  - the uncertainties in core melt progressions, and
  - ability of containment sprays to reduce source terms
- Severe accident behavior and modeling is an area of active research following the Fukushima accident
- Containment pressures and temperatures are the most relevant parameters for Order EA-13-109 and related guidance
  - Analyses and sensitivity studies support 545°F design value for Mark II containments for cases with SAWA
- Staff performed sensitivities in support of CPRR rulemaking related to radiological releases and the timing of suppression pool bypass

Questions & Discussion

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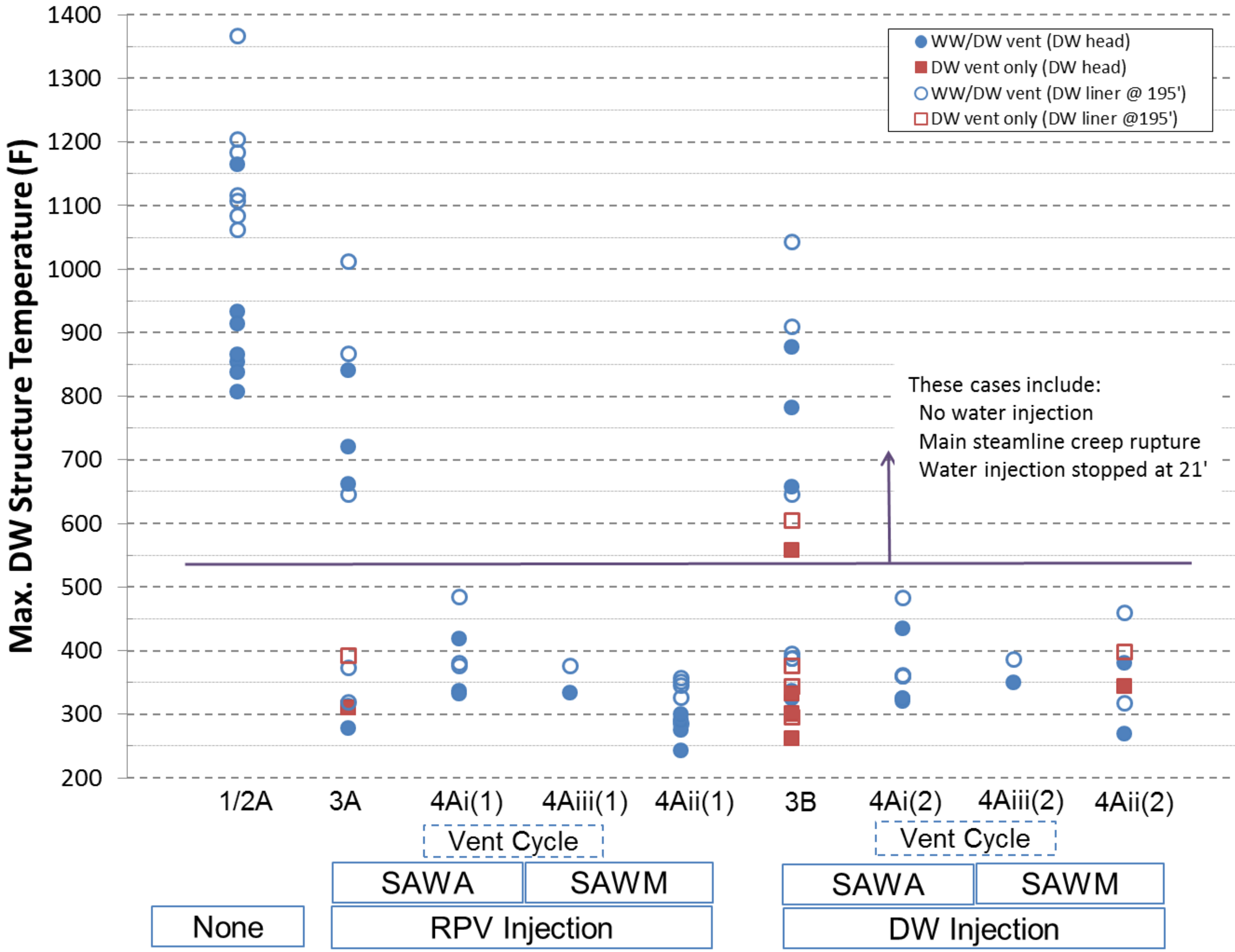
BACKUP SLIDES

MELCOR Results for Mark I

(containment structure temperature)



Mark II Suppression Pool Bypass

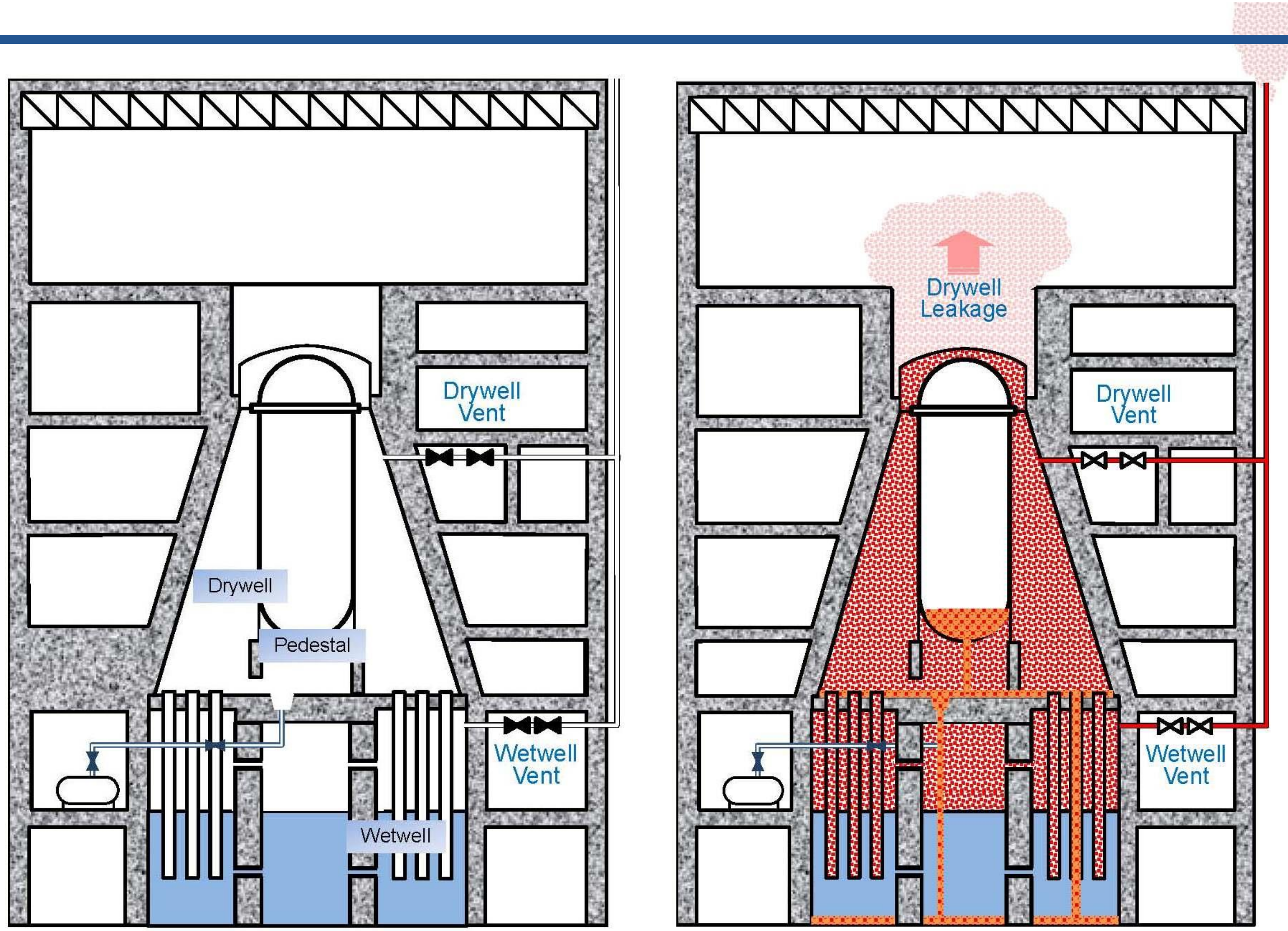
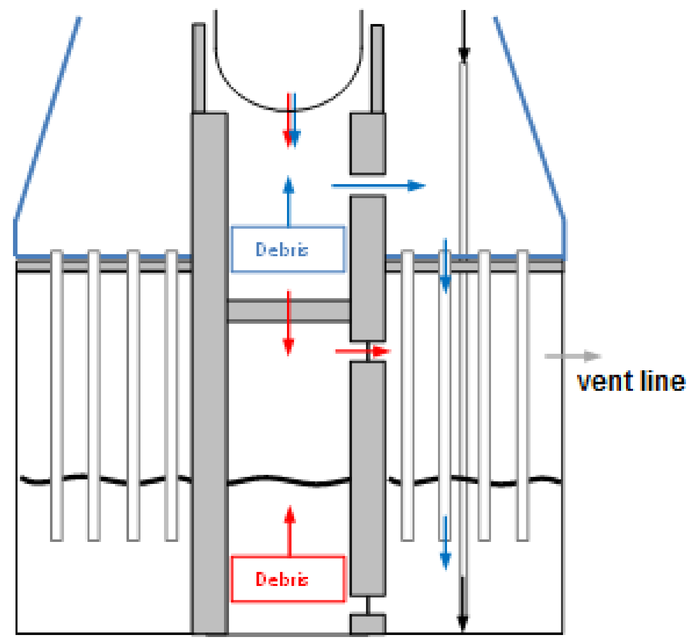


Figure 3-4
Representative Mark II containment layout

Figure 3-5
Mark II debris location

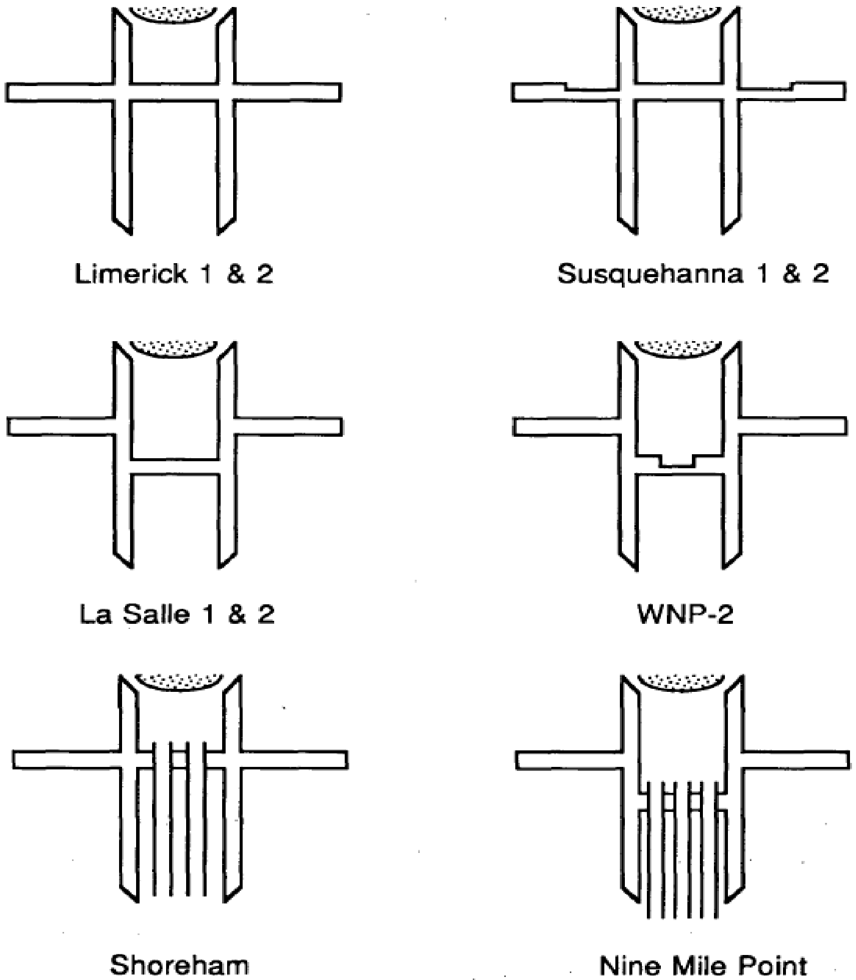
MELCOR Run Matrix for Mark II

			Pre Core Damage					Post Core Damage				
		RPV Pressure control	RCIC Operation				Anticipatory Venting	Flex Operation		SRV Operation	Venting	
		Availability (hr)	RCIC Availability (hr)	RCIC Suction	Failure Temp (F)	Open SRV after RCIC fails	Setpoint (psig)	Injection @ LH failure	SAWA Injection rate (gpm)	Allow SRV stuck open failure?	Location	Setpoint (psig)
Option	Case											
1/2A	1	72	16	SP	230	N	15	-	-	Y	WW	60
	1p1	72	16	SP	230	N	15	-	-	Y	WW	45
1/2A	3	4	4	SP	230	N	15	-	-	N	WW	60
1/2A	5	72	16	CST	230	N	15	-	-	Y	WW	60
1/2A	6	72	16	SP	230	N	15	-	-	Y	WW	30
3A	10	72	16	SP	230	N	15	RPV	500	Y	WW/DW	60
	10p1	72	16	SP	230	N	15	RPV	500	Y	WW/DW	45
3A	11	72	16	SP	230	Y	15	RPV	500	Y	WW/DW	60
	11p1	72	16	SP	230	Y	15	RPV	500	Y	WW/DW	45
3B	24	72	16	SP	230	N	15	DW	500	Y	WW/DW	60
	24p1	72	16	SP	230	N	15	DW	500	Y	WW/DW	45
3A	42	4	4	SP	230	N	15	RPV	500	N	WW/DW	60
3B	44	4	4	SP	230	N	15	DW	500	N	WW/DW	60
3B	45	-	16	SP	230	-	-	DW	500	Y	DW	60
3B	49	-	0	-	-	-	-	DW	500	Y	WW/DW	60
3B	51	-	16	SP	230	-	15	DW	500	Y	DW	15
3B	52	-	16	SP	230	-	15	DW	500	N	DW	15
		Sensitivity to DW-WW bypass and lower reactor cavity (LRC) pool										
1	1a1	Same as case 1 but assuming suppression pool bypass is delayed until upper reactor cavity (URC) floor is completely ablated										
1	1b1	Same as case 1 but assuming lower reactor cavity is filled with water										
1	1b2	Same as case 1b1 but assuming immediate suppression pool bypass (0 min delay)										
1	1b3	Same as case 1b1 but assuming suppression pool bypass is delayed until URC floor is completely ablated										

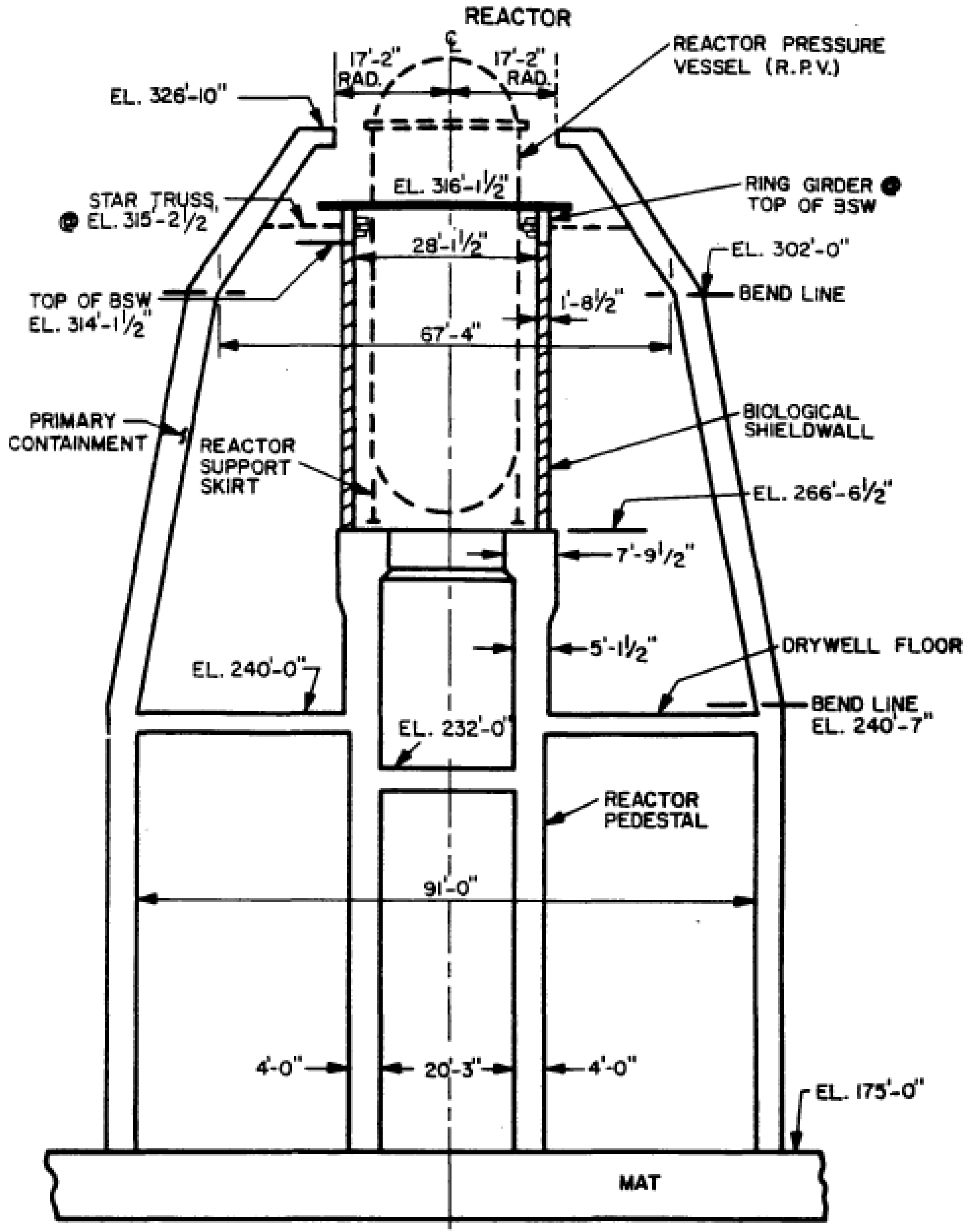


RPV intact / SRV & SP scrubbing
Lower head failure / DCV & SP scrubbing
Suppression pool bypass / MCCI & overlying water scrubbing

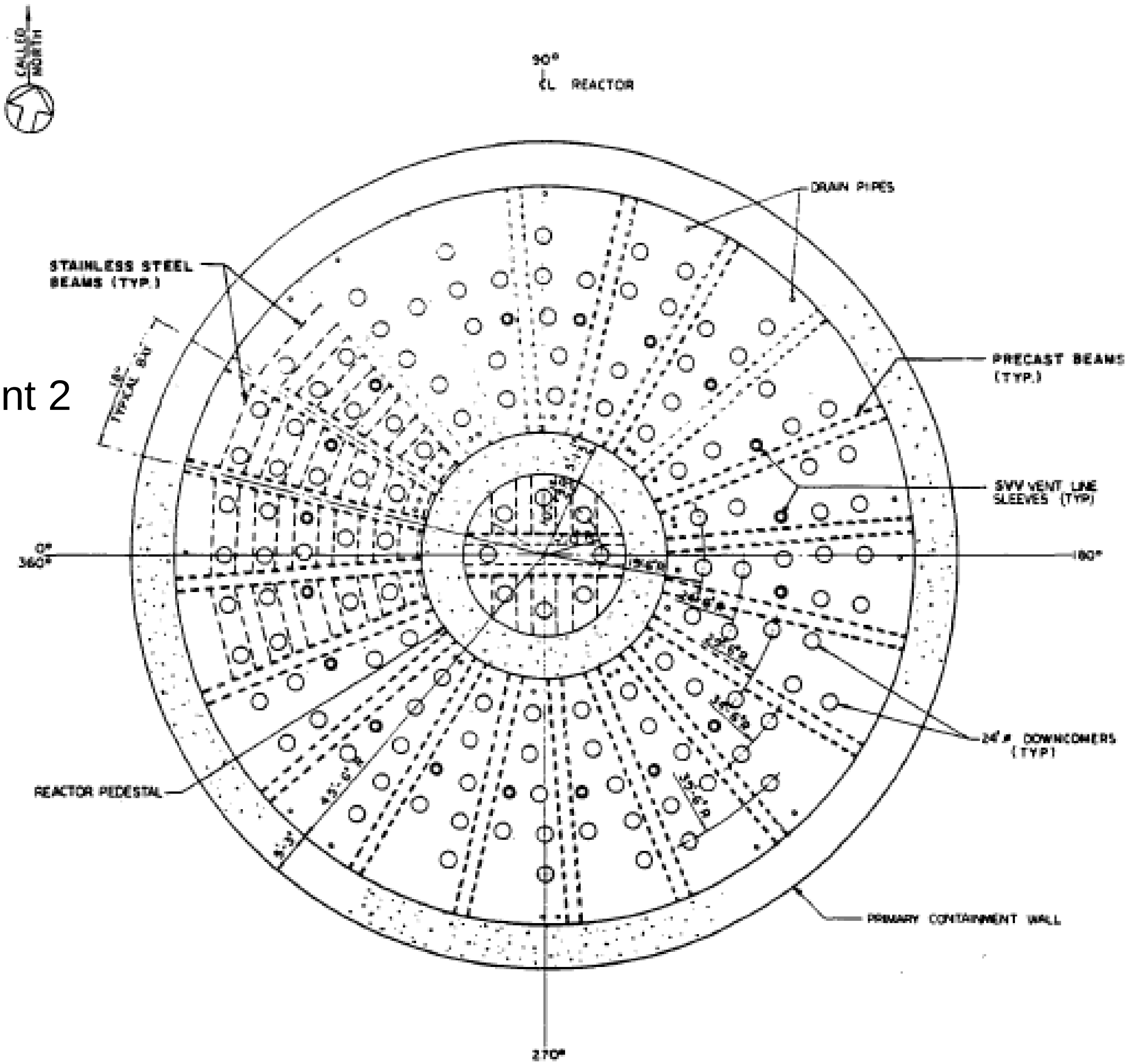
BWR Mark I/II Containment Designs



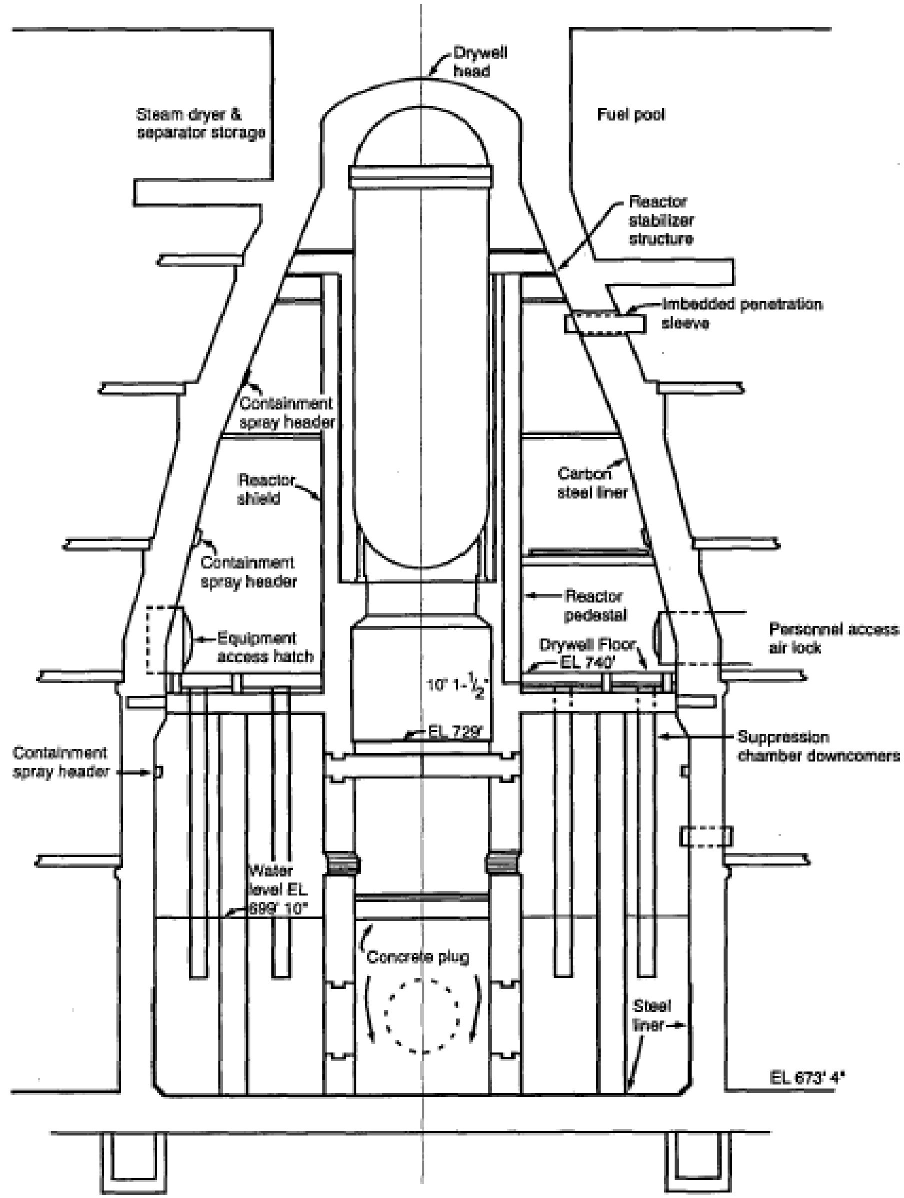
Nine Mile Point 2 Containment



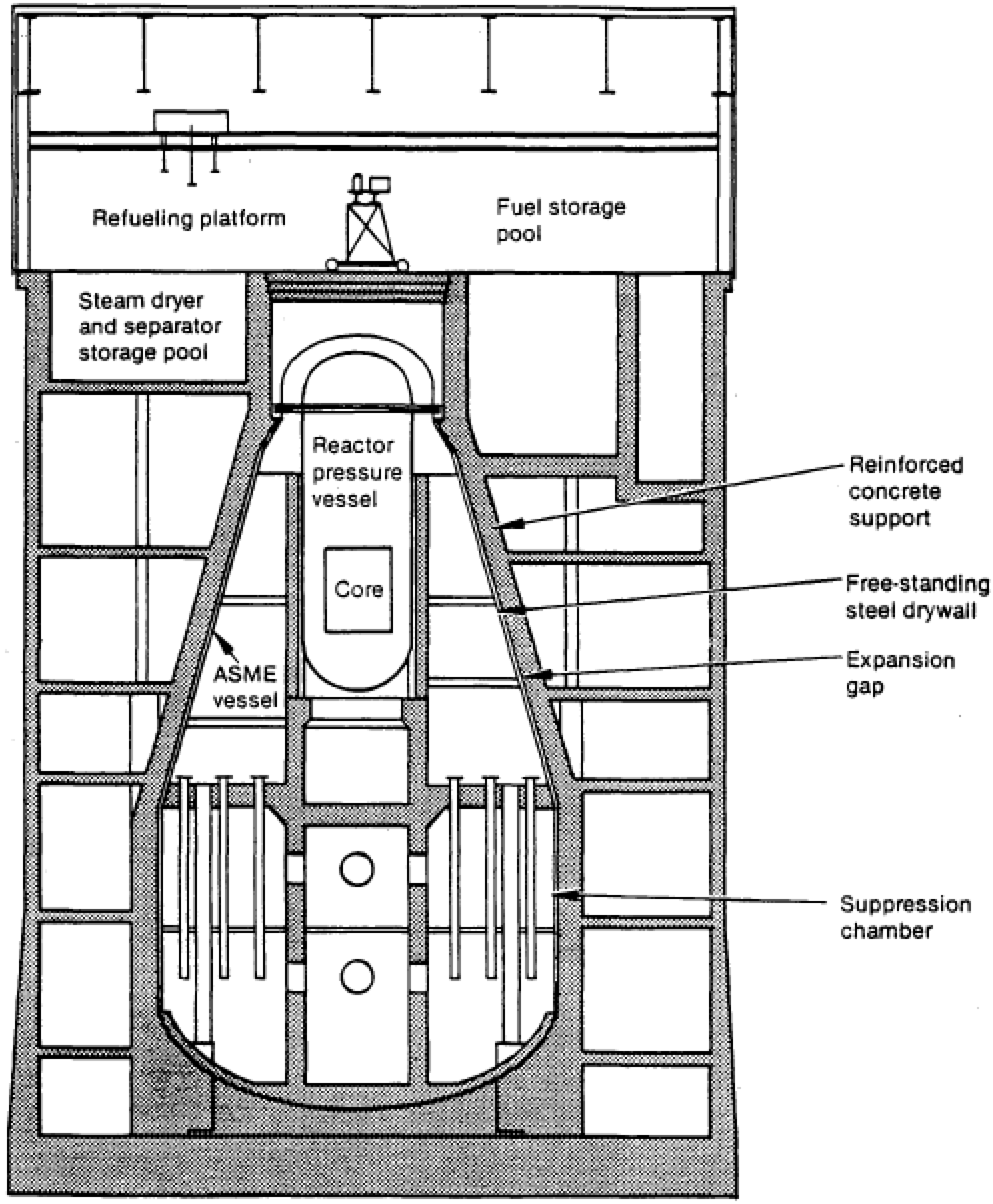
Nine Mile Point 2
Drywell Floor



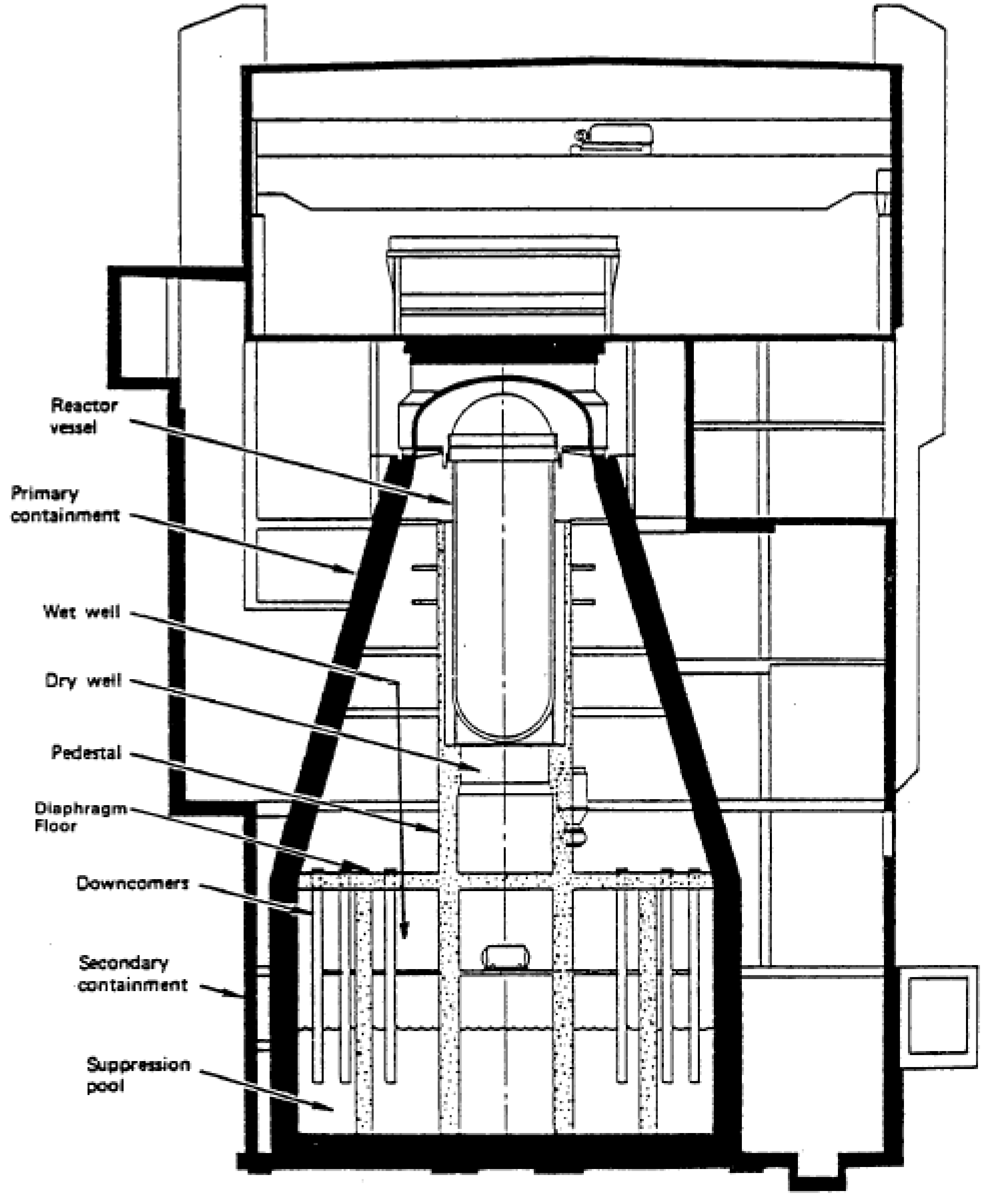
LaSalle Containment



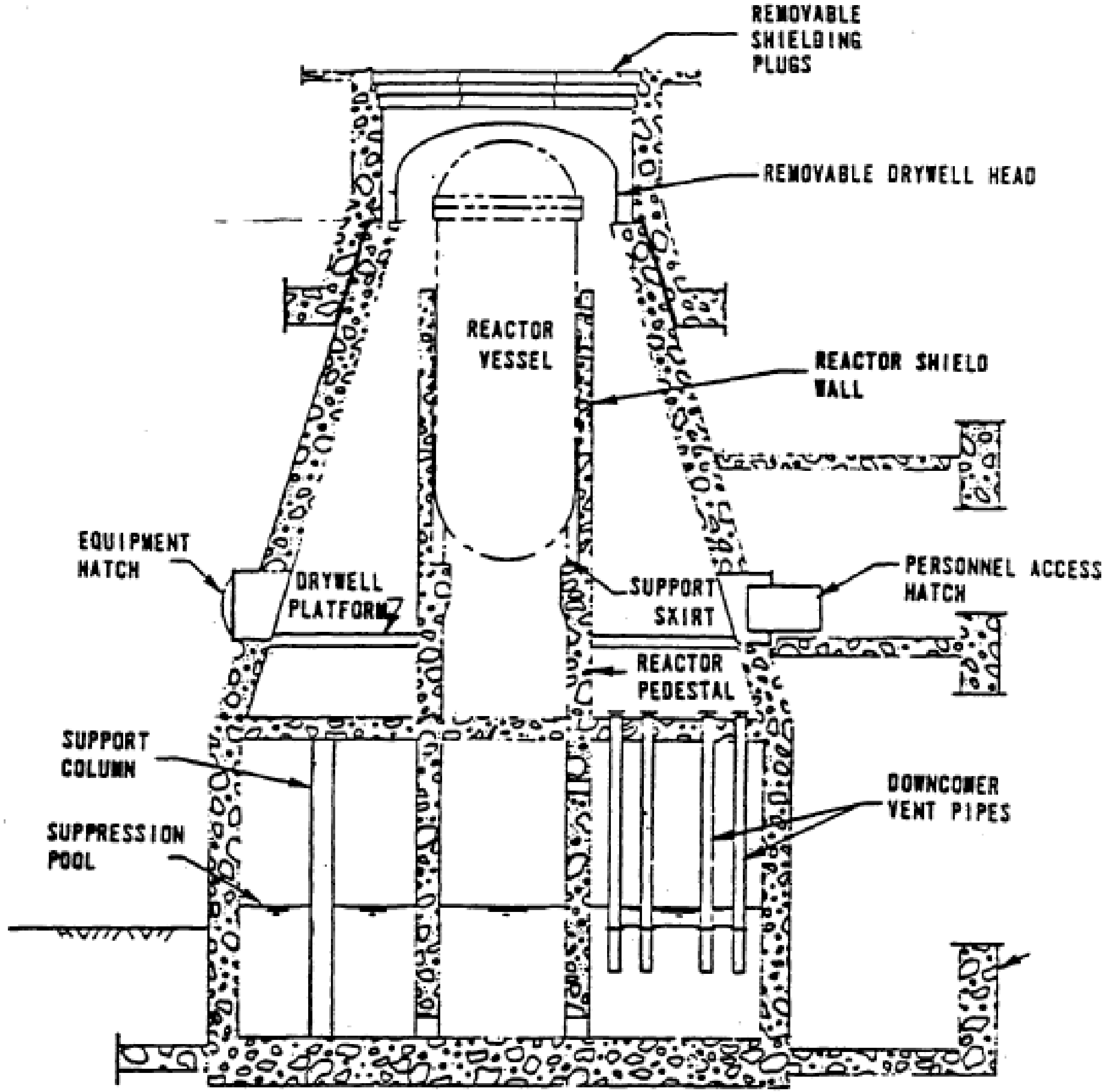
Columbia Containment



Limerick
Containment



Susquehanna Containment



Susquehanna
Drywell Floor