UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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PERIODIC BRIEFING ON NEW REACTOR ISSUES

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WEDNESDAY,

JUNE 25, 2008

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The Commission met at 1:00 p.m., in One White Flint North, 11555 Rockville Pike, Rockville, Maryland, the Honorable DALE E. KLEIN, Chairman, presiding.

COMMISSIONERS PRESENT:

DALE E. KLEIN, Chairman

GREGORY B. JACZKO, Commissioner

PETER B. LYONS, Commissioner

KRISTINE SVINICKI, Commissioner

INDUSTRY PANEL:

ANTHONY R. PIETRANGELO, Vice President, Regulatory Affairs, NEI

JACK A. BAILEY, Vice President, Nuclear Generation Development, Tennessee Valley Authority

JOHN M. RICHARDS, Principal Engineer, Duke Energy Corporation, Chairman EPRI Structural Reliability & Integrity Committee

NRC STAFF:

R.W. BORCHARDT, Executive Director for Operations

MICHAEL JOHNSON, Director, Office of New Reactors

NILESH CHOKSHI, Deputy Director, Div. of Site and Environmental Reviews (DSER), NRO

REBECCA KARAS, Branch Chief, Geosciences and Geotechnical Engineering, DSER, NRO

SUJIT SAMADDAR, Branch Chief, Structural Engineering, Branch 2, Division of Engineering, NRO

MICHAEL JUNGE, Branch Chief, Operator Licensing & Human Performance Branch, Division of Construction Inspection and Operational Programs, NRO

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

CHAIRMAN KLEIN: Good afternoon. This is going to be one of those long sessions. We get to hear from industry and then we get to hear from staff, and so we have all been doing our exercises to go through a three-hour Commission meeting to be sure we have the right stamina. So I know this is one of a series of hearings we have on new reactors. This one has a little bit of a focus on the seismic activities, so we look forward to hearing both from industry and from the staff.

Any comments from my fellow Commissioners before we start?

Well, Tony, do you want to start?

MR. PIETRANGELO: Yes, please. Thanks.

Mr. Chairman, Commissioners, good afternoon. Although it seems like yesterday, it's been a couple of months since the last new reactor plant briefing. We certainly appreciate the opportunity to be able to share our perspective today on where we are on a number of different activities, and as the Chairman alluded to, a focus on seismic issues.

These periodic briefings really do serve a good purpose in terms of keeping us and I think the staff on track as we work through a lot of the issues on new plant licensing.

Let me introduce my cohorts with me today. To my left is Jack Bailey. Jack is the Vice President of Nuclear Generation Development at the Tennessee Valley Authority. He's also a member of NEI's new plant working group.

And to Jack's left is John Richards. John is the principal engineer at Duke Energy. He's also Chairman of the Electric Power Research Institute's Structural Reliability and Integrity Committee. So, John has been a key player in all the seismic discussions in the industry.

Our topics of discussion on Slide 3 today, I will cover the new plant status. Jack will go through the priorities and pretty much focus in on the rulemaking activities that are ongoing. And Jack and John will cover the different seismic topics. And then, I will come back for some conclusions.

So if we go to Slide 4, we will go right to new plant status. Constructive interactions do continue with the staff. On almost a daily basis there is a meeting between either industry and NEI task forces, applicants and design centered working groups on applications and design specific topics.

We are still on the learning curve on implementation of Part 52 and the level of detail necessary in a combined license application. But I think we are just making tremendous progress as we go through. The lessons learned are being shared through the design centered working group process. We want to make sure that the questions that the applicants get are shared with the other applicants in a particular design group.

And a great example of a success story in this regard is the electronic submittals. There were a few hiccups with the first electronic submissions and getting them on the NRC's website. I'm pleased to

report, and I'm sure the Commission has seen this as well, that that process is almost seamless now. And that information is getting on the public web site almost immediately. So, that is a real success story.

We have begun to focus more on post-licensing implementation guidance that's under development. In particular, the construction inspection program and the ITAAC closeout, we have developed guidance that includes letters of submittal on ITAAC closure, the documentation necessary to close out that ITAAC, several examples. We have gotten input from not only the architect engineers and constructors, but also our utilities and the design centered working groups.

Again, various examples, I think we are making good progress towards getting a common understanding of the expectation that the staff has with respect to ITAAC closeout. We have submitted a document to the staff and public interactions have begun. So we expect that progress to continue.

On the staff side, there has been good leadership in the construction inspection program. We compliment staff management there in this regard. They are well prepared, there's pre-agreed schedules, and everyone is adhering to the schedule, so the progress is quite good.

We expect to be able to reach a common understanding on the ITAAC closeout guidance and achieve full endorsement on the Regulatory Guide sometime in 2009.

Another area that we focused on is problem identification and resolution. That's going to be extremely important going forward in

the construction of new plants. Again,

we've gotten input from the spectrum of the industry. We did submit a document about a month ago to really initiate discussion on what a problem identification and resolution program looks like at a construction site. Discussions have started; there's meetings planned. And again, we are making, I think, good progress here.

The next area is operator training. We are in the process of updating a generic template on new plant training programs that the staff had approved last year. We have added a cold license training plan. This cold licensing will provide a method for operations personnel to acquire knowledge and experience for licensed operator duties at a new plant and especially under the unique conditions present during plant construction and initial operation.

We understand that the staff is on track to complete a review of our update and issue an SER later this year.

The next issue we wanted to chat a little bit about was the implementation of the Limited Work Authorization rule. That rulemaking completed last year. The main intent of the rule was to focus resources and attention of the NRC on those activities that had a direct nexus to public health and safety. As the rule states, there are some structure, systems and components that have that nexus to radiological health and safety. And the classification of these SSCs will be design specific for the facility.

We are trying to preserve the definition of construction that that rulemaking laid out. As identified in the rule and statements of

consideration, things like the cooling
towers are not part of the definition of construction because they don't have that nexus to safety significance. We are interacting with the staff on their interim staff guidance, which should reflect the language and the supporting content of the rule.

As with all new rules, there is always going to be some difference of interpretation in the implementation. We are working through that. And I think what will serve us well here is that there is a finite number of structure systems and components that make up each plant. I think there is clearly going to be a category that is not within the definition of construction. There is going to clearly be a category that clearly does satisfy the definition of construction. And then there's going to be a gray area in the middle.

So the way we work through this is through examples. Again, it's not an endless list. It's a list of structure, systems and components that meet the intent of the rule. So that will by codified in the guidance document, ultimately, and I think that will help planning go forward on what preconstruction activities are, what you can do under an LWA and a combined license application.

The last item I wanted to touch on was improving the environmental review process. We are certainly looking forward to the staff's plan for improving the process within the framework of NEPA. As we get through the first wave of COL applications where the design certifications really make up a large portion of what's referenced in the COL, we see the environmental reviews perhaps being the long pole in

the tent going forward after that first wave.

So we are really looking for ways to improve the efficacy of that process through either using common methodologies, what is generic to each plant and site, things that we can come up with common methodology, and then it is just the difference in the input parameters to those methods that could be focused on. So again, we look forward to making progress with the staff in that regard.

With that, let me turn it over to Jack.

MR. BAILEY: Turn to Slide 5 in the package. We have limited slides and limited words in the slide and a lot of the words in between, but we try to list here some of the rulemakings that are important for us to complete on the schedule that everybody is anticipating, because they directly impact, in most cases, the COLs that are under review right now or the schedules that we have established for them.

One of these is the aircraft impact assessment rule. Certainly, last December, we provided comments on the proposed new rule, which is designed to consider aircraft impacts. We have, in parallel, developed a methodology to be used to do the assessments for the new plants. That is a draft right now, and we don't expect it to be approved by the NRC until after the rule is issued. But, we tried to anticipate what we would need to do in order to complete the assessments that the rule requires.

The draft does incorporate comments received from the NRC and from the considerable interactions we have had with the staff, which has been helping this process move along well. At the same time,

we have established an industry peer
group that will go around with the designers and evaluate how they are applying that methodology and ensure that it is both consistent and correctly applied before they do their detailed engineering analysis of those -- well, that methodology.

So far, one of the designers, the AP1000, led by Westinghouse, has completed both the original design review and the analysis for their design. Two other teams, the GESBWR and AREVA EPR have completed the assessment orientation part of that, where the peer review group made sure that they were analyzing the right things in the right way. And they are now started on the analytical side of that analysis.

And then the aim is to complete all of the assessments for the other designs, too, by the first quarter of 2009. So you can see that it is a short time frame after the actual rule is to be finalized, at most this work is scheduled to be completed.

Shifting gears away from that to another one on new plant security, the 10 CFR 50.54 rule, again, we are already anticipating what the requirements will be and the need to do the assessments. And we expect to start the assessments on that within the next six months for the designs.

The security plans for new plant rulemaking is one that probably has us with the most anxiety, mainly because of the schedule relative to the schedule that we have to meet on our COL reviews. We, I guess, in April brought up -- the issue was brought up and our concern

was brought up that the schedule seemed
to be fairly tight on when the final rule would be issued and when reviews actually had to be completed to support the various phases of COL reviews.

However, as we have been doing in a lot of other areas, there are things we can do in parallel. And we are already trying to work out together what the direction will be for the elements of that security plan requirements so that we can, in parallel, be working on the details. So that when it is finalized, we ought to be able to quickly submit changes to our COLs and have those reviewed by the staff.

The key in that is making available to the industry information as quickly as we can that could by be useful in our parallel approach. The most important of which might be the SECY document itself that will be submitted on the final rule making package. And we would like for that to be quickly made public once it is submitted, so that we would have sufficient details of what's being proposed that we can anticipate and work towards changes that we might have to make in our own applications.

And, finally, on waste confidence rule. DOE, of course, has jumped out now and has already issued letters just recently, to applicants for new plants that says they are ready to start negotiations on a contract for their used fuel. And we understand and we are pleased that the NRC is also moving forward on the rulemaking on the waste confidence rule.

We believe that -- and we think this is a proactive step, in that it will improve and further strengthen the current regulatory basis for

waste confidence, and that will also
enhance the predictability of new plants licensing process overall for the industry. Okay.

We turn to the next slide. And we introduce the seismic topic here, and both myself and John will cover some of this.

The first point we would like to make is that we have been designing nuclear plants for seismic requirements since we were building nuclear plants. And there have been recent events that give us an opportunity to determine how well even those prior analyses have held up against those events.

And the most recent of seismic events in Japan and even the most recent one in northern Japan have shown that in most cases -- well, in all cases that we have looked at, that these designs are very robust and that they withstand the seismic events. Which means that there is considerable margins built in, maybe even beyond just the seismic design requirements themselves, that make these plants withstand these events to a greater degree than we might have thought when we were first designing them.

Clearly when we go back and look at how that played out over earlier designs than the 1990's, the industry took action to voluntarily look at what the effects of different seismic criteria would have been or events on plants through the individual plant examination of external events approach, where we actually then evaluated many of our plants against different criteria. And again, it showed that there was considerable margin in the designs and the construction of those plants.

The one point, I think, we made considerable progress on seismic over the last decade both with the NRC and with the industry, and I believe in many cases, just one small point I'll make today, I will not make a big issue out of it other than to put it on the table, I think in many cases we are spending almost the same amount of time now on things that have much less safety significance than they may have had a decade ago when we were looking at these issues.

We seem to try to resolve every academic question or scientific question that might be raised, even though experience or practical empirical evidence of what's happened in the past have not shown that to be a particular concern or issue. And so we are having trouble getting the final closure on some of the last things that we have to deal with. It does not mean it is not a significant issue. It certainly is. I think we have dealt with many of those significant issues and the designs of the new plants under the COL process are implementing many of those improvements.

It is probably on part of the learning curve of Part 52 and first plants that are going through it that is causing some of that, asking more questions than we may need to, but nevertheless, I think it is at the point where it requires a hard look on what is the incremental value added out of some of the things we are still trying to finalize here.

On the more positive note, though, improved and more realistic methodologies and tools have been developed and are now available for seismic evaluations. Since the mid-1980's, we have had

significant advancements in both the regulatory and the technical guidance in this area, both seismic design and ground motion.

In the mid-1990's, as I mentioned, the industry and NRC reached common understanding of a new approach, and that's the one we are using today for our new plants.

Over the past four years we learned some things from the Early Site Permits for new plants that when we applied that new methodology that was developed, we didn't always get the results that were realistic, and we had to work through some ways to fine tune it, is what I would call it. And we spent several years doing that, which was good. And we now have those rules in place.

I will turn this over to John Richards now so he can highlight some of those things that have been done over the last few years to get it to this point.

MR. RICHARDS: So if we move over to Slide 7, I will describe some of those processes that we have been working on pretty aggressively over the last several years in the industry and with the staff.

We have developed some common understandings on a variety of process improvements in how the seismic hazards are calculated and assembled. I'll take these just a bit out of order from what's listed here.

I will start with the cumulative absolute velocity. That is a process that was developed back in the '80s. And it came up when there were some small earthquakes at operating plants or plants that were

about to be operating that were very high frequency and non-damaging but they exceeded, depending on how you measured, the response spectra of both the operating basis and the safe shutdown basis, in spite of the fact that they could barely be felt at the plant. And it highlighted the fact that the response spectrum tool that we were using was not, in all cases, a great tool to figure out the significance.

So, industry put together and NRC eventually adopted something called a cumulative absolute velocity, which is a way of evaluating these high frequency, short duration, non-damaging earthquakes and excluding them from the operating basis earthquake exceedance criteria, which would have required shutdown of those plants.

So we applied that tool inside the -- we proposed to apply that tool inside the seismic hazard methodology as a way of eliminating -- having a better informed process for stripping out earthquakes that would not matter, would not be damaging in the process. We did a lot research for that. We had a lot of discussions with staff. And that has been adopted now into the process.

Another tool that we worked on was incoherency. And the concept on that is that the lower frequency motions, one or two hertz, move into -- from the ground into the foundations of the building fairly coherently and excite the whole foundation at the same time.

The very high frequency motions that were moving around at 20 or 30 times a second go into the foundations with a more scattered process and don't move the whole building and excite the whole building, some coherently. So there was a lot of work done using recorded data

from arrays and evaluations of that data,
a lot of interactions with the staff and a process to incorporate that has been put into the process. The probabilistic seismic hazard process.

The third thing that is listed is the new software package validation. What that effectively does is it incorporates the equations from the incoherency method into the analysis, the soil structure interaction analysis of the building, which is the step where the motions are mathematically propagated through into the buildings.

So, since the incoherency equations were new, they had to be incorporated into the software, and then that had to be tested and validated. So we've been through that whole process with the staff.

The next item is the process for updating seismic hazards. And as we went through the evaluations amongst ourselves and then submittals into staff, we have received a number of questions from the staff about some new data, things that were not originally in the seismic hazard studies. Those studies were done about 20 years ago, both through the Electric Power Research Institute and the Lawrence Livermore and have been approved through the Reg Guides for the starting point of a seismic hazard, a site-specific seismic hazard analysis that is used to determine design level for the plant, the design -- well, the site specific ground motion.

So, some portions of those updates were done on a site-specific basis, where there's clear new information. The two clear examples would be there's new information about the Charleston earthquake. They have done a bunch of trenching and scientific studies.

That information has been well vetted. It is well understood and agreed to. Those have been incorporated into an update of the seismic hazards.

Similarly, the earthquakes in the New Madrid area in the central United States have been through a similar process. So, all of those have bin incorporated into the updates.

The other thing that was done, actually, is in 2004, there was a study done of the attenuation models, which is how the earthquake motion moves from the site of the earthquake to a particular site. So that has all been incorporated into the submittals.

There are, though, a variety of other -- it's a very popular area for scientific studies, so there is a variety of other reports and studies that are done for other reasons and other purposes. Those were reviewed qualitatively as submittals were put together, but we have received a variety of questions from staff looking for more details on that.

As a result of that, we have recently proposed to the staff a screening process for how that type of information could be considered. It's information that has not been, perhaps fully vetted and evaluated by the scientific community. It's under some -- it's been proposed, perhaps, by one organization but not the whole community has reviewed it and adopted it.

So, it's a two-level screening process. The first level is, does the quality of the information rise to the level of quality commensurate with the kind of work we would do for nuclear power? Is it a one PhD thesis done for some industry outside of nuclear that might be evaluated

qualitatively as not warranting a numeric study?

Other studies would have more scientific horsepower behind it, perhaps. Shall I say higher quality studies. Those would be evaluated using a sensitivity -- numerical sensitivity study on a site-specific basis. And then, there is threshold for when the impact of those is high enough that they warrant updating the site-specific study.

So that is a process that we have proposed fairly recently and have submitted into the NRC along with a couple of examples, and it is currently, under review. But we're hoping that it will help everybody get to a common understanding of how we will evaluate some of this new information as it comes around.

So that's what I have. And I will turn it back over to Tony.

MR. PIETRANGELO: We think through what John just went through, we have certainly better analytical tools than had when the first generation of plants was designed, and that these new designs will increase our operational and safety margins.

The point we're at now, I think, is how do we implement these new tools in Part 52 and bring the seismic issues to closure. And we hope we can get that done by the end of 2008, stabilize that area of the regulatory framework and move forward.

We certainly are going to maintain our focus on completing our end of the new rulemakings, including the guidance and the discussions with the staff of the different items that Jack covered. Again, we appreciate the opportunity to speak with you today and look forward to

your questions. Thank you.

CHAIRMAN KLEIN: Thank you for that helpful update. We will begin our questioning with Commissioner Svinicki today.

COMMISSIONER SVINICKI: Thank you. Thank you, Mr. Chairman, and I want to thank everyone for their presentations. I was trying to take careful notes. And I think I will start with you, John, because I wanted to return to this screening process that you have proposed for new studies and new information.

And you will have to bear with me a little bit because we receive briefing materials in advance, so I will make reference to things that I have a strong belief that staff is going to present when they come up and do their panel. But this is my opportunity to get your reaction and get a more complete understanding of some of these issues.

And I understand that staff, according to recent studies, they are indicating in the east Tennessee seismic zone may have the potential to produce large magnitude earthquakes, and geographically, that might implicate a number of COL sites, potential sites are in that seismic area. Those particular studies, is that what you would be referring to when you say that they are new studies about which staff is asking questions but have not been completely vetted in your view? Would that fall into that category?

MR. RICHARDS: Yes. What we've done, in fact just recently -- east Tennessee is a fairly active region, but they are fairly moderate earthquakes is what the history has been so far. Within our own activities on our side when we were preparing submittals, we had

discussions about those things within our own meetings with our own sets of experts.

There was no indication that the types of things that were being found were significantly outside what had been previously predicted. So, we have, however, received more questions from staff and, in fact, that is exactly one of the sensitivity studies that we performed.

As you mentioned, it has the possibility of impacting several sites. So when the questions started coming, we got together to propose a generic study on that. And we worked with staff to determine some of the parameters for that study, and we have submitted that recently and it is under their review now.

COMMISSIONER SVINICKI: So as you work on that more -- I will call it a generic issue resolution or an ability to look at those particular studies and do the sensitivity -- I know that industry initiated the new reactor seismic issues resolution program, and my understanding of the intent there is to work collaboratively and to work early and to try to resolve some of these things generically. But as I reflect on some of the materials for today, what I think might be happening is that because of the schedules for some of the individual applications, we kind of -- we may be of duel tracks here -- we are trying to work together and resolve some of these issues generically. But yet the pace and the published schedules for some of the application reviews are leading us to do it ESP by ESP and COL by COL, which I think industry and staff had hoped to avoid that circumstance.

So, is there anything -- I mean, we find ourselves where we find ourselves. But is there anything that we could do to improve the process here? Should we continue working on issues collaboratively and generically or should we focus efforts on answering these questions specifically, some of it will be site specific? Do you have any improvements?

Tony talked about maturing the Part 52 process, but if we can make some improvements as we go along, I think we should stay open, even though everyone is very busy with the pace of activities, to try to do that as well. Is there anything you would suggest maybe for seismic specifically or other issues that we are trying to tackle?

MR. RICHARDS: Well, I would agree with you with an awful lot of what you just said. And, in fact, what Tony mentioned about going through the learning curve on Part 52, I would suggest we are going through a similar learning curve in the seismic arena, both on industry and staff.

We are exercising Regulatory Guides and some processes that have not been applied before. To the extent that we were aware of some of the potholes that we were start to fall into, we tried to address those early on in the process as much as possible. As I said, we have been working together with the staff for several years on the issues we are aware of.

Some of the questions that are starting to come up now I think are because the staff didn't have the submittals yet and didn't necessarily know some of the details. And so, until they see a few things, it might be a little tough for everyone to know what some of the issues are. So we are working pretty hard, I think, to sort of look ahead to project on what some of the issues might be and work generically on the front side.

A few of these, we probably are going to have to suffer through the learning curves. We are attempting as much as possible, though, to share the lessons learned as we move forward. Simple examples of that are the new characterization of the Charleston earthquake is being used generically -- as far as I know, generically, almost all the submittals.

COMMISSIONER SVINICKI: Correct me if I'm wrong on that, but in terms of the studies that were done in, I think, '86 or the mid-80s, you're indicating to me that the submittals and applications that the staff is reviewing now have, at least, been updated for Charleston and New Madrid earthquakes?

MR. RICHARDS: The ones that I'm aware of have been updated for those, yes. There are one or two other areas that I'm not specifically aware of. I'm most familiar with the ones in the southeast myself.

I know there is at least one area, and I can't think of the right name for it, but I know that is being generically updated also.

So yes, there are some clear -- the major issues where there is clear new information. We are working very hard to try and keep everybody as consistent as we can so that we have a good set of information submitted. It surely serves our best interest as well as staff to try to have quality submittals.

COMMISSIONER SVINICKI: Okay. I agree with that, and I think I had not been aware of your proposal for a screening process for emergent data. Even that, I think, is a constructive proposal because we will have to be able to accommodate new information. So, I hope staff and industry will have productive discussions on that.

Another challenge that was previously identified was limited testing capability for dynamic soil testing. I think this was identified by staff a few months ago on a Commission briefing. As I understand it, staff was sequencing some of their review so that this limited testing capability that existed nationwide, that applicants could tee up and have access to that capability and staff would pace different elements of their review.

Is that still working or is additional testing capacity coming on line? I was a little surprised to hear that that was constrained, given the downturn in a lot of construction. I would think that there would be a lot of soils testing capacity available. Can anyone speak to that?

MR. RICHARDS: Yeah, I can speak to that a little bit. Part of what is happening -- this is an unusual test. It's not that common in all commercial industries, but it's not unheard of, and so there are some test facilities to do it. But it is a relatively new test.

And there has not been a huge demand for it, which is why there has been a limited number of resources available. So, the process that was proposed is instead of completing all of the testing prior to submittal, some testing would be done prior to the submittal. There are some standard data that could by used. So you take your limited test, match it up with the standard data, and use that for your submittal with the commitment to complete the rest of the testing in a confirmatory nature that the generic data you have used is applicable for your site.

What's also happening is there are more test lab facilities coming on-line. It is a standard business process now. There is a bigger demand for it, and so people are willing to -- and it takes a fair amount of money and upfront time to put these together, but now there's expected to be a steady demand. And so, the commercial industry is responding.

COMMISSIONER SVINICKI: Okay. So with those two, I will call them work arounds or different ways of mitigating this, is this testing on the critical path for anyone or are we able to kind of keep that off the critical path?

MR. RICHARDS: I am not aware that it is on a critical path for anyone, but I would have to admit that my site does not need that to the depth that a lot of others do. And I been blessed to stay a little step removed from that one.

COMMISSIONER SVINICKI: Okay. I appreciate that.

I had a much more general question, which was there are some schemes and instructions in place for staff in terms of prioritizing

new reactor applications. And in your view, are the schemes that we have in place for prioritizing applications fair and workable as far as your experience so far? Are there any alterations that you would recommend, just collectively in your experiences?

MR. BAILEY: I think overall, they are fair. And I think right now it is working relatively well. We are starting, I think, to reach the point, with more and more applications coming in, where the limitations on resources have a bigger impact on everybody.

The most difficult part for everybody is the ability to change the plans in any way without having a huge effect, potentially, on existing schedules. That's because, I think, there is such a precision right now of trying to schedule the resources, at least as we understand it, that if they cannot be used exactly at the time where they were originally planned, sometimes a year ahead of time, then the flexibility on what can be done is limited.

So if anything, we probably need to find a way to build in some ability to absorb small deviations without having huge impacts on schedule. I don't know if that is having additional time in the schedule that is available for dealing with those or what. But, overall, up to now, it's worked well and it's been a big challenge for the NRC, and we think they are managing through it relatively effectively.

COMMISSIONER SVINICKI: Thank you. Thank you, Mr. Chairman.

CHAIRMAN KLEIN: I can't help but start off with my generic questions, since we are talking about new reactors and make sure that we don't miss an opportunity to enhance public confidence, and that's giving tours through reactors. When I was in Japan and I was very impressed with how they conduct tours. At some point, we really need to get the public ability to get back into reactors.

So, Tony, I assume that NEI is looking at all these new designs for ways we can conduct tours. Is that a good assessment?

MR. PIETRANGELO: It would be nice if we had one built to go show someone. That would help.

We are all for it. The more we can get folks in to take a look at what's going on, the better.

CHAIRMAN KLEIN: I was very impressed with what I had seen in Japan where you can go through these tours without putting all the boots on and dosimeters. And people can actually see these to give them the confidence that these are operating safely and securely. And I just want to make sure that we don't miss an opportunity in the design stages before the walls are poured how you can really look at getting the public back into these facilities without compromising your operation.

MR. PIETRANGELO: I don't know if you if been doing that for your new sites.

MR. BAILEY: We have not been putting in design features that would make it easy to do the tours. I think from a principle of trying to support more public visitations and interactions on new plants, we

anticipate we would want to do that,

because we think there will be a positive message for the industry to see these new plants. And the more people that can see it, the better off they will be.

But we haven't even -- at this stage, the future construction activities that are on the horizon are taking up most of our attention, and the features that we will put in once the plants are nearing completion of that construction it's more of an idea right now than any detailed plans.

CHAIRMAN KLEIN: I would really encourage you to take a look what those, because if you don't do it up front, once you pour walls, it may by hard to get the tours through there. And you might miss an opportunity to really look at what do you think the public would like to see as they might go through these reactors. And again, in a way that you can do the efficiently and not compromise the safety and security or the operation, from that standpoint.

Tony, I had another question for you in terms of -- on Slide 4, you talked about the challenges of the environmental review process and that might be the long pole in the tent. What have been the major challenges that you have seen so far in the environmental reviews?

MR. PIETRANGELO: It's not so much the challenges that we have seen thus far, but what we are anticipating is that given that we are standardizing up to 70 percent of the COL submittals and that a large part of that references the design certification, that we expect those reviews to be facilitated once the first wave in each design group is through.

The site specific information that goes into the environmental review, we don't have the same level of standardization nor the same level of cooperation like we had on trying to standardize.

So again, looking at areas that we can make generic where we can come up with a common methodology and really try to streamline that process and have less discussion on what the methodology is and more on what those site specific inputs are to the methodology, hopefully, there will be some efficiencies there to be gained. Again, we have not had the same level of effort to try to reduce or anticipate reduction of that time as we have on the standardization that goes into the COLs.

But in terms of the current reviews, I'm not aware of any significant issues with regard to the environmental reviews.

MR. BAILEY: I would not call them issues. I will give you a couple of insights, and again, I'm winging this, so bear with me. But we spent a lot time and a lot of worry on these applications on need for power as an example in ER. And I think without question, this country is going to need more power. And whether we need it in 2017 or we need it in 2019, the energy usages continue to grow throughout the country.

So to make that an area we even spend a lot of time on these ER reviews would just seem to be not an efficient use of resources and time, for example.

Another one that we have struggled with is we were using existing transmission lines for our transmission from our application, and the amount of effort to defend why that was better than building new

transmission lines took a lot of time. So I think there is common sense issues that we can't seem to make go away easily, and we still have to spend the same amount of time on those that we spend on anything else.

Now, that is not so much a process issue as it is just a what does it take to convince everybody we have done an adequate job on an ER. But that is imbedded throughout the process in a lot of different areas.

CHAIRMAN KLEIN: Do you think once we get through this first wave, if the environmental reviews are the long pole in the tent because they are site specific, that that would tend to encourage people to do the Early Site Permits to get some of those issues addressed early?

MR. BAILEY: It may. The problem with that is you really have to have great 15 to 25-year planning that anticipates exactly when you are going to make those decisions and move in those directions. And if you want to bank -- if you want to go ahead and expend the resources to bank a bunch of sites early, then you might take that approach. If you suddenly find yourself wanting to build a nuclear power plant, then the time it takes to go through the two-step process versus just getting started and doing the work usually rules the ability do that out -- it makes it more difficult, let's put it that way.

So I don't know if that issue alone would encourage them to do it, but it may they push some people to say let's make sure this risk is dealt with early enough so it doesn't become limiting -- later on they may start a little bit earlier.

CHAIRMAN KLEIN: Thanks. Jack, you, on Slide 5, had talked about some security plans. And I guess have you looked at the -- at these designs with security in mind so that you can take advantage of security opportunities in the design, rather than have to do after the facts?

MR. BAILEY: Yes, we have. As a matter of fact, for -- we are using the standardized approach, too, so we are using an industry group of security experts to work with Westinghouse, for example, on features that need to be considered or built in to their plant design to better deal with security. So, that was
early in the process, we did that.

We also worked together in terms of how we would respond to the COL application requirements, too. So all along the way, we have had a peer group, so to speak, from all the utilities that are built in a common design that work together to look for ways to enhance that.

Now, once -- we're about to that stage now, we provide the input, Westinghouse has made some changes to the design -- actually, several changes as a result of that input, but now that design is being locked down. So the ability to do that going forward obviously now is limited.

CHAIRMAN KLEIN: I think that is good to look at those early on. It might reduce operating costs at a later point. So, it is good to factor that in.

Jack, you had also mentioned waste confidence, and I think the last time Tony appeared, I had asked him how the standard contracts

were doing. How are we doing now?

MR. BAILEY: We have been invited to go talk to DOE about those contracts. And we are scheduling -- I guess every utility now is scheduling meetings with them to have those discussions. Ours has not taken place yet. It probably will be in July sometime. But that's well underway now.

They have drafted certain features of those contracts that they would like us to adopt and sign off on, and we are having the dialogue. So, hopefully, within the next, I would say, four to six months a lot of those contracts may actually be signed.

CHAIRMAN KLEIN: Have they talked about the pick up date and how long you may have to store the spent fuel on site?

MR. BAILEY: That is part of what they are proposing in those contracts.

I don't know if you have anything you want to add to it on a generic basis, but it's longer than we would like. So, that's part of the negotiation.

MR. PIETRANGELO: It certainly minimizes the legal risk of the Federal Government.

CHAIRMAN KLEIN: I'm sure that the first draft would have that in mind.

Any discussions on central interim storage being proposed by DOE?

MR. PIETRANGELO: No, not at this point.

MR. BAILEY: It has not been proposed.

CHAIRMAN KLEIN: Well, on the seismic -- I guess this could be for either Jack or John. You talked about the analytical tools have increased. Certainly, computer codes and computer analysis has made that job better.

And I guess the question is, is there a lot of experimental data that has complimented the computer codes and analysis, or is there still some gaps?

MR. RICHARDS: There is a lot of recorded data that would help to validate a lot of the codes. I'm sure a good researcher could find gaps along the way, though. It is a boundless place where someone could say, well, what about this little detail or that little detail? But, to the extent that the real safety significant portions of it are addressed, that's covered, I think, quite well and validated by testing and recordings.

CHAIRMAN KLEIN: Thank you. Commissioner Jaczko.

COMMISSIONER JACZKO: I have probably more comments than questions. But I guess I would just start with putting in my agreement for the need to complete the rulemakings that I think we have in front us. Waste confidence, the aircraft and the Part 73 rule making, I think, are extremely important to get done. And I think the staff is certainly on target with two of the three of those, and I think we are pretty close to being on target with waste confidence. So I think that is a good step, and I think we will be able to get those done in a time that is sufficient to satisfy any rulemaking activities.

I appreciate Commissioner Svinicki raising the issue of the soil testing. I would just suggest one addition to what she said. I think this was not an issue that has been raised months ago, but I think this is an issue that was raised, I want to, say back -- I will throw in a month here -- maybe October, one of the early periodic meetings we had on new reactor activities. The staff did raise at that time seismic as an issue, and one of the issues -- they may not have specifically raised at that time, but subsequently talked about was the lack of laboratory testing capability for soil samples

And while it may not necessarily be the long pole in the tent right now, I certainly can see a lot of potential for this causing modifications and changes to the schedules as we go forward. The idea is to have soil characterization done early so that we have a good understanding for those sites for which it is not essentially a hard rock site. I assume that's where it becomes an issue there that we have a good understanding of the site characteristics to be able to model and do all the things that need to be done as part of the SER.

Getting new information about that late in the game is only something that has the potential to cause significant delays in our ability to review. It potentially introduces the opportunity for late filed contentions in the hearing process, all of those kinds of things that could ultimately become crucial when it comes to completing this work in a timely manner.

So I certainly think that getting the laboratory capacity, making that available is really the most important thing that needs to be

done in dealing with this. And I think as Commissioner Svinicki characterized it, staff did come up with a work around, and it is precisely that, a work around, and I don't think that is the situation we want to be in. But it sounds like we are moving in the direction of improving that -- or of improving that situation.

The environmental reviews -- and the Chairman brought this issue up -- one of the things that I would just throw out there on this, and I think sometimes we lose sight of it, because certainly from your perspective you have put a lot of focus on the environmental report as a part of the application, but ultimately, the EIS is an NRC responsibility. And as such, it is slightly different from the application in that regard.

So all of the processes that you talked about, the things that you talked about wanting to improve, need for power, all of those kinds of things, those are requirements that we have to do on analysis ultimately. So I'm not necessarily sure at this point that there is anything really fundamentally wrong with our analysis.

I mean, I think as you indicated, Jack, if there is a need for power, the analysis should be relatively straightforward. And I think as we do a variety of these, we will probably get better information and have a better basis on which to be making those kinds of decisions.

It is an interesting point about transmission. I think transmission will probably continue to be an interesting issue as we go forward and look at issues of reliability and all of those aspects.

So, again, I think in the end, the environmental EIS responsibility falls to the NRC, and I think at this point, we have a good

process and we have a process that I
don't necessarily know can be shortened too much without statutory change --

MR. PIETRANGELO: But in the license renewal arena there was a lot of things that were done generically for the EIS. So, all we are doing is suggesting a similar approach on a new plant.

COMMISSIONER JACZKO: And I think that is certainly an option. But again, I think there is a limit of what we want to do generically, because at so point for the integrity of the process, we are better off doing site-specific EIS's. And if in the end it requires a site-specific EIS, the time it takes to complete is EIS is not necessarily any shorter, because most of the timelines are mandated.

It is a process statute. It is not necessarily the technical work that takes the time, it is the need to do a scoping meeting and whether we are doing a supplemental EIS or a full EIS, the time is roughly the same. So, while we may be able to do some things generically, if we can't do it all generically, I don't know that we necessarily save any time in that regard.

Again, I think it is something we certainly can take a look at, but I don't know that it is one where we get that much in the way of -- right now, we've got about an 18-month timetable for EIS's, and I think that is pretty reasonable to get something like that done.

I wanted to just briefly turn to the Part 73 rulemaking, if I could. The Chairman raised an interesting idea and that is the need to -- it would be a good idea, I think as he said, to ensure that from a security

standpoint we look at improving the
designs and make the designs more inherently robust from a security standpoint.

I would note that the Commission had a rulemaking in front of us to do that precise thing. And at time when we were working on the aircraft rule, that was really the focus of that rulemaking. I think it is unfortunate in a way that we did drop that rulemaking, because I think it would have provided those enhancements to that process, much in the way that the Chairman suggested, I think, to ultimately eliminate the need for as many guards and guns and those kinds of things as we have now and make security more passive.

So I think it is unfortunate that we moved away from that, but that is certainly the reality of the situation now.

One question I did want to ask on that rulemaking. It is my understanding that we gotten some estimates from the industry about the potential cost of that rule. I had heard things on the order of on the billion dollar range. The staff went back and certainly looked at the draft Reg analysis, and from the staff's perspective, I think it was on the order of several hundred million dollars -- I mean about a million dollars up front, maybe a million dollars a year in subsequent operating costs.

Can you tell me what you think the big disagreement is or where the big difference is in the analysis? You all arrive at a billion and staff is at, I think, a much lower range.

MR. PIETRANGELO: I'm not in a position to give you specific details today, but I think it is all the devil is in the details, and that's

why putting the draft Reg Guides out with
the final draft language is so important because it's how you interpret the rule language.

COMMISSIONER JACZKO: Are there any particular areas --

MR. PIETRANGELO: If you would have told me it would have taken four years to determine what readily available meant, okay -- I mean, it should not take that long, but it does. And when you have that many words to be interpreted, you can have a wide spectrum of interpretation in terms of what the implementation costs will be.

COMMISSIONER JACZKO: Are there specific areas that are right now areas of -- where the cost -- I mean, is it in the b5b area?

MR. PIETRANGELO: No. No. It's in the physical security plant and designs of the cask and the level of redundancy, and that kind of thing.

COMMISSIONER JACZKO: I certainly hope that we -- I am certainly interested in more information on that as we certainly want to try and figure out where the differences are there.

MR. PIETRANGELO: There is good progress being made, I think, as the different task forces that we have and NSIR has works through the draft Reg Guides and our comments on those. So, we are making good progress.

But I think as much for new plants in terms of updating the templates we originally developed for the COL applications as well as to determine what the impact of the final rule is going to be on the current set of plants, that's why we want to request the Commission to release the

SECY with the final rule package as soon
as practical after you receive it.

COMMISSIONER JACZKO: I certainly have no problem with that, and I think the standard on a paper like that, the standard procedure is it gets released in 10 days, unless the Commission would say otherwise. As far as I am concerned, we can release it as soon as we get it.

MR. PIETRANGELO: In the past sometimes we have had to formally request it, so I hope this serves as a formal request.

COMMISSIONER JACZKO: Absolutely, and they should always -- that one, since it is a rulemaking, will, I think, be made -- it goes out by definition after 10 days. But as I said, I'm perfectly comfortable with releasing it as soon as we get it. I don't have any problem with that.

If I could maybe just turn to a question here at the end. On the seismic issues -- this is again, more of just a generic question, but maybe you can tell me what, if any, lessons right now industry is taking from the Japanese earthquake and what efforts you have ongoing to address that issue and perhaps do some operating experience or other -- gather other information that could be applicable to some of the techniques and methodologies used here?

MR. BAILEY: First of all, we have put together folks that have gone over there and actually visited Japan, for example, when they had their earthquake event to try to learn firsthand what was going on and what they were saying about it. They participated with IAEA and, of course, INPO has done some lessons learned for the industry on that, so

all that information comes back to us.

The good news, I think for us in this country is that our process is and our seismic procedure and regulations right now that we use over here tend to actually incorporate many of the things they still want to do in some of the other countries. Now, we are not an expert on all of the countries' rules, but in the case of the Japanese experience, we think we're in a pretty good position to already have things underway that would deal with those issues.

The other big lesson learned from Japan, of course, was that even the fact that there may have been some differences or not doing some things we are doing now, their seismically designed features of their plants did quite well and much better than they anticipated. And that was the biggest lesson learned.

John actually was on one of those teams that visited over there, so I'll let him tell you what they are doing with some of that stuff.

MR. RICHARDS: First, I would echo the last thing Jack said, and that is that one of the lessons out of the Kashiwazaki event is that the things that were seismically designed did what they were supposed to and performed quite well. The things that were not, had trouble.

So from a seismic design perspective, it is actually a pretty positive story. But from, of course, a business perspective, it is a hard lesson.

Now, in greater detail, there is a variety of studies going on, the Electric Power Research Institute is working closely with TEPCO on a variety of detailed studies. In fact, I'm supporting them myself on one

study where we are offering some
suggestions on how they might do inspections for hidden damage.

I know that we are also working through an IAEA group that was coincidently put together six months or so prior to the earthquake, sponsored primarily by the Japanese to investigate some issues, because they had had a string of earthquakes near their plants. Then this earthquake happened, and it was almost surprising how closely the things that that group was going to study over a three-year plan lined up with the kinds of things that happened at that event.

NRC is also a sponsoring member of that study through IAEA. One of the things that everyone is trying to understand internationally is the event was -- the recordings from the event were bigger than what they had predicted, but the seismically designed portions did very, very well. So there are significant margins in their design practices.

Their design practices are a little different than ours and different than folks in other countries, too. So one of the tasks that the IAEA group is working on is to investigate that by modeling one of their buildings and getting their recordings and their standards and each -- people from different countries are going to try to run a similar analysis using their own countries' design standards to see if there is a chance to figure out where each country has their margins and how they start to add up.

So we are as an industry, through the seismic qualification utility group that I happen to be chairman of, we are participating and

following that effort, and NRC Research
is also on working on that same task.

CHAIRMAN KLEIN: Commissioner Lyons.

COMMISSIONER LYONS: My thanks to the briefers for informative discussions, and I now, too, with some of the questions from my colleagues, some of the things I was going to ask have been well reviewed.

I think I'll start, though, as the Chairman did, with some fairly general comments up front. And, Tony, those probably will go to you from the standpoint of your first bullet on status of new plants. But at least I want to echo the Chairman's comment on trying to look at public access or educational opportunities in the new plants. It is something that I very much share the Chairman's concern that, particularly as I travel to other places in the world, I think other countries are doing a phenomenally better job in terms of educating the public on what is truly going on inside those plants.

And certainly, we have restrictions here that have to be there from a security standpoint, but I can't help thinking that it is a real opportunity for industry, with the new construction, to think very, very seriously about how to build improved opportunities for public education and public knowledge. Just a comment and agreeing with what the Chairman already said.

Tony, by way of just a few questions and they are not specific to your briefing, but within that new plant status area, we're about halfway through or more than halfway through this fiscal year. And I was

just curious from your perspective if you anticipate that we are going to get roughly the number of COLs that we anticipated at the start of year?

MR. PIETRANGELO: We do.

COMMISSIONER LYONS: You think we --

MR. PIETRANGELO: Yes.

COMMISSIONER LYONS: There have been some delays, but you are guessing that --

MR. PIETRANGELO: Yes, the number will not change substantially. I think an area where there could be impact is how we finalize the limited work authorization guidance on what can be done with and without an LWA. If as a result of those interactions, a licensee believes they need to come in with an LWA in order to gain efficiencies in their construction schedule, that could have a resource impact on the staff in terms of the review of the LWA that was not there before.

So again, the outcome of that guidance will play on resources.

COMMISSIONER LYONS: Thank you.

Another question I was going to ask staff as well. We have talked a lot about the importance of standardization. We have now got enough COLs with similar designs, at least in the AP1000, to be able to be starting to assess both from the industry perspective and the staff perspective whether we are seeing as much standardization as we had hoped for.

And I was curious if you would comment or any of you would comment on your views as to whether the standardization, the working groups that have tried to encourage that standardization, whether that's going as you would anticipate? I would like to ask staff that too later.

MR. BAILEY: Since the AP1000 is probably the one that is the broadest and deepest right now, it absolutely is working the way we intended, if not better at this stage. In those applications you may be aware that we have designated sections within the COL that are standard content between each application, and everyone after the reference has used the same words and language to submit their COLs.

There are certainly parts of those application that are site specific or nonstandard, and those are left up to individual utilities, but for the power block and the reference to the DCD and the things that we would want to be standard, which is when we build these things, that they have the same safety features and the same equipment and the same design, we are all still trying to, at least as a first group of five or six, to purchase the identical product and build it the identical same way.

Now, how well we can keep that together as we try to work into the operating phase and other things I think is our next big challenge as an industry, because we never had to do that and then find ways to do it.

There is a strong builders group, right now we call it for those that are looking at the option to build an AP1000 where they periodically meet -- as a matter fact, I think they are meeting today

probably in Charlotte, where they go over
how they can both deploy and build these things in a standard way and then as part of that looking at how they can train operators. We have got an operator training group that is looking at standardizing all the training materials and work, doing the knowledge and skills and abilities evaluation now for operators for those plants.

So anyway, those are just illustrations that -- we are trying to take these things one at a time. It is a challenge sometimes getting industry with different owners and different utilities to agree on the approaches, but we are committed to doing that, and so far, it is working.

MR. RICHARDS: I would like to add, though, that one place that's perhaps becoming a little tricky for us is in the seismic arena, and that is that the ground motions for a given site they vary a little bit from site to site. We have a standard design with a standard seismic input, and we are working pretty hard with the staff to follow a process where the design of the plant is per that standard design. And then, we are doing a sensitivity evaluation for anything that's outside of that to show that we don't have any vulnerabilities that would be unique from that site-specific motion.

And I think as a concept, we have a pretty good agreement in with staff on that in principle, and we will have to keep working through to see perhaps how deep and how many decimal places we have to carry those sensitivity studies.

COMMISSIONER LYONS: From the regulatory standpoint, I think that standardization is very, very important, and I'll ask the staff a

similar question.

With regard, John, to your comment on seismic, I can well imagine that there have to be some differences between sites, everything from bedrock to how the fill is handled. Still, I appreciate we are trying do as much standard as possible.

MR. RICHARDS: Our goal is to try and buy the same plant and install it at each place.

COMMISSIONER LYONS: I had one more question, Tony, probably for you. I was at the American Nuclear Society meeting a couple of weeks ago, and there were a number of NEI speakers. The number was -- they were frequently asked how many plants are likely to be built in the first wave, and it seemed to a pretty standard number of four to eight. But in at least one or two cases they were asked how many designs would be built. And to my surprise, the answer was five to six.

And I don't know if you want to comment on that. I'm putting you on the spot, but I don't know what the sixth is.

MR. PIETRANGELO: How about four to five?

(Laughter)

MR. PIETRANGELO: I don't know who the sixth is either.

COMMISSIONER LYONS: I have not had a chance to call some of your colleagues and ask them exactly what they meant when they answered that question.

MR. PIETRANGELO: One of them is behind me. I'm going to ask him when we are done.

(Laughter)

COMMISSIONER LYONS: But the answer five to six was used, and I just found myself wondering what you knew that we don't know or that I don't know.

The only other thing I would ask would be to follow up in an area that I think Greg pretty well explored, but let me ask it slightly differently. And, that was on the experience from the Japanese earthquakes.

I was going to ask it -- certainly was very interested in the responses that Greg got. I was going to ask it specifically with regard to Slide 6 where there is the reference to coming up with more realistic methodologies for seismic evaluations. And I'm curious if there are any ways in which any of you could assess how Japanese experience might fold in to improving the realism of those methodologies, or frankly, what even was meant by coming up with more realistic methodologies?

MR. RICHARDS: I would say part of what was meant by coming up with the more realistic methodologies was some of the tools that we have implemented, which is the cav filtering to remove some of the non-damaging earthquake motions from the hazard calculations, the incoherence analysis that takes credit for the very real behavior that the high frequency motions don't get smoothly into the foundation and propagate as well through the buildings as a load. I think that was sort of the idea of the more realistic analysis.

More realistic than that perhaps might be to take credit for more nonlinear behavior of a variety of things. I don't know that there is

any real plan to go in that direction for a design basis, although there may be -- there is a margin and seismic PRAs that in the future will be able to take credit for those things.

The lessons from the Japanese in terms of that, they are using -- they are reevaluating what their design basis should be for that plant. In fact, I have seen some things just in the last couple of weeks. And it's pretty big. Obviously, it has to be bigger than the one they just had and it's pretty well above that.

They are still using a process to do that, though, that I would say is more akin to the way we licensed our first fleet of plants, not how we are doing it now. How we are doing it now is based on the seismic hazards, which while it's a first time evolution for us and giving us some trouble as we work through it, it is a more, I would say -- it's a positive step in how to better predict motions.

They are fairly risk versed in a lot of their regulatory positions, I believe. So they don't take advantage of a number of the risk-informed things that current U.S. plants are doing. So I don't know that we would go back and apply how they are doing some of their business.

In terms of how they are going to evaluate their plant for this new design basis, we are working with them actually fairly closely on making suggestions on how they might do that. So I think that's the case where we are working closely with them on methods, and then, we are attempting to learn much from them in their experience so that we can -- I mean, this is the one plant that I know of with a really big earthquake, and

we would love to work with them in how the analysis matches up with the recordings and things of that nature to help learn, perhaps, how to better baseline some of the analytical tools.

COMMISSIONER LYONS: I appreciate those comments, and hope that interaction continues.

MR. RICHARDS: Actually, they have been pretty open and cooperative with the international community, I would say. They have done a heck of a job in tours. It's almost like going to Disney. I will say that. It's really an interesting setup they have for that.

COMMISSIONER LYONS: But to my knowledge, they have still not set dates to start any plants, have they?

MR. RICHARDS: Not that I'm aware of, no. They just recently in the last few weeks, as far as I know, came up with this new proposed design basis. So while they have been doing inspections and repairs now since it happened, and doing a lot of analysis to see that they understand the actual earthquake motions, they have yet to really start, as far as I know, reanalyzing for the new design basis.

I think they are just getting to that point. And they are focusing on the two ABWR units, the six and seven, which were the newer units, which had the lower seismic recordings.

COMMISSIONER LYONS: Well, in fact, if I remember correctly, the seismic response at those two was within their design basis, I think.

MR. RICHARDS: Maybe. I'd have to go back and look at the data, but that might be right. I don't remember those details.

COMMISSIONER LYONS: Anyway, thank you.

CHAIRMAN KLEIN: Well, thank you very much for your presentation. And, Tony, appreciate your complimentary comments as far as staff. They are hardworking. And what I would encourage you to do is continue those open dialogues and interactions and try to resolve those differences that might pop up every now and then. We will continue to protect the people and the environment. Thank you very much.

(NEW PANEL)

CHAIRMAN KLEIN: Well, good afternoon again. Now we are ready for our second panel. You have heard a lot of discussion and you can tell while this discussion was somewhat focused on seismic activities, you can tell that we are never limited to those bounds and we ask whatever questions that we feel like asking. So we look forward to hearing from the staff on the status of the new reactors, and certainly on the seismic activities.

Any comments before we start?

Bill?

MR. BORCHARDT: Thank you. Good afternoon.

Slide 2, please. Since the creation of the Office of New Reactors, we've been holding periodic briefings on the status of new reactor activities and selected technical topics at about an eight to ten-week interval. We will be shifting to quarterly, but the intent is to maintain the same kind of form that we have in the previous meetings, which will be a general overview of project activities, and then to discuss

in a little bit of detail, some select technical issues that we think are of interest to the Commission or might potentially need some Commission decision in the future.

So today, this slide shows the agenda for today's briefing. And I will now turn the meeting over to Mike Johnson.

MR. JOHNSON: Thank you, Bill.

Good afternoon, Chairman, Commissioners. My name is Michael Johnson. I'm the director of the Office of New Reactors. And as Bill stated, I will provide an overview of the recent accomplishments and activities.

I should note, I'm joined in this briefing to my right by Dr. Nilesh Chokshi, who is the Deputy Director of the Division of Site and Environmental Reviews; to his left is Becky Karas, who is the Chief of the Geosciences and Geotechnical Engineering Branch in that same division; to her left is Sujit Samaddar, who is the Chief of the Structural Engineering Branch in the Division of Engineering; and of course, last but not least, all the way to my right is Michael Junge, who is the Chief of the Operator Licensing and Human Performance Branch.

Next slide, please. Slide 4, please.

While we continue to make steady progress on our new reactor reviews, since the last Commission briefing in April, we have completed two acceptance reviews and issued review schedules for two combined license applications. We completed acceptance reviews for Vogtle and Part 2 of the Calvert Cliffs combined license application.

And we issued review schedules for Shearon Harris and for

Grand Gulf.

In the area of vendor inspections, our efforts continue in that area. Of notable interest, in May, the staff conducted inspections at Mitsubishi Heavy Industries in Kobe, Japan and at Doosan Heavy Industries in Changwon, Korea. And Mitsubishi Heavy Industries and Doosan are, of course, among the world's largest manufacturers of reactor vessels and steam generators, reactor internals and other components used in the nuclear industry.

During the Mitsubishi Heavy Industries inspection, inspectors and management from the Japan Nuclear Energy Safety Organization observed the NRC's activities; and at Doosan, the NRC and the Korea Institute of Nuclear Safety conducted a first-of-a-kind parallel inspection. And that enabled us to identify methods and the scope that our various agencies are using in the processes and procedures that we are using with respect to vendor oversight.

We will issue an inspection report at the end of July on results of these efforts and continue our ongoing efforts, self-assessment and bilateral and multinational design evaluation program initiatives, that is to share the results in the area of vendors.

We continue to communicate with licensees and future applicants on the importance, of course, of their role in ensuring that vendors fully understand and comply with NRC quality assurance requirements. And I should note that we plan to devote a full Commission meeting to vendor inspection programs in the future.

We continue to perform outreach, central outreach efforts to keep the public informed of new reactor activities, the combined license process under Part 52, and to inform the public of how they can participate during the licensing process.

Since the last Commission meeting, we conducted public outreach meetings at the Texas Public Utilities Commission, to share information about new reactor licensing; we held outreach meetings in Levy County and Glen Rose, to inform the local communities of Progress Energy's and Luminant's plans for submitting combined license applications; and we held public scoping meetings related to COL applications at Lee, Shearon Harris and Grand Gulf sites.

Next slide, please.

With respect to status -- I will not spend a lot of time on this slide -- of course, we have Three Design Certifications and One Design Certification amendment under review. All the acceptance reviews have been completed and review schedules issued. We are currently evaluating changes to the Economic Simplified Boiling Water Reactor Design Certification as a result of their submission of Rev. 5 to that Design Cert. We plan to issue a revised schedule in the near future.

Regarding Early Site Permits, we continue our review of the Vogtle Early Site Permit/Limited Work Authorization application. Recently, we identified a new issue on Southern Nuclear's LWA request, which resulted in the Level 1 change. A Level 1 change is defined as a significant schedule impact that affects publicly established milestones.

Specifically, we determined a need to review the soil/structure interaction analysis. We revised our schedule based on that, from August 2008 to February 2009. That new schedule provides for the resolution of this issue in a manner that ensures safety but still supports Southern Nuclear's construction plans. Although I should be quick to note that additional extensions to the schedule could impact their plans.

And finally, with regard to the combined license application reviews, we have completed eight acceptance reviews, we have issued five review schedules, and we officially began the acceptance review of the VC Summer COLA, the combined license application on June 2nd.

Next slide.

Before I introduce the topics, the technical topics that we will talk about, I would like to turn for a moment to our process for setting schedules. Upon completion of our acceptance review and after the application is found acceptable for docketing, we use our assessment from the acceptance review with regard to the quality and the completeness of the application to help us develop the review schedule. Of course, the resources of both the staff and contractors are integrated into that schedule. Later in the presentation, we will provide examples in the seismic area of how we establish our review schedules.

Once those schedules have been established, we have been very open in terms of sharing them, the milestones associated with the reviews, with both the industry and the public. We communicate with applicants via routine calls, design centered working group meetings and

public meetings. And the review schedules are available in ADAMS and on the public website.

Significant schedule impacts are handled and again, those that affect publicly established milestones are handled through a from controlled process. A key part of that process is that potential schedule impacts and project risks are identified and raised to a Resource Management Board, which is comprised of deputy division directors in the Office of New Reactors.

The Resource Management Board evaluates those impacts and the risks and identifies best alternatives and approaches for addressing those risks and those potential impacts. In fact, we use that very process in looking at the Vogtle ESP, LWA issue.

Next slide.

Finally, let me just introduce quickly the technical topics that we will talk about, two technical topics, the first is, of course, seismic evaluations. As will be discussed later in more detail, very early in the ESP process, it became obvious to us that some significant developments were needed with respect to seismic methodology, and you have been hearing about them before or previous to this meeting. Of course, we heard about them earlier today, and we will talk more about them.

Of course also, the Japan and China earthquakes have heightened public awareness in the area of seismic. And so, we just believe that it would be a good time to come talk to you about seismic. We are going to focus on some of the key issues and how they have been resolved, and our continuing interactions with stakeholders as we go

forward in the area of seismic.

I should point out that today's presentation is on seismic evaluations, and we will focus on new reactor topics, of course. We recognize that -- I'm smiling because I know that you are going to go wherever you want to go with respect to questions, but I thought I would tell you this anyway.

We recognize that the seismic topics are broader than new reactors, and we are working with other offices to ensure that from a programmatic perspective that is across our programs, that we are consistent.

The second topic that will be discussed is operator knowledge and abilities. We are addressing that topic as a follow-up from the April Commission meeting.

Commissioner Lyons, I think you asked questions and we are going to touch that -- Michael is going to touch that at the end of presentation,

Finally, I would like to note that throughout our review of applications, issues are going to emerge. We have done, I think, a good job in terms of putting guidance in place. We are working closely through that guidance but issues will emerge. And just as we have been able to address challenges needed in the area of seismic, we believe that we will be able to deal with those issues. We've got a process to consider those issues again in the schedule impacts and move forward. And we are comfortable and confident that we will be able to perform the new reactor licensing reviews in a timely manner.

With, that I'm turn it over to Nilesh.

MR. CHOKSHI: Good afternoon. My name is Nilesh Chokshi. I'm Deputy Director of the Division of Site and Environmental Reviews.

And I'm pleased to be here to talk to you about New Reactor Seismic Evaluations.

Slide 9, please.

I won't discuss purpose because Mike just talked about why we are here, but to recap, we will provide an overview of the NRO seismic evaluations review process, and will discuss the issues which we have come across, which we have resolved and our current interactions as we go through the reviews.

I will discuss mostly the background information in terms of what has transpired and where we are today. And then Becky Karas will present the siting area, and Sujit will talk about the engineering area.

Next slide, please.

I want to spend a couple of minutes on this slide. A seismic event affects the entire site, structures, systems and components. So, any comprehensive review of the seismic evaluations for site and design involves multiple disciplines both in the geosciences and engineering.

For the purpose of this presentation, we have divided our discussion into the sighting area and engineering area; however, this is an integrated process and there are key interfaces that one goes to the other in the design process.

This also is how we are organized in the NRO. So I think I will be able to describe the review process more clearly.

The siting area is handled in the Division of Siting and Environmental Reviews, and engineering is handled by the Division of Engineering.

Specifically for siting, we have two branches of Geosciences and Geotechnical Engineering, and we have experts geologists, seismologists, geophysicists, and geotechnical engineers who deal with the siting.

Fortunately, as we have staffed up in the last several years, we have been able to attract very good talent with significant experience and experienced siting of critical facilities.

These two branches look at the geologic, seismologic and geotechnical engineering aspects. And to give you the flavor, this includes the evaluation of local and regional geology, including evaluating seismic sources such as earthquake faults, the stratigraphy or layering of the sites, and other aspects of the site suitability.

They also review the determination of the sites-specific ground motion, and we will talk a lot about that this afternoon, and the probabilistic seismic hazard analysis.

And the geotechnical engineers concentrate on review of the geotechnical properties of the site, such as soil and rock properties and the evaluation of geotechnical structures, earthen embankments, slope stability. So they look comprehensibly at the site aspects.

Now, just a couple of words on our review process. This process includes site visits. We go and look at the geotechnical borings; the geologists go and look at some of the structures, technical structures, for explorations.

We also perform independent confirmatory analysis and sensitivity studies as needed as part of the review process.

Now, the two key products from the siting reviews and which form the two key inputs to the engineering analysis are the site-specific ground motion and the geotechnical properties, the model site aspects and analysis.

Now, moving to Engineering, there are two branches of Structural Engineering and there two branches of Engineering Mechanics in the Division of Engineering. And they are experts with a dynamic analysis background, probabilistic analysis background, and other aspects of the analysis. And they review the design aspects of structures, systems, and components.

Now, the ground motion inputs from the siting are used to analyze the response of the building foundation system. This is the so-called soil-structure interaction analysis you already heard, and that's the jargon. And you will be using that, SSI, or soil-structure interaction. I just have it, I can't get away from it.

But the outcome from that analysis is the design loads for the structures themselves as well as the floor motions, which are called floor response spectra. And they are used subsequently in the design of

the systems components and also to qualify functionality of equipment.

So this is the general process now. But in addition to this design and site review, there are other seismic requirements in the regulations. One is the explicit requirement for the seismic instrumentation, and there are requirements for shutdown after an event and post inspection requirements that are a part of our regulations.

I think this -- I will be repeating this part -- which you heard earlier, that our seismic design process, all SRPs and regulatory guides and industry codes and standards generally produced a significant margin. And there are a variety of reasons why that happens. But we have seen -- and as we have gone through the IPEEE we know that that's the case.

So that's the very, very broad discussion our review process.

Next slide, please.

Now, what I would like to do is talk about -- give you a brief background of what has happened in the last few years and how we got to where we are today.

I think you heard that we revised our siting requirements in mid-1990's, I think '97, that time frame. However, we did not use them until we started the ESP reviews. So this is being the first time they are being exercised in actual practice.

And as the implementation begins, for a number of reasons, it became clear that enhancements were needed to be incorporated into the methods. And you heard earlier about this in methods for probabilistic seismic hazard analysis, determining ground motion and soil-structure

interaction analysis.

And again, I think this announcement was necessary because of a couple of reasons. One was the advancement in methods, in codes and standards, but also, there was a need to conduct more realistic analyses as we were getting some results of site-specific ground motion which would not envelope the motions used in certified design because of some of the considerations. And the Becky is going to discuss the specifics of this issue.

Now, the enhancements did not necessarily involve new concepts. We knew about the phenomenon, but to incorporate conception to design, it is a long process and requires many decisions in terms of conservation and uncertainty. So it was a significant development process, and that's why the industry recognized that and created this New Reactor Seismic Issue Resolution Program to conduct necessary studies and interact with us.

Now, this also required significant effort on our part to review and not only review but also to come up with the necessary regulatory infrastructure in terms of acceptance criteria, review guidance. So that was a significant effort involved. And this effort involved experts across the agency and with NRR earlier and then NRO and Research taking leads, depending on the aspects of the study.

And you will hear, Becky will talk more about that the staff ultimately approved these new methods and developed and issued regulatory guidance.

So the next two presentations you are going to will hear about more specific issues that were addressed from the early initiatives as well as ongoing interactions we are undertaking during this COL and DC reviews. The format we are going to follow is to discuss an issue followed by actions taken to resolve that issue, and outcome of the issue and then, go to the next issue. So you will hear issue, resolution, issue, resolutions, like that.

And with this, I'm going to have Becky talk about the siting area.

MS. KARAS: Good afternoon, Commissioners, I'm Becky Karas, Chief of Geosciences and Geotechnical Engineering Branch 1. I'm going to start off with an apology. I am fighting off a cold, so I may be a little difficult to understand at times.

Move to the next slide, please.

Some of the major achievements in the siting area have really come about as a result of the Early Site Permit reviews that staff successfully completed between 2003 and 2007. That resolved several issues.

One of the principal changes in the revised siting regulation during the '90s was the requirement related to explicit consideration of uncertainties in the development of the site-specific ground motion. And the probabilistic seismic hazard analysis is considered an acceptable approach in meeting that requirement.

One of the significant developments in the intervening years, then, between the publication of the regulations and the submittal of the first Early Site Permits, was new ground motion models for the central and eastern U.S. And that is part of the United States east of the Rocky Mountains.

I'll discuss that more later that during the Early Site Permit reviews staff reviewed those models. But, as Dr. Chokshi mentioned before, implementation of those models resulted in site-specific ground motions that were not enveloped in all cases by those that were used in the standard design.

So, in an engineering context, that is the so-called high frequency issue that affects the combined license and design certification applications. And Sujit Samaddar is going to be discussing that later in the engineering portion.

We can move to the next slide.

So to conduct more realistic evaluations, as you heard earlier today, the industry proposed enhancements to probabilistic seismic hazard analysis and the use of a performance-based ground motion that I will describe more in a minute.

They also proposed changes to the soil-structure interaction analysis that more accurately accounts for high frequency ground motion.

Sujit will be discussing enhancements related to the soil-structure interaction analysis later during his portion of the presentation.

But in probabilistic seismic hazard analysis, those enhancements included proper consideration of the relatively small, non-damaging earthquakes. And you heard some more detail about what that entailed specifically by industry earlier.

The use of a performance-based ground motion spectra was initially proposed in the Clinton Early Site Permit. And it is based on the American Society of Civil Engineering Standard 43-05. And the performance-based criteria is really a way to derive levels of the site-specific ground motion from a probabilistic seismic hazard analysis.

This ground motion then is used in conjunction with the current nuclear power plant analysis and design practices to satisfy the overall performance criteria. And this is consistent with NRC's efforts to update requirements to be risk-informed and performance-based.

We also described the use of this approach in a memo sent that was sent to the Commission back in June of 2006

There were also extensive interactions with stakeholders on the issues I just talked about throughout the Early Site Permit reviews. And really, the good communication among stakeholders resulted in effective reviews and led to the resolution of those technical issues.

The new methods that were reviewed during the Early Site Permits were incorporated into new regulatory guidance, and specifically, that was Regulatory Guide 1.208. We published that back in March of 2007.

In addition to the required geological and seismological investigations, the guide includes advances in probabilistic seismic hazard analysis and the new performance-based approach that I just described for determining the appropriate site ground motion levels.

Another important aspect of the Regulatory Guide, which is not a new element, but it was further clarified in the new guidance, was the requirement to update the existing hazard models to account for any new seismic hazard data and information. And this is an area where we are continuing to interact with stakeholders on. You heard some discussion about it earlier today, and I'll describe more about that later as well.

Next slide, please.

The next topic that I will discuss that we already touched on today is related to soil testing.

Soil dynamic testing is performed by applicants to accurately characterize the response of the soil at the site to earthquake ground motions. And there is currently limited laboratory capacity for soil dynamic testing. This capacity could not support the full characterization needed for the combined license application schedules. And it is a concern that was identified earlier in pre-application visits for Combined License reviews and also through interactions with stakeholders.

Next slide, please.

What industry did, you heard described earlier also, is they prepared a white paper that supported limited initial testing to facilitate

timely acceptance of the Combined

License applications by NRC. With this alternative complete testing is provided later for staff review on a schedule that's committed to by applicants during the acceptance review.

We met with stakeholders and issued Interim Staff Guidance that really successfully addressed the industry schedule needs as well as the staff technical review needs. And that ISG was issued for public comment. We received and incorporated changes from a majority of comments and later issued it as a final ISG.

And as you heard described more laboratory capacity is also developing. In the future we expect it to be less of a concern than it really is currently.

Next slide, please.

Another topic I will discuss that I referred to earlier is related to seismic hazard characterization.

For the central and eastern U.S. sites, Regulatory Guide 1.208 endorsed the use of seismic hazard models developed in the 1980's as a starring point.

And the guide also states that these models need to be updated if new information exists that indicates changes are warranted. And the guidance does provide a framework to industry to meet our regulatory requirements for seismic hazard analysis.

Specifically, the new information that causes the need to update these older models can really be viewed in two categories: Data and also other information that can include new interpretations, new

analysis or new hypothesis.

The data here relates to the occurrence of events such as earthquakes or the discovery of other evidences, like geologic evidence of past earthquakes.

An example is a recent geologic investigations and the resulting evidence in the New Madrid and the Charleston zones that allowed us to better characterize the frequency of earthquakes and better define the seismic zone in that area.

New interpretations, analyses or hypotheses also need to be considered, and those include items such as new scientific studies or new scientific hazard analyses.

Previous ESP applicants have updated the old models for regions impacting their site's hazard, and they have taken into account information like this. These included Charleston, South Carolina and New Madrid, Missouri, as I just mentioned and you heard mentioned earlier as well.

But besides specific data, industry has expressed they still have some questions with regard to deciding what to update and how to determine the significance of this new information.

And so, in cases where it has not been clear why updates to the old model have not been performed for some source zones, we identify those concerns early during an application’s acceptance review. And then we communicate with the applicants through public meetings and teleconferences.

And ultimately, the schedules that we issue allow for sufficient time for the technical review of any sensitivity studies or any potential reanalysis we expect may be needed to resolve the concern and the concerns also clearly identified as a scheduling risk within the published review schedule.

Next slide, please.

To resolve concerns raised by us where certain source zones were not updated, the industry conducted generic sensitivity studies that are currently being reviewed by our seismology staff. And we also met with stakeholders on May 23rd to discuss those studies.

And I just also want to say that throughout this whole process, we have held multiple interactions with stakeholders, and that includes stakeholders such as the Department of Energy and other governmental agencies. Those agencies are interested in our interactions because they also use probabilistic seismic hazard analysis and they encounter the same need to periodically update information.

At the May 23rd meeting, we also discussed a white paper submitted by industry that proposed additional detailed implementation guidance that you heard described by industry earlier today. And we are looking at that to see if there were any enhancements that would really facilitate industry's implementation that we should look at possibly including in our guidance.

I would also like to take the time on this topic to acknowledge the efforts that the Office of Research has been undertaking

to assist us in looking at lessons learned

throughout the seismic hazard community by facilitating discussions with an expert panel. This is really part of our continuing efforts to remain current in this area, and we know their work will help us with additional enhancements to our guidance in the future.

They are also assisting us with plans for future long-term periodic updates to both the ground motion and hazard models.

Next slide, please.

I would also like to take a little time to talk about acceptance reviews.

Staff has completed multiple acceptance reviews to date, as Mike mentioned earlier, within approximately 60 days, consistent with Commission direction.

And staff has also implemented the framework we issued through the revised regulations and guidance. And we have continued to interact with industry, really to stress the need for applications that are complete and technically sufficient and the need to communicate to us early any plans to use any new methodologies.

During the acceptance reviews, we have noted that industry continues to encounter challenges in some areas in providing the necessary level of completeness and technical sufficiency.

So in cases where there is a concern with completeness or technical sufficiency, we communicate early with the applicants and other stakeholders through public meetings and teleconferences to highlight any important concerns early. And in some cases, acceptance is delayed until

receipt of the necessary information.

In other cases, while the information is sufficient to begin the staff's review, there are sometimes challenges to the scheduling of the review. And additional dialogue with stakeholders is sometimes needed before a review schedule can be issued that the staff has confidence will provide sufficient technical review time and be executable.

As I mentioned, we have also stressed the need to industry to communicate early the planned use of any new method. And the use of new methodologies typically requires additional technical review time. And we have basically learned that from past experience, which is what we are trying to apply here.

What we have learned is that any new methodology typically requires two rounds of request for additional information instead of normally only one. And there can also be additional difficulties if there is insufficient documentation or if the details of implementation of that methodology are not clear in the application.

So our approach on this is to be proactive and to engage stakeholders early in the process of the review of any new methodology. And we have held meetings with applicants intending to use new methods to be certain that they are clear on the documentation requirements and also on our schedule needs.

And throughout the entire review, we ensure that there is really early clear communication of any key concerns that we might have. And our presentation that we made at the Regulatory Information Conference really highlighted some of those interactions that we been

having.

I'll turn over next to Sujit Samaddar, and he will discuss the Engineering area.

We can move on to the next slide.

MR. SAMADDAR: Good afternoon, Mr. Chairman and Commissioners. I am Sujit Samaddar, Chief of the Structural Engineering Branch 2.

Becky Karas presented the impact of new seismologic and geologic information and processing methodology on ground motion response spectra.

In the following slides, I will discuss the engineering issues, resolutions, current interactions and future plans that have resulted from the effect of ground motion on the design of structures, systems and components.

Next slide, please.

Now I will talk about the engineering issue, the so-called high frequency issue. Structural engineers compute the building response to prescribed ground motion. The responses or seismic loads are then used to design the structures, systems and components of the plant. So, ground motion issues affect the design of structures, systems and components.

For any site specific application, the certified seismic design response spectra are compared to the site-specific ground motion response spectra.

If the site-specific ground motion response spectra are enveloped by the certified seismic design response spectra, no further evaluation is needed as there are no exceedances of the certified design.

If the site-specific ground motion spectra exceed the certified design response spectra then the structures, systems and components affected by the exceedances are evaluated.

In the central and eastern United States for some rock plant sites, the site-specific ground motion response spectra are higher than the certified seismic design response spectra in the high frequency range.

Next slide, please.

In the next two slides, I will talk about the resolution of the high frequency issue.

As a result of interaction between staff and stakeholders, industry undertook development of methods and criteria to more realistically perform the soil-structure interaction analysis including ground motion incoherency, as a part of the New Reactor Seismic Issues Resolution Program, particularly for the high frequency ground motion.

The Standard Review Plan did not have provisions to address spectral exceedance. The staff updated SRP Section 3.7.1, "Seismic Design Parameters" to provide a framework for review of high frequency exceedance. The updated SRP recognizes the non-damaging effect of high frequency ground motion on most components and allows the use of a phased approach in the evaluation such that if the acceptance criteria at any level of the framework is met, there is assurance that the

demand resulting from the exceedance

would be bounded by the design demand of the certified design.

In addition, the SRP recognized that for some sensitive mechanical and electrical components, demonstration of functionality may be required to a level of exceedance.

The SRP allows the use of advanced analytical techniques such as incoherency of ground motion and the use of this information in the development of building response accounting for soil-structure interaction.

Next slide, please.

To implement the SRP framework, the staff developed an Interim Staff Guidance on seismic issues. The ISG identifies information to be included in an application to address this issue. It also presents staff's technical positions and acceptance criteria for the high frequency analysis and evaluation methodology of structures, systems and components.

The ISG identifies the conditions under which evaluations are performed and allows the use of screening to identify high frequency sensitive structures, systems and components.

Evaluations include the structural integrity of structures, systems and components, and functionality of sensitive mechanical and electrical components. Acceptance criteria and approved computer code to implement the new soil-structure interaction analysis are identified.

Other technical criteria included in the ISG pertain to the adequacy of the structure models, methods used for the response

analysis, and basis of screening.

Issuance of the ISG has provided the necessary guidance to applicants for resolving the high frequency issue.

Next slide, please.

I will now address the current interactions and present our future plans.

The guidance is being used by applicants to address spectral exceedance. One such application is currently under review. The details of the implementation are the focus of the review.

Discussions continue on the implementation details of the ISG. One such example is the use of previous qualification test data to screen certain components. The review requires site audits of test data and the basis of its applicability in terms of similarity of the tested component and the component being screened, similarity of the support conditions and the similarity between the test motion and the high-frequency response motion.

As we gain experience through actual implementation by a few applicants, the ISG will be incorporated in the Standard Review Plan or Regulatory Guide as appropriate.

Next slide, please.

Now, I will summarize the key points of this presentation on New Reactor Seismic Evaluations.

We have issued guidance on both site characterization and engineering design incorporating advanced methods and addressing major issues. The guidance is now being implemented by the applicants

and we are continuing open interaction

during the review.

Our approach, if an implementation issue emerges during the review, as discussed throughout the presentation, is to be proactive and engage stakeholders early in the process and develop generic approaches to resolve the common issues. Having said, that, it is important to recognize that the seismic reviews are very site-specific and the importance of issues will vary from site to site.

As the experience with the seismic reviews of new reactors suggest, it is very important that we maintain cognizance of technological advances and lessons learned from the actual events. Of course, the earthquake in Japan which affected seven plants is a very important one. And we are following the studies undertaken in Japan as well as those organized by others.

NRO and NRR have sent joint user need request to Research emphasizing lessons learned. Several agency experts attended a two-day workshop last week in Japan. An example of advanced technology is seismic base isolation systems which may have the potential applications in advanced reactors are being followed.

One of the important components in efforts related to resolving the issues and maintaining cognizance is through national and international collaborations. Becky discussed the joint effort with DOE, EPRI, and USGS on the probabilistic seismic hazard. The examples of other international collaboration include collaborative programs with Japan and active participation in activities of IAEA and CSNI.

This concludes the presentation on New Reactor Seismic Evaluations. Mike Junge will now address New Reactors plan to incorporate digital I&C knowledge, skills and abilities into the reactor operating licensing standards. Thank you.

MR. JUNGE: Good afternoon, Commissioners, I am Mike Junge. I'm the Chief of Operator Licensing and Human Performance Branch.

I am here this afternoon to update you on New Reactors plan to incorporate the digital I&C knowledge, skills and abilities into operator licensing standards for new reactors, including how the standards will address recognizing and responding to indications of digital system failures.

Next slide, please.

Many of the discussions involving highly integrated control rooms and digital I&C focus on licensing, verifying and validating this technology, and fully understanding potential failure modes. While those important issues are being addressed by the NRC's engineering staff, my expertise is in operator licensing, and from my perspective, there are many advantages to the Highly Integrated Control Room and its operating environment.

Specifically, the new Highly Integrated Control Room computerized display systems mimic plant Piping and Instrument Diagrams with which operators are thoroughly familiar as a result of their experience and training. And by building on familiar mimic displays a

more intuitive operating environment is created.

Furthermore, alarms are prioritized and timely and appropriate screens are displayed to enhance and optimize response to off-normal conditions.

These benefits are more than theoretical. Several members of the staff from NRO, NRR and the Office of Research had the opportunity to visit the Mitsubishi APWR Highly Integrated Control Room simulator in Pennsylvania this month. It was a complete control room for the Ohi plant in Japan. And with some modifications, it will be the model for the USAPWR.

While we were there, we witnessed a demonstration of a Steam Generator Tube Rupture scenario performed by a Japanese operator and then repeated by two Comanche Peak operators. And the Comanche Peak operators performed quite effectively in response to the event, which is noteworthy, because they only spent a few hours preparing for the scenario as well as writing the procedures.

I believe their performance served as a testament to the effectiveness and simplicity of the new operating environment as well as the professionalism of our licensed operators. The operators noted that the operating interface is very intuitive and there is a lot of information available on one monitor screen that would appear in several different places in our current control rooms.

Members of the NRC staff were also given the opportunity to operate the simulator. Many of the members commented on the easy use

of interface and processing of plant information.

Actually visiting the Highly Integrated Control Room simulator and seeing how easy it was to interface with the plant systems validated information I had gained from the Halden simulator observations I discussed with you during the last Commission briefing. Discussions with the Halden personnel indicate that operators learned how to use computerized displays quickly.

All of these observations were also consistent with discussion by NRO management during recent interaction with personnel engaged in construction of new reactor designs in Japan and Korea.

Next slide, please.

NRC Operator Licensing Exams are the ultimate products of a very deliberate process and involves collaboration with numerous stakeholders.

This process begins with a complete control room design. This means that all associated equipment including the digital I&C equipment, must be selected. And once the equipment is selected, a Human Factors Engineering Evaluation is conducted. And this includes functional analysis and task analysis for a new plant. And we perform a verification and validation process after the task analysis to ensure the adequacy of the evaluation.

Once the task analysis is complete, industry surveys personnel with significant plant knowledge on new reactor technology. The results of these analyses provide input to the Knowledge and Abilities

catalogue. It is expected that the
analyses would identify operator needed digital knowledge, skills and abilities including casualties such as a loss of all digital systems.

The K&A catalogs are used as a basis for the skills and knowledge examined on NRC exams. We currently have two K&A catalogues, one each for PWR and BWR technologies. And our plan is to update our current K&A catalogs as necessary and to create two more catalogues for the new passive reactor technologies.

The staff will document the Knowledge and Abilities Catalogs in several NUREGs with an anticipated due date of September 2011.

Next slide, please.

Returning to the original question posed by the Staff Requirements Memorandum as to how we will incorporate digital I&C knowledge and abilities into operator licensing standards for new reactors, including how standards will address recognizing and responding to indications of digital system failures, we will accomplish this through three areas

The first is operator training. Based on a plant specific function and task analysis the licensee is responsible for developing a Systematic Approach to Training based operator training program. It is expected that the licensee's training program will train the operators to recognize and respond to indications of system failures, including those failures caused by the digital processing system itself. The licensee's training materials, including operator required knowledge and abilities, will

be available to NRC license examiners
for review.

Secondly, through operator license examination. As I described earlier, a design-specific function and task analysis is performed to identify the knowledge and abilities required of licensed operators. The resulting K&A catalog is a high-level listing of knowledge and abilities and their importance to safety. The K&A catalog is used together with the training program materials to develop operator licensing examinations.

And finally, Highly Integrated Control Room design review. Using the principles of human factors engineering and based on plant-specific function and task analysis, the licensee is responsible for designing a Highly Integrated Control Room such that operators are able to recognize and respond to indications of plant system failures. It is expected that the digital instrumentation and controls will be designed such that their operability will be obvious to the operators.

The staff will review the licensee's Human Factors Engineering program to ensure that the Human Factors Engineering guidance such as provided in NUREG-0700 is applied in the Highly Integrated Control Room design.

In summary, we have had a successful program that has been in place for several years. And we plan on continuing to use this process for the new reactors as well.

That concludes my remarks.

MR. BORCHARDT: That completes the staff's presentation.

CHAIRMAN KLEIN: Thank you. I notice the alarm went off

just as you were finishing. So that was a good thing, good timing.

(Laughter.)

CHAIRMAN KLEIN: Thanks for a good presentation, and we will begin again with Commissioner Svinicki.

COMMISSIONER SVINICKI: Thank you, Mr. Chairman.

And I'm sorry, Becky, with your cold. I do have a couple of questions. I will start with you

I would like to return to the issue of the emerging studies on the east Tennessee seismic zone that I raised with the earlier panel. I think I have a sense now of that that is truly emergent work and is not yet incorporated in any of the submittals that we have received. None of them are updated to incorporate that yet. And it sounds like this is an area in which staff is engaging with applicants on or you have the white paper, as you referenced on how you might go ahead and look at new and emerging studies and whether or not -- what is the threshold for data that needs to be incorporated and how do you arrive at that decision point.

But could you give me a sense, just more generally, on that specific -- I don't know if it's one study or more than one study -- on that particular seismic zone? What is the path to resolution on that or the estimated time in terms of making a decision of whether applicants need to update for that data?

MS. KARAS: What actually happened with that is the issue was initially raised on several specific applications that came in, and staff raised that issue. And then, early during the acceptance reviews, as I

mentioned that we do during our process,

we had interactions, and industry, because there were a couple of sites involved, that the way that industry has decided to resolve that is through submittal of a sensitivity study that would be generic.

That study is now referenced by at least a couple of specific applicants in response to that issue and those requests for additional information that staff raised on those items.

So that the schedule for looking at that generic study is incorporated, was incorporated into the acceptance review and the schedules that were issued for those applicants that are affected by that. So, that's already -- that study was submitted, I believe it was in the middle of May to support those applications. So that's in the beginnings of being reviewed.

But we have also had some interactions with stakeholders. As I mentioned, there was a meeting on May 23rd. That was one of the studies that we discussed. And so we had a meeting very soon after that was submitted with industry and other stakeholders to go over what was in that evaluation. And so that will follow the normal process, and it's all built into the schedules already within those applications.

COMMISSIONER SVINICKI: In terms of industry's decision to take multiple affected applications and work the issue that way, from your perspective, do you think that that is a useful framework or way to resolve something like that?

MS. KARAS: Yes. We actually -- we do think that that is a very useful framework. And what we have communicated to industry is if

there is there are any plans, if there are
any zones that do affect multiple plants where they expect that there would be a need to send in a sensitivity study, to send that in, to send that in early so that we can get a look at that and have that before those applications start coming in is really the most effective way. But we see that as a way that helps with our resources as well.

COMMISSIONER SVINICKI: Okay. Great.

The other issue I wanted to raise, I think it's your as well, has to do with dynamic response of fill material. I think when Mike Johnson gave the status report on COLs, I think Vogtle is impacted in this. But it may be that others who want to build on other than bed rock or on fill material may be similarly impacted or have issues. What I'm trying to understand is what the emergent aspect of this issue?

I know that the Interim Staff Guidance talks about describing soil columns and associated properties and the soil structure interaction analysis and having that well modeled. Is the issue here the truly new maybe stratigraphy or is it that the fill material and the different layers that are being built is unique here and needs to be uniquely analyzed, or is it that even though there is guidance out there, the quality and completeness of the analysis that you are receiving is not adequate? Is it any of the above or a combination?

MS. KARAS: What this specifically was in the case that you're describing -- I can go into the specifics of what it is for Vogtle, if that will be helpful. But what that is related to the LWA request that came in. And it really related part of that LWA request is also going to request

placement of what's called the mud mat,
which is a thin layer of lean concrete after they excavate and they backfill, and then there is waterproofing membrane and then another layer of mud mat. And there is an analysis that is required to determine sliding under a seismic event.

And so, the LWA, if you will remember, was submitted midpoint throughout the Early Site Permit review. And so, fairly early in that process staff raised some questions about the sliding aspect, and it has been working through that issue in a public forum and talking about how that was going to be addressed by Southern.

It resulted in a revised analysis that included the soil-structure interaction portion of the analysis, supporting that sliding analysis. It was submitted somewhere around the middle of March. So it's really the amount of time for staff to complete that portion of the review. It is already covered within our Standard Review Plans, and it's been there in one of the sections to evaluate sliding.

So that's really the aspect that was looked at for Vogtle.

I don't know if Nilesh or Mike or anybody wants to --

MR. CHOKSHI: It is not a new issue. We have been looking at that particular – foundation stability as a part of the review. And this analysis was conducted to make that finding.

COMMISSIONER SVINICKI: So if I'm understanding this, it is that based on staff's first look, additional analysis was needed. And so it's been the time to prepare that analysis, and now we're in a stage where staff needs then the time to review that analysis?

MS. KARAS: That's correct.

COMMISSIONER SVINICKI: So, there is not anything new or unique?

MS. KARAS: No.

COMMISSIONER SVINICKI: And this is the kind of thing that I guess has to do with -- could arise in any application?

MS. KARAS: That's correct.

COMMISSIONER SVINICKI: It's not an emergent technical issue?

MS. KARAS: No, that's correct.

COMMISSIONER SVINICKI: There was reference made in talking about the staff that we have sent over to Japan. That the Japanese are working on advanced technologies, I think the term was for seismic based isolation systems. Is that anything that if utilized here -- I don't know if it's mature enough -- that could help in terms of some of these fill issues or sliding issues?

MR. SAMADDAR: Actually, the Japanese are -- in their plants they had one control center that was damaged pretty badly in the earthquake. Those are the types of structures they want to put on base isolation. So base isolation simply isolates the earthquake waves from getting into the building. So, that's what really it is. It may not have a similar application in fill design.

COMMISSIONER SVINICKI: But it is something that you identified as of interest and worth perhaps consideration.

MR. SAMADDAR: That is correct. For newer reactors, there is a good chance of the applicants putting in base isolation for those types of applications. So we are trying to follow that up with the Japanese.

MR. CHOKSHI: And to add to that in the mid-90s, there was a proposal to build a reactor on the base isolation type of scheme and we had looked at that experience. This was new. And on advanced reactors that concept -- that was the context of just looking at what's out there in terms of technology. And so that's dealing -- proactive somewhat.

COMMISSIONER SVINICKI: We heard from the first panel, they mentioned ITAAC -- the development of ITAAC generally. But I think staff had previously identified in another periodic briefing the need to develop ITAAC for backfill. And I think at that time they were engaged with industry and applicants on possible formulations for that. What is the status of your interactions on the development of ITAAC for backfill?

MS. KARAS: We have had multiple interactions with industry on those ITAAC. And, I guess the lead probably facility for that was Vogtle. And through those interactions, there has now been, and Vogtle is kind of what they are using as the lead, to send in that ITAAC submittal. And that, obviously, we are still under review of their LWA request.

But we do see that there is a good path forward on that. The interactions have been very productive, and I think both sides have a real clear understanding of what's necessary for that.

COMMISSIONER SVINICKI: Thank you.

Thank you, Mr. Chairman.

CHAIRMAN KLEIN: Well, Mike, in terms of keeping with the Commission guidance of starting off with the question that has nothing to do with seismic, I noticed in the EPR design cert that they are referencing M-5 cladding, and there's been some issues with the M-5 cladding recently. How are you going to address that now in the design certification?

MR. JOHNSON: Chairman, the issue of M-5 cladding is an issue that we have raised as being potentially problematic, and we have captured that as a scheduling risk. I do not have the details, actually, of how we are working through that specific issue. But again, it is one of the issues along with issues about the passive containment, cooling for example, that we are working specifically to be able to resolve it and to be able to meet the schedule.

CHAIRMAN KLEIN: And another sort of generic question, I noticed on the AP1000 there still seems to be some design sump issues. I would have thought by now we would have had that one totally nailed. Can you talk a little bit about where we are and how that is going?

MR. JOHNSON: We are still working on it, Mr. Chairman. I wish I could tell you that we finished it. We have not. There have been a number of submittals on AP1000 regarding long-term recirc. We are reviewing those submittals. And we expect to get to a point where we are satisfied with what is being proposed with respect to design for long-term recirc. And that is a GSI 191 issue but we are not there yet.

CHAIRMAN KLEIN: Okay.

Thanks.

Well, Becky, getting back to seismic issues, I noticed that the USGS has come up with some new maps that they have looked at. And I think Mike had mentioned this in his comments, the fact that we don't stove pipe, that if there are things that you are finding in new reactors, you shift that over to others.

And so I guess the question with the new USGS maps that they are coming out with, have there been any indication that existing reactors need to be examined on seismic?

MR. CHOKSHI: We have a generic issue, Generic Issue 199. And that came from part of the ESP reviews, the use of new ground motion models and the publication of USGS maps. NRR then sent a request to Research to create a generic issue and we are in the process of following that generic issue process.

The screening of evaluations were completed in December, and the evaluation panel met and suggested to move forward with the safety risk assessment portion. We met with the stakeholders in April, Research has the lead on this. And we had some discussions with them on directing information, hazard information for use in the safety risk assessment. And as I understand, the MOU with EPRI, is just about in the final stages to work on this. Individual plant examinations for external events provide some basis to go forward with the risk calculations. That's what will be the next step, and there will be further interactions with industry in the fall. So it's going through its generic issue process.

CHAIRMAN KLEIN: Okay. Thanks.

Becky, on Slide 15, you had talked about some soil dynamic issues. If I understand it, the Kashiwazaki site, there may be a backfill issue that they did, a backfill that might have had an impact. Could you talk a little bit about that and what impact that might have on the new reactors?

MS. KARAS: I think Nilesh has got that one too.

MR. CHOKSHI: Let me say a couple of things. Part of the failures which were observed at Kashiwazaki was because the foundations are on a different media. So there was relatively little settlement. There was a transformer fire. The transformer was on a pile foundation. The turbine building was up to the base rock. But the connecting bus was on a foundation which rested on the top of the media, so that settled much more in severing the bus connection.

And now their fix is to put the pile foundation under that base connection. So the settlement, and then – whatever was in the top layer, there were issues with soil failures and other things and that's why failure of -- separation into those parts of the soil.

CHAIRMAN KLEIN: And how will that issue be addressed for the new reactors?

MR. CHOKSHI: In our discussion presentation we focused on the ground motion. But in our siting review, we looked at much broader site suitability issues in fact Part 100 requires that we look at potential for the non-tectonic and tectonic deformations at the site. You look at the

potentials for the stability of soil and rock

media, the potential for liquefaction and the things like artificial and natural slope stability, landslides, and that sort of thing.

However, SRP, I think it's in 2.5.4 has a specific section on the stability of the soil and rock surface. And we look at things like the degree of concentration, water content, potential for under the seismic and other loads of the liquefaction settlements. And the reg guide for liquefaction. So we have a very broad comprehensive review of the site. So all of these things are addressed as a part of the application.

Now, with respect to the backfill itself, the backfill for the category one, which affect – structures, there we have specific requirements and that's why we have backfill like that, an issue because it affects not only -- the but also, used extensively in the analysis. And depending on the properties and things so that requirement for compaction considerations and then the testing, so, we look at backfill because it is a integral part of the nuclear island and the safety related.

CHAIRMAN KLEIN: Thanks. Well, Michael, you talked about the knowledge and abilities catalogs. Are there any generic differences between the analog and the digital?

MR. JUNGE: Not in the catalogs. The catalogs will look at -- since they are generic for feed systems and since we have those digital and analog in our current operating fleets it will talk about a failure of a component in the feed system.

Then what we do is we will go to the training materials and we will see what the training organization has for an analog system. They

will describe a failure and how they have

to handle it. For a digital system, they will have the information on a digital failure, and have they have to handle it

And then we will examine based on whichever analog or digital system is in there. So it's pretty generic.

CHAIRMAN KLEIN: I guess my observation is what you might have observed when the Comanche Peak operators went to NHI's facility that the new digital I&C are more user friendly sometimes. Is that sort of the assessment?

MR. JUNGE: Yes. Very much so.

CHAIRMAN KLEIN: I think we have looked a lot at how do we do the training and qualification and what do those operators get. And you commented on an operator that might have been trained on an analog system that does fairly well going to digital.

What do you think will happen if we go the other way; if you take an operator that has been trained on a digital I&C system and then gets transferred to another location that is analog?

MR. JUNGE: That is a good question. It's real simple. The reason it was simple going from the analog to digital is the way operators are trained is you go through PNIDs, you learn system interactions. So the screens that you see on this digital system are PNIDs. So you call up the screen and there is, for example, for the steam generator tube rupture, there were all four generators, all the lines that go in, all the lines that go out. You identify which generator is affected and you just push the buttons and it isolates.

So going to an analog control room, in a normal operating control room, you have to go to a couple of panels and look at different layers on the panel to do all that. There's two or three panels that you have to accomplish this in.

So, it would be -- I think it would be more difficult. When I was talking to the Comanche Peak operators up there, learning the control room area is just so much easier. The alarms are there are. There are logs -- there are procedures on what the alarms are.

When you are learning in the current control room, you go from panel to panel to panel. Basically you learn a panel then learn the interaction. So I think it would be more difficult going from digital to analog.

CHAIRMAN KLEIN: I know that Commissioner Lyons and I both have seen some of the digital systems in Japan and at the Halden site. And it seems like that information really is readily apparent to an operator needing to make decisions.

So, I think we will probably have to watch if any operators go the other way, that they have the proper training, because I think it will be more difficult to go back to an analog from a digital I&C.

MR. JUNGE: A lot of the time for operator licensing is learning the control room and where things are. If everything is right in front of you, the way you have learned it makes it a lot easier. And the time can probably be cut back, we haven't discussed that, it is a much easier system.

CHAIRMAN KLEIN: Thanks.

Commissioner Jaczko.

COMMISSIONER JACZKO: Well, first I want to say I think the staff has certainly made a lot of progress on the issues with seismic issues and back when I had a briefing from the staff, I think in September, you were on the verge of resolving a lot of these issues and it seems that progress has really been made, in particular on the high frequency thing. I think that's really good work and seems like staff has a good handle on resolving these issues.

The one question that I had on this issue is, Becky, I think you mentioned this that you work with DOE, you work with a lot of other federal agencies, USGS as well. To what extent do we rely on work from them, and to what extent is that critical to our ability to complete our review? I suspect USGS does a lot of work in the seismic area that we rely on.

MS. KARAS: Actually in the case of my branch and the sister branch, most of that work is really done in-house. Nilesh has mentioned we been very fortunate, we been able to get experts in seismology and geology with real good field experience, good experience in seismic hazards and the same in the case of geotechnical engineering as well.

What we do is we use the USGS because in some cases they do have experts that have real good knowledge of some of the local geology, and so we really use their in insights into those applications to supplement what our experts find.

So in those cases, it is really -- we use it as a supplement and everyone works together as a team. In fact, the two branches even are completely integrated and work together as a team. So it's not a real high reliance on outside agencies.

COMMISSIONER JACZKO: It is good to hear the expertise that we have.

Becky, this is something you brought up and I suspect others may want to comment on it. But you did talk about continuing challenges with completeness with applications and submittals. I don't know if you were talking specifically in the seismic area or if that was a more general comment?

MS. KARAS: I was talking basically for my areas. I'm sure there are probably still challenges in some other areas as well. But, yes, we mentioned some of those specific areas in our presentation at the Regulatory Information Conference. And I know that industry is well aware of those areas as well.

There are simply some areas where I think it is challenging to get that work completed that's needed, and so we do try to communicate very early on what our expectations are and what needs to be in. And we take a real good and close look at it during the acceptance reviews to make sure that there is sufficient information there.

What we see is a lot of it is in the geotechnical areas, and that design that needs to go on it’s very site specific and interfaces with the standard designs, which are challenging areas as I'm sure you would

expect.

MR. JOHNSON: If I could just add: One of the things -- Becky is right, more broadly with respect to beating the drum with respect to the quality of the application, we do continue to give that message. We have noticed in my relatively short time at NRO and leading up to it that, in fact, I would say that the quality of submittals is getting better. In fact, the time or the effort that it takes us to do an acceptance review is getting better.

So I think the signs are good. There are areas that we need to continue to watch and we continue to give those messages.

COMMISSIONER JACZKO: It is good to hear that there is improvement in the timeliness and I think this will certainly be an important area as we go toward. As I was reviewing some of the schedules that we published for the COL applications, one of the important issues that we identified in all of them, I think, is that we are anticipating about a 30-day response time for RAIs. And that, certainly from my experience, is a very aggressive time frame for which to get RAI responses. And obviously, that will depend crucially on the quality of those responses and not only just the timeline to do it.

So it is certainly good to hear that there's improvements in those areas. But I think it adds a degree of -- I guess I will say skepticism on my part on the ability to meet a lot of these schedules because that is such a tight timeline. And certainly one of the specific ones I know we have had some challenges with Belafonte and on the seismic issues in particular and working through some of those issues.

And on that, maybe if you can comment -- anyone who wants to -- on what impacts, if any, that will have on the other AP1000 applicants, since Belafonte is the reference application or if this is a issue unique to Belafonte and it won't necessarily impact the delays we are seeing right now in resolving some of the seismic issues that won't necessarily impact other applicants?

MS. KARAS: I can talk a little bit about the seismic issue. It's dealing with a regional issue, so it affects a couple of them which has been referenced within the acceptance review memos. It's not related to the design, though, it is based on regional location of where those facilities are. So, it's related to the fact that those generic studies -- obviously, anybody referencing that generic study to resolve an issue, that generic study needs to be looked at and then to resolve it.

So, that's how those are tied together as applicants that are chosen to reference that generic study. But, if somebody else want to --

MR. JOHNSON: I was looking around for Dave.

Dave, do you want to field that question more generically?

MR. MATTHEWS: I might give an answer that isn't a direct answer, because the principal driver as we see it right now on the coordination of these schedules and their vulnerability to future delays is site specific issues. We don't see those issues translating across the design center working groups from application to application.

But back to what I was going to say, the principal driver, we think, or vulnerability, is going to be the ability of the design cert review

activities to precede and succeed in
advance of the findings needed to be introduced in the combined license reviews.

So I think the bigger issue is not site specific vulnerabilities associated with a given review that might relate or somehow affect another review. The bigger issues are going to be the design cert review activities that are going on.

And to use the analogy that somebody used if you're out on the autobahn and you have a safe driving distance, that driving distance is starting to disappear between some of the design cert activities and the subsequent COLs.

COMMISSIONER JACZKO: Are we seeing that with all the certs, or are there some that have less breaking distance than others?

MR. MATTHEWS: The difficulty is that we have got design certs, two of which have only been here since December. So therefore, it is hard for us to give you an estimate as to whether we are seeing possible delays associated with those design certs affecting their subsequent COLs.

We do have some issues that are potentially driving the AP1000 and ESBWR review schedules.

COMMISSIONER JACZKO: Well, as I've said in past meetings, certainly our focus needs to be on safety. And we often get very involved in the discussions about schedules, but we certainly will do the review that we need to do and I know staff will do that.

I bring up these issues more just to put this information on the table because in the future, I don't want others to be looking at our agency and looking critically at our inability to meet schedules that we have laid out when timeliness is a result of a lack of completeness of submittals from the applicant. That is an important piece.

It's certainly an understandable piece and this is a complicated undertaking. I don't think it's essentially a criticism of anyone, it's just a reality that schedules that we publish for our reviews are very aggressive schedules, and whoever came up with that autoban analogy, that is a good one. I don't think the end result is a collision necessarily or an accident, the end result is you get to where you are going a little bit later than you wanted to. Which in the end if you get there safely, that's what matters the most.

I don't have any other questions at this point.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: Well, first thanks to all of the presenters. This was a complex set of issues and it was an excellent set of briefings.

I'm going to start as the Chairman did with issues that are more generic to the new reactors and then get into more specifics later and hopefully in another round.

I did want to ask -- I don't know if it's for Mike or Bill -- the same question I asked industry on standardization. Just in general as you are starting to get more of the COLs in, are you seeing the degree of

standardization from industry that we
hope to see?

MR. BORCHARDT: I think our experience has been from the very beginning that the industry has dedicated a lot of effort toward doing what they could in working with the design centered groups. And we have seen the fruits of that labor pay off, that the quality of the applications have been getting better. And I understand from Mike that it continues to get better, and that there is a high degree of conformity between the various applications.

COMMISSIONER LYONS: Maybe another question would be following up in a general direction that Commissioner Jaczko was just asking. We frequently publish charts, this happens to be one, it one of the few times that we haven't used the chart in a reactor's briefing, in which we show timelines for the design cert and timelines for the COL.

In some cases, we show the design cert extending longer or at least well into the hearing period for the COL. And maybe this gets to the same point that Commissioner Jaczko was just asking about collisions or "collision" may be the wrong word, but breaking. But I am a little puzzled as to how on some of our charts, we can show the design cert extending for a period that extends well into the COL hearing.

Could someone help me understand how that does not end up with this breaking event?

MR. JOHNSON: Can I just refer to the chart that you are looking at which is one that I love and I carry around.

MR. JOHNSON: Having said that, it was a wonderful chart when we were using it to try to look ahead and to figure out what the budget would be and to project ahead. In fact, it is in fiscal years, typically most of it fits on one page, and so it's really good at conveying those kinds of pictures.

We have not been -- it's not the tool that we want to use, or we have not developed it into the tool that is really going to be the tool that you would use to be able to look at where we are with respect to individual applications that have come in, design certs that we are working. And we are looking at that to see if there is another tool that we can use that is just as good in terms of conveying an overall picture.

So, I know that answer goes to the tool that you are talking about. But I think that is a part of the problem, it's getting that to be a clear reflection of where we are with respect to schedule and schedule implementation.

MR. BORCHARDT: And if I can interrupt, Mike, I was convinced before I left New Reactors that the blue chart as you referred to could not, in fact, provide the granularity that was needed in order to understand the status of any one review. And there are efforts underway to try to come up with a chart that could show, in fact, how much progress is being made on individual review activities, because it gets far more complex as you try to integrate all the various technical areas and the technical issues and balance that or compare that to the resource models upon which the schedules were developed.

We have the tools now that we have never had before, and we needed to use those in order to have an accurate assessment of where we were, and most importantly, from my perspective, to be able to have early engagement when we start to solve problems.

Fifteen years ago, we didn't know we had a scheduler problem until the due date was right on us. Now we can tell years ahead of time because of the resource loading of individuals and the impact not meeting the 30-day RAI response could have on not only that review, but five other reviews.

COMMISSIONER LYONS: I very much appreciate that comment. And just as, Mike, you said you carry it around a lot, I can't count the number of times this chart was shown at that ANS meeting by all kinds of folks. So I would encourage trying to come up with perhaps an alternative kind of chart that would show a little bit more accurately where we are in these.

And I think Dave wanted to comment?

MR. MATTHEWS: I think maybe your question also deserves a direct answer associated with some of the reviews and their schedules that have been published. And although Karen and others might not predict and you can't predict exactly how long in the duration of the hearing that might ensue, both the mandatory and possibly contested hearing, there are instances where schedules have been published wherein the established schedule and expectations for the issuance of the final and effective design cert rule will exceed the time in which the staff

has already completed its FSER and its
FEIS, and therefore, could go to hearing.

And therefore, you have the opportunity for somebody to suggest that they are going to hearing on a specific combined license application that relies by reference on a design cert that has not yet received a final rule or approval by the Commission. In that instance, I believe the Commission just issued, either in draft or final, a policy statement associated with the conduct of the -- at that time I think it was called advance reactor hearings wherein guidance was given in a general way to the boards that if those issues are raised in a judicatory hearing, that they be deferred and treated in the context of the rulemaking activity that the Commission has underway as a preferable way to resolve that issue. And then, they might need to be, of course, addressed in some formal way at the conclusion of the hearing.

But those situations at present time are anticipated to incur by our scheduling.

COMMISSIONER LYONS: Well, I am by no means suggesting that need to be driven by the schedule. We have to be driven by safety and by the submission of appropriate RAIs. So I'm not suggesting that at all.

But I do think that to the extent we can come up with some sort of visual that would help everyone, including me, understand the overlap of these, it probably would be useful.

MR. MATTHEWS: I don't disagree with you. I just want to be clear that it isn't all an imprecision associated with the chart.

COMMISSIONER LYONS: Let me turn to the Vogtle ESP which to some extent, Commissioner Svinicki already asked questions about.

And I was a little puzzled, Becky, by your comment that the issue on the engineered backfill came up in the context, I think you said, of when the LWA came in and not in the context of the ESP. I would have thought that would have come up within the context of the ESP. But am I missing a point here?

MS. KARAS: No. The LWA request, what came in for that was a request to place the engineer backfill and then to also place the mud mat and the waterproofing membrane and the other mud mat. That is all part of a Limited Work Authorization. It is a part of the Early Site Permit. You're not looking at where backfill is going to go or anything like that.

The sliding aspects the section of our Standard Review Plan, that those if you don't go in for a Limited Work Authorization, those would typically be looked at a combined license stage and at that stage of the review.

So the only reason that that was being looked at for Vogtle was because as part of their Limited Work Authorization they requested placement of that mud mat. So you need to verify that mud mat and the interface with the backfill and the sliding criteria.

The entire soil-structure interaction analysis is something that is normally done at the combined license stage.

MR. CHOKSHI: Because that involves the actual plant structures and the site response. So that's part of the COL knowing normal course, because the activities they had planned during their LWA, they needed to show that they can meet the sliding criteria. So they had to do this analysis.

COMMISSIONER LYONS: Thank you.

A question on South Texas. I'm wondering if we are getting close to the point where we can re-look at schedules based on, perhaps, a better understanding of whatever changes may be engendered by the change from GE to Toshiba. I don't think we have reestablished a schedule there.

MR. JOHNSON: You are correct. We haven't reestablished a schedule. We, in fact, have a meeting -- have had conversations with them. We do expect that they are going to give us a revised application. We have talked about the timing of that. We do expect that -- in fact, we set up a meeting in July, I think the date is the 23rd of July to meet with management to talk about what that revised application is going to look like.

Once we get that in, we will re-look at the schedule and see what implications that has on the schedule. So we are, in fact, getting close.

The issue with respect to them using a supplier that is different than the developer or the sponsor of the design, that's an issue that we have been thinking about and talking to OGC about. And we have

an approach to deal with that. We are going to rely on our existing processes, including inspections and reviews. And we are beginning to talk and to set that down, if you will. A lot of that is going to depend on what they submit to us in terms of demonstrating -- the applicants submit to us in terms of demonstrating that, in fact, that this new supplier is capable of, in fact, building that design.

And we will use that then to look at our inspection -- what we are going to do in terms of inspection, what we are going to do in terms of reviews, and so, those considerations are ongoing, and I would expect that the next time we sit together we will be able to give you more information on that.

COMMISSIONER LYONS: I appreciate that response, Mike. And I can well imagine that it is a significant overall set of challenges for the staff to look at those changes. Thank you.

I will have a few questions if we come back.

CHAIRMAN KLEIN: Commissioner Svinicki.

COMMISSIONER SVINICKI: Thank you. I know this is a periodic update on new reactors, but I just wanted to check in on the topic of advance reactors, so I think this question is for Mike Johnson. I know that staff operates generally under the instruction -- and as a matter of fact, I think there was a recent SRM that said in the area of advance reactors and in terms of resourcing and responding to expressions of interest from industry, I think that the Commission has given very general guidance of keep an eye on it, maintain your agility and be responsive.

And I had some reservations about issuing that. I don't know

how terribly helpful that is in terms of

guidance. It sounds a little bit like saying continue to do your best.

How do you receive that and act on it, and how are things going in terms of -- I know you're interacting with various folks who have said they have some interest in an application, but is there any update that you would give on that?

MR. JOHNSON: First, I would say that we are implementing the guidance and the SRM with respect to the way we been developing the next budget. And as we did in the Commission paper on advance reactors, we have thought about what it would take to do the reviews -- prepare for the reviews and to do the licensing for advance reactors. And we will -- that will fall through -- that will go through the process, the budget process, of course.

I guess I would just add that we are continuing to get, as I'm sure the Commission is well aware, folks who are expressing interest, telling us that even though there is not -- they can't tell us with a high degree of certainty that there are plans coming forward, and of course, we give them the answer. We tell them what we have with respect to the direction that the Commission has given us for how we should handle those things.

But we do, in fact, meet with them. We give them a meeting to talk about what their plans are. But again, we are very up front with them with respect to where we think -- the direction that we think we been given by the Commission.

I would just add that we are preparing a Commission paper that provides for the Commission criteria on grid appropriate reactors and how we would budget for those and we are trying to, in that paper to, again, to give the Commission an opportunity to give the staff guidance with respect to what you want us to do looking at budgeting going forward for folks who are expressing interest in advance reactors.

I hope that helps.

COMMISSIONER SVINICKI: That is helpful, and I appreciate that.

I would encourage you to continue to bring things to the Commission's attention. It is a difficult area in terms of predictability. So I think we all need to pledge to keep our eye on it.

We have Dr. Mallett at the podium.

MR. BORCHARDT: Before Bruce goes.

There are, of course, two offices that have a role in here, the Office of Research and the Office of New Reactors right now. And the demand and the industry desires far exceed the budget that we have allocated for this activity.

The 2009, 2010 budget has a very limited amount of resources in this area which won't meet the industry desires. So we will have to engage the Commission and the industry and decide how best to utilize what we have available. Our number one priority as an agency in the new reactor world is the near term COLs. And that will continue to be the priority unless the Commission directs us otherwise.

COMMISSIONER SVINICKI: Thank you.

CHAIRMAN KLEIN: I liked Commissioner Lyons' comment about the blue graph. There is a lot of information on that. Do you have a wallet size version, Mike?

(Laughter.)

CHAIRMAN KLEIN: Just a generic question on the area of seismics. In terms of -- and whoever feels like answering this can do it, what do you feel the state of the art is both in the analytical tools and the experimental data in seismic?

MR. CHOKSHI: I think it is quite mature in the sense of we have been designing for seismic analysis like soil-structure interaction and dynamic analysis has been -- those have been tried in methods that has now been from the observation of earthquakes and opportunities to benchmark. There have been tests conducted earlier about the seismic containment buildings, seismic Category 1 buildings. We have done a lot of development work.

There was also a lot of work done in the risk assessment methodology. And the seismic PRA methodology has now fairly been applied quite a bit. But any seismic events, and the geosciences, the earth sciences, you continue to learn from each event. And that's why our understanding of the seismic sources sometimes changes or the ground motion as we get more data. And it's pretty uncertain from that aspect. And that's why one of the focuses is on how to characterize the certainties in design basis to minimize impact of new information.

So, in terms of engineering, I would say it is a fairly mature field.

CHAIRMAN KLEIN: Are there areas that Research should be involved in for looking at potential technological gaps?

MR. CHOKSHI: Yes, sir. We are working with Research on number of these areas as one of the lessons learned. One of the things -- and I think an industry presentation was discussed that there is a lot of emphasis on ground motion models in the Japanese evaluation. And that will be an interesting exercise where they will actually do the model source, the transmission part and the ground motion on a active seismic sources that kind of modeling. They are doing the evaluations of damage using some of the testing -- that sort of thing plus analysis. That will give us some insight into what works, what does not work. I'm sort of mixing what we had learned from the events.

Another thing is important thing is to what works. In the Kashiwazaki there was no loss of off-site power. And generally in the seismic the switchyard component and the loss of off-site power is the vulnerability but their design seems to perform well.

What we see in many of these events, we relearn some of the things we know like common cause effects, loose, not properly anchored, and things like this is reemphasized. But there are also a lot of good practices types of things.

In terms of the example of base isolation, it is something we have not used in our applications here in this country that other people

have used in a variety of -- but if you
want to incorporate it into our design, we have to bridge that gap. So that's one example.

MS. KARAS: I just wanted to point out, too, that we work extremely closely with the Office of Research, and our seismologists speak with their seismologists, I think, at least on a weekly basis. And they have really been doing an extraordinary job of supporting us and looking for things that we should be doing in the future and they are doing work for us in those areas, looking at the ground motion models again, some of the things that I mentioned in my presentation and working with this expert panel and looking at other updates of the models.

So we really do have a very close working relationship to make sure that we don't miss any of those opportunities.

CHAIRMAN KLEIN: Thanks. Commissioner Jaczko.

COMMISSIONER JACZKO: Just a brief comment and then a question I would just suggest on the advance reactor issue, and I think Commissioner Svinicki raised a good point looking forward on that. And one thing I always keep in mind we have -- right now we are looking -- we have about nine applications for 15 reactors. And I think as Commissioner Lyons indicated, most of the discussion is about actually constructing four to eight of those at this point.

So when we project down to the advance reactor world, I think there is even a much more high degree of uncertainty in terms of one or any of those desires there will turn into reality. And so, I tend to have a high degree of skepticism there and am not so worried about the

disparities between our budget,

perhaps, and what the requests are.

Mike, this is a question -- Michael, this is a question for you. You said you went up to Pennsylvania to observe a demonstration of some of the digital control systems. I'm wondering to what extent right now or to what extent in the future, failure modes and failure of digital instrumentation and control will be built into operator licensing and operator training?

I actually don't really know to what extent that's there with analog systems, but that's clearly something we are looking at and trying to understand. And as you are so reliant on the digital systems are operators trained to try to understand the information may be inaccurate, or how do they handle that?

MR. JUNGE: I can speak to digital systems that are in plants now and we are expecting it to be the same way. For a digital feed system -- at Calvert Cliffs -- I was an operator at Calvert Cliffs -- we put in a digital feed system. It has two trains, and there are indicator lights that identify when one train is out of service, there is another light that says it's frozen and its indication position. So, in that regard, we are expecting similar stuff for the new reactors as well.

So, I would say that we should see -- the operator should be able to identify a failure mode -- not necessarily the failure mode, but that the instrument has failed. And that's what we are expecting out of the human factors review as well.

When we take that human factors review and then go into

the license exam, the K&A catalogs will identify component failures that they have to look at. And then as we get further through the design and the I&C platform is more developed, that information will be part of the training program and then part of the license exam. So they will have to go through and identify those failures.

COMMISSIONER JACZKO: Thank you.

CHAIRMAN KLEIN: Commissioner Lyons?

COMMISSIONER LYONS: Just a comment, on grid appropriate reactors. Commissioner Jaczko brought it up. This is an area where I would be very hopeful that there would be both congressional guidance and perhaps funding if they wish us to proceed. I think it's highly unlikely that there will be application for grid appropriate reactors in this country.

COMMISSIONER JACZKO: I think grid appropriate in this country is 1,500 megawatts.

COMMISSIONER LYONS: There's Galena, and maybe that will happen. At least we can agree that they are very, very limited. But I also think there are immense applications around the world. But that will quickly get into a question that I think really does require congressional guidance as to whether they truly wish to encourage us, which means fund to us, to move in that direction which just adds to the complexity of the issue I think.

A question for Mike: Just curious, as you work towards constructing exams in the digital arena, are there any lessons that we

could learn from the international

community, from countries that have, to some extent, made this transition? I don't know if their licensing or exam procedures are similar enough to ours to have any carryover. You have got company these behind you, too.

MR. BAKER: I will let Mike answer your question first.

MR. JUNGE: I don't believe that there is a big match on the way we give exams to foreign and international examination standards. We are going to look to see how Lungman ABWR and Tomari. We are going to look at how they qualify their simulator, how they have transferred the knowledge to the operators and how they have given exams, if they have given exams. So we are planning on going and gathering that information.

And we plan on using that information as well as for Finland and Okiluoto. So we are planning to go visit and learn as we can.

COMMISSIONER LYONS: I think that is very commendable. If there are lessons, great; if there are not, fine. But let's at least find out if there are. So appreciate that.

I really have one more question but Ed is at the mike

MR. BAKER: Ed Baker. I'm the Director of the Advance Reactor Program in NRO. I wanted to make one point. You're talking grid appropriate, and you are using it in the context of something to make electricity.

I know that the Pebble Bed folks were in here. And they are not aiming at the electricity market in the United States. They are aiming

at the process heat market. And their comment was given the price of oil, their market is in providing process heat whether it be the chemical, the petro chemical, the mining industry, any number of industries. Their statement was they see a market for 40 Pebble Bed reactors in the U.S.

So, I agree with the statements that were made about what is grid appropriate in the U.S., but let's not forget that they are identifying another market segment. They are pushing hard for having their design certification review continue. As Bill said, that is not something that is within the current budget scope. And they may get selected as a participant in DOE's NGNP program, but if they continue on their own, there appears to be a very developing market that is not electricity.

COMMISSIONER LYONS: Thank you for the comment. And at least in my mind, NGNP, in general, it is a completely different issue from the advanced reactors because that is a congressional mandate.

I would like to get one more question in.

CHAIRMAN KLEIN: Go for it.

COMMISSIONER LYONS: I don't know exactly who this question might go to. It might be Mike, it might be Bill. Way back when the President's 09 budget came out, we expressed -- we the agency expressed some concern whether we would have adequate resources to handle all of the COLs that we anticipated without any delays. Maybe it's premature to be asking this, but I'm wondering if that -- if you can make any comments on whether that has been reevaluated, and given that there are more and more rumors of a CR, whether this has started to be

factored into the thinking on how COLs
may be impacted?

It is a broad question. Maybe there is no single simple answer. I doubt there is, but I think it is a very important issue that we need to be facing.

MR. BORCHARDT: The CFO and the EDO's office and all the other offices are working very closely on '09. We believe we have identified funding that will help resource load for fiscal year 2009 the incoming COL applications.

COMMISSIONER LYONS: Does that include the potential of a CR, a long CR?

MR. BORCHARDT: Yes. I believe so. I will get back to you if that answer is wrong. But there was not a significant amount of technical review growth planned, so that the resources we have now identified, which are from previous years' funding, will be largely sufficient.

COMMISSIONER LYONS: I hope you are right.

CHAIRMAN KLEIN: Well, thank you very much for a good presentation. And even though we did deviate from seismic and got into other areas, it is comforting to know that you have a good handle on the seismic issues and the technology is relatively robust. And we will continue to work with industry to resolve issues that come up. Thank you for a good presentation. And keep those communications going.

(Whereupon, at 4:02 p.m., the proceedings were adjourned.)