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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

557th ACRS MEETING

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THURSDAY,

NOVEMBER 6, 2008

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The meeting came to order at 8:30 a.m., in room T2B3 of White Flint Two, Rockville, Maryland, William Shack, chairman, presiding.

PRESENT:

William J. Shack, Chairman

Said I. Abel-Khalik, Member

J. Sam Armijo, Member

George E. Apostolakis, Member

Sanjoy Banerjee, Member

Dennis C. Bley, Member

Mario V. Bonaca, Member

Charles H. Brown, Jr., Member

Michael Corradini, Member

Otto L. Maynard, Member

Dana A. Powers, Member

Harold B. Ray, Member

PRESENT: (CONT.)

Michael T. Ryan, Member

John Sieber, Member

John W. Stekar, Member

San Duraiswami, Designated Federal Official

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Adjourn

P R O C E E D I N G S

CHAIRMAN SHACK: The meeting will now come to order.

This is the first day of the 557th Meeting of the Advisory Committee on Reactor Safeguards.

During today's meeting, the committee will consider the following:

Chapter 14 of the SER, associated with the ESBWR design certification application; incorporation of ICRP recommendations in 10 CFR Parts 10 and 50; the status of license renewal activities; and subcommittee reports.

A portion of the session dealing with the ESBWR design certification application may be closed to protect proprietary information applicable to this matter.

This meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act.

Mr. Sam Duraiswami is the Designated Federal Official for the initial portion of the meeting.

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

A transcript of portions of the meeting is being kept, and it is requested that speakers use one of the microphones, identify themselves, and speak with sufficient clarity and volume so they can be readily heard.

Our first topic this morning is the ESBWR, and Mike Corradini will lead us through that.

MEMBER CORRADINI: All right. Thank you, Mr. Chairman.

So let me bring everybody up to date. As you are aware, we have been looking at the ESBWR set of SER drafts on a chapter-by-chapter basis.

In October we were scheduled to discuss chapters 14 and 7. The release of 7 was delayed a bit. We will discuss that at a subcommittee meeting concurrently, at which I'm sure we'll discuss too planned for December and then subsequently the full committee in December.

So what we are here to do today is to kind of have a progress report. Eric Oesterle is going to join us from staff, and there is other staff and folks from GEH here in case we have questions, to primarily talk about chapter 14.

Many of the members were at the subcommittee meeting in October. I think we were here

21, 22, talking about chapter 14, which is the chapter on ITAACs and DACs.

So what the staff is prepared to do is kind of give the full committee an overview of what chapter 14 is about, and kind of how it's organized, particularly relative to design acceptance criteria, but the overview of how ITAAC fits into this.

The one example, chapter 7, we'll have to hold off and discuss once we get our next subcommittee meeting scheduled.

Then following that, the plan is to have an interim letter, and this will be the last of interim letters and we will have covered chapter by chapter all the pieces of the ESBWR.

So with that, I will let Eric go ahead.

MR. OESTERLE: Thanks, Dr. Corradini.

Thank you, and good morning, everyone. My name is Eric Oesterle. I'm the lead project manager for review of the ESBWR DCD chapter 14.

Like Dr. Corradini said, I'll go through the topics in chapter 14 and the organization of the information in chapter 14, and provide an overview of the staff's safety evaluation report, with open items that we have provided to the ACRS on section 14.2 and section 14.3.

So, again, my purpose this morning is to provide a briefing on the status of the staff's review of the ESBWR DCD tier 2 chapter 14, which contains information on the initial test program, and also on GEH's selection criteria and methodology for including structures, systems, and components into tier 1, and also on the ITAAC.

The section 14.3 SER with open items also includes a review and evaluation of the tier 1 document in the ESBWR DCD.

I will also provide an overview and historical perspective on the use of tier 1, tier 2, tier 2*, ITAAC and DAC as used in design certifications, and that will help to understand the information in chapter 14 of tier 2 and the information in tier 1, and to help understand, well, what's tier 2 and what's tier 1? What am I talking about?

I also want to discuss the overlap that exists between ITAAC and the initial test program. As we were going through the review and as we heard questions from the subcommittee, there was a recognition that this overlap between these two programs needs to be more fully communicated and understood by everyone involved.

So with that, I'll go ahead and provide a brief overview and historical perpsective of the Part 52 process and the items that we're talking about, tier 1, tier 2, tier 2*, ITAAC, and DAC.

Part 52 was first promulgated in 1989, and as a lot of us have come to know, Part 52 as a process rule -- and the reason we call it a process rule is it contains little or very little or no new technical requirements for applicants. It establishes a new and different process for reviewing information provided by applicants.

Part 50 still contains the technical requirements for an applicant for design certification and for early site permits and for combined license applications.

In order to help with the implementation of this new rule, the Commission issued some guidance that was contained in several SECY papers, and I've listed them there.

This guidance deals with level of detail necessary to be included in a design certification, it deals with ITAAC, it deals with design acceptance criteria, and it also provided a status on the development and review of ITAAC for the ABWR System 80 Plus design certifications that were undergoing

development and review in the early '90s. So those two applications were really the prototypes for ITAAC and DAC.

With respect to level of detail in ITAAC, what the Commission identified was that a graded approach would be used for including information in the applications in an ITAAC. And what that means is that that graded approach, what you include is really commensurate with the safety significance of the structures, systems, and components.

So if you have structures, systems, and components that are safety related, you expect more detail in the FSAR and more information in the ITAAC for those features.

In addition, the level of detail -- for level of detail on the graded approach, the Commission established a two-tiered approach, and that's where we come up with tier 1 and tier 2.

Tier 1 is the certified material and that ends up becoming an appendix to Part 52, and we call that the design certification rule. So any information that is included in tier 1, we also like to call the legal description of the plant, and that exists for the life of the design certification.

Tier 2 information, as discussed in the

level of detail SECY, was intended to include information on the design and the design basis for the plant at a level of detail that was consistent with what was contained in FSARs at that time. And just for an example, at that time we were talking about plants like Palo Verde or Byron and Braidwood, that had FSARs that included possibly 24 or 25 volumes of information.

In contrast, the tier 1 information for ESBWRs is one volume. The remainder of the DCD, which is tier 2 information, is probably on the order of 13 to 15 volumes.

With respect to Part 52 and the development of the --

MEMBER MAYNARD: What becomes of the tier 2? Does that end up, the documentation, at a licensee's, or does the designer keep the equivalent of an FSAR for the tier 2 information?

MR. OESTERLE: Well, to answer your first question, when an applicant for a combined license references a design certification, that information from tier 2 gets incorporated by reference into the COL application, and so it becomes part of the FSAR.

MEMBER MAYNARD: Okay.

MR. OESTERLE: And it is supplemented by

site-specific design information.

MEMBER MAYNARD: That's what I thought. I just wanted to make sure that there isn't another one that is being kept for the tier 2.

MR. OESTERLE: Well, and that's your second question. The design certification vendor, as well as the NRC, is required to maintain that information as certified and approved.

MEMBER MAYNARD: Okay.

MR. OESTERLE: And available for either an inspection review by the public or for use by COL applicants.

MS. CUBBAGE: This is Amy Cubbage, NRO.

The control of that document is -- it's interesting because it's covered by the Part 52 appendices with the change process, so a member of the public could petition to make a change to that design certification, the NRC staff could make a petition -- well, not a petition, but it could propose a change to that as long as it met the criteria in the change process, as well as the vendor.

MR. OESTERLE: Right. And I have a slide coming up that addresses the different change processes associated with tier 1 and tier 2 information.

MEMBER BROWN: And one other tier 2, then, when they apply for the license, they can -- tier 1 is up in the log?

MR. OESTERLE: Yes.

MEMBER BROWN: Tier 2, when he applies, he can propose changes to some of the information in the tier 2, even though -- because it's easier to change. You don't have to change -- it doesn't become part of a regulation up in the tier 1 rule.

Does that then come back in to NRC if they change something in there? Is that --

MR. OESTERLE: The short answer is yes. There are provisions to allow the COL applicant to make changes to both tier 1 and tier 2, and so all of those changes get reviewed as a part of the COL license review process.

MEMBER APOSTOLAKIS: Do you have a simple example?

MR. OESTERLE: Not for this high-level discussion, but for making a tier 1 change, it also includes requesting an exemption from the regulation.

MEMBER APOSTOLAKIS: That's a process, but an example of something that would be in here, too.

MEMBER APOSTOLAKIS: But is there a simple example?

MS. CUBBAGE: All of the results from the safety analysis would be in tier 2, like all of the doses and -- excuse me.

CHAIRMAN SHACK: One conversation, please.

MS. CUBBAGE: Amy Cubbage, NRO.

All of the results from the safety analysis would be discussed in detail in tier 2, and then tier 1, we just have the high-level design features that are required, such that those results are achieved.

MEMBER APOSTOLAKIS: There is also the safety analysis.

MS. CUBBAGE: So all of the dose results, all the pressure plots and temperature plots for the LOCA, all of that information is tier 2. That's tier 2. And then tier 1 would have the design features like you have to have this many PCCS condensers, et cetera, et cetera.

MEMBER CORRADINI: So just to follow along, because that's very helpful, and then so the committee knows, we actually have tier 1. We may not look at it as much as we do tier 2, but it's there. We all realize -- I mean that's where the ITAACs are.

But let me just go with another example just so I'm clear.

So let's say a post-72 hours, if GEH decides to put in, as they're considering, or have decided to put in these fans to essentially now go back to an active mode of cooling, that would be in tier 1.

The presence of the fans and their specifications would be in tier 1. The analysis associated with what led them to the specifications would be in tier 2.

Is that a good example?

MS. CUBBAGE: That's right. Right. That's right.

MEMBER BONACA: But all the system descriptions are in tier 1?

MS. CUBBAGE: The high-level descriptions.

MEMBER CORRADINI: Summaries. Summaries.

If you look at it, since we didn't separate them, you get kind of like a table -- a tabular description of the system, some appropriate figures, and then immediately to the ITAACs that define what has to be done to make sure what you say is there is there and functional.

MR. OESTERLE: And I have an example or a few examples on one of the slides coming up to show what the ITAAC is and where the design commitments

are.

So now that we're on the ITAAC discussion, when the guidance was issued on how to implement Part 52, there were discussions with industry on predictability. That was the main concern of the industry.

In a previous era of licensing under the Part 52 process, there were a lot of concerns from industry about predictability of inspections, what the scope of the inspections would be, what would be the timing for these inspections, and what are the acceptance criteria for these inspections.

And so as a result of those concerns, this concept of ITAAC was developed, and identifies and codifies up front in tier 1 what inspections are required, when are they required, and what the acceptance criteria are.

So these things are part of tier 1, and they get certified by the staff of the NRC. So the ITAAC need to be completed prior to the fuel load.

MEMBER APOSTOLAKIS: I -- maybe there was a quick answer for this, but why would this committee care about all this?

MR. OESTERLE: Well, because --

MEMBER APOSTOLAKIS: Just because we are

reviewing the full ESBWR?

MR. OESTERLE: Just to achieve common understanding on what the staff reviewed in terms of what's in tier 1, and what's in chapter 14 on the initial test program and the ITAAC.

MEMBER STEKAR: I mean it's the completeness that the committee has to worry about, George. You have to make sure there's enough information in those ITAACs that what you think you're buying is what you're going to get.

MEMBER APOSTOLAKIS: But the bulk of this sounds like process to me.

MEMBER STEKAR: But until you realize, George, that the entire -- for this plant design, the entire digital I&C system design is ITAAC -- so understanding what's in ITAAC and the level of detail is pretty important for understanding how and when we see, or if we see features of the design.

MEMBER CORRADINI: Eric is going to get to that, though.

MR. OESTERLE: Yes. And I think you've hit on an important part. Part 52 is a process rule, but what's important is that when you compare all of the things that the NRC did under Part 50 and overlaid Part 52 on that, you'll look at the beginning to end.

We do all the same things under Part 52 as we did under Part 50.

However, we have organized them in a different manner, and we have raised the inspections, analyses, and tests under ITAAC to a higher regulatory level than previously under Part 50, because now COL applicants, when they implement ITAAC, they have to successfully complete all of the ITAAC and prove that to us before we can authorize fuel loading.

MEMBER APOSTOLAKIS: I understand that. I don't want to take too much on that.

MR. OESTERLE: Okay.

MEMBER APOSTOLAKIS: You said that 40 years ago we didn't care about this.

MR. OESTERLE: Correct.

MEMBER APOSTOLAKIS: We didn't have tier 1.

MR. OESTERLE: Correct.

MEMBER APOSTOLAKIS: Did the ACRS at that time review the digital I&C regardless of whether it's in PR 5 or 10? Did they express any views on the safety implications? That's what I think they did.

What I'm saying, though, is as you said, you have organized it, which is great.

MEMBER BLEY: George, one reason we might

care, if I understand this right, and if you go back to what we've been reviewing over there, we reheated the whole DCD. Chapter 1 is tier 1.

MR. OESTERLE: Tier 1 is a stand-alone document, so it's in chapter 1.

MEMBER BLEY: Okay. But tier 2 is all the stuff they give us, give the NRC to review. Tier 1 is an abstraction, but that's the only thing that gets certified.

MR. OESTERLE: Correct.

MEMBER BLEY: Tier 2 isn't certified, so that's -- do we care about that? I don't know. But tier 2 is all the stuff we would have seen either way.

MEMBER APOSTOLAKIS: It seems to that we would look at those things, anyway. But, anyway, we're spending too much on this.

Go ahead.

MR. OESTERLE: Okay. All right. So the ITAAC, just by --

MEMBER BROWN: I want to just -- having been on the 1989, when this all was being generated, the nuclear program had been dictated by Rickover. They would present new designs to the ACRS. It was part of his -- he thought they ought to do that. And we were putting in the first ever -- I won't tell you

what type of digital I&Cs, far more sophisticated than what anybody has in here, and we spent two days, of which a day -- on that design, of which a day and a half was devoted almost to the new I&C systems, and there were tons of discussions, presentations of which I was the presenter. They were interested in it. They didn't have all this other stuff to deal with, but so you asked before, yes, did they do it, the answer is yes.

MEMBER APOSTOLAKIS: I know it was yes. I know it was yes. Anyway, let's continue this.

MEMBER CORRADINI: I think you want to go through what you're presenting.

MR. OESTERLE: Yes. By definition --

MEMBER CORRADINI: Educate us.

MR. OESTERLE: -- the ITAACs are those inspections, tests, and analyses whose successful completion demonstrates that the facility has been constructed and will operate in conformance with certified design for the license.

So there are two regulations associated with ITAAC, and you'll see that in the last two bullets. There is one for design certification applications, under 52.47(b)(1), identifies the requirement for applicants for a DC to include a

proposed set of ITAAC.

The other regulation is for combined license applicants, and that's under 52.80, and that's for the entire facility, and the combined license applicants also must provide proposed ITAAC. And if they refuse to reference a certified design, all of those ITAACs from the design certification get incorporated into their application.

However, they also need to provide site-specific ITAAC for site-specific designs and provide ITAAC for emergency planning as well.

You can see the other regulations up there under Part 52, subpart (b) and subpart (c), which apply to standard designs.

The reason I bring this up is because a lot of questions we got were really applicable to the combined license applicant or once the COL applicant receives its license, because they are the ones that are responsible for implementing the initial test program and completing all of the ITAAC, so you have to understand the whole in order to understand the parts.

MEMBER BLEY: I just wanted to -- George, I didn't say it right, what I wanted to say before. The reason, at least I'm concerned, isn't what it's

called. It's that under this process, hunks of the design are not realized until the ITAAC phase, and those are the things called DACs. And that will not come to ACRS under the current way it's arranged.

So there are big pieces of the design, including all of the detail on I&C and other things that will never come before this committee if the process runs as it's kind of expected to run, because they're part of the ITAAC. They belong at the COL, and it never -- it isn't submitted back. It's checked off as if it were a test, rather than part of the design.

MEMBER MAYNARD: Well, we get to review the design acceptance criteria and the ITAAC, but that doesn't really tell you how the --

MEMBER BLEY: But those are -- this is general statements of what ought to be there. They aren't the real design.

MEMBER APOSTOLAKIS: The findings will never come here.

MEMBER BLEY: Well, unless we somehow -- that's correct.

MEMBER APOSTOLAKIS: But that's the --

MEMBER BLEY: Under the normal process, they would not come -- the design itself would not

come here.

MEMBER APOSTOLAKIS: That's consistent for my request for the -- and we never see the implementation of what we are using, the much broader issue. We review the regulatory guides, but until they are implemented, darkness. Unless we specifically ask for a briefing, you know. But we never really get involved in the implementation. So I think we ought to discuss this in general.

Anyway, that's general.

MEMBER CORRADINI: So just to make sure that we go back, was that different under the previous way in which Part 50 was implemented? I want to make sure about that.

MS. CUBBAGE: At the time of issuance of the operating license, the plant, the facility was constructed, it was already built.

MR. OESTERLE: It was a timing issue. Even part of the Part 50 licensing process, those designs, once completed and installed, were reviewed and the implementation of the design was inspected, to my knowledge.

MEMBER CORRADINI: So I just want to make sure, because the uneasiness here is the same uneasiness that came up in the subcommittee, so we

might as well just make sure we're clear about it, and then move on, which is that in prior times, even though there was no legally -- or legally binding, I guess that's the proper terminology, for an ITAAC process, when the plant was constructed and came back for the operating license, the ACRS was brought into the discussion and issued a letter of opinion on issuing the operating license; whereas here all that's going to take upfront for the COL with only design acceptance criteria.

MEMBER BLEY: Right. And at that time the design was in place, I do believe.

MR. OESTERLE: Yes.

MEMBER BLEY: Part 50, when you got there, the whole design was there.

CHAIRMAN SHACK: Well, there's a big difference between a design acceptance criteria and an ITAAC. I mean an ITAAC is to ensure that you have the design you thought you approved. A design acceptance criteria sort of gives you some very high level that will describe the design, but you don't have the design.

MEMBER CORRADINI: Right. And that's all I was trying --

MEMBER BLEY: Except the words they use,

the DACs are ITAACS.

CHAIRMAN SHACK: The DACs -- but they're a special kind.

MS. CUBBAGE: I just want to make -- you know, we'll get into this a lot more when we come back to brief chapter 7, but the staff does have to make sure that we have enough information to reach a reasonable assurance finding, and that information is the commitments that they are making to various regulatory standards, regulatory guides, et cetera, and also the design process that the applicant is committing to.

So it's more -- you have much more information about the process that they're going to use to complete the design, and then you verify later that they have in fact completed that design in accordance with all of the commitments they have made, the process that we have reviewed and approved, as opposed to in the old Part 50 world where you looked at the results of the design at the time of issuance of the operating license.

So, you know, I think we'd like to share with you a lot more on that review process when we come back with chapter 7.

MEMBER CORRADINI: I just wanted to make

sure we were clear as to what the uneasiness was coming from. That's all.

MEMBER RAY: Well, I've got to make one comment here, finally. In this meeting we are going to talk about something later on called interim staff guidance 08, and it has to do with this very problem, which is it has do with the tech specs application. Because Part 52 didn't change the requirements of Part 50 when it comes to tech specs.

So you have to somehow deal with that problem, and it's just now become an issue that we will talk about later, as I said. But there are ramifications to all of this that we can only incrementally sort of digest, I think, is the way to put it.

I think this is a good briefing. I appreciate it.

MEMBER MAYNARD: I agree. I think the briefing -- I think we need to let them go forward.

MR. OESTERLE: Okay. I'll go forward.

So this slide just identifies the regulatory guidance that we had to follow in performing our review of the standard review plan 14.3, which covers ITAAC, provides a lot of guidance that was based on the NRC experiences in reviewing

design certifications for ABWRs System 80 Plus, AP 600, and we have several what I call sub-SRPs under 14.3 that we followed in doing our review and preparing our safety evaluation report with open items.

That SRP was updated in March 2007. And we also have Reg Guide 1.206, which is for combined license applicants. However, it contains a lot of useful guidance for design certification applicants, and contains some sections there on ITAAC design acceptance criteria, and ITAAC for COL applicants, representing the design certification and/or ESP.

And before we get into the summary of the staff review, I just wanted to go over some of these concepts that were established for Part 52. And the easiest way to do this is to talk about tier 2 first.

Tier 2 provides all of the design information and the design basis for the design of the plant -- the systems, the structures, the components, et cetera. That is where you will find the detailed information upon which the staff makes their reasonable assurance determination, okay.

Tier 2 is like the FSAR. There is a change process in the design certification rules, the appendices to Part 52, for how to make changes to the

tier 2 information.

Now the NRC reviews the tier 2 information and approves that information. In contrast, the tier 1 information is a small subset of all of the tier 2 information, and how the design certification applicant determines what information they pull out of tier 2 to put into tier 1 is contained in section 14.3 of the DCD, and that specifies their selection criteria and methodology for identifying what information from tier 2 goes into tier 1.

And just briefly, I'll share with you what the staff guidance on that is.

The staff is interested, particularly interested in ensuring that the assumptions and insights from key safety and integrated plant safety analyses in tier 1, where plant performance is dependent on contributions from multiple systems that the designer adequately considered in tier 1.

Addressing these assumptions and insights in tier 1 ensures that the integrity of the fundamental analyses for the design are preserved in an as-built facility referencing the certified design.

These analyses include flooding analyses, overpressure protection, containment analyses, core cooling analyses, fire protection, transient analyses,

anticipated transients without scram analyses, steam generator tube rupture analyses -- that's for PWRs only -- radiological analyses, unresolved safety issues, and generic safety issues, and TMI action items and other key analyses as specified by the staff. And that's in addition to all of the traditional safety-related seismic category 1, class 1(e) type of things that we have focused on in previous reviews under the deterministic method of review for these plants.

The tier 1 information includes design descriptions for systems. It includes the ITAAC. And we do like a tier 1 the legal description of the plant. Tier 1 is certified by the NRC in addition to being approved. And so it has a higher threshold for change, and that is reflected in the design certification rules in the appendices of Part 52.

So, for example, if a COL -- if a combined license holder wants to make a change to tier 1 information after it has already received its license, it needs to come back to the NRC under the license amendment process, CFR 50 Part 90, as opposed to if they want to make a change to tier 2 information, they can make that change in accordance with the 50.59 process. Okay? That's the main difference.

MEMBER BONACA: So two COL applicants can have different tier 2 information in their design ultimately? Tier 1 information is going to be identical for everybody.

MR. OESTERLE: Yes.

MS. CUBBAGE: Unless they have requested a departure and we have approved an exemption.

MR. OESTERLE: Right.

MEMBER BONACA: Tier 2, you could have some differences.

MR. OESTERLE: On a very limited basis, yes. For example, if they had different plant-specific design features. One site may be using cooling towers, where another site may be using intake from a river or a cooling water pond.

MS. CUBBAGE: But any COL applicant or licensee could request a departure from tier 1 or tier 2. The approval process varies depending on whether it's tier 1 or tier 2 or tier 2*.

MEMBER BONACA: But that is important because I think for tier 1, if the NRC approves it, it applies to all the plants will take this design.

MS. CUBBAGE: Only if it's a generic change to tier 1. You could have a plant-specific departure to tier 1, that that one licensee or

applicant could request, and it could be approved. But we would also factor in standardization in our thought process on whether or not we would approve an exemption to tier 1.

MEMBER BONACA: That is what I'm trying to understand now.

MR. OESTERLE: There are several factors that the NRC considers in making a change to tier 1 information, and that's discussed under 52.63, which talks about finality of the design certification.

So there is also another category of information called tier 2*, and there is a portion of tier 2* information that is -- the NRC considers was subject to change by the applicant. And I'll give you some examples of some tier 2* information that the NRC considered would be changed by the applicant further on down the road:

Fuel burnup limit; fuel design evaluation; fuel licensing acceptance criteria. Those were tier 2 stuff -- that was tier 2* information in the ABWR design certification. So that's an area where we didn't strictly control it as much as tier 1 because we knew that there may be changes in fuel designs down the road, and that we would still want to take a look at that.

MEMBER APOSTOLAKIS: Less than tier 2?

MR. OESTERLE: Yes. But we still review it.

There is another set of tier 2* information that has a sunset clause, and that's for design information that typically wouldn't change, like the design of your containment building and things like that, where after the first full power operation of that plant, where that tier 2* information converts to tier 2 information and can be changed under the 50.59 process.

MS. CUBBAGE: And if you're looking for the tier 2* information, it's not like it's in a separate volume like tier 1. It's within tier 2 itself. You may find some text that's italicized and in brackets with an asterisk after it, and that designates the tier 2* information.

MR. OESTERLE: And the design certification rule in the appendices to Part 52 clearly identify what the tier 2* information is.

Let's move on.

What's ITAAC? Well, the answer is, the short answer is ITAAC is a verification program, and it is applicable to design certification applications and combined license applications, and it is

implemented by the COL holder or the combined license holder.

ITAAC must be successfully completed prior to fuel loading.

There is an overlap with the initial test program, and the initial test program comprises preoperational testing, start-up testing, power ascension testing.

Now because the ITAAC must be completed prior to fuel load, the amount of testing that you can do under ITAAC is limited, but ITAAC is not limited to just testing. It also includes inspections, it includes analyses.

So the overlap that ITAAC has with the initial test program is that there may be one test that you run under the preoperational test program that satisfies the purposes of both the preoperational test program and some of the ITAAC. But you have to check off two boxes, two different boxes, because the intent of the two programs is different.

One of the other questions that came up about ITAAC is that we need to make sure that we clarify is that the ITAAC program is not the be-all and end-all of testing for the facility. When you take a look at the ITAAC program, you will have tests

and analyses and inspections of various components of a system or structure, but when you take a look at the aggregate, the information that the staff gets from that inspection and testing analyses provide sufficient information for the staff to make a reasonable assurance determination that that system, structure, or component has been constructed and will operate in accordance with the license or with the certified design.

The other -- the reason I mention that is because there have been questions about, well, I don't see a complete system functional test in the ITAAC.

Well, for some systems you can't do that. You have to do that under the initial test program. Some systems require fuel to be loaded in before you can do that.

But when you take a look at individual pieces and parts of the ITAAC and take a look at the aggregate of all those things, that provides the staff with reasonable assurance that the plant has been constructed and will operate in accordance with the license.

So let's move on.

MEMBER MAYNARD: Did you say earlier the ITAACs all have to be completed prior to fuel load?

MR. OESTERLE: Yes.

And so after fuel load, as you know, there is additional testing that goes on.

During all of that time, the license holder is subject to the traditional enforcement program, so it's not -- that doesn't start after fuel load, it starts after the license is issued. So we do have an additional vehicle to ensure compliance.

The ITAAC contains a limited number of design completion aspects, and that's what we've been talking about as DAC. Those are design acceptance criteria.

The ITAAC, there is a graded approach applied to the ITAAC that is commensurate with the safety significance of the structures, systems, and components, so that means you don't put everything in ITAAC. If you've got a nonsafety system, nonseismic category 1, you want to ensure that it functions as designed, because of this graded approach it doesn't get included in ITAAC. It gets taken care of by other construction inspections or pre-op testing and things like that.

MEMBER APOSTOLAKIS: So this graded approach is what was presented to us two years ago or so, so it's a rating factor and safety and --

MR. OESTERLE: Yes.

MEMBER APOSTOLAKIS: Okay.

MR. OESTERLE: Yes. Primarily ITAAC is a verification program for the as-built or an as-installed condition. We want to make sure that the design has been installed as intended.

No new design information can be included in tier 1. It all has to be in tier 2. So additional information that we can see in tier 2 is information on how certain tests, inspections, or analyses are to be performed, and maybe some additional information on what a report might need to contain in order to satisfy the acceptance criteria for an ITAAC that includes analyses for verification.

MEMBER APOSTOLAKIS: Well, if you apply this graded approach, that means that a number of these ITAACs would not be confirmed; correct?

MR. OESTERLE: No.

MEMBER APOSTOLAKIS: That's what graded means.

MR. OESTERLE: Well, you have to back up one step. Applying the graded approach means that there is a certain set of information or a certain set of requirements that will never make it into ITAAC because they are not safety significant, they are not

risk significant, they are not essential to --

MEMBER APOSTOLAKIS: But the graded -- I have a set of ITAACs.

MR. OESTERLE: Yes.

MEMBER APOSTOLAKIS: The time now comes to confirm that all this stuff has actually been implemented. That's when the graded approach is used; right?

MR. OESTERLE: No.

MS. CUBBAGE: It's both places. It's both places. In the selection of what becomes an ITAAC, there is a graded approach --

MEMBER APOSTOLAKIS: Well, that's where --

MS. CUBBAGE: And then -- then -- once you have all these ITAACs, then the construction inspection program takes a look at it and they decide on what the sampling is going to be.

MR. OESTERLE: All of the ITAAC must be completed before fuel load. Now I think where you are going is --

MEMBER APOSTOLAKIS: The selection is greater.

MR. OESTERLE: Yes.

MEMBER APOSTOLAKIS: Okay. Okay. Good. That's the way it should be done.

MR. OESTERLE: Okay.

MEMBER APOSTOLAKIS: Thank you.

MR. OESTERLE: You're welcome.

MS. CUBBAGE: But the inspection -- there is a sampling.

MEMBER APOSTOLAKIS: It's overkill now. I have agreed.

(Laughter.)

MEMBER CORRADINI: But you actually happened to hit upon a discussion point in the subcommittee that caused some concern, so --

MEMBER APOSTOLAKIS: Oh, I see. I'm sorry.

MR. OESTERLE: The agency has an inspection program that they are still working on for ITAAC, and one of our branches, the construction inspection branch, is one of the other few branches that takes a look at all of the ITAAC for design certification and for COLs, because they need to go through that and do a prioritization or a grading of those ITAACs to determine what ITAAC will the agency receive the most benefit from in terms of compliance assessment in performing direct inspections or how much can we rely upon the ITAAC determination letters that we get from the applicant.

One thing I do want to point out is that for design acceptance criteria, the portion of ITAAC that when the designs are completed, the current thinking is that those are not just to be inspected by your construction inspector out in the field. We will have technical reviewers from staff who will be looking at those -- the completion of that design acceptance criteria to ensure that the designs meet the functional requirements for those systems that are specificied in the acceptance criteria for DAC.

MS. CUBBAGE: Right. And we also would not intend to sample those.

MR. OESTERLE: Correct.

MS. CUBBAGE: We would be comprehensive in our inspection.

MEMBER CORRADINI: So I guess -- not to belabor this, though, but just so I understand, Amy, in this case one it's not statistical sampling. For the DACs, it will be a complete review where headquarters staff will be as involved as the normal ITAAC staff doing this because of the fact that you've got a lot of the details of the design that you want to now look at and make sure it all fits?

MR. OESTERLE: Correct.

MEMBER CORRADINI: Okay. Did I understand

that correct?

MS. CUBBAGE: Correct.

MEMBER CORRADINI: Okay.

MR. OESTERLE: So just a little bit more information on the ITAAC, on the format and content. And we'll see that on the next slide.

There is a -- it's a three-column format. The first column is the design commitment in there, and that's consistent with the design description in tier 1, otherwise known as the legal description of the plant.

There is a column on inspections, tests, and analyses, so either an inspection, the test, or analyses, or a combination of the three, will be specified as the means for verification of the -- that the design can perform its function as required.

And then there is acceptance criteria, which are intended to be objective and verifiable.

Primarily the ITAAC have been written on a structure, system, and component basis. The responsibility to successfully complete all the ITAAC is with the COL holders. And that must be done prior to fuel load.

There is a regulatory requirement to notify the NRC of successful ITAAC completion, and we

are currently in discussions with industry on what documentation requirements there should be, and how much detail there should be in these documents that the license holders send to us to verify that they have successfully completed the ITAAC.

We'll look at that documentation. We'll also perform inspections and audits, and the NRC also has a regulatory responsibility to provide notice in the Federal Register of our determination that, yes, we agree with the license holder that they have completed the ITAAC.

Once all that gets done, the Commission has a requirement under 52.103(g) to authorize fuel load or not, depending upon the successful completion of the ITAAC.

And here's an example of several ITAAC that we pulled from the ESBWR DCD.

The first one is on functional arrangement of the nuclear boiler system. There are tables with figures provided in tier 1 to be used to verify functional arrangement of the system, and they are referenced in the acceptance criteria.

There are other very specific ITAAC with respect to piping being designed in accordance with ASME section 3 hydrostatic testing, and where we can,

we have referred to other documents and standards such as the ASME Code Report, which is very prescriptive, for the acceptance criteria rather than duplicate it in the tier 1 acceptance criteria.

And the last one is an example of a very specific and objective acceptance criteria for an ITAAC, the band of main steam line flow restricters.

The reason that was included is because that was an important assumption in the safety analyses.

MEMBER ABEL-KHALIK: How about the routing of the piping rather than the piping description itself? Is that a tier 1 or tier 2?

MR. OESTERLE: The routing of the piping, just insofar as its functional arrangement there, we're not talking about verifying isometic diagrams as part of ITAAC. We're talking about verifying that, okay, this check valve is downstream of this pump, and then down past the check valve is a T-branch connection, and things like that.

The verification of the isometrics will be performed under a different program. Not ITAAC.

MEMBER ABEL-KHALIK: Which different program?

MR. OESTERLE: Construction inspection

program. The licensee's quality assurance program, quality control program, which during that time period we have oversight over.

MEMBER ABEL-KHALIK: Even if the details of the routing of the piping may have an impact on the safety analyses?

MS. CUBBAGE: There may be some specific aspects of pipe routing that would be required to have an ITAAC. For example, the slope of the DDSC or venting. So if there is a specific aspect of the pipe routing that we need to verify to ensure the safety of the plant, then that could be an ITAAC, but in general the pipe routing, if it doesn't matter whether it goes this way or that way, there's not going to be an attack.

MR. OESTERLE: And for those piping systems where it does matter -- for example, ASME code section 3 piping -- there are ITAAC in here to verify that the as-built reconciliation of that piping is in accordance with the design requirements.

Okay. Now on to our favorite subject, design acceptance criteria. As I mentioned before, the amount of design acceptance criteria contained in ITAAC is limited. And the reason that we have them in the first place is that back during when the NRC was

reviewing applications for design certification, specifically to ABWR and System 80-Plus, there was an acknowledgement that these applications were not providing design and engineering information at a level of detail customarily reviewed by the staff in reaching a safety decision.

And certain areas were identified such as pipe stress analyses, radiation shielding, I&C systems, and control room designs, where the level of detail typically reviewed could not be provided at that time because the designs had not evolved to a mature enough point where procurement documents were available and things like that, so that we knew the details of the design.

So a process called design acceptance criteria was established and approved by the Commission for very specific areas that included rapidly changing technologies, no as-built information, no as-procured information, and the merits of whether or not these technologies were rapidly changing or not, or whether piping design is a rapidly changing technology or not be debated. But it's been approved by the Commission, and for ESBWR, we are not following any different process than what has been already followed for previous design

certifications.

In general, the design acceptance criteria are a set of prescribed limits, parameters, procedures, and attributes upon which the NRC relies in those limited number of technical areas to make a final safety determination to support design certification.

These DAC must be verified as part of the ITAAC program. So the design needs to be completed prior to fuel load, and we have been working with GEH to include what we call a COL action item for the COL applicants referencing the design certification application for ESBWR to provide us with schedule milestones for when they believe they will have sufficient design information or designs complete for the staff to audit those and review those.

The goal is prior to having those designs installed and implemented in the plant.

MEMBER APOSTOLAKIS: So the time comes when you open up the book and say this is a DAC, this is an ITAAC? What am I going to do different?

MR. OESTERLE: What you're going to do different is a couple of things. And to facilitate that, GEH has specifically identified in their tier 1 document and in the ITAAC which ones are DAC.

MEMBER APOSTOLAKIS: Okay.

MR. OESTERLE: So what we do different is we have our technical reviewers from headquarters staff review the completion of the design and the construction inspectors prefer that, because they don't want to review design.

MEMBER APOSTOLAKIS: I suspected that. Yes, that's fine.

MR. OESTERLE: They want to review the installation of the design.

MEMBER BLEY: One other key difference is you do 100 percent of the DAC reviews --

MR. OESTERLE: Yes.

MEMBER BLEY: -- and a sampling of the ITAACs.

MEMBER APOSTOLAKIS: No, I thought we do all of the ITAACs.

MS. CUBBAGE: The licensee has to complete all of them, and they have to tell us they have completed all of them. We will sample when we inspect.

MEMBER APOSTOLAKIS: That is not consistent with the previous answer, that you're using this decisionmaking methodology when you declare something is an ITAAC. Now you're saying no.

MS. CUBBAGE: There is a graded approach to determining which systems and structures and components have ITAAC.

MEMBER APOSTOLAKIS: And then?

MS. CUBBAGE: And then the licensee has to complete all the ITAAC. Then the NRC will inspect a sample.

MEMBER APOSTOLAKIS: Okay.

MS. CUBBAGE: Unless it's DAC, in which case we do 100 percent.

MEMBER APOSTOLAKIS: Okay.

MEMBER BLEY: Now you just said the designer identified the DAC items.

MR. OESTERLE: Yes.

MEMBER BLEY: We have another design we're looking at where the designer thought they had no DAC, but it turns out there's a strong disagreement. Now I assume that can happen anywhere and the staff negotiates with the applicant, or the staff decides what will be DAC? Is that right?

MR. OESTERLE: There is a -- we come to a mutual understanding. It's not like we say, you know, that has to be DAC or that has to be DAC. In the review process, if we identify that there are areas where they don't have the necessary design attributes

or features for us to review and come up with -- and provide a reasonable assurance finding, that would be a candidate for DAC.

However, we have only limited areas that the Commission has identified for us to allow the use of DAC on, and in the rulemaking process, there -- let me back up.

There is no generic DAC that each and every design certification applicant can use. In fact, approval of DAC is done on an application-specific basis, and so we are just identifying which areas we have seen DAC used in.

If there is an area that a particular design certification applicant is proposing DAC for that we haven't seen before or haven't approved before, I think we'd want to have some detailed discussions with the applicant about the prudence of continuing with that approach.

MEMBER MAYNARD: But that's kind of the opposite of where an applicant thinks they have enough detail and the staff doesn't. I think the bottom line is the staff has the final word on whether it's DAC or whether there's enough information.

MEMBER BLEY: That's what I wanted to hear. Because the designer was saying we have no DAC,

we just have ITAAC. But it looked like the ITAAC were really design items.

MR. OESTERLE: Well, in fact, we have been pushing applicants to provide or to minimize the number of DAC in the areas in which DAC is used to varying degrees of success.

MS. CUBBAGE: But they certainly would have to have the appropriate level of detail if they're saying they don't have DAC.

MR. OESTERLE: Okay. So the last two bullets, the DAC must be verified as part of the ITAAC and performed to demonstrate that the as-built facility conforms to the certified design.

And as far as the timing goes --

MEMBER BROWN: One other question. The DAC is presented in the paper as the same format as ITAAC are?

MR. OESTERLE: Yes.

MEMBER BROWN: Same three-column format?

MR. OESTERLE: Yes.

MEMBER BROWN: And so, again, to repeat, all DACs are ITAACs, but not all ITAACs are DACs?

MR. OESTERLE: Correct.

CHAIRMAN SHACK: There is a bracket design acceptance criteria on every one of the DAC.

MR. OESTERLE: Yes.

CHAIRMAN SHACK: And there are 84 of them.

MEMBER BROWN: That was my -- thank you. You are a little ahead of me. So you counted them?

CHAIRMAN SHACK: Well, the computer counted them. I didn't count them.

MEMBER BROWN: Do you expect a more detailed acceptance criteria for DAC than you do for an ITAAC?

MS. CUBBAGE: Not necessarily.

MR. OESTERLE: No, it may be different. The -- well, we don't expect anything more detailed for DAC because the common basis upon which we reviewed the information in tier 2 and for what's in DAC is that there needs to be sufficient design information for the staff to make their reasonable assurance finding.

For DAC, what we have focused on is ensuring that the applicant has established functional performance requirements sufficient for the staff to make their reasonable assurance finding, but at the same time not be so specific that it locks the applicant down into one specific design or one vendor.

The whole purpose of DAC is to provide flexibility for rapidly evolving technology, for the

applicant to choose from a number of different vendors, such that each vendor could meet that functional performance requirement and such that that functional performance requirement is something that the staff relies upon in order to make their reasonable assurance finding.

MS. CUBBAGE: Also I'll give another example. You know, the table itself may not be more detailed, but I'll use a human factors example. The table may say you need to implement a -- you know, do something in accordance with an implementation plan.

Well, that implementation plan is very detailed and is incorporated by reference into tier 2. So the acceptance criteria really is this big topical report that they are obligated to implement, and we verify that they have done this human factors element in accordance with that topical report.

So the table may not look more detailed, but there's a whole lot behind it that supports what the staff has to look at to ensure that the DAC is complete.

MR. OESTERLE: That's correct. For example, I know we are talking about ESBWR here today, but on the AP-1000 design certification, a good example is they provided a WCAP which is in a separate

document, and that specifies --

MEMBER BROWN: What is WCAP?

MR. OESTERLE: Well, it's a Westinghouse topical report.

MEMBER BROWN: Oh, Westinghouse. All right, fine.

MR. OESTERLE: And it specified the design process that Westinghouse would go through to come up with the final design for a system that would meet certain functional requirements for digital control systems.

And so the staff reviewied that process, looked at what the functional requirements were that the system would eventually be designed to meet to ensure themselves that it would -- that system would meet their requirements for reasonable assurance.

MS. CUBBAGE: I just also wanted to comment on the designation of the DAC within tier 1, where you see the design acceptance criteria language. That's something we've worked with GEH to do on ESBWR so that we could all be very clear on which ones of the ITAAC are DAC.

You won't see that in the previously certified designs. We felt that it was very important to make that very explicit in tier 1.

MEMBER BLEY: So in other -- that's not a standard policy then. So other design certs that might not be clear what items are DAC and --

MS. CUBBAGE: That may be true of previous certifications, and I don't know what the other current design certification applicants are intending to do, how they may or may not be designating their DAC items.

But for ESBWR, we have certainly made that clear.

MEMBER BLEY: That's really interesting. I mean it's not a comment about what you folks are doing. That looks -- we're able to find them easily. But in general, if the DAC are not easy to find, this is even a more --

CHAIRMAN SHACK: Well, on the one side it actually lists tables of DAC for ABWR and AP-1000.

MR. OESTERLE: And that's probably the most comprehensive listing of those DAC, but I'm sure that you would find that same listing in the design certification documents.

CHAIRMAN SHACK: Okay. I have to go to this to find it. Okay, that was done after DAC.

MR. OESTERLE: Right, after DAC.

MS. CUBBAGE: I just didn't want you to go

off and look for it in other tier 1s and get confused. That language was developed for ESBWR.

CHAIRMAN SHACK: Yes. That's a good idea.

MEMBER BLEY: I'm just curious. Given that that's in the Reg Guide, does that imply it should be in future design certs?

MS. CUBBAGE: Well, that's certainly something I'll take back to our colleagues working the other design certifications to see how they are doing it. I would expect that they are doing something similar.

MEMBER BLEY: Okay. Thanks. I hope so.

MEMBER MAYNARD: So you could ask for it at the ACRS meeting.

(Laughter.)

MEMBER BROWN: It will turn up.

MR. OESTERLE: All right. All right. I just wanted to mention that there's a couple of examples that I had from the presentation that I brought to the subcommittee meeting. We had some examples of DAC from human factors engineering, and there are several documents which the applicant develops that are referred to in the human factors engineering DAC, one being, for example, for the operating experience review implementation plan, and

the HFE allocation of functions implementation plan.

So these plans identify the design processes by which -- that the applicant will follow to develop their designs and meet the acceptance criteria.

Similar approach, but not following the topical report review approach at this time. We've been talking about the topical report review approach in other areas of DAC for ESBWR.

MEMBER ABEL-KHALIK: Would the emergency operating procedures be a part of ITAAC?

MS. CUBBAGE: Yes, there's an ITAAC to verify that they're --

MEMBER ABEL-KHALIK: Is it a tier 2?

MS. CUBBAGE: The actual development of the emergency procedures is a post-COL issuance item, the actual procedures themselves, and I'll check here in the ITAAC to make sure, but I believe that is one of the DAC items for human factors, the completion of development of the procedures.

MEMBER MAYNARD: Well, I believe -- isn't it kind of a two-step -- I think it's partly a design cert. I think they have to lay out the key steps. They don't have to have the emergency operating procedures, but they have to show how they would

respond. But the detailed procedures wouldn't all be in place until the COL stage, I think.

MS. CUBBAGE: That's true.

MEMBER MAYNARD: Kind of what we discussed the other day in the subcommittee meeting with the ABWR.

MEMBER BLEY: Well, that was a different thing. That was a new backup system that required a new kind of procedure, and they were laying out the steps for that.

MS. CUBBAGE: Right.

MEMBER BLEY: But that wasn't in general about the emergency procedures.

MEMBER MAYNARD: I got the impression it would be different.

MS. CUBBAGE: Part of the ITAAC in the human factors area is the procedure development, so there's a procedure development implementation plan, and we're going to verify that they have implemented it. And one of the acceptance criteria is that there's a report exists and concludes that the procedure development was conducted in accordance with the implementation plan and contains a description of the plant procedures derived from the ESBWR EPGs and goes on and on and on. So it is enveloped in the

ITAAC.

MR. OESTERLE: But this is a great segue to the initial program and other programs that the design certification applicant provides a lot of information, the technical basis for various procedures and programs that the COL is ultimately responsible for implementing. And so 14.2 is one of those.

So now we are into that review. I have shown the regulations that apply to the initial test program for a design certification applicant. The review guidance that the staff relied upon in reviewing section 14.2.

On a high level, the staff has -- the staff issued 98 RAIs, the majority of which had been resolved. There are only a few remaining open items on the initial test program, and the technical reviewers and the branch chief really wanted to, although they couldn't be here today, they wanted to extend kudos to the subcommittee because of the comments that they raised expanded their focus of the review of the initial test program to ensure that a broader -- they took a broader look at the digital I&C systems in the context of testing, because the digital I&C systems are the brain and the nervous system of

the entire plant.

So it's really looking at ensuring that the functional performance requirements are identified as part of the initial test program as well, even though the designs for the digital I&C system have not been completed yet.

We felt that the functional permanent requirements could be established without having the design completed, and so that's -- we feel confident that by the time we get done with the review that there will be no open issues in that regard.

Some of the remaining unresolved RAIs associated with the initial test program relate to expansion, vibration, and dynamic effects testing, testing of the digital I&C system functions, as I talked about, and the two bullets underneath there, safety system logic and control, pre-op testing and -- I'm sorry, that should be leak detection, not lead detection.

(Laughter.)

MR. OESTERLE: Leak detection and isolation system pre-op testing. They kind of fall under the digital I&C also.

Reactor internals vibration testing and some AC power distribution system pre-op testing.

The next section that we reviewed for chapter 14 was 14.3, and as I indicated earlier, that contained the applicant's selection criteria and methodology for what tier 2 information gets put into tier 1.

The regulations again for design certification applicants is contained in 52.47(b)(1), which we saw earlier. It specifics ITAAC.

The staff's review guide is contained in SRP 14.3, and includes the various what I call sub-SRPs, and the SER with open items that we prepared is organized along the lines of those sub-SRPs.

As far as the status of review of 14.3, we -- because of its topic, we decided to include the staff review of the tier 1 document as part of the review of section 14.3, because they are really joined at the hip.

As far as the RAI status goes, we had approximately 437, 440 RAIs issued for ITAAC. Approximately 365 resolved. And those that remain unresolved, a combination of responses that are in house for staff review and responses that we are still expecting to receive from GEH.

Review of section 14.3 on the selection criteria methodology. There was an RAI issued for GEH

to provide a cross-reference table that identifies the key aspects analyses and features of the design that were included in ITAAC.

This was something that was referred to in our SRP which really provides an essential basis for our review, and has been included in other design certifications.

It's also very important for reviews by engineers that want to perform change to designs of a plant that the COL is now operating. Those reviewers will need to see whether or not any of those changes that they're making will impact any of these assumptions or any information in the tier 1 ITAAC.

There is a COL action item included in section -- appendix to section 14.3, which requires the COL applicants to provide a DAC closure schedule to the staff, and we are working with industry and COL applicants on that effort as part of our ESBWR design center working group.

There is an open item on interface requirements specific to offsite power.

There is no ITAAC included for emergency planning because that's the responsibility of the COL applicants. We expect the COL applicants to include emergency planning ITAAC in their applications. It's

not within the scope of the design certification application.

In addition, the review of physical security harbor ITAAC is ongoing, and we're continuing to work with industry on that.

I just wanted to point out some lessons learned for previous design certification reviews, but some of those have already been discussed this morning.

We have had the benefit of some senior -- former senior resident inspectors involved in the development of the NRC's ITAAC inspection program, and in getting them to review the ESBWR ITAAC as well as ITAAC on other design certification applications.

They are also involved in the working group that we have with NEI to develop guidance on ITAAC closure documents.

For the ESBWR, we have really benefited from their review in terms of ensuring consistency among the ITAAC for similar systems, such that misinterpretations or varying interpretations might be minimized in the future when the licensees go to close out these ITAAC.

We have also changed or gotten applicants to move away from this ITAAC on basic configuration

which really included five or six separate elements, and we have had them broken out separately, and this helps implementation of the ITAAC.

As you can imagine, just doing a functional arrangement or closing out a functional arrangement ITAAC for a system that may start in one corner at the lower level of a plant and go up to another -- the opposite corner of the plant at a higher level -- well, you're going to have to wait until that plant is like 95 percent complete before you can do the functional arrangement on that ITAAC, whereas you might be able to perform the ITAACS on MOV functions or seismic qualification or welds prior to having that entire system completed and the functional arrangement verified.

The last one we have talked about where we have had GEH identify specifically in the ITAAC tables which ones are DAC by including the DAC in the nomenclature in the curly brackets.

With respect to the remaining areas that are still open in the staff's review of tier 1, they include digital I&C systems, human factors engineering, electrical systems, some containment system issues, some limited reactor systems issues, and still some remaining format inconsistency issues

across similar ITAAC.

MEMBER CORRADINI: Except for -- I just want to make sure. Except for the first two, which are really DAC related, are the others -- in the subcommittee meeting I don't remember anything in the final ones that were of any large significance. It was more clarifications. Am I misremembering? I want to make sure I don't pass over anything.

MR. OESTERLE: No, you're largely remembering correctly. There were some issues on electrical systems and interface requirements for offsite electrical power systems that remain to be resolved.

In containment systems, there were -- I'm trying to find my previous presentation, because that's where I had those.

MEMBER CORRADINI: Well, I didn't remember any. I just wanted to make sure that I -- in terms of importance that -- in the presentation I remember there were clarifications and things between what staff and GEH were doing, but nothing that stood out that there was a problem.

MR. OESTERLE: Right, nothing that stood out as problems in those areas. Staff is confident that, you know, continuing dialogue with GEH will

resolve those open items, and we are still working with GEH on the two DAC-related areas, digital I&C and human factors engineering.

And like Amy said, when we come back with chapter 7, there will be more discussion about digital I&C systems in DAC.

MEMBER CORRADINI: Thank you.

MR. OESTERLE: Well, last but not least, I always leave a slide for discussions and questions.

MEMBER APOSTOLAKIS: In case you don't get any during the presentation.

MR. OESTERLE: Exactly.

(Laughter.)

MEMBER CORRADINI: Any questions from the -- additional questions from the members?

MEMBER ABEL-KHALIK: How do you make sure that there is no, quote, wiggle room in the acceptance criteria?

MR. OESTERLE: The acceptance criteria are largely, if not completely, based upon the information that's in tier 2, so it's kind of an iterative review process.

We need to ensure that the systems designs and the structure designs and the component designs that are provided in tier 2 contain sufficient

information for us to make our reasonable assurance finding.

And we need to translate that -- maybe not -- "translate" is not the right word, but need to ensure that those same design requirements and performance requirements are reflected in the acceptance criteria.

We have tried to minimize subjective language in acceptance criteria to avoid the misinterpretations or different interpretations down the road by perhaps different inspectors or between, you know, a utility inspector versus an NRC inspector. And we have tried to make them as objective as possible. And where we have actual values that we can use, we will specify those in the acceptance criteria. Just like the example that we gave on the main steam flow limiter.

There is an assumption on the minimum diameter from the analyses that we need to verify.

MEMBER CORRADINI: Okay. Other questions?

MEMBER MAYNARD: Not a question but a comment. I really do appreciate this discussion. I think it's very helpful.

MR. OESTERLE: Thank you.

MEMBER CORRADINI: Anything else?

To remind everybody, though, that because of the separation of an example case relative to DAC which is chapter 7 and chapter 14, we're going to have a subcommittee meeting prior to considering both as an interim letter, and we can revisit and rediscuss some of the questions that you all have relative to the design acceptance criteria at that time.

MEMBER APOSTOLAKIS: So that's the December meeting?

MEMBER CORRADINI: That currently is what we will discuss tomorrow, but it's the December meeting, yes.

MEMBER APOSTOLAKIS: Twelve o'clock seems strange.

MEMBER CORRADINI: We are perfectly poised to organize it, so don't worry. All right. That's a way to avoid talking about it right now and wait until tomorrow to talk about it.

Questions to Eric or to Amy or other in the staff?

Okay. Thank you very much, Eric. I appreciate it.

Mr. Chairman, the floor is yours.

CHAIRMAN SHACK: We are ahead of schedule. We have a break until 10:15.

(Recess.)

CHAIRMAN SHACK: We can come back into session.

Our next topic is a Commission options paper on revising the radiation protection regulations, and Mike Ryan will be leading us in this discussion.

MEMBER RYAN: Thank you, Mr. Chairman.

By way of introduction, I think all members have received a series of letters that the ACNW wrote over the last couple of years on this topic. The ICRP has been very busy creating --

CHAIRMAN SHACK: I wish you'd tell us what you really thought about it more, Mike.

(Laughter.)

MEMBER RYAN: Yes, there were a few clear opinions in those letters, weren't there?

And we worked very closely with the staff as the evolution of the ICRP's recommendations have developed over say the last five years.

You have, I think, also some materials that give you what current radiation protection regulations look like, and what part of ICRP 103 recommends differently from what we do now.

To me, there are a few key issues to think

about as we hear Dr. Cool's presentation, and also Dr. Dehmel's presentation.

One, a major change would be that the ICRP recommends an annual worker limit of two -- I'm going to use our units -- two rem per year versus five.

It also has some structural differences in the subset of requirements that fit under that.

Second is there's a units change. Instead of rem, they use Sieverts. And just for everybody's benefit, 100 rem equals one Sievert. So that would be an interesting conversion.

The second is what does it mean for our industries that are regulated in the United States? Two groups come to mind. One is --well, there's another specialist that does high dose rate and high dose work tend to be the ones that bump up against the two rem per year limit. That's managed now in other countries by having more workers that absorb part of the dose rather than giving it to one worker.

The second group are some of the medical folks that are involved in high extremity exposures from hands-on work, both in beams radiation, typically cardiac catherization is one example, and the second is CAT scan where they're using short life high activity radioactive material, and they're actually

preparing materials, injecting patients, so their extremity doses would exceed the appropriate extremity limits.

MEMBER RAY: Which are tied to the whole body?

MEMBER RYAN: Yes, which are tied to the whole body. They're a higher number but limited to that portion of the body and so forth. There's a couple of charts here that will give you that layout.

And then if something does go foward -- and I think we're going to hear the staff about the abuse on this -- what would you think about, as an implementation strategy, over some period of time and how that might work.

So with that introduction, I'm going to just ask Dr. Cool to give us his background, insights, and path forward on -- or thinking on his path forward for what to do with ICRP recommendations.

One last point I don't think we're going to talk too much about today. The ICRP is recommending standards for nonhuman species. I'll be very honest with you and give you my own personal opinion. I have no idea what that really means. You know, recommending both plant and animal species. It's some kind of concept of environmental injury.

MEMBER APOSTOLAKIS: Why do you say you have no idea what it means?

MEMBER RYAN: I have no idea how to take what we use for humans, which is endpoints of certain diseases, cancer and other things, and translate that into say grass. Or plants.

MEMBER APOSTOLAKIS: I thought you said for animals.

MEMBER RYAN: And plants.

MEMBER APOSTOLAKIS: Oh, and plants.

MEMBER RYAN: The major principle that radiation biology has given us for the last 50 years is that if you protect man, you protect his environment and everything in it. And that's based on genetics, it's based on lots of interesting radiation biology. So let's put that one aside and just hear how it might work for human workers.

MEMBER ARMIJO: But that issue isn't on the table right now for the --

MEMBER RYAN: As far as I know, it is not, because we don't cover it in Part 19, 20, or 50. So -- but that's out there as something the ICRP is wanting to address and is actively preparing technical assessments thereof.

MEMBER BANERJEE: Looking at the effect of

very high fields like around Chernobyl and things, mainly, or --

MEMBER RYAN: Great question, Sanjoy. By taking humans out of the environment, the ecosystem around Chernobyl has reverted back to a much healther ecosystem, it turns out.

(Laughter.)

Several species of mammals have returned to the environment, plants have flourished that were, you know, being overtaken by human activity. So there's another example where there wasn't the accident is the Savannah River site in South Carolina. It is the most robust southeastern savannah ecosystem that exists in the United States, and the reason is there's been a fence around that 350 square miles since 1956. It's the largest population of white-tailed deer in the United States, for example.

MEMBER BANERJEE: They just glow in the dark.

(Laughter.)

MEMBER ARMIJO: I have another question that's more general. If these ICRP recommendations are accepted or not accepted by the NRC, what happens with EPA? Do they make decisions independently?

MEMBER RYAN: Since John is a member of

the interagency task force that addresses radiation protection regulations, I'd suggest, Sam, we throw that question to him when we get into that.

MEMBER APOSTOLAKIS: What is the history of this? Has this agency over the decades complied with --

MEMBER RYAN: I'm going to interrupt. I'm sorry.

MEMBER CORRADINI: He's going to answer this.

MEMBER ARMIJO: Just assume that we don't know nothing.

MEMBER BANERJEE: Double negative.

MEMBER ARMIJO: We know nothing, I meant.

(Laughter.)

MEMBER BLEY: He's upset by what happened in the recent week.

(Laughter.)

MEMBER CORRADINI: Well, that was just simply by his dress. I mean --

(Laughter.)

MEMBER RYAN: Gentlemen, can we move along. Can we turn the microphone to Dr. Cool. Don, welcome.

DR. COOL: Okay. Thank you, and good

morning, gentlemen.

Lots of very good questions, some of which I will probably touch on in the next few minutes as I give you a background discussion, some of which I don't explicitly have here, but we can go to any of a variety of places that you would like to go to help you get the background on the sorts of activities that are going on, because there is a lot that has gone on, that is going on, that will continue to go on.

The purpose today is to talk to you a little bit about the background, what the staff is currently looking at to respond to the Commission.

As Mike pointed out to you, the ICRP, International Commission of Radiological Protection, was engaged over actually quite a large number of years, eight or nine years, in considering and putting together its most recent set of recommendations.

To step back just for a moment in the chronology of history, the NRC last revised its standards for protection against ionizing radiation, 10 CFR Part 20, with the final rule in 1991. That was the culmination of a 12-year rulemaking process which completely revised the regulations, the structure, the components of those standards, and was based on the ICRP recommendations from 1977.

That rulemaking activity actually got started in '79, the proposed rule was in '85, the final rule was all ready to go about '89, and then our friends in the Federal Register said, no, we don't want you to put out a regulation which has the exact same numbers as the old regs -- this is one of the implementation questions -- and it took a while to sort through the process, so the rule actually didn't get out until '91, and it was actually fully implemented in 1994.

In 2001, staff went to the Commission and said, okay, it's been 10 years. ICRP put out their revised recommendations, Publication 60, just about the time we put out Part 20. At that point we deliberately said no, we're not going to start a new rulemaking right now. We need to at least get this in place and get things implemented, so we're just going to hold the line at the moment, but it's now been 10 years, and we gave the Commission some options that we had thought about. Part of that was in recognition that in 2001, the ICRP was already starting discussions for a new set of recommendations.

So what we actually suggested to the Commission was why don't we wait this time so that we don't get ourselves behind the eight ball once again

by having worked through all sorts of public processes only to get a new set of recommendations.

The second part of our recommendation was but let us start working on some of the technical bases, the impacts of things that we likely will have out there, so that we are pretty well positioned once ICRP puts out its new set of recommendations.

The Commission said, yes, we agree, you should wait so that we are not behind the eight ball again, but, no, don't engage in any technical basis work, or other activities, just interact around the ICRP recommendations.

So we have been dutifully sitting quietly. You will see that that plays into what we are suggesting to the Commission now in a very significant way.

Sir?

MEMBER CORRADINI: So maybe later, but somewhere, can you just remind everybody the statutory shift that EPA now sets standards and NRC -- the connection between EPA and NRC? I think that's important. When you think it's appropriate, but somewhere.

DR. COOL: We might as well do that now because that's not actually part of the presentation.

So let me digress just for a moment.

In the U.S., we have, of course, a rather a complicated system of jurisdictions and semi-overlapping jurisdictions otherwise.

EPA has specific authorities under a whole variety of statutes, one of which is the Atomic Energy Act, but the Clean Air Act and the Comprehensive Liability, otherwise known as CERCLA, et cetera, et cetera.

Under that, they do several things. They have what are referred to as generally applicable environmental standards. This is 10 CFR 40 -- 40 CFR 190, 191, and 192, a set of things that were promulgated shortly after the EPA came into existence. They are based on the ICRP, too, actually, recommendations.

They also have the responsibility to issue Federal guidance to the Federal agencies, and this is what you are referring to. There is a document signed by the President, which is Federal Guidance for Occupational Exposure. There is a document signed by the President on Federal Guidance for Public Exposure.

Now this is guidance in that it is not mandatory that the NRC would adopt exactly what was in that guidance, but we try to work very closely and

have our regulatory structure match the EPA, signed by the President, Federal guidance documents.

MEMBER CORRADINI: But that harmonization is recent. It's in the '90s that there was this harmonization of the -- or an attempt to create a process of that. Am I remembering correctly?

DR. COOL: It actually goes back to the '80s.

MEMBER CORRADINI: Okay. Sorry.

DR. COOL: The occupational guidance was updated and made final in 1987. It was part of the justification and support that we used for the existing Part 20 rule.

MEMBER CORRADINI: Okay.

DR. COOL: The guidance for public exposure dates back to Eisenhower, and despite multiple opportunities to try and update, still sits without coming out for revised public comment. So it is quite ancient, and we and everyone else have gone well beyond it.

In addition to that, just to complete the picture for you, they put out a number of technical reports. They're called Federal Guidance Reports, which contain dose coefficients and risk coefficients.

The Federal Guidance Report 11, which is

the dose coefficients, is close to but not the same as the dose coefficients which are in our Part 20 today, which underlie Appendix B, ALI, Annual Limits of Intake, concentrations and things.

The reason for the differences are, one, they were developed a little bit later. And two --

MEMBER CORRADINI: They?

DR. COOL: "They" being EPA's Federal Guidance Report which came out in '94 or '95. Maybe that's what you're thinking about.

MEMBER CORRADINI: Right.

DR. COOL: And secondly, EPA moves and does the calculation using U.S.-based assistance for cancer incidents, mortalities, the U.S. population. So they are more U.S.-specific values rather than an international value, which is a smeared Euro-Asian, North American combination population. So there are some small differences associated with that.

That will also be a factor eventually as we consider what numbers we may wish to move forward with.

Today the EPA is looking at the process to update those Federal Guidance Report materials. They are talking a little bit about whether there is a need to update the Federal Guidance that would be signed by

the President.

They have had no discussions with regard to possible updating and revision of their General Principle Environmental Standard 40 CFR 190 and following.

The Department of Energy has regulations similar to ours. They are actually in the middle of the process of getting around to adopt ICRP Publication 60 from 1990.

Even though we suggested to them rather strongly that they should wait and therefore be able to move with us as we started this process, they chose to go ahead and move a few things. So there is a bit of out of phase at the moment. We are in negotiations with them.

The other big player, if you will, is the Occupational Safety & Health Administration, OSHA, who has all of the machine produced, or anything which isn't covered by a Federal agency, aka us and the Atomic Energy Act.

The states, of course, will immediately tell you, well, but of course we actually license all of that, so OSHA's jurisdiction may be relatively limited.

Their regulations are identical to 10 CFR

20, CERCLA 1965, and are based on the 1958 and 1959 recommendations ICRP Publication 1 and 2.

MEMBER RYAN: It is probably important to point out, though, to members that 35 states are now agreement states, so they have accepted the authority which is basically the same as the NRC's regulation, but at the state level.

A practical matter is what's regulated under the Atomic Energy Act and agreement states is all the other things -- medical, machines, and all those other things -- are regulated by the same people under the same kind of an umbrella program at the state level. So the practical fact is that the same people doing the same thing with the same numerical limits.

DR. COOL: And just to complete that picture, in our discussions with the folks from the states through the Organization of Agreement States and the Conference of Radiation Control Program Directors, it is very clear that as we work with them through this process, wherever it may lead, that they would move the state regulations for both byproduct materials under the Atomic Energy Act and everything else to match it.

So as we take these considerations, one of

the things that we have in our mind is we are looking at the entirety of basic radiation protection in the United States.

MEMBER APOSTOLAKIS: How large is this commission?

DR. COOL: How large is the commission? The ICRP? The main commission has 13 members.

MEMBER APOSTOLAKIS: Thirteen?

DR. COOL: Thirteen individuals from all over the world. There are -- it's either two or three Americans on the commission. The ICRP is actually an independent charity chartered in the U.K. They fall under the jurisdiction originally of the Radiation Council. They date back to 1928. There are five standing committees now under the main commission; a committee that deals with the biology, the risk coefficients and things.

There is a committee that looks at the modeling of the body that's been responsible over the years for what we have referred to as reference man for the various lung models, GI tract model, and all those sorts of things.

There is a committee that specifically is focused on medical, which was ICRP's original origin.

There is a committee on practical

application of the commission's recommendations, sometimes known as the surrogate commission, because they get involved in all of the pieces of how to try and make things work. I am a member of that committee.

And there is now a committee on protection of the environment.

We can go back and have those discussions later, if you'd like.

MEMBER APOSTOLAKIS: Who appoints them?

DR. COOL: They are a somewhat self-reproducing unit. They are not appointed and there is no specific governmental representation. So there is not a U.S. representative representing the U.S. government.

MEMBER APOSTOLAKIS: So it is individuals?

DR. COOL: It is individuals.

MEMBER APOSTOLAKIS: Who funds them?

DR. COOL: They are funded from a wide variety of sources. The NRC, in fact, contributes -- I think Vince is here -- I think it's 50K now per year towards their overall budget and support.

MEMBER CORRADINI: So it is not that much. It's a small organization.

DR. COOL: It's a small organization. It

is a very small organization.

MEMBER BANERJEE: It is not U.N.?

DR. COOL: It is not U.N. It is like the Atomic Energy --

MEMBER RYAN: It's not like UNSCEAR. It's completely separate from the UNSCEAR Committee.

DR. COOL: That's correct.

MEMBER APOSTOLAKIS: They have staff?

DR. COOL: They have a scientific secretary.

MEMBER APOSTOLAKIS: And that's all?

DR. COOL: That's it. And that individual is actually changing. It was Jack Valentin from Sweden, who will retire in December. The new scientific secretary is Chris Clement from Canada, formerly a fairly senior manager in the K-Nuclear.

MEMBER CORRADINI: I was going to say, he wasn't a member of the commission, but --

DR. COOL: No.

MEMBER CORRADINI: -- he was on the staff.

DR. COOL: No, he was senior staff.

MEMBER CORRADINI: Senior staff.

DR. COOL: Senior staff. Someone I'm very familiar with. I think he will make a good scientific secretary.

But, anyway --

MEMBER BANERJEE: How do they get their importance? Is it because they are really smart or -- what --

MEMBER BLEY: Or various government agencies involved.

DR. COOL: It is a historical growth. They have been regarded as a place where people from all over the world could come together and put together some consensus with regard to recommendations and suggestions, and over the years international organizations and national organizations have tended to pick up and use. So their importance is sort of grown, not legislated.

MEMBER SIEBER: Like Al Gore.

(Laughter.)

MEMBER BLEY: In all of this, does the National Academy's BIER Committees fit anywhere, or they just do their own evaluation every once in a while?

DR. COOL: The National Academy's BIER Committee, independent of all other things that we have discussed, providing their views with regard to the underlying risk coefficients of things, they -- the BIER Committee is most like UNSCEAR, the United

Nations Scientific Community on Atomic Radiation, functioning to provide a view on the underlying science and risk.

Those things are taken by ICRP, translated into recommendations, which are then taken by organizations like the International Atomic Energy Agency, and turned into standards, such as international basic safety standards, the European Commission in the Eratom Directives and various national organizations.

We, the NRC, in the U.S. have looked to the ICRP recommendations as well as things from NCRP, as a clear piece of the puzzle, but we have never felt any mandate to adopt verbatim.

So there is nothing that says if ICRP wrote it, yea, verily, we are going to put it in.

Now that's a bit different from someone like IAEA, who pretty much has "the ICRP wrote it, we're going to figure out how to put into a standard." There is one of the differences again between a process in the United States under the Administrative Procedures Act activities versus some of the international organizations.

MEMBER CORRADINI: So just one last thing. So you mentioned, and I was going to ask, NCRP,

relation for NCRP, because it's based here in DC, it is very small staffed. Does it do subsidiary things to ICRP, there is no connection? That's where I'm a bit --

MEMBER RYAN: NCRP was chartered by Congress, the United States Congress chartered NCRP with the mission to collect, analyze, and disseminate radiation protection information in the public interest. So they have that broad charter from the United States Congress. And they do the same kind of things.

It's not really small. There are 103 members currently, I think it's 103, of NCRP, and there's a, you know, staff of seven or eight folks that keep that activity going forward.

MEMBER CORRADINI: Yes, I was familiar with their staff.

MEMBER RYAN: So -- but they do kind of the same thing, but I think in a different way. They are kind of a blend between say a BIER report and an ICRP report. There's a lot more technical depth in the NCRP report to justify what conclusions, opinions than --

MEMBER CORRADINI: Damn the ICRP.

MEMBER RYAN: I think so.

MEMBER APOSTOLAKIS: What does NCRP stand for?

MEMBER RYAN: The National Council on Radiation Protection.

MEMBER APOSTOLAKIS: Council. And they've got 103 members?

MEMBER RYAN: Yes.

DR. COOL: And you're looking at one of them.

MEMBER RYAN: Yes.

MEMBER BLEY: You guys ever make a decision?

MEMBER RYAN: Yes.

(Laughter.)

MEMBER BLEY: How does NCRP validate their technical -- I mean is there any technical or scientific beef behind --

MEMBER BROWN: I have looked at your chart and there are some fairly large reductions in allowable, although we have gone that way, I guess, at least in the ship building industry, we've tried to reduce stuff just for general purposes, but not because people told us to. The initial stuff I remember from 40 years ago, there was a lot of arguing about what the right limits were, but at least there

was an attempt to try to provide a technical basis, scientific basis behind it.

DR. COOL: Yes.

MEMBER BROWN: Has that continued, or --

DR. COOL: That has continued. You can debate the degree to which you feel it was a -- the reanalysis.

In Publication 103, the latest recommendations, they do not have this time the annex parallel to the annex that was in Publication 60 in 1990, which was a detailed scientific analysis of the various contributions.

In fact, the dose limits didn't change. They didn't move any of that. The underlying risk --

MEMBER BROWN: Between 60 and 103?

DR. COOL: Between 60 and 103. And so they didn't reproduce some of that material, or update it.

And if we can perhaps pop along just a little bit, that's actually not a bad segue, because the next couple of slides were to briefly walk you through what's in the ICRP recommendations.

MEMBER BANERJEE: I am still trying to understand why this is so important, why these people are so important. Are they really eminent people, or

why do we give them --

MEMBER POWERS: What exactly will you do with that information once you've gained it, Sanjoy?

(Laughter.)

MEMBER BANERJEE: Then I will feel more comfortable about what they're saying, you know.

MEMBER RYAN: I think the answer is yes. I think every country that offers members for working committees or participation in the various areas are viewed to be, you know, the preeminent people from across the world.

DR. COOL: They are very highly regarded individuals in their particular fields. The U.S. representatives at the moment, John Boice from NCI, one of the leaders in cancer epidemiology and activities in the world; John Poston at EPA, who heads one of the committees. So these are very well-known leaders in their fields.

MEMBER RYAN: It's a different John Poston.

DR. COOL: Julian. Julian Preston. Thank you. Part of my brain is gone at this point. I apologize.

MEMBER SIEBER: You did not send us the basic ICRP 103 document?

MEMBER RYAN: We did not. No. I can certainly get that around to everybody.

MEMBER SIEBER: I'd like to read it if you have a current version.

MEMBER RYAN: Absolutely. Absolutely.

DR. COOL: Okay. And it's about 130 pages.

MEMBER BANERJEE: So you said we should listen to them very seriously?

MEMBER APOSTOLAKIS: Well, they've been around for at least 80 years, right?

DR. COOL: They've been around for a while, and we can talk some more about it.

MEMBER RYAN: The history is they started as a medical committee, focused on the use of radium in medicine. And it grew into x-rays. And then all of a sudden the medical uses of radiation and radioactive material were the focus. And then with the development of nuclear power, they expanded into industrial uses, and so forth.

So it's grown to address the broad spectrum of issues from the early medical questions.

DR. COOL: All right. So --

MEMBER BROWN: So these guys are not the Al Gore approach to throwing information around?

DR. COOL: No. And, in fact, over the last few years they have engaged rather systematically in a public consultation comment process on each of the documents that have been produced.

Publication 103 actually went through three major public consultation pieces in which we and many other countries contributed, and it had a significant impact on the direction and pieces of the final document.

Did they do everything we wanted? No. Of course not. But --

MEMBER BROWN: That's the purpose of consensus.

DR. COOL: That's the purpose of that sort of process. So there is some of that that's in there.

Publication 103. Consolidated material from the previous set of recommendations, 1990, Publication 60, and a whole bunch of subsequent publications that had come out.

It continued the fundamental system of radiological protection. You have to justify exposures, you have to try and optimize, what we call ALARA, and you have to limit doses.

It continued to take the view that the rounded radiation risk was roughly five times 10 to

the minus 4 per rem. That really did not change significantly from the risk estimates from 1990.

MEMBER RYAN: Just for everybody's benefit, the risk of --

DR. COOL: Fatal cancer.

MEMBER RYAN: Sometime in the lifetime of the individual.

DR. COOL: Sometime in the lifetime of the individual. This is this fantastic and, with LNT cumulative, yes.

MEMBER RAY: And with LNT cumulatives?

DR. COOL: With LNT cumulatives, correct. Okay. Just a record note. The risk estimate from 1977, which is the basis of our current Part 20, was about 1-1/4 times 10 to minus 4 per rem.

So while the risk estimate hasn't changed in the last 15 years, the actual underlying basis of our regs today was a lower risk estimate. That plays into depending on how you wish to play the arguments, one reason why we might consider moving something once you get to that point.

MEMBER RYAN: And I think it's a fair debate to question whether or not the coefficient of 1.7 is statistically different from the coefficient of 5. It says about 5. It doesn't say 5 point

something.

MEMBER CORRADINI: So can you just -- I know very little -- I think I understand what this is saying, but this is from natural and manmade together, or manmade emissions?

DR. COOL: This is a risk of any additional contribution over background.

MEMBER CORRADINI: Thank you. Thank you.

MEMBER BANERJEE: But the background varies; right?

DR. COOL: That's right.

MEMBER RYAN: Yes. So you take an average.

DR. COOL: But with the linear model, which I put a little one up here in the corner, you draw the nice line. Now does anybody really believe that that represents how the biology works?

Well, yes, some do, and some don't, which is of course part of the great debate.

But for a modeling purpose, it continues to be recommended for prospective planning of radiation protection. ICRP has actually gotten to be very careful about how it says that, but --

MEMBER STEKAR: What does it say?

MEMBER RYAN: Threshold versus the linear

model.

MEMBER STEKAR: So you can get some before anything happens, and it doesn't matter, or you're getting some probably even some microscopic, micro-microscopic.

DR. COOL: Depending on your models, you can have something which would say that very small is actually more dangerous to you, and you can have the stimulation theory, which is a little bit actually causes a protective factor, and you actually might for subsequent doses have a lower risk.

MEMBER SIEBER: It's unusual that if you look at practice, when you reduce the maximum limit, you end up employing more people to do the work, and so the question always becomes, is the risk to the total population greater or lesser or the same, considering this, when you expose more people to lower levels?

DR. COOL: Right. And one -- that is a very hard question. Over the years ICRP -- I don't have this on the slide, but ICRP's recommendations now have actually focused more on the protection of the individual and a little bit less on the collective calculation. But that is a great debate between various ethics and methodologies for how you construct

it.

MEMBER SIEBER: The environmental standards do not ignore or exclude total dose to total populations?

DR. COOL: That is correct.

MEMBER RYAN: Jack, I think an argument is often that collective dose really is not a metric of risk.

MEMBER SIEBER: Right.

DR. COOL: And ICRP, in fact, in these recommendations makes it clearer -- we wanted them to make it clearer still -- but it makes it clearer that they do not believe that collective dose should be used in a risk assessment to give a value of an estimated risk to a population because of the uncertainties and the wide variances of activities.

It's useful in certain circumstances, particularly in the circumstance where you are comparing I can do the work this way, I can do the work that way. How many workers, what's the individual doses, what's the combination. There collective dose is a very useful tool to help you figure out what might be the best way to do a job.

But to simply say, okay, I'm going to take the entire population in this room and I'm going to do

something, and then I'm going to say how many cancers are going to occur in this room -- while you can do the mathematics and you can get a number, its relationship to reality is not very strong.

MEMBER SIEBER: The industry focuses on collective dose when they collect data to compare plants?

MEMBER RYAN: That's a good use because it's a relative measure of impact. For example, the same activities at plant A produce "X" person rem.

MEMBER SIEBER: Right.

MEMBER RYAN: The same activities at plant B produce 10 "X" person rem. Maybe plant B should do some work and learn what plant is doing. That's a fine use. But to particularize a risk metric --

MEMBER SIEBER: But you have to have the distinction to risk. They're not closely coupled.

MEMBER RYAN: But as a third activity tool or an effectiveness tool, or a training implementation tool -- all those kinds of uses of relative measure is good. But as a risk of a disease or endpoint, not so good.

MEMBER APOSTOLAKIS: This risk coefficient, 5 times 10 to the minus 4 rem, this is cumulative; right? Is that what you said?

DR. COOL: You want to apply that to your cumulative dose over your 30 years of work or whatever it was.

MEMBER APOSTOLAKIS: So it doesn't depend at all on how --

DR. COOL: It is not dependent upon dose rate.

MEMBER RYAN: It is assumed not to be dependent on dose rate.

MEMBER APOSTOLAKIS: Is that a reasonable assumption or --

MEMBER RYAN: It is assumed not to be dependent on dose rate. The current -- you know, some of the low dose studies that are going on are actually addressing this question.

I mean if you look at the range of dose rates that humans are exposed to, background is now viewed to be about 350 millirem per year from natural sources, which is at a relatively low rate, 350 millirem divided by the number of hours in a year.

But if you have cardiac catherization, you're getting 100 rem per minute during the camera portion. Just the regular part is 10 rem per minute. Or 10 rad per minute, Roentgens per minute at the chest.

So the dose rates are very different, and of course the biological response does have some relationship to dose rate. So you can argue 10 rem delivered at 100 rem per minute has a different impact than 10 rem delivered at 350 millirem per year.

MEMBER SIEBER: See, that only works if you assume the linear model.

MEMBER RYAN: That's the whole point with that little proximate 5 times 10 to the minus 4. My own view is you can think about the order of magnitude probably being about right, but the coefficient, who knows.

MEMBER ARMIJO: The basic risk of cancer is what? Three, three?

MEMBER RYAN: Yes, .3 is your risk of cancer.

MEMBER SIEBER: So these are small numbers?

MEMBER RYAN: It's a very small fraction of the normal incidence rate of cancers.

MEMBER SIEBER: The public doesn't want somebody doing it to them. And that's why it's usually a factor of 1000.

MEMBER RYAN: And all those questions of, you know, accepted versus imposed risk and all those

kinds of things are very important questions, but not part of the numerical value that's on the board.

I'm going to let you proceed.

DR. COOL: We'll move long just a bit. This is wonderful to study.

ICRP 103 moves to a situation-based framework, which from your standpoint probably isn't terribly important, but from which ICRP's standpoint was because it allowed them to put a consistency to the approach to all radiation exposures.

So whether you planned it in advance, like all the things that happen in a power plant, or whether you discovered that you've got radon in your homes, your basic approach is the same. How much have I got there? What can I do to reduce it?

So optimization.

The constraint or, in the case of emergency exposure situations, they use the phrase "reference level," is a level which they suggest be used for planning purpose to understand where you would not want to be above as you plan the kinds of radiation protection requirements issues and things that you would put in place.

They have been very clear that a constraint is not a limit. A constraint is a lower

value used in planning, not to be confused with a limit where our friends from the Office of Enforcement come in and would pop the licensee over the head.

There are many people who do not see the distinction between those two. As I said, ICRP retained the dose limits and the values for those limits. These have not changed in 15 years in the international recommendations.

That is an average of 2 rem per year expressed as 10 rem over five years, and the maximum of five in any one year through occupational exposure, 100 millirem per year for public exposure, and now 100 millirem per year for the embryo fetus. All of those are the same as what you found in the ICRP recommendations in 1990.

They are not, as you know, what is in Part 20.

MEMBER BANERJEE: Can you give us an idea of the background and the variability in the background compared to these numbers?

DR. COOL: As Mike mentioned, if I'm understanding your question correctly --

MEMBER BANERJEE: Well, this is 100 millirem. What's the background exposure?

DR. COOL: In the United States, from

cosmic radiation, terrestrial radiation, and the smeared average of radon, each of us is getting 320 or so millirem per year. That's the smeared average.

Now for those of you who live more near the sea coasts at lower elevations, you're probably not getting quite that much.

If you're living in Denver, Colorado plateau, where you're at a higher elevation higher natural concentrations of radioactive -- you know, the naturally occurring radioactive soil, you probably have a higher value.

Now the second piece of this, which I will go ahead and mention, is --

MEMBER CORRADINI: You're getting killed.

MEMBER STEKAR: I used to be six foot six and had a full head of hair. Look at me now. I'm a shadow of my former self.

MEMBER BANERJEE: In addition to that, 500 millirem a year?

DR. COOL: Well, for every air flight, you're getting another 5 millirem or so, so it depends on how far you fly. And the smeared average now in the United States for all medical exposures, including CTs and everything, has grown dramatically, and is now to hopefully not violate the thesis too much, but it's

been talked about is now something on the order of 300 millirem to each person in the United States as well.

MEMBER RYAN: So what you can think about as the average --

MEMBER BANERJEE: Well, why is this standard like that? I mean, really, what's the logic? Is there a logic?

MEMBER BROWN: Well, this is above background. This is not -- that 600 millirem doesn't fall into that --

MEMBER BANERJEE: Five hundred millirem, right?

MEMBER RYAN: I think Sanjoy's point is that if you look at increments on top of background, this is a very small increment of the risks that they are already accepting, you know, by the background.

DR. COOL: It is intended to deliberately be a maximum which is still a small fraction of that which an individual might be getting from other contributions.

MEMBER RYAN: It's a third. I want to point out something that's very important.

MEMBER APOSTOLAKIS: The variability is already very high; right? That's what you're saying, Denver to sea coast?

MEMBER RYAN: Yes. The variability is high.

The ability to actually measure impacts in a population at these levels of additional exposure to background is zero. You'd never be able to solve that out because the power of the statistics just won't let you do it.

MEMBER APOSTOLAKIS: Did you say flying from here to Los Angeles, you get about 5 millirem?

DR. COOL: I think here to Los Angeles is going to get you about three. I'm getting a five when I fly to Vienna.

MEMBER RYAN: Unless there's a sun spot, and then you have a couple of rad.

(Laughter.)

MEMBER BANERJEE: Well, the point -- I am sort of interested in this because does this make you do incorrect things, like during emergency planning, when you'd be far better off staying in your house with iodine tablets and putting duct tape on your windows than trying to evacuate?

MEMBER RYAN: Good question.

MEMBER BANERJEE: I think that is really the issue.

MEMBER BROWN: Great question.

One thing I want to point out about the occupational exposure is this is a dangerous way to have a standard. Right now we've got an annual standard. If I had a limit of 10 rem in five years, and I could have five in say year one, I am less valuable to my employer in year two through 10 than somebody who comes in and doesn't have any prior exposure above the annualized rate.

Now under current OSHA thinking, my idea is I'm occupationally injured because I can't work to the same level as the person who comes in without a high dose in year one, because I can't get five rem or two rem or three rem in any subsequent year.

Let's say the first two years I get five rem in the first two years, I can't work for the next eight years. I'm occupationally injured.

So having a cumulative total as opposed to just the annual number creates a lot of headaches with, you know, how a worker is treated in subsequent years.

MEMBER RYAN: Let's hope emergency bank accounts are kept of people who had accumulated that high dose.

MEMBER BROWN: But the bank account now runs out every year.

MEMBER RYAN: Yes. It doesn't carry year to year. It used to be a funky way to do it, but --

MEMBER BANERJEE: Well, my question was more with the 100 millirem. Does it lead to incorrect procedures for dealing with, you know, emergencies? Because it could be much more dangerous to evacuate a place when you don't need to.

MEMBER RAY: This is not a consequence of the 100 millirem, though.

DR. COOL: There is whole other set of EP protective action levels and guides which are significantly different from this. This actually -- and just to note, Part 20 actually doesn't apply in an emergency.

MEMBER CORRADINI: Right. It's got nothing to do with it.

DR. COOL: So you can stay separate from that and we can engage in another discussion sometime around the protective action guides.

MEMBER CORRADINI: So you said something to me, and I just want to repeat it so I get it in my head right, constraint and limit. So 10 CFR 20, your limits. And instead of two is five.

DR. COOL: That's correct.

MEMBER CORRADINI: Okay. So in some sense

that's a dead band between where I'd like it and what I start fining people for.

DR. COOL: That's one way to look at it.

MEMBER CORRADINI: Okay. Great. Thank you.

MEMBER ABEL-KHALIK: You know, there are many current licensees who set their occupational dose limits well below the five rem per year value, and there are many of them who set it at two R per year. Do we have an inventory of what those limits are for the various licensees to see whether or not a change to two R per year versus five would operationally have any significance whatsoever?

DR. COOL: A fanstastic question. And something that I wish we had been able to re-up the analysis on over the last few years. That's one of the things that we now need to do. But at this point all we can do is give you more anecdotal information than hard, survey-based facts.

You have referred to these as limits. They are called action levels, they are called all sorts of things that licensees use in their planning.

In fact, the licensees who do that are using the concept of constraint as ICRP would suggest. The only difference is they do it because it's a good

practice and not because it's in the regulation.

So for all of those licensees -- and Ralph Anderson is here; he could validate it if he wanted to -- in the nuclear power industry, every single plant has such a value. They are all less than two.

MEMBER MAYNARD: I would think we have to be careful, though, in that there are several reasons for that. It still provides them with the flexibility in there on a case-by-case basis to make decisions.

If we change the regulatory limit, then that's going to have an impact and they're going to have then come out with new guidelines less than that.

MEMBER RYAN: Well, let me tell you what could happen. Let's say the limit is magically two tomorrow.

Now the first thing I'm going to do is take an administrative constraint of say 15 percent off of that, so I never really go over the limit even though I might get close on an individual measure. So it's not two, it's 1.8 is my operating limit.

And then you say, well, we want to, you know, be below that because radiation protection practice, ALARA and all that, can give us some.

So by ratcheting it down, you get into the problem that Otto was talking about.

MEMBER SIEBER: But that depends on skill.

MEMBER RYAN: You could make it more difficult.

MEMBER SIEBER: There's certain skills in a power plant that are hot jobs. Some years they do, some years they don't.

DR. COOL: But we are engaging in a discussion that actually is nicely teed up by one of my slides in a little bit.

(Laughter.)

MEMBER RYAN: Where are you going on slide four?

DR. COOL: Where am I going on slide four?

(Laughter.)

DR. COOL: ICRP recommendations, of course, is not done. There is a lot of ongoing work that continues to look at scientific information. In particular they are now in the process of updating the dose coefficients for different radionuclides, that information that underlies things like Appendix D values in Part 20.

So the nice little picture here is some of the new things that are used, a lot more complicated but a lot more accurate, than the old models and other things.

They are now in the process of updating their dose conversion factors. The first of those will be available about 2011 for the commonly used radionuclides.

The current schedule doesn't have a complete set of those until perhaps 2014. Keep those dates in mind. Those are again important in terms of when the staff might or might not even be able to consider some things.

MEMBER RYAN: Just a point here. I think you'd agree that this updated modeling which, you know, helps with more accurate calculations and dose, is really a very positive contribution of the ICRP.

Some of the old models were very unsophisticated. You know, some overestimated and some underestimated doses, and this is really an effort to do a better job understanding physiology and radiation interaction to get a better number.

MEMBER BANERJEE: So they basically bless such things being done all over the world; right?

MEMBER RYAN: Yes.

MEMBER BANERJEE: And bring it together in some cohesive --

MEMBER RYAN: Yes. Many countries in the world adopt ICRP recommendations and methods. They

just take them into national programs and that's it.

DR. COOL: You will find that the calculational approach that we use for assessing intake to distribution retention dose from internal radionuclides is the ICRP models.

Now the current ones we are using are the ones from 1977 and 1980. There is one of the issues, that we have gone through some generations, they have been generated.

MEMBER RYAN: There is an exception for reactor calculations. Some reactor calculations rely on 1959 models.

MEMBER BANERJEE: I'm trying to understand. This is a body of knowledge which exists in the literature, which they have sort of assembled in some way and blessed and said now you put these component models together in this way, and then it's fine.

DR. COOL: This is one of the places where not only do they assemble the material, but in fact the work of the ICRP committee in developing and publishing these models is the recognized location where it's synthesized and pulled together in a form that various people use.

MEMBER BANERJEE: They don't have staff

doing it; they do it themselves?

DR. COOL: These are done by committee members.

MEMBER BANERJEE: Wow.

DR. COOL: The majority of this particular work is done down in Oak Ridge, Dr. Keith Eckerman, and we and EPA and others put a fair bit of money in to keeping that place alive because it is the world repository of the expertise in doing this stuff.

So moving forward from the brief summary of ICRP 103, just to note that we and the commissioners -- for example, Chairman Klein at the general conference -- are continuously asked when are you folks going to get around to getting out of the 1970s and getting up to date with the rest of the world? That's just the fact of the matter.

As Mike mentioned, some portions of the regulatory framework date all the way back to 1958, '59. For example, Part 50, Appendix I. Jean-Claude will in a few minutes talk about some of those considerations. So that's even older than where Part 20 currently is.

They were not updated when we did the revision of Part 20 because that revision only took care of cross-references. It didn't go try to analyze

each of the places where explicit radiologic material criteria were in place. So we have a really old generation.

The flip side of that is that we allowed licensees to apply for and we approved using the methodology from 1990 and following if the licensee committed to a set of requirements.

So for fuel cycle facilities, almost every single fuel cycle facility is in fact using the coefficients and methodology from 1990 through 1995 or so, the NCRP Publication 60 and following numbers.

The reason they did that? In 1977, '80, those models had uranium significantly increased in the dose pre-entered amount. Those numbers came down by a factor of three or more with the 1990 and the continued updated science and, as you might suspect, those licensees wanted to take advantage of that material.

So the reality is we have three generations of recommendations and scientific approaches all in play at the same time now within the regulated community.

Now our initial interactions. The nuclear power industry and others, they are looking to try and get out of this conundrum of really old things. As

they have said on multiple occasions, they are just a wee bit tired of getting nice bright HPs out of school and going back and teaching them 1958, 1959 methodology.

(Laughter.)

MEMBER RYAN: The professors don't know the 1958 and 1959 methodologies to teach.

DR. COOL: Well, it isn't taught anymore out there.

So there are perhaps a variety of reasons like this to which to think about whether or not we want to make some changes.

So the staff has during this past year been looking at putting together some options for the Commission to consider. The senior technical group, with the steering committee. That paper with the options is due to the Commission in December. We are about to go into office concurrence. I'm going to describe to you today where the staff currently is in that. Recognize it has not concurred. It has not gone to the Commission, so this is a preliminary staff position subject to change, perhaps not without notice, but still evolving.

From an option standpoint, we could decide that we've got adequate protection, everything is fine

and dandy, and not change anything.

Now for the variety of reasons here, that is probably not the best place for us to be.

We could decide to not make any changes to Part 20, but to go and to fix the stuff that dates all the way back to 1959 in a variety of issues. It doesn't necessarily address all of the questions, doesn't get you some of the updated models in science which a lot of people think is kind of a good idea. Even Mike Ryan agrees to that.

MEMBER RYAN: That's right.

DR. COOL: The third option is begin a process that would eventually perhaps -- you'll notice all those caveats that I put in there -- move us towards alignment with updated recommendations.

Now this is where the fact that the Commission told us not to do any technical basis development or analysis work comes into play because today I don't have a technical basis for rulemaking even if we all thought it was the most wonderful idea and that we needed to go off and start doing this.

I can't answer your questions on exactly what the impacts are, what combination of options would be for dose limits and constraints in a variety of things. So there is work that needs to be done.

The staff's preferred option as we go into office concurrence is to start engaging in the process of figuring out what might be the appropriate moves towards alignment with the new updated recommendations.

This is not to say that we are recommending that the Commission agree to initiation of rulemaking. In fact, we explicitly say that we want to go out and talk with the stakeholders, with the industry, various industry parties, understand the issues, try and understand the options and the impacts, implications, backfit analysis and everything else, work on the technical basis that underlies it, part of ICRP numbers, 2011 and beyond, in order to be able to do updates to Appendix B values, and to come back to the Commission with a recommendation and the details and the resources in a couple of years once we have continued that process and we actually have a basis for putting together some specific proposals.

MEMBER BANERJEE: Would this put some additional burden on the industry, or --

DR. COOL: It could.

MEMBER BROWN: Well, you make the statement in here that industry generally -- your earlier viewgraph said that there's a -- I don't know

if it's a general consensus, or was that just the nuclear power industry?

DR. COOL: That's 30,000 foot here.

MEMBER BROWN: Okay.

DR. COOL: Now even with that, there is a clear recognition that some of the things that would be on plates would add burden, would change things. When you update the science, when you update the numbers, you've got to go through and change compliance codes. You've got to update B&B. There's all sorts of things that would need to move. But it's still a good idea, in their view.

So take 30,000 foot and part of what we need to start looking at is, okay, let's get down to the devil and the details and see where the pieces might or might not interact.

MEMBER RYAN: And, you know, what's the phased implementation if everybody is in consensus that it is a good idea?

MEMBER SIEBER: Well, let me ask a simple question, which has an answer yes or no. If I'm a radiological technician and I work in a hospital, you know, in a nonagreement state, does Part 20 apply to me for occupational exposure?

DR. COOL: The answer is, as you used the

words, no. Because a radiological technician would typically be someone working with an x-ray machine or something like that, and the answer would be no.

If they are in a hospital in a nonagreement state and they are in the NUCMED program where they are using byproduct materials --

MEMBER SIEBER: That's what I'm talking about.

DR. COOL: -- they would be -- they are an NRC licensee. They would be impacted.

MEMBER SIEBER: And so when you look at the spectrum of people you ought to be interacting with, with regard to impact, you ought to include that class.

DR. COOL: All of the above. That is exactly right.

MEMBER SIEBER: Right. So it's not power plant licensees --

DR. COOL: It is the power plants, it's the research test reactors, it's the field facilities, it's the industrial radiographers, it's the gauge users, it's all of the different versions of medical. It's everybody. And they all will have different points of pressure.

MEMBER RAY: There are members of the

public, perhaps, that don't fit into any of those categories.

DR. COOL: Yes. Exactly right.

MEMBER BLEY: I don't see it coming, but inside of moving toward Pub-103, are there areas of Pub-103 with with the staff really isn't comfortable or thinks you would want to object?

DR. COOL: There are some places where we have serious open questions. Dose limits is one of them.

MEMBER BLEY: Any other major ones?

DR. COOL: Why don't I walk through some of these.

MEMBER BANERJEE: Are you going to address that?

MEMBER RYAN: Just an aside. That picture is the first use of an x-ray machine in the Sudan in 1898.

MEMBER BANERJEE: The technical issues have been around for quite a while.

DR. COOL: This is the medical radiographer. This is his assistant. That's actually the guy who got a lot of exposure.

MEMBER RYAN: The timer is the stopwatch in the guy in the bed's hand.

DR. COOL: So some of the questions, the starting points. The issue of the terminology. Internationally, most everyone else, including DOE, has now moved to using the words "effective dose" rather than "effective dose equivalent."

From a Part 20 standpoint, you could almost regard that as editorial because the underlying concept of adding internal and external doses together is essentially the same.

So there could be some impact in moving the terminology from procedures and other things, but you have the benefit that at least we all talk the same language.

Now for other portions of the regulations, like Part 50, Appendix I, it is that terminology and the underlying approach that is the big deal in moving to a consistent basis.

MEMBER CORRADINI: I don't think I understood what you just said.

MEMBER RYAN: We have a lexicon of ALARA and limits and words that we work with. The principles are the same, but the words are different. And getting everybody to learn the next lexicon and how it applies and all of that, you know, a constraint is a limit or is a, you know, a limit really a limit,

and the answer is no in the new lexicon.

So it is very confusing unless you sit down and actually make a translation dictionary for yourself on how it works.

DR. COOL: But what I was referring to is --

MEMBER CORRADINI: I'm sorry. Go ahead.

DR. COOL: See if I can try again for you. This will help.

In Part 20 today, the requirements -- the words used are "total effective dose equivalent." It could be changed to "total effective dose." The underlying approach is adding external and internal exposures is the same.

MEMBER CORRADINI: That I got.

DR. COOL: If I go to Part 50, Appendix I, the requirement is based on a whole body dose and a dose to each of several organs. It does not sum. So if you move that regulation to effective dose, that is a whole new approach to the radiation protection. And that's how you start to harmonize the systems.

MEMBER CORRADINI: If I could just get back to the one question I asked earlier, constraint and limit. It goes to what Mike was explaining, or was trying to emphasize.

If you work off of a constraint, which is what you aim for, but you make sure you don't go above a limit, you still have a dead band of operation where -- right?

DR. COOL: You can call it a dead band, you can call it a safety net, so that you don't bump into enforceable action.

MEMBER CORRADINI: So what I'm still struggling with is in your previous slide, or one of the slides, it isn't a matter that you go back to it, where you said you guys would prefer option three. Is that for the constraint as well as for the limit? That's where I was going to go to. And if it fits into your discussion further, just wait on it.

DR. COOL: Let me go ahead and answer the question because it's the next piece of the discussion.

MEMBER CORRADINI: Okay.

DR. COOL: Option three, we're asking the Commission for permission to go out and talk with this wide variety of stakeholders around these sets of questions.

MEMBER CORRADINI: Okay.

DR. COOL: Which is, okay, what about constraints? Lots of licensees have something which

quacks like a constraint, but it isn't actually a regulatory requirement.

On the other hand, there are licensees out there like industrial radiographers for whom this is totally a foreign concept. And would there be a benefit to adding a structure like this to help them improve protection and optimization? Probably.

The question on the table would be, do you put this in as a requirement? If so, how? Do you make it reportable or not reportable? Do you put a numeric maximum tap on it for different people? A whole series of things for which we would want to explore further before we possibly want to make any proposals.

And couple that with the next item, which is the dose limits. We set it at five rem here. We're the only country that's there. There are a lot of countries that have a dose average, 10 rem over five years. There are a few countries that went to the "it's just to be going two rem, we're not going to make you go back and assess it," and all those sorts of things.

Each of those has obvious implications. As Mike pointed out, if you set the limit at two, and then you say, oh, and then you've got to have a

planning constraint which is less the limit, everything slides down.

Is that necessary? Maybe, maybe not.

Part of what we want to interact with the community again is for different categories, what are the various impacts and approaches? Because I could sit here and argue with you with a perfectly straight face and agree that if we moved and added a constraint and we said the constraint can be no more than two, then there might be no reason whatsoever to change the limit, because I will have through the constraint process in requiring planning and optimization pulled the upper end of the dose distribution down to where we would want it, anyway, and provide that safety net without forcing people down further.

MEMBER CORRADINI: That helps a lot. I understand.

DR. COOL: That's one possibility.

But, of course, lots of international people go, "But if you've got a straight five rem and they come over and they get burned out and they come home, what does that mean for all these transboundary" -- because workers are moving back and forth all the time, trying to get systems lined up, what's international consistency. We live in a globalization

world that's increasingly concerned about harmonization of standards.

This is part of what we need to explore. And that's why the staff does not today have a specific recommendation, because the implications are going to be different if I talk to the nuclear power industry than if I talk to the industrial radiographers and than if I talk to the medicals.

For the medical community, interventional radiology and interventional cardiology, if you look at their badges, they sit up here on the collar, outside of the lead apron that most of them use, you'll see most -- there are a huge number of badges over five rem every year. That's not effective dose.

If you are over in Europe, they're reading the badge which happens to be underneath the apron. They're all nicely under two rem per year.

(Laughter.)

Funny thing about that. There are all sorts of things that need to be explored and analyzed to understand impacts in order to be able to prepare a reasonable technical basis, a reasonable regulatory analysis, to make any proprosals. That's part of why we're not ready.

The third item up here is just to continue

to carry along the fact that, yes, there are all these updated scientific models and numbers which most of you -- you asked the question where does the staff align or not align. This third item is where we would be most aligned towards, yes, we ought to do something.

MEMBER RYAN: One of the points in the letters that you all had in the packet was that these things, as I think the staff will do, is if a licensee says we want to use the updated modeling information, the answer is yes, please do.

MEMBER BANERJEE: How many staff are involved in this?

DR. COOL: The senior technical advisory group probably has nine or 10 folks, a senior level person from each of the major program offices. You have the same number of division directors folks, which are the steering committee for this. And then I've got several folks within my office, FSME, who are providing me some help in drafting up the paper.

MEMBER ABEL-KHALIK: Now changing the dose limits for embryo fetus of declared pregnant females from the current 500 MR to 100 MR would probably have the biggest consequence amongst all these changes in dose limits, because, you know, pregnant females

working for licensees may elect not to declare their pregnancy if the limit is set far too low.

DR. COOL: That is correct. This is one of the most complicated of the issues. ICRP's recommendation is 100 millirem after the individual makes her pregnancy known. So if you translated that to the U.S. regs, it would be 100 millirem after declaration.

If she chooses not to declare until month seven or eight, it would actually be less protective than the current requirement in Part 20.

MEMBER ABEL-KHALIK: Which is? Can you remind me?

DR. COOL: Which is 500 millirem over the entire gestation period. Today if she declares, you go back and retrospectively assess what she already has, and so you know how much is left that you can play with.

MEMBER ABEL-KHALIK: Right.

DR. COOL: Under the ICRP recommendation, you would just make it flat and simple, don't worry about going, it's 100 after declaration. So that might be more protective, it might be less protective.

We already know from interactions with the medical community that people like in nuclear pharmacy

and nuclear medicine techs, particularly working with PET, positron emission isotopes, are a category which could have a significant impact, because they routinely get 400 or 500 millirem per year, that's their total. It's a large population of females, so the current regulation doesn't pose them any significant issues, but if you moved to 100 and they wanted to declare it early, there could be a big issue.

There is another one of the things that we need to look at. That's another part of the discussion, because that does have significant potential implication, and it depends not only on the number you pick but what the number applies to and when. Because you are exactly correct, legally in the United States we cannot require a lady to declare her pregnancy. It may be very obvious, but it is her choice. And that goes back to a longstanding legal precedent that has nothing to do with radiation.

MEMBER BROWN: Is there any data from that population of workers, pregnant workers, that says --

DR. COOL: We will be working to try and get that data.

MEMBER BROWN: Medical data. In other words, it's a real impact on the -- it's kind of hard

to assess, but I don't know what the --

DR. COOL: That's part of what we're going to be trying to do is to get additional data so that we can try to have a more accurate assessment of the impacts in the populations and the actual exposures.

I think we have already talked about most all of the little points to ponder, which was good to tee up the discussion. We've already had it.

This is going to have potentially a huge impact, depending on how you play it. Every single licensee and all the variety of stakeholders out there we will need to have interactions with.

We need to be able to look at the benefits, impact, backfit implications, which includes the degree to which you would put this in and allow voluntarily licensees to come up to speed, what the new plants would do versus the old plants. There are a variety of possibilities which need to be assessed and looked at to make a proposal when you start to do a rulemaking. And, of course, all this requires resources.

We're making -- resources will really depend on how big the rule is. Maybe even the bigger load is the fact that you have the regulatory guides, you have computer codes and standards, you have the

D&V activities and all those sorts of things, in order to make sure that licensees can actually comply once it's on the street.

All of that would be part of the package that we would deliver to the Commission after the stakeholder and technical basis development, roughly 2011, if the Commission agrees that we should go to work on refining this further over the next couple of years.

With that, I will get out of the road and turn to Jean-Claude Dehmel to talk briefly about Part 50.

MEMBER MAYNARD: One comment here, and that is on the potential impacts to consider. That's for what impacts are going to be outage workers, and particularly for PWR steam generators jumpers. If you lower the limits, you know, you're going to impact their job. But the other thing you could be impacting is experience level of contractors that you have doing some of these key jobs, too. So I think that's another impact indication.

DR. COOL: That is exactly right. That is exactly right. Our interactions with the industry have indicated that they are engaged in a process to try and move even those categories of workers such

that if the limit were to move to two, they would be okay.

MEMBER BANERJEE: Is this going to impact our safety analysis in terms of, you know, releases and things like that?

DR. COOL: Not nearly as much.

MEMBER BANERJEE: Mainly occupational? Is that --

DR. COOL: Most of these issues you saw are in occupation. The current standards for public exposure are equivalent to current international recommendations. So most of the things that we have on the public exposure side, on the effluent release side, are not in fact really any different from where the international standards are.

So while undoubtedly I would expect issues to be raised and questions that need to be looked at, at the moment the staff does not see significant changes that rose to the 30,000 foot -- these are the big ones you have to first start looking at.

MEMBER RYAN: Would you accept just for Sanjoy's question the caveat that this assumes that all those calculations use the updated models and metabolic models and radionuclide models, or whatever is going to be there?

DR. COOL: Right. Right. And Jean-Claude will talk some about bringing the Part 50, Appendix I, which is the ALARA and the effluent calculations for reactors.

MEMBER ARMIJO: You know, I listened to your presentation. It's very informative. And I see that there should be some practical benefits of moving towards these ICRP recommendations. But I don't see a strong argument that the workers will be any safer. You know, is there a real safety benefit, or is this just trying to be consistent with ICRP and it's a "nice to do" thing? Separate from the calculations. I think Mike's --

MEMBER RYAN: That's right. I think that's a very valid question. Now are we taking a step in the safety direction that's positive, neutral, or negative?

Now it could be negative for a while and get better, but you know, I think that is a very legitimate question that I'd ask everybody to think about as we consider all this.

DR. COOL: I would just give you a bit of framework for that thought process. If you look at it from the standpoint of what's the average exposure in the population, the answer is we probably wouldn't be

influencing it much at all.

If you look at it from the standpoint of moving individuals who are currently getting the highest exposures, three, four, five rem per year, in some of the medical areas, in industrial radiography, and moving them down closer to the tightening up the distribution, and thereby improving safety by reducing their dose, the answer could well be yes.

MEMBER MAYNARD: But shouldn't there be considerable data? We've been in medical and nuclear power for a number of years, and is there data that supports that?

DR. COOL: There is a tail, not insignificant, beyond two rem.

MEMBER MAYNARD: Okay.

DR. COOL: Not very much in the power industry.

MEMBER MAYNARD: Right.

DR. COOL: Much more so in other groups.

MEMBER MAYNARD: And, you know, there have been studies. Just to give you an example, there was a fellow, Bob Emery in Texas, who looked particularly at industrial radiographers and well loggers and so forth, and he found a pretty significant and statistically valid correlation with new entrants to

drilling.

You know, as the old fields go up and a lot of new folks come in, and it's a training issue. Once they get trained, you see, you know, the number of incidents go down, and then when there's a downturn, well, those people all leave, and at the next upturn they're all new folks or need retraining. So it's a very good correlation in that case with training and performance.

But I think your question is how do we look at that sort of issue, you know, across all these other areas where folks are getting those higher numbers and why are they getting them, and then, you know, have implementation to say let's see if we can prevent that or let's moderate it or do whatever it might be.

MEMBER STEKAR: Here is a real naive question. Has the EU adopted the ICRP limits?

DR. COOL: Yes.

MEMBER STEKAR: Okay. Fully? The reason I bring that up is you talk about mobile populations and things like steam generator jumpers. The EU has primarily pressurized water reactor -- from the nuclear reactor side of the business, they are primarily a, you know, a pressurized water continent,

and have now a fully mobile workforce.

DR. COOL: The European Union, following ICRP Publication 60, in 1990 did a revision and update of their Eratom Directive and adopted those recommendations.

They are now engaged in the process of revising and updating that directive, consolidating a number of other directives for high activity sources and medical and everything, so they are doing some consolidation process. That directive will be headed first draft for council next summer.

So they are already engaged in the process of taking the ICRP 103 recommendations and moving it in.

For them, most of this is not new. So it's much more consolidation because they did it ten-plus years ago.

Likewise, the International Atomic Energy Agency for the international basic safety standards adopted in 1996 a structure that was based on ICRP Publication 60, and they are also engaged in a process of updating and revising the basic safety standards.

Next week I will be in Vienna, Austria at the Radiation Safety Standards Committee, where the entire week's meeting will be devoted to a discussion

of that draft.

The rest of the world is actively engaged in updating their standards.

MEMBER STEKAR: The only difference, the IAEA doesn't have the real-world application -- they don't have to worry about the real-world applications. The EU does. They set the standards, but they are always careful about saying that they are not enforcers.

DR. COOL: I would reframe that just a little bit, in that the big influence of IAEA is again on a lot of the materials and medical areas. The IAEA's basic safety standards and otherwise become mandatory is if a country is accepting support from the IAEA to build their regulatory infrastructure.

Further, many countries adopt the basic safety standards as their national regulations verbatim. So, in fact, for the --

MEMBER STEKAR: But that is a member state decision.

DR. COOL: That is a member state decision. But for many countries in the world, the basic safety standards are the radiation practices --

MEMBER RYAN: I guess I could ask, maybe, again, I'd like to get back to another thing, because

that's where the rubber meets the road for us.

MEMBER RAY: There is one thing I do want to say. It isn't always the case -- and I have had a lot of experience with steam generator jumpers, believe me. Robotics is an alternative, and at some point the effect of all of this does tend to push in the direction of use of robotics, because that's what we did.

MEMBER STEKAR: No, that's true. It's just looking at an experience base from operating experience, let's say traditionally in the United States, 1980s, '90s, let's say, versus European Union under these types of regulations. You know, as a practical matter, what difference in the real experience base does that make?

MEMBER RAY: I'm just saying there is an effect that isn't just like you described in the oil fields and so on. They changed the technology.

MEMBER STEKAR: Oh, no, that's just one example. Absolutely, Harold. And I think changing technology and then, of course, the cost of changing technology is not a trivial matter that should be set aside. It's something we need to consider in the whole equation of, you know, what's the benefit, what's the cost, what's the risk.

MEMBER BANERJEE: Can I ask a question? How is ACRS going to be -- let's say you go forward with this part of trying to harmonize this. How is ACRS going to be interacting with you in this process?

DR. COOL: Thank you. I would actually like to propose to you, if the Commission agrees that we should go forward and do this, that the staff continue to interact with Mike's subcommittee, as I understand your structure, and perhaps engage with Mike in some of the forums or other -- I don't have the exact words -- as part of our ongoing dialogue to continue to develop the underlying basis.

We would hope, and I would assume you would perhaps wish, for us to come back and give you some periodic updates, and obviously, as we get towards the point where we can actually make some recommendations to the Commission, to interact further with you.

MEMBER RYAN: And I think this broad picture has been very helpful as an introduction, but then the real work is what changes in Part 20, what changes in Part 50.

MEMBER BANERJEE: Then you need letters from us.

MEMBER RYAN: Yes. Yes.

DR. COOL: At that point, we would need some letters from you.

MEMBER RYAN: I think as I see it, there'd be a first letter at some point. Now you're going to issue your plan to the Commission. I think at that point we could hear about, well, here is now the plan we discussed in general today, and do we agree with the staff's plan. Do we think that going forward makes sense from our perspective. That would be the first letter.

The second would be, well, what are the details of that planning and the results of the activities that will be executed in that plan, and what do we think about it as it evolves.

MEMBER BANERJEE: What is the time scale, Mike?

MEMBER RYAN: It's years.

MEMBER BANERJEE: Okay.

MEMBER RYAN: This is not going to be done in six months. This is -- as you know, there were 2011 and 2014 dates in Don's plan. So there's time to study and learn about this, but it is going to be a sweeping change to radiation protection and all the regulated entities under the NRC's flag.

MEMBER BANERJEE: Can you have a

subcommittee together following this?

MEMBER RYAN: We have not formalized it, but --

MEMBER SIEBER: I want to be on it.

MEMBER RYAN: Sure. No problem. And I'm sure the whole committee would have interests from various points of view. But it's, I think, an important area where regulations are going to change.

MEMBER BANERJEE: You have answered my question. Thank you.

MEMBER RYAN: Jean-Claude.

MR. DEHMEL: Thank you. As a matter of record, you gave me a doctoral degree earlier, but I don't have a doctoral degree.

MEMBER RYAN: I'm sorry. My error. We'll give you one today.

MR. DEHMEL: An overview of the staff's thinking about the impact and the need to revise Appendix I to Part 50 in light of the overall consideration and considering and implementing the ICRP 103 recommendations in Part 20.

The obvious requirement is that whatever we end up doing with Appendix I to Part 50 has to be synchronized and coherent with Part 20, and right now it is not.

The reason it is not is that in Appendix I, the underlying dosimetry basis of Appendix I to Part 50 are still on ICRP 2 concept, referring to the total body and critical organ dose, while ICRP at 26 and 30 are using the current Part 20. So there is this inconsistency.

Also you should be aware of the Appendix I requirements are not a safety standard. It's an expression, a numerical expression of ALARA, and so we can define and send Federal Register Notices issued by the NRC.

I have two slides addressing the rationale for the update. Obviously it's outdated. Numerical guides based on ICRP 2 recommendation again are not streamlined nor coherent with the current Part 20.

We also have an issue of essentially being scientifically difficult to define a dual system of radiation protection because this, at this point, it requires all power plant operators to actually consider doses and calculate doses in the peer requirements in the regulations using two different methodologies, because they are different. The calculation methodology for ICRP 26 and 30 refers to, as it is noted in Part 20, to a concept, and ICRP 2 is still under the old concept of total body and critical

organ.

We also believe, and we know based on interaction with new applicants, is that it is inconsistent with global approach in licensing and building new power plants.

And, again, it's inefficient for the staff and the applicant to actually come up with two sets of calculations to demonstrate compliance.

The first item we included in here because one of the issues that was made, and I think it was alluded to earlier, was that, you know, what is the net gain? What is the benefit?

Well, you know, the fact that it's not a radiation safety standard is an expression, a numerical expression of the concept. Then someone may say, well, it's completely divorced from Part 20 because it's not a radiation protection standard, and therefore we need to continue on it and work with Appendix I the way it is structured, leave those limits the way they are, the criteria the way they are, and just go on and pursue our business the way it is, and have the licensees essentially struggle with two calculational methodologies.

It reaches a point where the material and the underlying basis is so far out of date that using

a rationale, a traditional cost-benefit analysis for keeping an old system, is no longer valid. It just will not withstand kind of technical or regulatory scrutiny.

Don mentioned earlier the fact that ICRP 2 is no longer involved in -- it's an obvious problem for us. It may undermine the public confidence in the NRC licensing process, and may present some challenges in new plant licensing and leave the staff to defending the early site permit for North Anna before the ASLB. We were challenged already with that, looking at two different concepts in those calculations, the outdated concept of ICRP 2 being different than Part 20.

MEMBER BANERJEE: Is there evidence that it is undermining public confidence already?

MR. DEHMEL: No. We don't have -- no, we're suspecting it because some of the feedback we've gotten, namely from -- to the ASLB. We also have gotten some calls from contractors who are supporting current utilities in putting together application packages, FSARs and design certifications about what the NRC has been doing with respect to the potential revision of Appendix I to Part 50. The fact that the computer codes still use the old methodology and so

on.

One issue that you should be aware of, that we -- invariably the staff is drawn into this kind of argument, is that somebody says, well, you know, if you are complying with Appendix I, you therefore are well below the Part 20 dose, which it is in fact correct.

But now we are comparing essentially a system of dose calculation methodology underlying the pinning of the framework is different in Part 20. So we are comparing the fact that it's safe under Appendix I, and we are making essentially an assumption that it's okay under Part 20 as well.

MEMBER RYAN: It's even more blunt than that to me. On the one hand, we've got a dose system for workers, and we say this is the outdated way to do it. And we have abandoned the outdated way to do it, that we still use in Appendix I. So it's okay for Appendix I, but it wasn't okay for workers. That's a logical inconsistency that just makes no sense, and there is a -- or you can make an argument that, well, how could that -- it's a little bit schizophrenic. I mean how can you do that.

MR. DEHMEL: Well, you know, drilling into the elements of Appendix I to Part 50, what are we

thinking about?

Well, what we are trying to do, and Don mentioned it earlier, is that the push that we are trying to make is to revise Appendix I one way or the other.

We want -- obviously the main thing is to have Part 20 updated to the ICRP recommendations of ICRP 103.

Then, if so, we would upgrade the Appendix I underlying technical basis and dosimetry to ICRP 103.

If the Commission decides not to do anything, and essentially leaves it in place, then we would like to essentially take the Appendix I requirement right now and update those to be consistent with current Part 20 and ICRP 26 and 30 dose concept and dose calculation methodology.

In either case, we would reconsider the criteria on section 2(a), 2(b), and 2(c). These address and present criteria for dose limit to air from noble gases, and then dose limits from -- effluent dose limits, gaseous effluents.

And again in here we have, for example, for liquid effluent, we have a dose limit of three rem -- three millirem to the total body and 10 millirem

per year to any organ.

For gaseous effluent, it's five millirem to the total body, and 15 millirem to the thyroid and any other organ.

We would reconsider that such that we might drop the organ dose limit, and we put everything as effective dose.

There is an issue as to whether or not we may want to retain the skin dose because of noble gases. So this is something that we would have to debate internally and get some feedback from the stakeholders on this. But this is a possibility because of noble gas releases from power plants.

We would also update the definition of dose receptor in section 2 and section 4 of Appendix I, mainly because right now, for example, we have two definitions in Part 20 to dose receptors to members of the critical group. We have members of the public in Part 50, Appendix I. We refer to any individual. We also refer to maximally exposed individuals, and then on top of that, you have to look at the EP definition of the requirement of 40 CFR Part 190 for doses from the entire fuel cycle, which includes the operation of a power plant.

And I believe the ICRP recommendation in

103 makes reference to a reference man, which is more attuned to the member of the critical group.

So we would have to actually, you know, synchronize and make sure that there's again a coherent consistency of the dose -- the definition of dose receptors.

Also out of date are the cost-benefits in section 2(d) of Appendix I, namely the $1000 per person rem. That's already inconsistent with current policy guidance, which is now $2000 per person rem in NUREG BR0058, which was revised in 2004. So that needs to be streamlined and updated.

We also need to assess whether section 1 and 5 qualify regarding how, you know, we would phase that in with the existing fleet of operating reactors versus the new plants. So there should be a provision in there making it clear that the fleet of operating reactors may stay with the current Appendix I requirement, and that the new plant licensed after the effective rule -- after the effective date of the rule will be required to comply with the new requirement. And also making optional for all power plants to adopt on a voluntary basis the new concept, the new methodology, the new dose calculations.

We would also put in a clarification in

differentiating the applicability of Appendix I to light-water reactors and non-light-water reactors in the next generation of power plants. Right now it is very specific. It says light water reactor.

So some of the nongenerating -- new generation of nuclear power plants are going to be, you know, designs are not going to be light water cooled. And so we should make sure that we extend the rule to provide the specific qualifiers.

Revisions. For example, we would seek to redefine compliance requirements for licensed operation for multiple licensees. There is an inconsistency right now between Appendix I and Part 20. The doses in Part 20 are per licensed operation while Appendix I is per reactor. So the question is what if you have a number of reactors at a site that are operated by multiple licensees or multiple business entities. How do we comply with that.

And also the interaction with the requirements of 40 CFR Part 190, which reference to a site now, regardless of the number of operating power plants, and regardless of who actually the licensees are. So that needs to be streamlined.

And then we need obviously to update the licensing basis and the guidance document, starting,

for example, with Regulatory Guide 1.109, which is the methodology with which to demonstrate compliance with Appendix I requirements, and there is a full series of NUREG computer codes that would have to be updated and revised accordingly to reflect a new dose calculation methodology.

That's all I have.

MEMBER ARMIJO: Maybe I heard you wrong, but you raised an issue of taking into account or addressing a site where there's more than one entity licensed on the site for different reactors?

MR. DEHMEL: Yes, you may have --

MEMBER ARMIJO: Does that exist, or is that on the horizon?

MR. DEHMEL: It is about to exist, starting with new licensees, the new plants that are being built. It is about to exist.

CHAIRMAN SHACK: Well, it did exist for a while at Indian Point. Quite a while. But with the new ones coming on, you're going to have the site being used by two different licensees, with the new reactors.

MEMBER CORRADINI: Two different licensees?

CHAIRMAN SHACK: Oh, yes.

MR. DEHMEL: If you look at this, this was quite an issue with the board, whereas they actually, you know, drilled the staff, and OGC, they went back to Part 20 and they went back to the guidance and they identified this inconsistency, and they said it has to be fixed.

MEMBER CORRADINI: So I guess that was what I was going to get to. Maybe you said it and I missed it. So this seems much more urgent and can be fixed even under the current constraints/limits of how we were educated in the first half of the presentation.

So is it staff's intent to move on this ASAP? What's the logic here? I don't know I -- maybe you said it and I missed it.

MR. DEHMEL: The logic right now is to -- and this can only be described in a SECY paper is we intend to proceed on two viable tracks.

MEMBER CORRADINI: Okay.

MR. DEHMEL: One, to revise Appendix I to Part 50, another one to revise Part 20, with the ultimate objective to make sure that at the end both are synchronized through a regulatory framework, be it ICRP 103, or be it the current Part --

MEMBER CORRADINI: But if I -- I mean

maybe I misunderstood how you explained it. But the way I view it is that what you are really making sure we understood was that the method of calculation is currently inconsistent, so even though you're moving on parallel trucks, I would expect that -- forget about what the limits or the constraints are, you want to, as expeditiously as possible, regularize or make consistent the methodology of calculation. Am I understanding correctly?

MR. DEHMEL: Yes, that's correct.

MEMBER CORRADINI: Okay.

CHAIRMAN SHACK: But if you look at his slide four, you know, would you regularize it with the current Part 20 if you were about to revise Part 20? It seems to me you would make that decision first, I think. Or maybe not.

MEMBER BANERJEE: Aren't these all whole body and organ calculations the same? Are there sort of these whole body model, calculations of body models and things like that, involved in these calculations?

MEMBER RYAN: Yes.

MEMBER BANERJEE: So that seems to me -- what will you do there? I guess adopt the latest?

MEMBER RYAN: I think what you heard is that there are several versions of those models in

time. And all three of those are in play in one way or another in the regulations and guidance. And I think what Jean-Claude is saying is by synchronizing them, they'd pick one, whether it's the brand new 103 or the 26 and 30 ICRP, and say, okay, let's synchronize around one of them and try to eliminate this multiple modeling problem and get to one system.

MEMBER BANERJEE: Aren't they very different answers, or --

MEMBER RYAN: Well, some radionuclides, for example, yes. Yes. And, you know, for external radiation exposure, not so much, but for internally deposited radionuclides, it's very different. You heard the case for uranium. It's a factor of three. Some other actinides it's a factor of 10 or 20.

MEMBER BANERJEE: Well, what is your sort of trajectory here? Will you propose one of these as the sort of standard, or -- to be used? Or what's your thinking on it right now?

MR. DEHMEL: Well, we are essentially piggy-backing this effort with the proposed revision to Part 20.

MEMBER BANERJEE: Right, right. But --

MR. DEHMEL: And so the push for us is to actually go with ICRP 103 recommendation. That's the

preference. Because you want both Part 20 and Appendix I to ICRP 103.

CHAIRMAN SHACK: But that will be part of the Commission paper, and that will be your recommended option.

MR. DEHMEL: Right.

MEMBER BANERJEE: Do you need a reg guide on this or what's -- or is it well enough documented that you can simply say --

MR. DEHMEL: There is extensive guidance. And you will see in Enclosure -- by the way, Enclosure 2 to the SECY paper, you know, presents a lot more information than I just presented right now. And Enclosure 3 to the SECY paper has a long list of regulatory guides and NUREGs and computer codes that have to be updated.

So it's not that we have to invent the guidance. It's already there. It's a question of going there and changing the definition, changing the description of how the doses are calculated, putting new dose conversion factors in the appendices and so on.

MEMBER RYAN: I think the hard work is not so much in the reg guides but in the models and in the modeling of tools that support the reg guides, because

that's where the real work is going to be. Some of those codes are --

MEMBER BANERJEE: Presumably these exist; right?

MEMBER RYAN: Sir?

MEMBER BANERJEE: These already exist, these modeling tools or not?

MEMBER RYAN: Modeling tools exist, but with the old methodology. So it would be, you know, an updating, but in many instances it might be a "well, we're going to start from scratch."

MEMBER BANERJEE: Do these have to go through the usual sort of approval process, or how does this work here? I can only relate it to --

MEMBER CORRADINI: I know where you're going, yes.

MEMBER BANERJEE: -- thermal hydraulics codes or something. I mean there's a whole process that one goes through.

MR. DEHMEL: The codes would be structured. There would be a process describing, you know, what the purpose of the new code is going to be, describe all the elements, describe how the code is going to be built, what kind of QA/QC process would be established in a code, how the code is going to be

documented, and so on.

So, yes, there is going to be process associated with it.

MEMBER BANERJEE: Right. But once that is done, it has to be approved, right, in some sense?

MR. DEHMEL: Absolutely, yes.

MEMBER RYAN: I think it would be similar to the process you were thinking about for other areas. That's my own view.

MEMBER ABEL-KHALIK: With regard to sites with multiple licensees, I can conceptually see, you know, how you can easily deal with any compliance requirements with regard to occupational exposure, but I cannot conceptually see how you deal with any requirements with regard to public exposure.

MR. DEHMEL: Let me explain it this way. For example, let's stick to the North Anna site. We have two operating PWRs, and Dominion is proposing a BWR, ESBWR. There's going to be two business entities, two different licensees.

Once you step outside the boundary of the fence, you have a common receptor. So in essence what you have is you have two business entities competing for exposure, allowable exposure to the common dose receptor.

MEMBER ABEL-KHALIK: Correct.

MR. DEHMEL: So the way Part 20 is written, it implies -- the staff has always interpreted it that is the dose applies to all releases, all sources of radiation activity that has to be limited such that the dose to that person is less than 100 millirem per year regardless of how many business entities or licensees you have operating at the specific site.

So here with two business entities, they are all going to be sharing dose, or contributing to the common receptor, and so some arrangements have to be made with respect to demonstrate compliance with the multiple entities from exposure associated with multiple releases; in this case three plants.

MEMBER ABEL-KHALIK: Yes, but I mean conceptually do you have an idea how you would apportion that total dose?

MR. DEHMEL: For example, this was done for Indian Point.

MEMBER ABEL-KHALIK: They had to do that for Indian Point already. For decades, a couple of decades.

MR. DEHMEL: It was done procedurally between the operator at Indian Point Unit 2 and 3,

they actually assigned administrative factors for each site, and then as part of the dose projection requirements that are embedded in Appendix I requirements, they actually compare and project doses in the future, and then if one licensee felt that they were about to exceed their share of the dose allocation, they would confer and say how are we going to do this.

MEMBER BROWN: Cap and trade.

MEMBER STEKAR: That is essentially right. Yes. That is a repudiated concept.

MEMBER RYAN: All right. Any other questions or comments?

All right, gentlemen, thank you very much for a very informative couple of hours. I think we have all learned a lot about where you are and where you're going, and we'll look to future interactions.

With that, Mr. Chairman, I will send it back to you two minutes ahead of schedule.

CHAIRMAN SHACK: All right. Extended lunch hour.

(Laughter.)

MEMBER BANERJEE: Do we need a letter?

MEMBER RYAN: I think the answer is no. He has an information briefing to get the committee

organized, and until we have a work product that they have sent to the Commission, I don't think we have a lot. But it has been a very informative start to our thought process in working with you.

So thank you very much.

CHAIRMAN SHACK: We can discuss that.

(Whereupon, at 11:58 a.m., the committee recessed for lunch, and reconvened at 1:00 p.m., this same day.)

AFTERNOON SESSION

CHAIRMAN SHACK: We can come back into session and learn about license renewal. Our first topic this afternoon will be the status of license renewal activities. We have Ms. Janice Dean from the Office of the Attorney General of the State of New York on the phone bridge, listening to the discussion on the status of license renewal activities.

Also Ms. Dianne Durego from the Nuclear Information and Research Services is on the phone bridge listening to the discussion of topics this afternoon.

To preclude interruption of the meeting, the phone line will be placed in the "listen in" mode during the presentations and the committee discussion.

Mario will be leading our discussion this afternoon.

MEMBER BONACA: The purpose of this briefing is for the NRR staff to inform the committee regarding the current status of recent changes in the license renewal program.

NRR has recently improved the license renewal program by addressing recommendations from a recent audit by the Office of Inspector General and by incorporating other staff-identified enhancements.

So at this time I will turn the presentation over to you, Mr. Holian.

MR HOLIAN: Thank you, and good afternoon to the committee.

The license renewal staff is glad to be here for a second day in a row.

(Laughter.)

That's following a subcommittee meeting we had yesterday for the Vogtle plant and the draft safety evaluation report for those who weren't here for that.

I would just like to start quickly with introductions, and then I will cover a couple of slides, and we'll get right to the presentation.

To my right is Dr. Lee, the deputy director, Division of License Renewal. To my left is David Felton, branch chief in License Renewal Projects, branch chief, and we have just separated the presentation into just a couple of us so we don't have so many hand-offs, but a lot of the branch chiefs and staff assisted in the presentation and are here today and will be able and willing to answer questions as they come up in the committee.

Highlighting a few -- all of our branch chiefs that are here today, you know, starting out we

have David Wrona, one of the newest branch chiefs, for the Projects Branch. Dave replaces Rani Franovich, who moved on to the reactor oversight process, still in NRR, but a branch chief. And Dave has been in licensing also. It's good to have him transition up to the branch chief role.

Jerry Dozier, branch chief in one of the technical areas, and we have Raj Auluk also, another technical branch chief, and right behind them we have Travis Tate, who took over the Reactor Operations branch, and Bo Pham, our environmental branch chief.

We have additional staff I'm sure you will be hearing from later.

The first slide is just the agenda for today, and we wanted to do an overview in general I'll do in a second, and highlight three major areas. One is just the status and schedule of plants. You know, how are we doing overall.

The Commission has a general policy about 12 plants and trying to maintain that, so that we have got continuity really on the number of applications, and so that the Commission can match our budget, and we'll talk about how we're doing on that.

We will talk about the IG recommendations. You know, we have responded to them. That was an in-

depth review. I think I mentioned to at least members of this committee separately before I took this job, I -- coming in from Region I, I had gone through the whole inspector general report, and I met with them prior to coming here, and they said a lot in the report. We have done some changes for that. They still have some areas of concern, and we'll touch on those today, and those are recommendations that they will still be following.

Finally, we will go over some license renewal guidance changes that we have done. Part of those were a result of the IG recommendation, and part of them are just ongoing process improvements, and we will still be evaluating the effectiveness of those changes.

So, one, we look for your comments today as part of that process; you know, what you've seen that's worked well over the ages, and we would hate to change things that take us away from efficient operations and issues like that.

I know one area in particular is how we conduct our audits, and we made some changes to that, and we have some reasons why, but we'll go into those in a little more detail as we reach that part.

Finally, closing remarks.

This is for the overview status page. I just wanted to highlight my view coming back from the region for nine years, with being out there when Calvert Cliffs was the first plant to go through license renewal. The staff of license renewal, the division, the Commission, views it as a mature process.

You know, that's a positive. The positives that I've seen coming in here is we do have good Commission support. We have good budget support for our product lines. We have a predictable application schedule that comes in so we can look years out and kind of map our resources to that.

I will note on that line, you know, as we looked at fiscal year 2010 budget, there was some talk about dropping a couple of plants off, just as the Commission wrestled with that fiscal year 2010 budget and the amounts.

But the Commission looked at the importance of license renewal and the importance -- really, the continuity for the licensees themselves as they schedule and plan their resources for the application. They do a lot of contract work for that, and the Commission, I think, heard their interests in maintaining whatever staff that they have in place on

a current schedule so that we are not impacting them too much. And I'll circle back around to that thought when I get to our challenges in a minute.

But that's good. You know, the industry in general, they do learn from each other. I know the committee mentioned yesterday you had Beaver Valley in here observing the committee meeting on the Vogtle plant, and that's good. We do see that. We see them at some of our site audits, our inspection teams see them there kind of learning from each other out in the field, which we think is good.

On Vogtle, yesterday I think you saw an indication of some of their learning. That was the third Southern Company plant. Hatch and Farley had come through, and part of their learning, both in their application and in responding to RAIs, you saw Vogtle come through with no proposed open items.

So where the industry can learn and respond to issues like that, it makes the process more efficient.

We do have good guidance documents. One negative there is we have a lot of guidance documents, and they catch up with you after a while, and we are still in the process now of making sure that they are consistent between each other, and that takes some

time and effort, and we have some efforts underway to even streamline our guidance documents further.

I highlighted good regional interactions, and you heard yesterday during Vogtle's regional presentation that they had inspectors from both Region I and Region III present at their inspection.

I know you realize Region I, where Dave and I come out of, has had a history of very good inspectors in this area, and they are sharing their knowledge level and experience with the other regions. So we see that ongoing, and we reach out to them for our changes to our guidance documents for their advice.

You know, one item you heard yesterday in Vogtle, and I'll repeat it here, even a region member brought it up, was that we have worked over the years on improving what the region looks at during their inspections and what we look at during our audits.

We want to be efficient. We want to not duplicate efforts, and at the same time we want to communicate what we're doing, and I think one of the members picked up yesterday, hey, there was a good IME inspection report, that your safety evaluation report could have expanded on it to tell the whole story, and we agree with that, and we'll continue to work with

the regions on that issue.

One of the areas that I think Sam mentioned later in the IG recommendations is the use of operating experience. IG picked that as a particular focus area, and I think it's a good one to look at.

They are still concerned -- that's one of the areas that they have not closed out yet. They would still like us, I think, to do more in operating experience, just more across the board, both from headquarters and the region.

So we are still working with them on that, and I think they want to see that, you know, we are talking to each other. What we look at at operating experience during our audits or our requests for additional information, you know, and then can the region make sure they focus in other sites when they're on site.

So we are still fine-tuning our guidance in that area.

You know, license renewal is still finding issues. I think when I come into it, you know, we don't advertise as well the kind of things we find, you know. We go ahead and review it and make sure we do a comprehensive, extensive review. We put a lot of

effort into our safety evaluations, and you know, we don't always highlight the areas either we find or fix in their applications, or the -- even some of the technical issues that we drive.

I listed a couple of them here, and I know this committee has done well advertising them -- the metal fatigue issue, water in the manhole issues. Some of these items that raised their head in the license renewal space quickly transfer over. They're operating issues and they're also license renewal issues.

We need to treat them in both cases, and do it efficiently. They cross over both in license renewal to operating reactor space, and that's okay, you know. We want the ROP to be well informed as we find issues, and we want to continue tracking them in license renewal so that we can ensure the public knows and this committee knows that we want to track these commitments, no matter how far out they are, but identify them when they come in for license renewal application.

MEMBER APOSTOLAKIS: So can I interrupt for a minute?

MR. HOLIAN: Yes.

MEMBER APOSTOLAKIS: I'm trying to

understand what is happening here. Do you know, do you have a plan in place to inform these other groups of the findings?

MR. HOLIAN: Yes, in general, and on this one in particular, on water in the manholes, because we had an extensive discussion yesterday. We added a slide to our presentation to talk about that at the end. You will see a slide added. I don't even know if it got into your packages, but we have added it.

But the mechanism -- we still deal very well day to day with all the technical divisions. So we meet at a management level and then the process really is, even on metal fatigue, that we will ensure that a RIS or generic correspondence goes out.

On our events briefing, we sit in on the events briefings. It's not infrequent that, you know, once a week or once a month an issue comes up on a plant. It's one to look back, and this is an NRR -- did license renewal -- did this come up during the license renewal review. So they'll look back and ask us to go back and do that homework, and then they will ask the same question. What are we doing generically now to put a current face on these issues?

So the answer is on metal fatigue, we'll send out an RIS. We'll see not only where they're

using that in license renewal space, but where are you using it in operating reactor space, on relief requests, other issues, where are you using this type of application?

MEMBER APOSTOLAKIS: But it's not just metal fatigue. I mean --

MR. HOLIAN: No. It's not. It's not. Any of these operating experience type reviews, we've got to ask that question routinely. And I just listed a couple of them here that have come up.

MEMBER APOSTOLAKIS: All right.

MEMBER RAY: Brian, could you -- many of us were in Braidwood earlier this year. Unmonitored release paths, I assume that's on your checklist? During license renewal?

MR. HOLIAN: Yes. You know, Indian Point is an example of that, and that's an example of an application that's in house now, and so we track the structural aspects of that, you know, what's contributing to that from a structural aspect, and that's currently an issue that is clearly in the Part 50 type operating review. And so that's one that will be in both realms. But the answer is yes.

MEMBER RAY: Well, I just want to make -- I knew it was being pursued for the operating space,

but currently license renewal ought to have some look at that issue as these things come forward.

MR. HOLIAN: On how well structurally they're maintaining concrete and liners and --

MEMBER RAY: Well, no. I'm talking about just the fact that valves leak, and if you have -- in this case Braidwood was an unmonitored release path on a discharge line to the river that had vacuum breakers in it which leaked like you would expect they would. And there was no monitoring of it, and -- until, you know, the release was manifest. And I just wanted to ask if you had that as you mentioned a couple of examples here. That's one that we have been recently looking at.

MR. HOLIAN: Yes, I think -- the answer to that specific, I know on like the tritium leaks, I quickly jumped to the tritium leak thinking you were going there on that aspect.

MEMBER RAY: Well, it is, but let me tell you something. People call it a tritium leak. It really is an unmonitored release path.

MR. HOLIAN: Yes.

MEMBER RAY: All right. A release path that was designed into the plant from day one. They had no way of monitoring it. It clearly was going to

be a path at some point for releases because there's no way you couldn't ensure the valves wouldn't leak at some point. That's the lesson I'm trying to ask about, whether or not you've captured that or recognized it or --

MR. HOLIAN: I think --

MEMBER RAY: And it's not a tritium issue. It's a release, unmonitored release issue.

MR. HOLIAN: Release -- whether it's -- I agree with you. Whether it's through a valve in that case, an active component there, but if there's passive components that contribute to leaks, we would capture that.

MEMBER RAY: All right.

MR. HOLIAN: I wanted to briefly mention some challenges, and then we'll move on to some specifics. These challenges might not be new to you, but I wanted to highlight them because they are clearly present to us now. They affect us day to day on the reviews we have.

First off is a staffing issue, and I'll just raise it. License renewal, one division, probably due to new reactor division taking some of the staff, probably due to some of the churn at the NRC, and that is understaffed now, and we are coping

with that. We've been hiring out, we've got coping measures where we actually detail some staff from other technical divisions to fill that, but it's just an issue that as we deal with staffing, you know, it's affected us probably throughout the last year. We've got coping measures to get back up in staffing, but that kind of shortage can exacerbate itself as we go through the review process.

It's not unusual in a lot of divisions. You'll hear probably even at the Commission level now talking about churning among the staff, a lot of the staff just moving from division to division, or across, and the experience level of even our staff. So that's just an area, staffing and training and qualifications is an area that we're concentrating on. So we're doing that kind of while we're working applications, and you know, it's an area for our branch chief to focus on, and I just raise that as a challenge for us.

I mentioned the continuing resolution. And I wanted to mention that now because just this week we have contacted five plants, and told them that you will have a three-month delay in your license renewal schedule.

As we face the budget shortage and the

Commission looked at the continuing resolution, one of the areas they look at is license renewal. They look at licensing actions, they look at new reactors, and the budget cuts came in on this, and one aspect that will affect all five plants coming in in '09 right now is a three-month delay. And that's primarily out of our contract money.

I had to talk to one of the plant members who called up, and it was one plant was affected, and he said, well, you know, I don't understand the delay in us. You know, aren't you guys getting paid there? You know, I had to tell him, well, we have 14 plants in house affected. I'm delaying, you know, five plants three months. We've got plenty to work on. So we're rightly getting paid for the work we're doing.

But the continuing resolution will affect plants. It will affect your ACRS schedules. I haven't moved them yet, but we'll have to look at that, and I know we have to plan far out, but it may impact them.

Right now it's three months, and a couple of plants it might even go farther as they're looking at money. And that's only the six-month CR scenario. There's a one-year scenario which would send a few plants out eight or nine months or so if that were to

come into effect. We don't know if that's the case.

So I just bring that out as an issue. It's really a budget issue. It's not for this committee, but it does affect the industry. It affects them in some ways where they have contract staff, where they depend on them, and they have to then either keep them on longer or let them go and bring them back when they want to respond to our questions.

So it is an issue that's unfortunate, but I wanted to bring it to the committee's attention.

The other thing on that continuing resolution, we've had it before, we've delayed some plants before, so this is not new news. A couple of years ago we delayed some plants.

It's also sometimes a little bit hard for us to restart those contracts and get them going again efficiently. I worry a little bit about that. We've been talking to our contract people out there, and they are aware that this is an issue, but I just raise that. Sometimes it's an extra month or so before you get some contracts in place.

We do have plans to try to do with in-house staff still some work on those. We'll do acceptance reviews, we'll go into a scoping audit

where we can with in-house staff and not use contractors if this extends. So we are making some coping plans for that.

Process improvements. We'll talk about that. It's issues -- Dr. Lee will talk about these. Some of these that even he has initiated over the last six months or so in the division.

Process improvements come with a cost. They come with a retraining cost, they come with kind of a check or a pause while you check when you made a change, is it more efficient, is it more effective. And we're learning a little bit of process on that. We'll talk about that when we get to the audit process.

MEMBER BONACA: When you come to that, I would like to hear if you have, you know, any insights or commitments to improve the guidance documents in the areas of where there are so many exceptions from the industry.

MR. HOLIAN: Good. And we're specifically going to cover the GALL.

MEMBER BONACA: Well, I mean that's really an efficient way of going. I mean many of those exceptions are really tied to the fact that the guidance is so prescriptive, I mean narrow, right now.

MR. HOLIAN: Yes. Exactly right. And we'll cover the GALL update and the good news on that is the Commission realizes both that it's important to do GALL and GEIS updates.

When I mentioned that they looked at cutting the budget, even fiscal year 2010 for a couple of plants, they did not cut the GEIS and GALL update money they had. So we should finish those. We have the money to finish those updates.

We'll update GALL. We know the industry wants to do that. We've been talking to them a month ago at the NEI subcommittee, and a lot of the member plants came in and they'll be commenting on the GALL update, so we'll cover that.

And, finally, knowledge management. It's not just a buzz word here. On our knowledge management, our branch chief turnover is significant for the license renewal process. The process itself is an important aspect to have, and, you know, Louise Lund and Rani Franovich, two long-term branch chiefs here, that have moved on, we've got new technical staff in, and the process knowledge themselves is an important piece to pass on to our new reviewers; not only the "how" to the safety evaluation process, but you know, the ACRS process, the audit process and

those changes.

So that knowledge management is important to impart to our new people. And that's a burden we take on but, you know, we rightly take it on.

What are we doing? On some we have initiated an SLS position in license renewal specific to help us with the hearing process that we see we're going into, and we are in the process -- we have 20-some applications for that, so we're in the process of selecting an SLS, and that will help us with this kind of knowledge management as we continue on to train the staff.

Well, that's it. I'm going to turn it over to Dave, who will cover some of these current schedules.

MR. PELTON: Thanks, Brian.

Again, Dave Pelton. I am one of two projects branch chiefs in the Division of License Renewal, along with Dave Wrona. We ultimately are responsible for making sure the SERs are assembled and issued and presented to the committee as well as to the public for review, and that ultimate issue.

What we wanted to talk about next was just to give you a general overview of where our program has been, where we are at, and maybe a snapshot of

where we're going.

Out of the 104 units that are currently licensed, which are really 65 sites, we have already renewed the licenses at 28 of those sites, which covers about 49 units.

Currently in house we've got 14 applications for a total of 19 units. So like Brian said, we've got our hands full with a lot of work, a lot of units. So we just wanted to make sure you were aware of that.

On the next slide, it's kind of an overview of where we're at -- go ahead.

MEMBER APOSTOLAKIS: The remaining license units, do you know what they're going to do?

MR. PELTON: Well, of those 36, right now, we're anticipating we may get as many as 20 additional applications. Some of those we have actually got put into our budget through 2010, and the others, we gave the licensees an opportunity to provide a place holder so that they could -- it's just plant X, Y, Z, so that we at least anticipate or expect that they are interested in a renewed license.

MR. HOLIAN: And I think in a congressional update, Sam, if I get it right, every six months we're doing a congressional update package

from the NRC. And in there is an item where the Commission is interested in updating license renewal, and I think there's a sentence in there that actually says we are not aware of any plant who doesn't plan to make an application for license renewal. So that's always stated in there.

DR. LEE: Yes, this is Sam Lee. I guess if you go to slide six, I guess Dave will get to later, okay. We got actually a couple captioned up to 2011. We are seeing the industry volunteer information in terms of when they plan to submit, so we have information up to 2011.

MR. PELTON: Okay, great. Thank you, Sam.

Okay, if you look back to the ongoing renewal, I just want to give you a quick idea of what we are currently working on. I won't go into grisly detail, but one of the things I did want to point out to you was that of that listing, there are five applications for Oyster Creek, Pilgrim, Vermont Yankee, Indian Point, and Prairie Island, that through our process stakeholders have issued contentions against. And those contentions are currently under review by the ASLB or, in the case of Pilgrim and Oyster Creek, the ASLB has recently provided their conclusions and provided those to the Commission.

You know, as a result of the additional time it takes for the board to review, the Commission to review, and the staff to evaluate these contentions, our normal 22-month review schedule ends up getting extended, and initially we had said, well, considering what we estimate the workload would be, it would likely extend these schedules out to 30 months.

But as indicated in the table, for Oyster Creek, Pilgrim, and Vermont Yankee, we have actually gone beyond even the 30-month period by, you know, Oyster Creek by 10 months, Pilgrim by three months, and Vermont Yankee by about three months.

So it's a challenge. It's a challenge for the whole agency, and, you know, when it comes to deadlines, you know, we want to make sure that we get all contentions reviewed, you know, understand all the safety implications, and make an informed safety decision prior to renewing the license.

But it does impact schedule, and as it impacts schedule, you know, we are continuing to receive additional applications. So, you know, we have 14 in house now largely because of the extended time taken for -- to address the sites before the ASLB. It's just another challenge on staff is the number of reviews we have in house at one time.

MR. HOLIAN: One item there. We did -- historically there was never a budget model for an ASLB-type plant. I mean you had a 30-month review schedule but you didn't have a budget model that would give us kind of a staff to respond to that. And we do have that in for next year's fiscal year, but what we're telling you is the burden of still holding onto plants that we have -- we've finished the majority of the work, the SER, but there's quite a bit of work that we work with the OGC on the contentions themselves, including going to the hearings and preparing lawyers for that.

So it's kind of almost unbudgeted work in some ways that impacts the staff.

MEMBER BLEY: Now do you know about the contentions that are proposed before you do your review, or does it come somewhere in the middle? It can come at any time?

MR. HOLIAN: It can come at any time, yes. It depends. They can come at any time at Indian Point, so it's a mix. Prairie Island is a good example. I mean Dave might mention that near the end there. You've already got 11 contentions, I think it is.

MR. PELTON: Yes, 11 contentions were

submitted, and the ASLB heard those contentions last week. It now has to determine which of those will actually be admitted through the process.

MEMBER BANERJEE: So in the first one, ASLB admitted that one contention?

MR. PELTON: Correct.

MEMBER SIEBER: Correct. And issued a decision.

MEMBER BANERJEE: So what happens with the contention then?

MR. PELTON: Well, after the board, they'll issue their conclusion. That gets forwarded to the Commission. Now the Commission has the opportunity to, if they believe or if they agree with the recommendations made, they have the opportunity to issue an order to staff or the licensee to direct any or all of those recommendations be taken.

And then what we do is we -- once the board has made their conclusions, we can go ahead actually with our process and continue, you know, to get the draft renewal license together, get everything put together, and ready for issue. And then, you know, once informed by the Commission of their decision, then we would act on any specific --

MR. HOLIAN: Now in Oyster Creek in

particular, you may be aware that it went to ASLB, it came back, then went back to ASLB again, and now the ASLB has just responded again, I think within the last week here. So that's a document.

MR. PELTON: And stakeholders have the opportunity to appeal the decision of the board within -- you know, 15 days, I believe, is the time period. So it's -- but nothing -- that appeal does not prevent us from continuing with our part of the process.

MR. HOLIAN: Just on ASLBs in particular, you know, the data is here on some, you know, highlighting what OGC goes through, even the staff goes through. I mean on one of the plants, Dave, it was, you know, these are the admitted contentions, but we were on -- proposed contentions was up in the 100 on one of the plants.

MR. PELTON: Over a hundred, that's right.

MR. HOLIAN: And so we'll see. Prairie Island, you have 11 contentions. They were very similar to the contentions that were filed in Indian Point, so even the plants are looking at what issues are kind of current out there, and we're still responding to those. But as you see on Prairie Island, that's very early in the process there.

MEMBER APOSTOLAKIS: Can you give me an

example of a contention?

MEMBER SIEBER: Oyster Creek was the corrosion of the containment.

DR. LEE: That's correct. Metal corrosion, metal fatigue. Embrittlement. And then you get water use.

MEMBER APOSTOLAKIS: So if it's a technical contention, do we resolve it or who resolves it?

MEMBER SIEBER: ASLB.

MEMBER APOSTOLAKIS: The ASLB admits the contention. What does that mean? That it is an issue?

DR. LEE: It means that the intervenor would oppose the contention, and then we work with our lawyers, I guess, to provide our input, either to say whether this contention should be admitted or should not be admitted. Okay, what is the technical basis, okay. Is there a technical basis to admit the contention.

And the licensee would do the same thing, and the intervenor would do the same thing. And all that information goes to ASLB, and they decide if there's technical merit to admit the contention.

Okay, in this case for Oyster Creek, they

submitted several contentions, but only the drywell corrosion was admitted, because the ASLB decided it has technical merit.

MEMBER APOSTOLAKIS: And then what?

DR. LEE: And then we go --

MEMBER ARMIJO: This committee spent a lot of time on that corrosion of the containment in quite a lot of depth, and we concluded it was -- the proposal was okay.

Now does the ASLB review our findings?

DR. LEE: Yes. They have to consider your committee's recommendations.

MEMBER SIEBER: Ours, plus others.

DR. LEE: Yes. You actually have input.

MR. HOLIAN: You were part of the staff's input to that, but then these utilities will hire their own experts, raise questions on that. They will follow their own brief to the judicial panel.

In Oyster Creek in particular, you had a split panel of three judges. It came back to the Commission and the Commission decided to have an additional discussion, you know, of one aspect of the item, and it went back to them and it's just returned.

So the staff does support OGC on the presentation.

MEMBER APOSTOLAKIS: But the ultimate resolution depends on what? The Commission?

MR. HOLIAN: The Commission. So right now we're waiting for Commission direction on this. As Dave mentioned, we have gone ahead. Our license -- you know, the last thing for us is to prepare a license package. We do have a SECY paper that goes up to the Commission.

As a matter of fact, we have submitted that once and it came back from them because it was still going back to the judicial panel. So when we hear from the Commission, which, you know, we wait on to hear, it's ex parte communication, so you always can't find out when that's going to happen.

But when they decide, then we'll go ahead with the next process.

DR. LEE: Actually the Commission gets our input, the safety evaluation report, the ACRS letter. ASLB, you know, their decision, okay, and the intervenors appeal to the Commission. They look at all that and then they decide.

MR. HOLIAN: And while we are on Oyster Creek, I'll pause here, I was going to mention it at the end, you know, I was almost late to this subcommittee meeting. When I talked about regional

interactions, they are very good. Right now Oyster Creek is in an outage as we speak right now, and our inspectors are looking at the drywell again. The licensee is looking at the drywell in the sand bed region that you all reviewed, and they are taking new T measurements, and through the weekend our inspectors have been in the sand bed regions.

Just prior to coming over here I signed a board notification to go out to the ASLB. It was on an inspection issue that came up that the licensee identified, a blister in one bay on the coating at Oyster Creek during this outage.

Just to remind you, they had 100 percent inspection in 2006 and they were committed to do it at this time in 2008. Their license renewal commitment is to do one every four years, 100 percent inspection.

So during this inspection a blister was found. We have already had a couple discussions with the licensee and the state of New Jersey, and we just thought it prudent, although the safety significance might be small, we thought it prudent to notify all the members of the board. So you might see that in the press tomorrow, so I wanted to let you know since that was just happening today.

We do a board notification of that, and

then the board is aware of the latest information. So I just wanted to make you aware of that.

DR. LEE: And I think that the board can see -- you know, they are lawyers on the board, so they look at the legal process. Then all the parties follow the legal process. You don't just look at the technical.

MEMBER BANERJEE: There are no technical members of the board?

DR. LEE: They got two technical members and one legal member, so they look at the whole thing.

MEMBER BLEY: But the contention can be denied on a rule basis on whether you have the right to object, a whole variety of things.

MEMBER SIEBER: It's conducted like a trial. It follows the Rules of Civil Procedure as opposed to the forum here, which is in the form of a presentation. So there's questioning and --

DR. LEE: Okay. I just want to point out the last three plants. Starting with Kewaunee, the schedule says TBD. Those are the ones that are impacted by the CR.

MR. HOLIAN: I just wanted to go back to the contentions in the ASLB process. You know, in our public meetings, I just wanted to make sure that the

contention process is a good process. I mean we raise it at the beginning of the license renewal process, that the public is -- this process is open for public participation. You know, you have a say. You have a say in the environmental aspect, so we go out for a separate meeting, just reminding you of any environmental impacts that you are aware of in the community that you want us to evaluate, we want that input.

So, you know, we do that early on in the process. Early on in the process we say the license renewal application is out there, here's a copy of it on CD, here's where it is on the Web. As you look through the application, if you have issues that you think are safety issues with this, you know, we want to hear about it.

So, you know, the contention process, although we bring it up on schedule here, that it exacerbates our schedule and our planning, and that's a message here, I wanted to still say, we value the contention process, we value the public input, and leave that message there.

MR. PELTON: My final slide will -- I just wanted to give you a look of what is our future plans for receipt and review of applications.

As Sam already mentioned, and Brian talked about it a little bit, the continuing resolution does impact the pace of our review on a number of sites, you know, including Duane Arnold, Cooper, Kewaunee, Crystal River, and Palo Verde.

So I just wanted to make sure you were aware of that.

MEMBER APOSTOLAKIS: How old is the South Texas plant?

MR. PELTON: Roughly 20 years.

MEMBER BLEY: Time flies.

MR. PELTON: And then understand also -- I think Brian mentioned this earlier, too, is that not only does this impact, you know, the timing of our decision on whether or not to renew the license, but it also impacts, you know, how we coordinate with the ACRS. We want to make sure that we go through proper channels to look at future activities and make sure that if there's going to be any impact at all on any subcommittee or full committee meetings, we make you well aware of that.

MEMBER BLEY: What is STARS No. 3?

MR. PELTON: Sometimes they're not officially -- they'll put a place holder in for the plant, so we leave it like that until they officially

announce the plant when they go out there. So a lot of the fleets will go ahead and reserve a part in queue for application and then name the plant later.

MEMBER BLEY: Like the Exxon plant.

MR. PELTON: Yes, the Exxon plant is another one.

One other thing I wanted to mention, one other item I wanted to mention was, you know, at Indian Point and our review schedules. I don't know if the committee is aware, I believe you are aware, because it did impact one of your ACRS meetings, but, you know, we went ahead and delayed Indian Point SER by four months.

A combination of issues: One was, you know, issues of the contentions and the big impact of the number of contentions and the work that we had to do through the summer on that.

Part of it was the IG responses in our staff, part of it the complexity of a lot of the issues on Indian Point, and just staffing and workload that we really have on plants.

So, you know, where we're not ready to go with an SER, you know, schedule is important to us, but, you know, it's also the quality of the SER that trumps those other aspects, and I just wanted you to

realize that we are scheduled, we try to put out these schedules as much -- and they are publicly available, but where we have to, we will delay them.

MEMBER BONACA: All right, let's move on to the next one.

MEMBER SIEBER: You have one plant that's not shown on your chart, that is the NIST research reactor. There's a license renewal coming up on that one.

MR. PELTON: The research and test reactor branch, they do their own renewals in house.

MEMBER SIEBER: So you don't --

MR. PELTON: No.

MEMBER SIEBER: But we are for some reason or other reviewing NIST. And that's because of the power output, I presume.

MR. PELTON: Yes.

MEMBER SIEBER: It's 20 megawatt.

MR. PELTON: That's right.

MEMBER SIEBER: Okay.

MR. PELTON: I will now turn the presentation over to Dr. Sam Lee.

DR. LEE: This is Sam Lee again. I'm the nuclear materials division director for license renewal, NRR, and just to catch up with the actual

question about the research reactor, they have a separate process, so they don't use the same rules here.

MEMBER SIEBER: What section is that license under, do you know? It's Part 50, but I don't know which part.

DR. LEE: We'll get back to you. We'll get back to your staff.

MEMBER SIEBER: Send me an e-mail.

DR. LEE: Okay. Yes, we can do that.

They have a separate process, so they don't go through the -- okay.

And as we talked about earlier, the Office of Inspector General audited the license renewal program and concluded that overall the NRC has developed a comprehensive license renewal process to evaluate license renewal applications.

The IG went further to recommend eight specific improvements that can enhance the program operations, such as, you know, documentation.

We have responded to the IG, and our response is publicly available, and we provided the ADAMS number of those references to the ACRS staff, and you can get the details.

Can I have the next slide?

And here I'm going to go forward with all eight recommendations and how we responded to them.

Number one, what IG did was they looked at the SER that we prepared. They looked at the incoming, the license renewal application submitted by the application, and they found out examples where the SER basically had the information from the application, and we did not identify the source of information.

And in places we did not provide, you know, robust, I guess, explanation on the basis why -- you know, how the staff come to our conclusions.

Okay. We solved that. We revised our guidance to the staff in terms of how the documents are conclusions. And you will start seeing some of this in some of the later safety reports.

Okay. For the ones that are in house now, it's difficult to change, but for the future ones you will see starting some of this.

And for the IG on Susquehanna, you will start seeing the full implementation of our new guidance.

Number two, as a result of the IG recommendation, we put in a new staff, an additional staff of process to make sure that staff is following

the new guidance.

MEMBER APOSTOLAKIS: What is the mechanism that the OIG uses to bridge these? Do they interview people?

DR. LEE: They actually interview us. They actually follow us around at the audits. Okay. They come to all the meetings. Okay.

MEMBER APOSTOLAKIS: Well, I mean I presume they're people who work for the inspector general. What are they? They are not engineers?

DR. LEE: They have some engineers, too. They have some engineers. I think one of them has a legal background. And they actually spend a lot of time with us on license renewal. They just spent about a year off and on on the license renewal program. They interview people, they interview in the region, they interview the industry, you know. So it's pretty broad. ACRS lawyers. So it's a pretty broad comparison.

MEMBER POWERS: My reaction to their review was that you guys were dancing in the street. It was one of the most complimentary reviews I've ever read from the IG.

MR. HOLIAN: Did you say complimentary?

MEMBER POWERS: Complimentary, yes.

MR. HOLIAN: I don't know how much dancing we did, but --

(Laughter.)

No, well, it received a lot of bad press. Even in the subcommittee yesterday, you know, the cut-and-paste aspect. I mean there's an aspect we told them straight out. In the SER we try to include as much of the licensee's application, and then we -- you know, what did the staff do with it? So that it's an easy reference. That's the way it's been done.

Yet they found aspects that they didn't think the staff's analysis was good or up to snuff, and that's good. We want to hear that. This committee yesterday mentioned something about, you know, hey, you could have -- but it sounded bad, and worse than that, it makes it viewed as a rubber stamp review, which the public, we get at all our public meetings, anyway -- well, you haven't denied one yet, and that's a little bit of where I go back to kind of the safety improvements that have come up through the process.

One item I meant to mention, and just to review it here, is even on a branch chief review from the region, his view of it is, hey, we've added 19, 18 management programs for passive components, you know,

by doing license renewal early, you know, by doing the plants at the 20-year point. And now they're implementing aging management programs where they're looking at broader areas.

We don't advertise that to the public, you know. In that report they specifically saw a "your reviews aren't as in depth as they can be, you copied a lot in the application that's in the SER," so those pieces, we thought we were being kind of clear where we said "the applicant said." Now we're trying to be more clear.

MEMBER POWERS: The genre that you adopted, for better or worse, is the genre that you have adopted. And it is true by the time the SER gets to us, I mean it's gone through a substantial iterative process. I mean a lot of stuff happens. Sometimes they tell us about it, sometimes they don't.

At any rate, I thought you got a pretty good review.

(Laughter.)

MR. HOLIAN: Well, I appreciate that view. And we do reiterate where we do hear that they did see -- they spent quite a bit of time, and one example is op experience. I mean it's just an example where they think we can do better, and there are areas we

can do better.

They went in the op experience at a plant, and they asked the utility, how do you do op experience, and were kind of amazed at how on the computer you could search the history on that. And that was one area they didn't see as much either in our SER or in the inspection report that they'd like to see.

So there are some areas there we can fine-tune, and those are the kind of recommendations Sam is talking about.

MEMBER MAYNARD: I think another thing that gets missed periodically is that there are several of the applications that would have been denied if additional changes and work had not been done as a result of the staff's review and stuff. The licensee had a choice of either making additional modifications and changing programs, or else --

MR. PELTON: And that's a message we've shared, Brian and I shared up at Vermont Yankee when they were going through a power upgrade, for example, is you get accused of the rubber stamp. Well, every request for additional information in the Dave Pelton vernacular is essentially a "no."

(Laughter.)

MR PELTON: We do not approve this application, you know, pending the receipt of additional information.

So we try to, you know, talk about it in those terms, that we -- you know, we do challenge the licensee and we do, you know, ultimately come out with a product that meets our expectations.

MEMBER MAYNARD: And many of these are more than just them supplying more information. Many of these resulted in physical changes, either modifications or program changes or whatever, not just additional information for the process.

CHAIRMAN SHACK: Ultimately we would like this guidance to be so good and expectations so clear that everybody agreed that when the license application came in, it would never have an RAI. I mean that's the ultimate goal, is that, you know -- and to me, that is one of the triumphs of license renewal is you do have pretty good guidance. I mean it could always be better, but I think, you know, we see that the expectations are reasonably well understood by both the staff and the licensee.

DR. LEE: Another thing I would like to add is that, you know, the staff is not reluctant to return an application. We actually did that. Okay.

So we are not by any means a rubber stamp. Okay.

MEMBER APOSTOLAKIS: That's not -- you mean you have never rejected one, and therefore you are not good; is that what it is?

MR. PELTON: Yes, that's an overall -- and Sam mentioned that we --

(Laughter.)

MEMBER SIEBER: An airplane crashes once in a while, and you're better because you have more experience.

DR. LEE: Okay. I guess the recommendation number three. We have headquarters staff who go out to the site and do site audit. Also from the region, we have regional inspectors, and they would go out on inspections.

What the IG found was that we have different guidance to the two different groups in terms of, you know, how do they take documents back to the office, the licensee's documents back to the office. Okay.

We solved that. You know, we changed our procedure to make it consistent, to be consistent with the agency's, you know, guidance.

And then number four, I guess Brian talked about operating experience, so, yes, we work in the

region to make sure we don't duplicate effort in terms of operating experience.

Can I have the next slide?

Okay, on number five, the applicants for license renewal, they make a lot of commitments to do certain things, so before year 40, and we have the inspection procedures for the region to go in at year 40 to do inspection, to make sure all the commitments are carried out.

This procedure we have is actually pretty old. We did it, you know, before Calvert Cliffs. So IG recommended us updating this because now we have so many plants, so that's fine. So we did that, we updated that.

And then number six, we held public meetings to discuss the inspection procedure. This is about communication, make sure, you know, everybody knows the expectation.

And number seven -- these are all good recommendations, you know, these enhance the program. Okay.

On number seven, we have what we call interim staff guidance, so we have some information. We write interim staff guidance to carry out to the public so people know what the new information is.

We also have this new paragraph, 54.47(b), that talks about information, new information, and what the licensee needs to do with that.

So the IG recommendation was that, you know, we need to tell how these two relate, and so we are coordinating with the lawyer to try to, you know, clarify that.

And the last recommendation was actually from the IG to the Commission. They asked the Commission to affirm, and they did, relating to the factor here.

Can I have the next slide?

Okay, this relates to the license renewal guidance document. Like we said earlier, the license renewal, you know, one big advantage of license renewal is that we have a very comprehensive set of guidance documents, and the key technical document is the GALL report, the generic aging lessons learned report.

We started to prepare this as directed by the Commission. Because the industry requested the Commission to provide credit to manage aging for license renewal.

So the Commission directed us to look at all the aging management program that can be used, and

we did a generic evaluation, and we looked at all the previous aging studies done by Office of Research, we looked at operating experience, we looked at industry-supported -- you know, provided by industry, and we looked at public comments, and we did aging effects, we looked at programs, we evaluated programs adequacy to manage aging, and we documented our conclusion in the GALL report.

Okay. There are two conclusions. Okay. One is the program is adequate and no further evaluation is needed. And that is the audit piece. Okay. If an applicant chooses to adopt the conclusion in the GALL report for their plant, for a program that's adequate with no further evaluation, the headquarters staff would go out to the site, do an audit to verify consistency with GALL.

And one of the changes we are doing right now is to look at this other process to make sure this is the piece that we are comfortable with when we do the audit.

Then the second piece is that if a program is found not adequate, then the GALL report will so state that and say the program should be augmented, or a new program should be established.

And that becomes the focus of the review.

That's where we should spend our resources. We run a system program that we already decided is adequate. And the GALL report becomes the technical basis for the standard review plan, which is the guidance for the staff to do their review.

MEMBER APOSTOLAKIS: Is it a technical basis or --

DR. LEE: The technical basis. It's not "a." It is "the" technical basis.

Thank you.

MR. HOLIAN: You spelled inspector general wrong, too.

(Laughter.)

DR. LEE: We didn't catch this one.

Okay, the next slide.

Okay. Okay, this is background, the GALL report, so a program should have at least what kind of structure are you doing, and what kind of criteria should you have, and should the operating experience support the, you know, the adequacy of the program. So this is just for background information.

And the next slide.

MEMBER ARMIJO: The OIG critique on operating experience was just the amount of effort you put into it, or --

DR. LEE: Yes, that's pretty much it. What the IG said was that they would like to see headquarters audit staff go in and do an independent search of the licensee's corrective action data base, the CR.

MEMBER ARMIJO: Okay.

DR. LEE: Okay. The condition report data base. Look for degradations or action they have taken for degradations. Okay, rather than rely on the applicant's word in the application. Okay.

MEMBER ARMIJO: So it's more emphasis on the audit function.

DR. LEE: They pointed at the headquarters audit, but for us, they should we carry it out by the regional inspector on a sampling basis. So now we are trying to talk with the region and maybe the IG to find out -- we don't want to duplicate the effort if the region is doing that on a separate basis. Okay. We don't want to duplicate what the region is doing. That's not a good use of, you know, staff resources.

MR. HOLIAN: This is Brian Holian.

I think they wanted us to do more, and they wanted the region probably to do more. I mean they just assumed document operating experience in almost all areas, you know, because of their view of

the significance of that. And we agree. I mean we have the operating experience at headquarters, we have regional inspectors who think through that lens all the time, and don't always write it up in the inspection report that way. So a little of it is documentation and, as Sam mentioned, a little bit more from headquarters auditors.

MEMBER RAY: Well, maybe this is a point -- there's one thing about this that bothers me, is I don't understand how you separate an assessment of operating experience, which just applies to what's happened at a particular plant up to this point in time, but which isn't required by anything other than the good practices that have been followed up until that time.

How is that relevant to license renewal when you're talking about a plant 30 years from now, when lots of changes in operating practice can take place, because they are not mandated, they are not required.

It just seems like a lot of attention gets paid to how are we doing today, when I just don't see how that's relevant to the issue.

MR. HOLIAN: Well, just to quickly respond. We'd agree from the fact that it's a living

program, and that their operating experience should continue even post-SER and post everything that we have documented for license renewal, and that it's a piece that they will be living from in Part 50 after they get the new document.

MEMBER RAY: Well, do you think the inspectors can say 20 years from now, you know, back when you got your license renewal, you were doing all of this stuff, and I noticed you stopped doing it. Here's a citation. You can't do that. Right?

Wait a minute, George. Let me --

MR. PELTON: Well, you know, part of the reactor oversight program is problem identification and resolution. The inspectors evaluate that, the resident inspectors evaluate it every day, the regional inspectors look at it.

MEMBER RAY: What's that have to do with license renewal?

MR. PELTON: It has -- well, what it has to do with it is that one of the things they're looking at is does this licensee adequately consider operating experience, you know, day to day, and part of these aging management programs they present to us, you know, include, hey, we're going to manage this aging by reviewing operating experience.

MEMBER RAY: You're just repeating back to me what I've said, which is you're looking at current practice as a basis for renewing a license 20 years from now for another 20 years beyond that. And I don't understand what the relevance of that is.

I mean managements change, circumstances change. Every plant -- all those 104 plants we're talking about have had ups and downs throughout their life.

MR. PELTON: We simply don't want to base a whole program on just what this licensee was able to find at their site. We want to help inform that with what all the licensees are finding at all of their sites. It makes us safer.

MEMBER RAY: All right. Well, I'll just say to the committee I -- thank you. I don't think a lot of this is really relevant to the decision that's being reached by the Commission on license renewal.

It seems to me if something is important -- maybe being done now just fine -- but if it needs to continue to be done, there needs to be some way to ensure that it does continue to be done.

I just don't see that there is any mechanism to make that happen.

MR. PELTON: Jerry Dozier wants to just

add to that.

MR. DOZIER: My name is Jerry Dozier, a branch chief in license renewal.

When we are making a license renewal decision, we're basically saying the programs are adequate for license renewal. Okay. We're looking at operating experience, but, you know, really what we're licensing to not is how good --

MEMBER RAY: But those programs could be changed, right? Most of them.

MR. PELTON: That's right, it's a snapshot.

MEMBER RAY: But the programs can be changed. I can just decide this plant is too expensive, I'm going to cut back on some of these programs 10 years down the road here now. Nothing constrains me to keep these programs in place.

MEMBER MAYNARD: Any lessons learned for aging management, new aging management, new fatigue, items like that, are programs.

DR. LEE: Okay. The thing is that for the licensing program credit in the application, those get documented in the FSAR supplement. So essentially your licensing basis. You need to go for the change process.

MEMBER RAY: That's fine. Look, we just went through a design certification discussion before lunch, spent a lot of time on distinguishing between ITAAC and DACs, and making sure that the things that were important were identified and could be perpetuated through to the time when the fuel load took place and all that.

What I'm saying is the most of what I see you guys talking about, both yesterday and today, is stuff that is ephemeral in the sense that it isn't captured in the licensing basis. It's just how things are being done today.

Now that's not true of all of it, Brian, don't get me wrong. I'm not -- but if you want any feedback in terms of what I think our job is here, it just seems like you're putting a lot of reliance on how things are going today, when you're making a decision about extending a license 20 years from now for another 20 years.

The two things just don't seem to be correlated. Okay, that's the underlying speech.

MEMBER APOSTOLAKIS: Well, I'm completely confused now. If your recommendation at the end, as I remember it, is that the plant, with the existing programs plus the additional ones that will be

instituted, should be granted the license extension, don't these words carry any weight? I mean according to Harold here, I can change five years from now.

MEMBER RAY: You can.

MEMBER APOSTOLAKIS: But then what's the basis of the extension? How can you do that?

MEMBER RAY: That's my point, is you want it to be perpetuated, you put it in the licensing basis, in the tech specs or reference it in the FSAR.

Otherwise, it's just --

DR. LEE: We do have a license condition that --

MEMBER RAY: I know that. That's quite right, you do have. But hear me. A lot of what we're talking about doesn't correspond to that.

MEMBER ARMIJO: Well, you keep saying that, but I don't think that's true.

MEMBER RAY: All right, I do, and so that's I guess where the difference is.

MR. AULUCK: This is Raj Auluck.

I would just like to add to what Dr. Sam Lee said. All the aging management programs are summarized in the updated FSAR, which becomes part of the license.

MEMBER RAY: Absolutely right. They're

not what I'm talking about. What I'm talking about is -- you know, I've been listening here, yesterday and today, to a lot of stuff --

Brian, you tell me if I'm wrong -- that is not captured in the licensing basis.

MR. HOLIAN: No, I would agree with you that a level of operating experience can change. You know, what we look at, the snapshot during license renewal, licensees can change that.

We have given it our assessment at the time of relicensing that the program is in place. Can we relook at that through the ROP? That's what we would do if we think a plant eventually did not look at BORAL at all and let their spent fuel pool go down, I think under the ROP we could take some action, tie it back to license renewal and say we told you back then to watch this stuff. Now it's degraded to where your spent fuel pool is not acceptable, and take some enforcement action.

So that's how I would complete the circle. But I agree with you that we'd make an assessment of the program here. I think it's important. I think even this committee was doing a little bit of that yesterday when you were looking at a picture of a valve that was degraded.

MEMBER RAY: Too much. Too much. But that's another issue I don't want to go into here.

MR. HOLIAN: Right.

MEMBER RAY: I'm just asking that we try and differentiate between the things that are memorialized or that are captured for the future, and those that are just -- I would put them as observations about how things are going today, but God knows how it will be five years from now when you get two more CNOs have come and gone and people can change things. That's all I'm saying.

MR. HOLIAN: I agree. And I think behind Mr. Ray's comments, that from what I take also are the fact that we're talking about the IG recommendations and op experience, and we should study those recommendations on is this added just icing on the cake that one person wants to do or, you know, how much effort should we put into those areas to fine-tune? And we haven't missed that message. I think us and the regions, when we talk about the regions maybe documenting more, they look at us with, hey, we look at op experience every day of our life and as many things as we can.

CHAIRMAN SHACK: Well, if you have an aging management program that's supposed to prevent

corrosion and your operating experience shows that it isn't preventing corrosion, I think that's a fairly important lesson.

MEMBER RAY: Aging management programs aren't what I'm talking about. I agree that they're a reference that lasts to the end of the extended license period, unless changed.

MEMBER APOSTOLAKIS: Can you give me an example? I'm not really up to speed with this. What is the problem that exists now that may not exist 20 years from now and its disappearance will not be reviewed by the NRC?

MEMBER BLEY: And is tied to the license renewal.

MEMBER APOSTOLAKIS: Yes, I mean I'm confused.

MR. HOLIAN: I can think of one example where a licensee in their licensing organization, they'll have their tech spec group and they'll have a group that will look at IMPO SOERS or operating experience, and due to budget cuts, they will cut that to one person instead of the 10 that they had when they had their license renewed. I mean that's one example, possibly.

MEMBER APOSTOLAKIS: Is the license and

your decision based on the fact that they had 10?

MR. HOLIAN: I don't know. We talk about it a lot here, is all I'm saying.

Look, I think we ought to go on. I've made the point, for whatever value it has.

MEMBER BONACA: I think there is the current performance of the plant is not significant from that perspective. I agree with that. So we are talking about the human factor, really, the people that manage this plant, and but the point is that even in the current licensing life of the plants, you are dealing with those issues. There are the good performers that do things meaningfully. Their experience is reflected in what they do, the decisions they make. And there are those that don't pay attention.

That's always a factor you have to have. But actually there are inspections being done at the site to verify that these programs have been implemented, and they are working.

So even if it's 20 years from now, the inspectors are going to identify that they are working. If they don't work, then there's a major failure of license renewal or operation of the plant in general, I mean.

MEMBER RAY: Well, the aging GALL program, for example, you know, I have no comment about that being something that isn't going to be able to be relied upon by the inspection organization in the future. I think Brian gave a perfectly good example. I've been involved in these plants on the other side for a long time. There's a lot of things you do today that seem to be captured as part of this discussion, at least as I hear it, though, which is a management discretion item, or it's something between the plant and IMPO or whatever.

MEMBER SIEBER: I don't want to prolong the conversation, either. I think a perfect example that we should look at is Oyster Creek, where a past practice has resulted in refueling water running outside of the drywell, causing deterioration. If the license in its current condition has an impact on how long that plant will last, if the licensee does not have a very effective program to surveil and repair the conditions that exist at that plant, then the license should not be renewed. That's a current practice, it's a housekeeping practice, but it applies to equipment covered under Part 54, and I think that's the example that tells us that we ought to look at current condition, current practice, and when I go

through the Vogtle report, I will explain how I made those decisions. Because I have them written down.

MEMBER ABEL-KHALIK: I guess the bigger question in my mind is is the actual oversight process adequate, given the extended period of operation? Or can you capture all of the issues that may be raised by Howard or anybody else through the current reactor oversight process beyond the current period of licensing before beginning the period of extended operation?

MEMBER APOSTOLAKIS: It is a performance-based process. It's not part of the process.

MEMBER ABEL-KHALIK: I mean 20 years from now, you may have --

MEMBER SIEBER: It tells you the current condition. You see the program that's supposed to deal with that condition.

MR. HOLIAN: The reactor oversight process currently handles operating reactors, and we would expect that at year 40 plus one week that the ROP would continue to assess a plant the right way.

But the further answer to your question, though, is will we move into the ROP process samples of aging management programs and reviews, and my answer to that is yes. All right. We're working

right now with that division in the ROP and NRR because we've got one in 2009, possibly, Oyster Creek, possibly, if Oyster Creek comes through, that would enter the extended period of operation.

It's at that point that I ensure that when you go out and sample a maintenance rule, when you go out and sample this, you also pick up license renewal samples in your ongoing thing of aging management process and how you're making these evaluations. That's one other tie that might pick up operating experience and how we're doing.

MEMBER BONACA: One of the examples that we always use is for the length element of license renewal is the corrective active plan. I mean clearly you identify conditions, you have to put them in, you have to track them, you have to look at the industry experience on how they are doing it, and fix it.

Now in 20 years you may have the best corrective action program ever, you may have the worst. And the words there and the numbers don't tell you anything. So it is up to the licensing process and to the inspection process to verify that it works. That's the only thing that has to be constant.

MEMBER RAY: Well, but using Jack's example, what is it that is going to be included in

the license renewal process to ensure that the point that he raised is dealt over the extended period of the license?

MR. HOLIAN: Well, my answer to that would be in Oyster Creek, the aging management program, I would expect the region in the extended period of operation to continue to look at leakage background and drywell. I would expect them to continue to look at the sand bed region and going on those inspections and ensure that that aging management program is consistent with how they described it at the license renewal time and is effective going forward.

If it's not the case, then I call their corrective program ineffective in that area. I weigh it under the ROP, I see if that's a white finding, if it's a repeat issue that they had before. If it's -- you know, if I raise it on risk to a higher item where the drywell thickness has been now decreased, I weigh that against my risk arguments, I move them across the columns in the ROP to eventually where there's an unacceptable rating.

MEMBER RAY: But there is nothing in the licensing basis that would call for the surveillance to be done at Jack's --

MR. HOLIAN: In the example I gave, they

have committed to do it every four years.

MEMBER RAY: Then that's the kind of thing that I think we should focus on.

MEMBER SIEBER: And that's one management program.

CHAIRMAN SHACK: That is exactly what we spent a lot of time on. The current rules and regulations don't go away at the time -- what the license renewal process and what we review are the things that -- what may be good or adequate for 40 years may or may not be good for 60 years, so that has to be a change for that. But the other rules and regulations that require certain things don't just magically disappear.

MEMBER SIEBER: We should perhaps move on.

DR. LEE: Next slide.

The license renewal is already a part of the headquarters, from the region, for inspections. For the audits, there are two audits. One is a screening audit. This is to verify that the applicant had included the structures and components that require aging management.

The second audit is the consistent recall order to make sure if you claim your system is consistent, you are consistent. That's the purpose of

that audit.

And there's another, I guess, the self-improvement. We changed the documentation for the audit report for the consistent goal audit, and this was the first one that we changed the format on, and we just issued that, and the ACRS staff has a copy of that and they have the ADAMS number for that, so you're going to see that. That's one example.

Then for the regional inspection, they do two inspections. One is the inspection procedure 71002. This inspection is done during the time of the review of the license renewal application.

And you have an example of that at the last meeting. And the second inspection is 71003, and that's prior to entering into year 40. The region will go and perform an inspection to make sure all the commitments that the application had committed to in the license renewal application are being carried out before they enter into the period of license extension.

MEMBER STEKAR: Sam, did anything change? You mentioned some changes to the audit inspections.

DR. LEE: Yes, we updated 71003 because it was pretty old.

MEMBER STEKAR: And you mentioned 71003.

I was going to ask, have any changes been made to 71002 as a result of the inspector general --

DR. LEE: No.

MEMBER STEKAR: Okay. Good. Thanks.

DR. LEE: Yes, we might update it eventually.

MEMBER STEKAR: No, that's okay.

DR. LEE: But right now --

MEMBER STEKAR: I was just curious, you know, what from our perspective should we be aware of anything.

DR. LEE: The 71003 is pretty good. Okay.

Can I have the next slide?

Okay, we mentioned earlier about the interim staff guidance. This is a way for the staff to get new information out to the public, and they are three ISGs that we are working on right now.

The first one is the IG process. That's what we talked about earlier, about the IG recommendation. And we are preparing this for public comment.

And the second one is on the aging management of electrical cable connections, like terminal breaks. We have a program where we have public interest in terms of, you know, maybe we should

provide more. I guess other alternatives to the program.

Kind of like Dr. Bonaca was saying, you know, we need to look at how, you know, how these programs are being implemented.

So we are finalizing this ISG based on public comment.

The other ISGs are station blackout. This is only in terms of how much, you know, electrical equipment should be scoped in for license renewal based on station blackout, and we have an ISG based, but based on public comment we will be weighing this to see if, you know, anything should be changed.

CHAIRMAN SHACK: Just how many different pieces of ISG have you issued that aren't incorporated into the GALL now?

MR. HOLIAN: It's just a handful, I think, while he's looking, I think that have not been incorporated in GALL. I think we're --

CHAIRMAN SHACK: I mean I don't need an accurate number. I mean is it -- okay, it's on that order. That's all I'm curious about.

DR. LEE: But we don't have many.

CHAIRMAN SHACK: Right.

MR. DOZIER: We do have one that was

issued, you know, since GALL on the corrosion of the MARK I steel containment drywell shell. We issued that as a final ISG. That was in 2006.

CHAIRMAN SHACK: General numbers, Jerry? Four or five is what I understand that you need to get incorporated?

MS. SAKAI: Stacy Sakai. I'm the ISG process coordinator for the Division of License Renewal.

Currently we have about five ISGs that still need to be incorporated into GALL. These aren't -- all of them aren't final, but we are in the process. Some of them are final, and we're in the process for others.

MR. HOLIAN: This is Brian Holian again.

Just on the station blackout one, you know, this is one we are hitting on every committee, and rightly so. It's out there, and probably the committee says, well, when are you going to resolve it completely with industry?

Well, that one is thorny a little bit, and I know we've talked about it a couple of subcommittees. You know, you've got station blackout a little bit, and NEI's view is that you're coming at us through the license renewal process when you should

be coming at us through that backfit process to the station blackout rule.

So it raises some legal questions and, you know, we're still talking with our lawyers about that in the process. So it takes a while.

What you heard yesterday was these plants are realizing that the ISG that we put out a few years ago said typically it should include those breakers. They are okay. They see the sense in looking at aspects. Whether the station blackout renewal really required them to or not, they're doing it.

But we are trying to work these through and get them in in an industry position, but some of them take a while.

DR. LEE: Next slide.

This is what Brian talked about earlier about this is the water in the manhole. Okay. This is actually one of the good examples that I like. This turns out to be a current issue for Part 50, and like George was asking earlier, was that we work with the rest of NRR and the region, you know, we work together.

MEMBER ARMIJO: Just on that point, if there hadn't been any inspection, would you have found this by just looking through the operating experience

and the LERs?

DR. LEE: Those are actually showing up in the LERs.

MEMBER ARMIJO: Did the LERs trigger the inspection, or did the inspection that found water trigger a looking back at the LERs to see if it was a chronic problem?

DR. LEE: No, we actually did the inspection separately.

MR. HOLIAN: I know, but how was it we first identified it? Did some plant pick it up in an LER, or did we pick it up? I'm not sure we have that answer. But I've seen it work both ways.

I mean we --

MEMBER ARMIJO: Just getting back to this operating experience report, the way I think I understand it is they'd like you to look at a little bit more to see if you missed anything that didn't come up through all these various inspections and audits and reviews. Is there something in there that just got missed? I think it's a good idea.

MR. AULUCK: This is Raj Auluck.

I think it was picked up in LERs. There was an information notice issued in 2002 on the submerged safety electrical cables, and then there was

a generic letter issued in 2007 requesting applicants to provide information on their operating experience at their particular site.

So at this time NRR electrical engineering branch is reviewing the whole information and plans to issue the bullets I think shown on this slide. The staff is taking some positive action based on those LERs and then information received from the operating plants.

MR. HOLIAN: And I think the license renewal piece is that we're finding during our inspections more and more of these. And eventually the regions are picking up, and they're doing it on their own. On their plant walkdown inspections, regardless of whether they've had license renewal come up or not, they are out there doing that from op experience, anyway.

MEMBER STEKAR: Well, and my sense, having been through two or three or four of these now, is exactly what you're saying, Brian, that the LERs would pick up instances of safety-related cables, but because the license renewal extends out beyond safety-related space, the scope of this issue only comes up through the review of the operating experience through the license renewal process.

MR. DOZIER: This is Jerry Dozier.

On the topic of operating experience, that is really critical actually in this update, because this generic aging lessons learned report basically is a catalogue of operating experience, and that was done by reviewing LERs, international experience, and things like that, to see if there was any aging effects that had not been identified, so that industry operating experiences is catalogued in this, and in the update we'll do a very thorough review of industry operating experience to catalogue that further.

MEMBER MAYNARD: This is an area where I believe that the license renewal process in fact actually helped. I think even without this, the problem was being identified and would have been worked. I think the license renewal process actually accelerated and put more emphasis on it even for the current operating plants.

MEMBER SIEBER: It seems more important than that there was not a lot of regulation on the passive components, and the license renewal focuses on passive components.

MR. HOLIAN: Anyway, the next slide. We just wanted to add that to this discussion.

DR. LEE: Okay, the next slide. Let me

get back to the GALL report. Okay, the GALL reports are a good compilation of the operating experience and the aging management program.

The GALL report was originally issued in 2001, and then it was updated in 2005 to incorporate more experience. So we have had to update the GALL report again to make this more comprehensive, and also address some of Dr. Bonaca's comments in terms of, okay, now we've done all this, you know, we will come in like GALL, I guess some people take exceptions, too many exceptions.

MEMBER BONACA: I believe the heart of my question is a lot of the exceptions are tied to really prescriptive requirements of GALL.

For example, it says you shall inspect this fire-related, you know, every six months. So a licensee does it every three months or a licensee does it every two years, and then say that's fine. Well, if it's fine, change that number of every six months to once every two years.

MR. HOLIAN: That's right, almost make it performance based, so that we don't have to revisit things that might be applicable. If we can make GALL fit a variety of examples.

MEMBER BONACA: And you can look at an

issue like that and you can find there are 10 pages on the SER in the discussion that repeats the same thing about, you know, that's okay. But if it's okay, just let's make it okay, anyway.

CHAIRMAN SHACK: I am willing to have them make it conservative and let the licensee defend his position.

(Laughter.)

MEMBER BONACA: Well, I'm not saying in some cases it's true, but in other cases it's simply the practice, so you have to reflect, you know, existing practice, anyway.

CHAIRMAN SHACK: Well, I think if he's got experience to demonstrate that his practice is effective, that's fine.

MEMBER BONACA: It may be the case you will be right. And it emphasizes the range they can live with.

MEMBER STEKAR: I wanted to ask a question about the timing. You brought up originally staffing and schedules and things like that.

Your schedule for updating GALL is the end of 2010, according to this slide.

If I did a quick math, by the end of 2010 we'll have about 70, I believe, units already

scheduled for having -- at least having their license renewal application submitted already.

I would assume that -- let's assume that everybody is going to submit one. That leaves 30 or 35 or so, 33, 34 outstanding. I would assume that they will also by that time be very well underway with preparation of their applications.

Is an updated GALL by the end of 2010 going to have any practical impact on the number of exceptions in the license renewal application?

I mean it's nice to update the thing, but if it's updated after the fact, it's -- well, it's fine for the next wave 30 years from now, but --

MR. HOLIAN: I will take that question as are we doing it too late? We're trying to be efficient.

MEMBER STEKAR: Well, exactly.

MR. HOLIAN: I think it's worthwhile capturing it. There is, of course, the life after 60 that's still coming out there, and how would we use GALL in that, which is a possible answer.

But I think hopefully it's not too much effort to update it, categorize it, make it more efficient review.

I know license renewal will get pushed

eventually once my staffing is up, you know, my areas are up at critical. Can I do -- if they are, if they've grown from 40 percent applicable to GALL to 86 percent, consistent with GALL -- sorry, consistent with GALL -- you know, should my reviews and my review schedules show an efficiency?

So I know I'll get that question. I won't get it now because --

MEMBER STEKAR: My only question was the timing. If indeed 2010 is -- you know, use the flip term too late for this wave, should there be the emphasis to update it by the end of 2010? Or is that something you can use staff for, you know, and instead schedule that for 2015? You know, projecting the next wave.

MR. HOLIAN: Oh, I see. If we've already missed the time wave --

MEMBER STEKAR: If you already missed -- that's right.

MR. HOLIAN: I don't know, Sam, I think there's still --

CHAIRMAN SHACK: Either do it faster or do it later.

(Laughter.)

MEMBER STEKAR: Is it one of these things

of do it today or --

MEMBER MAYNARD: I struggled a little bit with the timing there, too. And even with -- I know it's quite a process to change anything within the guidance documents, so two years seemed a little bit extensive.

Have you explored other -- are there any other simpler ways that would get this done much quicker? And I'm brainstorming. Like a standard exemption or a standard exception to the GALL, something that could be done in our staff guidance. Something that would be more of an asterisk than having to write --

MEMBER SIEBER: That's what's going on now.

MR. HOLIAN: Let me let Jerry talk to it first, and we understand where you're going.

MR. DOZIER: During the 2005 update, I was the coordinator for the update of the GALL report, and actually it was one that was highly -- the industry was looking, you know, to that for guidance, and actually -- now like this looks like a two-year timeframe, but in reality they'll take that document when it goes out for public comments. They will probably use that document for the newer applications

at risk.

You know, of course, it could change, you know, between the -- well, it will change between the public comment period and the end. But they work at it at risk so they use -- you know, they can use that time, too, which is about halfway through the process. So that cuts that time down.

MR. HOLIAN: This is Brian Holian.

We'll take that thought. I know just from the legal folks that I've talked to, they don't like the ISG process being in place for too long. They need to get it into, you know, accepted guidance documents, and so I get pushed from OGC to get it right now.

Is there another thing, like an exemption you mentioned? I'll explore that with them. But we'll take that for a look.

I think in our view it was get it done now for the last wave, and then see how we can do with that, and then look at a future update as we finish through, you know, the current crop.

Go ahead.

DR. LEE: I think I had some discussion on this slide, so I'll just go back to Brian to close out.

MR. HOLIAN: Well, I don't have lengthy closing comments. We do view, even though I've stated some challenges we have in some areas that we're struggling with, and the IG recommendations can come off as tough for us in the middle of working our product lines to get that kind of advertisement.

We are a learning organization. We do want to be constantly improving. We think this committee has held us to be constantly improving over the years, and we look forward to continuing through that process, whether it's the guidance documents or suggestions on our SERs or suggestions from EPA on our EISs, we take those comments and we take them seriously.

We do view our work as mission critical. We do have the support of the Commission, both financially and with just their push at any meetings and all our meetings on the importance of this process, just for a comprehensive safety review, so we hold that up.

Out there in the public, we are probably the vision in NRR that is out in front of the public more than anybody else, and so we take pride in the fact that we want to give the public a good understanding of our process and how thorough it is,

and that's tough at times, and there's been criticisms both of the process and even the ASLB process, where the public -- they're still debating whether that's a good process for them to get their contentions through. But we believe it's working.

And I've mentioned about that we're working on improving our process in documentation. You'll probably see some aspects of it that we'll still fiddle with, you know, the audit process. We know it's important for us to be out there just like the inspectors out auditing.

You might hear from industry that we worked with them and they had a Q&A data base that we had, and we didn't spend too much time on that with Sam Lee going over that, but, you know, we saw in some plants here in the past year that we were delayed because our audit process -- we were almost reinspecting a lot, and there's a good piece to that, but it was delaying us on our schedules and processes from, you know, verifying things.

And so we want to get out there as much as we can, and we think we're more efficient almost when we're out there doing it at the site. But that's a balance, and so that's one of the changes that we've made, and we'll continue to evaluate that is what I'm

saying, going forward.

The GALL report, you know, over the years as you look back historically, it's been interesting to see the industry use that tool. So there's another success piece by itself where you've been able to come up with a well-used tool by the regulator that can be used for efficient reviews, and we want to reiterate that aspect today.

DR. LEE: This is Sam Lee again.

Just to add something. Okay. This GALL report is now so famous. IAEA has actually been working on an international GALL with other countries to put other reactor design like the Russian reactors, so the other countries are just starting, you know, this international GALL, okay, to make this, you know, more comprehensive.

MR. HOLIAN: That's all we have.

MEMBER BONACA: Before we adjourn, let me -- there is a request regarding the 20-megawatt plant?

MEMBER BLEY: Oh, the licensed research reactor.

MEMBER BONACA: And I think this lady has information.

MR. HOLIAN: Oh, good, Lisa Regner. Lisa is a new addition to license renewal, came over from

the operating reactors.

MS. REGNER: Good afternoon.

I spoke with a former branch chief for research and test reactors, Dan Collins, and he informed me, interestingly enough, there's no specific regulation associated with the research and test reactors.

What they effectively do, the bottom line is they go through the process under Part 50 of reissuing a new license. They call it a renewed license, but what happens is they are not under the same requirements that operating reactors are to keep their final safety analysis updated. So effectively they have to start from scratch and do all the same research.

MEMBER SIEBER: That will keep me busy for the next three years.

(Laughter.)

MEMBER BLEY: What more do you need?

MEMBER SIEBER: That's right.

MEMBER STEKAR: Hey, it's a career path.

MEMBER SIEBER: Talk about aging management.

MS. REGNER: Again, the staff does feel a bit of angst over that, so we may be looking at

changing that.

MEMBER SIEBER: Thank you. I think.

CHAIRMAN SHACK: Any other questions?

MEMBER MAYNARD: I think you addressed this, but I want to make it clear, because you talked about several of the challenges with staffing and continuing resolution stuff.

When it comes right down to it, you will slip a schedule rather than shortcut the review process; is that correct?

MR. HOLIAN: That's exactly right. That's exactly right. You know, a lot of aspects went into the Indian Point extension, and you know, we continue to evaluate that even under the current processes. We think we're getting through these fine. You can gauge them by our process. And as you look at those SERs, we are doing increased peer reviews of those.

So some of it was documenting what we tried to do historically, as I look back at what Dr. Lee put in place. But we are trying to document that and formalize some of these peer reviews a little better.

Even outside other divisions, people do power upgrades. How do you rate our safety evaluation. So we're trying to just improve that

aspect.

MEMBER SIEBER: Thank you.

CHAIRMAN SHACK: Okay. Only five minutes behind schedule.

We have a break until 10 of. We'll come back with some subcommittee reports.

(Whereupon, at 2:34 p.m., the meeting was concluded.)

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Protecting People and the Environment

NRO Overview Update of Appendix I to Part 50

ACRS Briefing
Nov. 6, 2008

Jean-Claude Dehmel
Health Physics Branch
U.S Nuclear Regulatory Commission
Office of New Reactors

Rationale for Update

- Outdated Appendix I numerical guides for design objectives

  Scientifically difficult to defend a dual system of radiation protection
- Inconsistent with global approach in licensing and building new plants
- Inefficient for licensees and NRC staff (doses calculated using two systems)

Rationale for Update

- Cost-benefit analyses may not justify keeping an outdated regulatory framework
- ICRP 2 no longer taught in health physics university curriculum
- May undermine public confidence in NRC licensing process
- Potential challenges in new plant licensing

Update of Appendix I to Part 50

- Focus in Updating Appendix I Guides and Dose Criteria (1)
  - align App. I criteria with Part 20 if revised, and if not,
  - align App. I criteria with current Part 20 (ICRP 26/30)
  - reconsider criteria in Sect. II.A, II.B, and II.C
  - update definition of dose receptors in Sect. II and IV

Update of Appendix I to Part 50

- Focus in Updating Appendix I Guides and Dose Criteria (2)
  - update cost-benefit criteria in Sect. II.D
  - assess whether Sect. I and V need qualifiers, i.e., existing fleet of reactors *vs* new plants
  - revise Sect. I in differentiating applicability between LWR, Non-LWR, and NGNP
  - review and update supporting NRC guidance and regulatory guides

Update of Appendix I to Part 50

- Focus in Updating Appendix I Guides and Dose Criteria (3)
- Other Associated Revisions
  - redefine compliance requirements for “licensed operation” for sites with multiple licensees
  - assess whether compliance with 40 CFR Part 190 needs further elaboration in Part 20 or guidance
  - Update NRC licensing basis and guidance documents

Update of Appendix I to Part 50

- Thanks for your attention
- Any questions?

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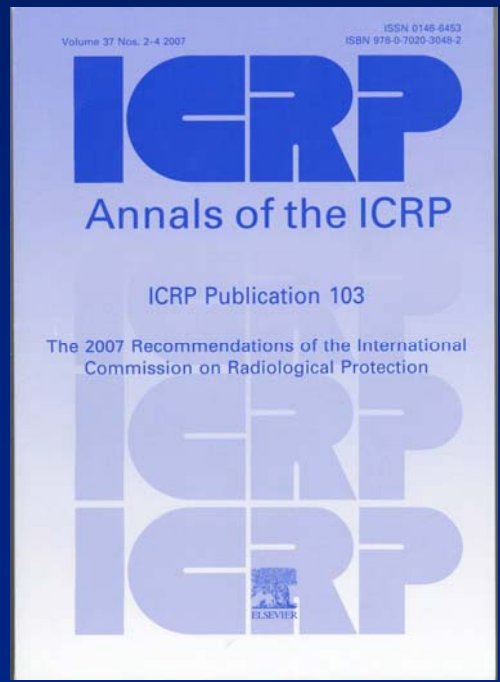
Commission Options Paper to Revise Radiation Protection Regulations

Advisory Committee on Reactor Safeguards
November 6, 2008

Donald A. Cool, Ph.D.
Senior Advisor
Radiation Safety and International Liaison
Office of Federal and State Materials and Environmental Management Programs

Background

- Commission direction in SRM-SECY-2001-0148 to wait for ICRP recommendations
- Commission did not approve staff working on Technical Basis materials
- ICRP Recommendations published in December, 2007 as Publication 103



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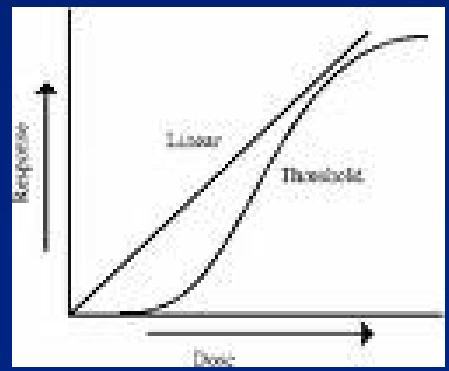
ICRP Publication 103

- Consolidated material from ICRP Publication 60 and subsequent publications
- Maintained fundamental principles of:
  Justification, Optimization, and Limitation
- Radiation risk remains as ~ 5 x 10^{-4} per rem
- LNT for prospective radiation control programs



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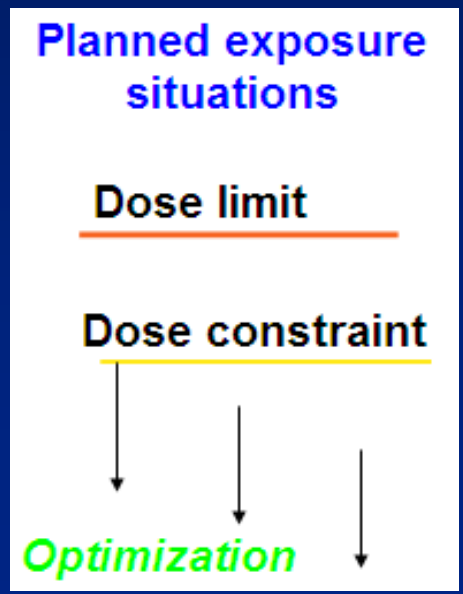
ICRP Publication 103

- Moves to a “situation” based framework
  - Planned Exposure Situations
  - Emergency Exposure Situations
  - Existing Exposure Situations
- Emphasis on Optimization using Dose Constraints
- Retained Dose Limits and values
  - Occupational Exposure: 10 rem / 5 years, max of 5 rem in any one year
  - Public Exposure: 100 mrem
  - Embryo/Fetus: 100 mrem



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ICRP Continuing Work

- Assessment of new scientific information has resulted in new tissue and radiation weighting factors
- Efforts now underway to calculate new dose conversion factors using updated models and information
- Commonly used radionuclides to be available in 2011 ... Complete set 2014

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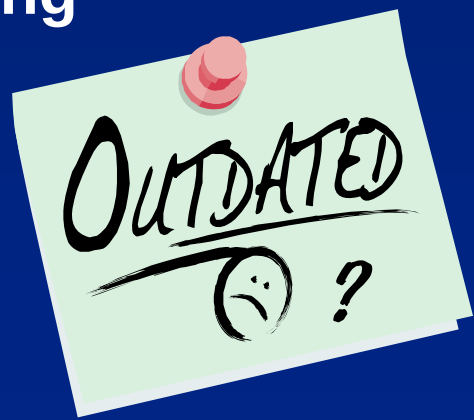
Staff Considerations

- Commissioners and staff have been asked on numerous occasions when the U.S. would update their regulations
- Some portions of regulations and guidance date back to ICRP Publication 1 and 2
- Nuclear power industry supports updates
- Rationale for action may include adequate protection, updating scientific information, trans-boundary implications, and achieving consistency of approach



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Staff Considerations

- NRC staff developing options for Commission consideration
- Senior Technical Group and Steering Committee
- Options due to Commission in December 2008

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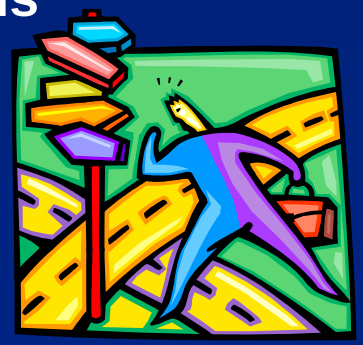
Regulatory Options

- **Status Quo**
  - **Make No Changes**
- **Update Part 50 and Appendix I**
  - **Make No Changes to Part 20**
  - **Focus on Reactors**
  - **Defer other portions of regulations**
- **Align towards ICRP Publication 103**
  - **Interact with stakeholders**
  - **Develop Technical Basis and Regulatory Analysis Information**



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Staff Preferred Option

- Option 3: Move towards alignment with ICRP 103
- Use next 2 – 3 years for:
  - Stakeholder Interactions
    - What are the Issues?
    - What are options and impacts?
    - What are costs and benefits … Back-fit?
  - Technical Basis development
- Provide recommendation for rulemaking to Commission when Technical Basis is available

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Technical Issues for Part 20

- Total Effective Dose
- Constraints
  - Occupational Exposure
  - Public Exposure
- Dose limits
  - Occupational
  - Public
  - Embryo/fetus of Declared Pregnant Female
- Numerical values of weighting factors and Appendix B

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Points to Ponder

- Changes to the radiation protection framework could be significant, impacting all types of licensees, and Agreement States
- What other issues do licensees and other stakeholders wish to have addressed?
- How do we effectively gauge benefits and impacts? Back-fit rule implications?
- Resources needed for Technical Basis, rulemaking, guidance, and code updates to support regulations

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Questions?

Questions?

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Status of License Renewal Activities

Brian Holian, Division Director
Samson Lee, Deputy Division Director
David Pelton, Branch Chief
Division of License Renewal
Office of Nuclear Reactor Regulation

Advisory Committee on Reactor Safeguards
November 6, 2008

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Agenda

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- Overview
- Status and Schedule
- Office of Inspector General Recommendations
- License Renewal Guidance
- Closing Remarks

Overview

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- Mature Process
- Good Guidance Documents
- Good Regional Interactions
- Finding Issues (metal fatigue, water in manholes, etc.)
- Challenges
  - Staffing
  - Continuing Resolution
  - Process Improvements
  - Knowledge Management

License Renewal Program Status

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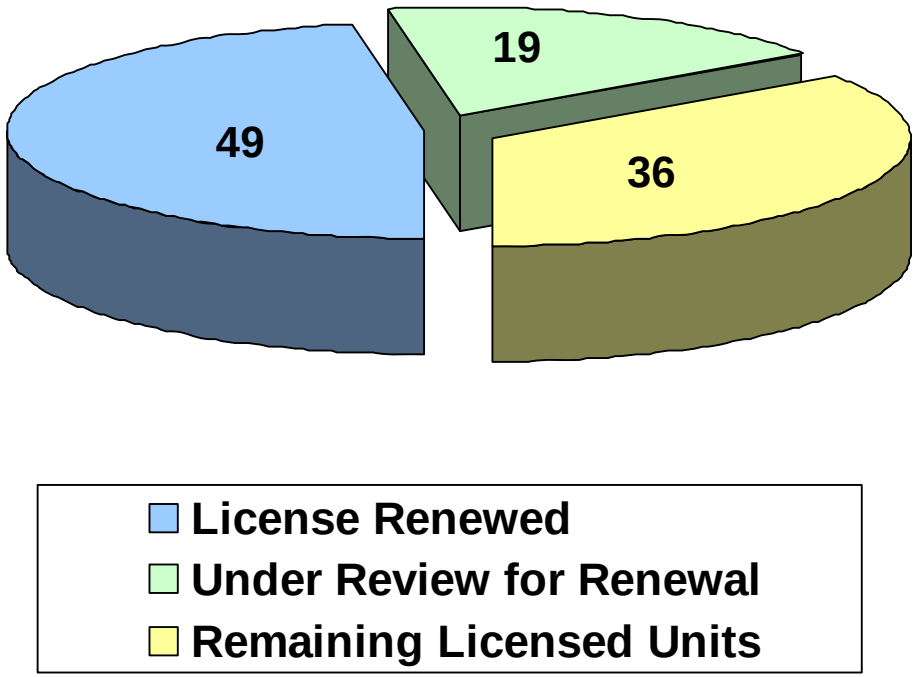
104 UNITS CURRENTLY LICENSED



Ongoing License Renewal Reviews

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Plant	ACRS Subcommittee	ACRS Full Committee	Status
Oyster Creek	Complete	Complete	ASLB decision to Commission (1 Contention); Review currently 10 months beyond 30 month planned review schedule
Pilgrim	Complete	Complete	ASLB decision to Commission (2 contentions); Review currently 3 months beyond 30 month planned review schedule
Vermont Yankee	Complete	Complete	ASLB admitted 3 contentions; Awaiting Board decision, Review currently 3 months beyond 30 month planned review schedule
Wolf Creek	Complete	Complete	SER issued
Harris	Complete	Complete	SER issued
Vogtle 1,2	11/5/2008	4/2009	SER w/ open items issued
Beaver Valley 1,2	2/2009	7/2009	Application under review
Indian Point 2,3	3/2009	9/2009	ASLB admitted 15 contentions; Review currently on track for 35 month planned review
Three Mile Island 1	4/2009	9/2009	Application under review
Susquehanna 1,2	4/2009	10/2009	Application under review
Prairie Island 1,2	7/2009	12/2009	11 contentions submitted; Awaiting ASLB decision on which will be admitted; Review currently on track for 30 month planned review
Kewaunee	TBD	TBD	Received August 14, 2008
Cooper	TBD	TBD	Received September 30, 2008
Duane Arnold	TBD	TBD	Received October 1, 2008

Expected License Renewal Reviews

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- FY 2009
  - Palo Verde 1, 2, 3
  - Crystal River 3
  - Salem 1, 2
  - Hope Creek
- FY 2010
  - STARS Plant No. 3
  - Columbia
  - Seabrook
  - Davis-Besse
- FY 2011
  - South Texas Project 1, 2
  - Waterford 3
  - Exelon Plant

Office of the Inspector General (OIG) Recommendations

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- Overall the NRC has developed a comprehensive license renewal process to evaluate applications for extended periods of operation

- OIG made 8 recommendations that would enhance program operations, e.g., documentation of the technical review

Response to OIG Recommendations

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1. Updated report-writing guidance to include management expectations and report-writing standards

2. Added safety evaluation report process review to verify that staff reports meet management expectations

3. Developed consistent guidance for removing applicants' documents during site audits

4. Coordinating with Regions on additional guidance for operating experience reviews

Response to OIG Recommendations (Cont'd)

5. Issued revised Inspection Procedure (IP) 71003: Post-Approval Site Inspection for License Renewal

6. Held public meeting at 2008 Regulatory Information Conference to discuss implementation of IP 71003

7. Coordinating with OGC on a draft revised Interim Staff Guidance (ISG) process to clarify 10 CFR 54.37(b) implications

8. Commission reaffirmed that the backfit rule does not apply to license renewal applications

Generic Aging Lessons Learned (GALL) Report

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- GALL is a catalog of generic aging management evaluations
  - Builds on previous aging studies
  - Reviews aging effects
  - Identifies relevant aging programs
  - Evaluates program attributes to manage aging effects

- GALL documents evaluations and conclusions
  - Program is adequate and no further evaluation is needed, or
  - Program should be augmented or new program considered

- GALL is a technical basis for the Standard Review Plan for License Renewal

Aging Management Program Elements

1. Scope of program
2. Preventative actions
3. Parameters monitored or inspected
4. Detection of aging effects
5. Monitoring and trending
6. Acceptance criteria
7. Corrective actions
8. Confirmation process
9. Administrative controls
10. Operating experience

Example Page of GALL Report

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V ENGINEERED SAFETY FEATURES
A Containment Spray System (PWR)

Item	Link	Structure and/or Component	Material	Environment	Aging Effect/ Mechanism	Aging Management Program (AMP)	Further Evaluation
V.A-8 (E-20)	V.A.6-a	Heat exchanger components	Stainless steel	Raw water	Loss of material/ pitting, crevice, and microbiologically influenced corrosion, and fouling	Chapter XI.M20, "Open-Cycle Cooling Water System"	No
V.A-9 (E-17)	V.A.6-c	Heat exchanger components	Steel	Closed cycle cooling water	Loss of material/ general, pitting, crevice, and galvanic corrosion	Chapter XI.M21, "Closed-Cycle Cooling Water System"	No
V.A-10 (E-18)	V.A.6-a	Heat exchanger components	Steel	Raw water	Loss of material/ general, pitting, crevice, galvanic, and microbiologically influenced corrosion, and fouling	Chapter XI.M20, "Open-Cycle Cooling Water System"	No
V.A-11 (EP-39)	V.A.	Heat exchanger tubes	Copper alloy	Closed cycle cooling water	Reduction of heat transfer/ fouling	Chapter XI.M21, "Closed-Cycle Cooling Water System"	No
V.A-12 (EP-47)	V.A.	Heat exchanger tubes	Copper alloy	Lubricating oil	Reduction of heat transfer/ fouling	Chapter XI.M39, "Lubricating Oil Analysis" The AMP is to be augmented by verifying the effectiveness of the lubricating oil analysis program. See Chapter XI.M32, "One-Time Inspection," for an acceptable verification program.	Yes, detection of aging effects is to be evaluated

License Renewal
Audits and Inspections

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- Audits
  - Onsite scoping and screening methodology audit
  - Onsite Generic Aging Lessons Learned (GALL) consistency audit

- Inspections
  - IP 71002: License Renewal Inspection
  - IP 71003: Post-Approval Site Inspection for License Renewal

License Renewal Guidance

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- Interim Staff Guidance (ISG) Status
  - Update of license renewal ISG process document
    - Staff is preparing draft for public comment
  - Revision of non-EQ electrical cable connections aging management
    - Staff is finalizing ISG for issuance
  - Station blackout (SBO) scoping for license renewal
    - Staff is reviewing and evaluating public comments

Non-EQ Inaccessible/Underground Cables

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- LERs and IP 71002 license renewal inspections have identified submerged cables in manholes
- NRR/DE issued GL 2007-01 requesting licensees to provide failure information on inaccessible or underground electrical cables
- DE is currently evaluating GL responses and proposing:
  - Issue a Regulatory Guide that identifies the essential elements of an electrical cable monitoring program
  - Revise applicable ROP inspection procedures
  - Take regulatory actions for licensees who have not demonstrated cable qualification for the current licensed period
- License renewal guidance will consider operating experience and be revised as necessary

License Renewal Guidance

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- GALL Report was issued in 2001 and updated in 2005
- Staff planning next update to GALL Report
  - Start in January 2009
  - Complete by December 2010
- Associated documents:
  - GALL Report, Vol. 1 and 2 (NUREG-1801)
  - Standard Review Plan (NUREG-1800)
  - Technical Bases
  - Analysis of Public Comments
- Incorporate lessons learned from the review of license renewal applications, operating experience, public comments, and approved Interim Staff Guidance

Closing Remarks

U.S.NRC
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- License renewal is a successful program
- Increasing public interest as shown in ASLB hearings and petitions to the Commission
- Staff is improving license renewal process and documentation
- Staff plans to update GALL Report

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Presentation to the 557th ACRS Meeting

Summary of Staff Review of ESBWR DCD Chapter 14 and Tier 1
and
Overview of Tier 1, Tier 2, Tier 2*, ITAAC and DAC as used in Design Certifications

Presented by Eric Oesterle
Lead Project Manager (NRO/DNRL/NGE1)
November 6, 2008

Staff Review of ESBWR Chapter 14 and Tier 1
Overview of Design Certification

Purpose

- Provide a brief status of staff's review of ESBWR DCD Tier 2, Chapter 14, Initial Test Program and ITAAC, and Tier 1
- Provide an overview and historical perspective on the use of Tier 1, Tier 2, Tier 2*, ITAAC and DAC for design certifications
- Discuss overlap between ITAAC and Initial Test Program

Staff Review of ESBWR Chapter 14 and Tier 1
Overview of Design Certification

- 10 CFR Part 52 first promulgated in 1989: Part 52 is a “process rule”; Part 50 contains technical requirements
- Part 52 implementation - guidance contained in SECY papers
  - SECY 90-377 (level of detail)
  - SECY 91-178 (ITAAC)
  - SECY 92-053 (design acceptance criteria = DAC)
  - SECY 92-214 (ITAAC for ABWR and System 80+)
- Level of detail - graded approach - tiered approach (2 tiers)
  - Tier 1 is certified - enforces/promotes standardization
  - Tier 2 is approved - contains FSAR level information
- Part 52 - Predictability, scope, timing - what will be inspected, when will it be inspected, what is the acceptance criteria for the inspection (ITAAC)
- ITAAC for DC; ITAAC for COL - those inspections, tests, and analyses, whose successful completion demonstrates that the facility has been constructed and will operate in conformance with the (certified design) license

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Regulations:

- 10 CFR 52, Subpart B - Standard Design Certifications
- Design certifications codified by rulemaking (DCRs) - included as Appendices to 10 CFR Part 52
- 10 CFR 52, Subpart C - Combined Licenses
- Design certification applications - 10 CFR 52.47(b)(1): for DC only

  "The application must also contain the proposed inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations…"

- Combined License applications - 10 CFR 52.80(a): for entire facility

  "The application must contain the proposed inspections, tests, analyses, including those applicable to emergency planning, that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, the facility has been constructed and will be operated in conformity with the combined license, the provisions of the Act, and the Commission's rules and regulations."

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Regulatory guidance:

- Standard Review Plan 14.3, Inspections, Tests, Analyses and Acceptance Criteria (ITAAC)

  - Draft Rev. 0, April 1996

  - March 2007

- Regulatory Guide 1.206, Combined License (COL) Applications for Nuclear Power Plants
  - Section C.II.1, ITAAC
  - Section C.III.5, Design Acceptance Criteria
  - Section C.III.7, ITAAC for COL Applications referencing a Certified Design and/or Early Site Permit

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Tier 1, Tier 2, Tier 2* - defined in Section II of design certification rule(s)

Tier 2: “means the portion of the design-related information contained in the generic DCD that is approved but not certified by this appendix (Tier 2 information)...”

*Changes to or departures from Tier 2 information are governed by the processes in Section VIII.B of the DCR and may require prior NRC approval (“50.59-like process”)

Tier 1: “means the portion of the design-related information contained in the generic DCD that is **approved and certified** by this appendix (hereinafter Tier 1 information). The design descriptions, interface requirements, and site parameters are *derived from Tier 2 information*.”

*Changes to and Departures from Tier 1 information require NRC approval and are governed by the processes in Section VIII.A of the DCR

Tier 2*: “means the portion of the Tier 2 information, designated as such in the generic DCD, which is subject to the change process in Section VIII.B.6 of this appendix. This designation expires for some Tier 2* information under Section VIII.B.6”

Staff Review of ESBWR Chapter 14 and Tier 1
Overview of Design Certification

Q: What is ITAAC? Ans: ITAAC is a Verification Program

- Design certification applications - 10 CFR 52.47(b)(1): for DC only
- Combined License applications - 10 CFR 52.80(a): for entire facility
- ITAAC must be successfully completed prior to fuel load
- Initial test program (pre-op, start-up, power ascension)
- ITAAC has overlap with the Initial Test Program although the purposes of these two programs are different (i.e., there may be one test that is part of the pre-operational test program that satisfies both an ITAAC and an ITP requirement; however, when that one test is completed, two separate and independent boxes must be checked)

Staff Review of ESBWR Chapter 14 and Tier 1
Overview of Design Certification

Inspections, Tests, Analyses, and Acceptance Criteria

- ITAAC contains limited design completion aspects - DAC
- Graded approach commensurate with the safety significance of the structures, systems, and components
- Verification of as-built/as-installed condition
- No new design information can be in Tier 1, it must all be in Tier 2
- Tier 2 can provide supplementation information on how ITA are to be performed to satisfy AC

Staff Review of ESBWR Chapter 14 and Tier 1
Overview of Design Certification

Inspections, Tests, Analyses, and Acceptance Criteria

- Format and content
  - Design commitment
  - Inspections, Tests, Analyses
  - Acceptance criteria - objective and verifiable
- Primarily written on structure, system, component basis
- COLs have the responsibility to successfully complete all the ITAAC prior to fuel load, notify NRC of successful ITAAC completion, and provide adequate documentation for NRC verification
- NRC inspection and/or audit
- NRC has the responsibility to provide notice in the Federal Register of their verification of successful ITAAC completion

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
The functional arrangement of the NBS is as described in the Design Description of this Subsection 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3.	Inspection of the as-built system will be performed.	Report(s) document that the as-built NBS conforms to the functional arrangement described in the Design Description of this Subsection 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3. For components and piping identified in Table 2.1.2-1 as ASME Code Section III, this report is an ASME Code report.
The piping identified in Table 2.1.2-1 as ASME Code Section III retains its pressure boundary integrity at its design pressure.	A hydrostatic test will be conducted on the code piping of the NBS required to be hydrostatically tested by the ASME Code.	An ASME Code Report exists and concludes that the results of the hydrostatic test of the ASME Code piping of the NBS comply with the requirements of the ASME Code Section III.
The throat diameter of each MSL flow restrictor is sized for design choke flow requirements.	Inspections of each as-built MSL flow restrictor throat diameter will be performed.	Report(s) document that the throat diameter of each MSL flow restrictor is less than or equal to 355 mm (14 in.).

Staff Review of ESBWR Chapter 14 and Tier 1
Overview of Design Certification

Design Acceptance Criteria (DAC):

- DC applicants were not providing design and engineering information at a level of detail customarily reviewed by the staff in reaching a safety decision
- Pipe stress analyses, radiation shielding, instrumentation and control systems, control room design details
  - rapidly changing technologies
  - no as-built information
  - no as-procured information
- DAC are a set of prescribed limits, parameters, procedures, and attributes upon which the NRC relies, in a limited number of technical areas, in making a final safety determination to support design certification
- DAC must be verified as part of the ITAAC performed to demonstrate that the as-built facility conforms to the certified design
- DAC may be closed out prior to or following COL issuance and shall be closed out prior to fuel load as part of ITAAC

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Summary of Staff Review of Section 14.2, Initial Test Program:

- Regulations - 10 CFR 50.34(b)(6)(iii) and 10 CFR 52.79(a)(28)
- Review guidance
  - RG 1.68, RG 1.20, RG 1.70, RG 1.206
  - SRP 14.2
- NRO staff issued 98 RAIs
- GEH resolved 93 of 98
- Unresolved RAIs associated with:
  - expansion, vibration and dynamic effects testing
  - testing of digital instrumentation and control system functions
  - safety system logic and control pre-operational testing
  - lead detection and isolation system pre-operational testing
  - reactor internals vibration testing
  - AC power distribution system pre-operational testing

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Summary of Staff Review of Section 14.3 and Tier 1:

- Regulations - 10 CFR 52.47(b)(1)
- Review guidance; Standard Review Plan 14.3, ITAAC
  - SRP 14.3.2, Structural and Systems Engineering
  - SRP 14.3.3, Piping Systems and Components
  - SRP 14.3.4, Reactor Systems
  - SRP 14.3.5, Instrumentation and Controls
  - SRP 14.3.6, Electrical Systems
  - SRP 14.3.7, Plant Systems
  - SRP 14.3.8, Radiation Protection
  - SRP 14.3.9, Human Factors Engineering
  - SRP 14.3.10, Emergency Planning
  - SRP 14.3.11, Containment Systems
  - SRP 14.3.12, Physical Security Hardware

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Summary of Staff Review of Section 14.3 and Tier 1:

- RAI status - 437 RAIs issued/364 resolved
- Selection criteria and methodology determined to be consistent with guidance in SRP 14.3 - **RAI 14.3-405** issued to provide cross-reference tables of key aspects, analyses, and features of the design for inclusion in ITAAC

- COL Action Item on DAC closure schedule
- Interface materials - PSWS and offsite power - **RAI 14.3-394**
- No review performed for SRP 14.3.10, Emergency Planning: EP-ITAAC not provided in DC application as this is COLA specific
- Review for SRP 14.3.12, Physical Security Hardware, is on-going

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Review of Tier 1:

Examples of lessons learned from previous DC reviews:

- review by former Senior Resident Inspectors involved in development of the NRC's ITAAC inspection program and documentation requirements for ITAAC closeout (NEI working group)
- format and consistency (e.g., ASME Code)
- "basic configuration" ITAAC (ABWR design) uncoupled to result in individual ITAAC entries for verifications of functional arrangement, welding, seismic qualification, environmental qualification, MOV functions
- identification of individual ITAAC entries that constitute design acceptance criteria {{DAC}}

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Review of Tier 1:

Areas of ESBWR DCD review which include remaining open items:

- digital instrumentation and control systems
- human factors engineering
- electrical systems
- containment systems
- reactor systems
- format and consistency issues across similar ITAAC

Staff Review of ESBWR Chapter 14 and Tier 1 Overview of Design Certification

Discussion/Committee Questions