

Official Transcript of Proceedings  
NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Reactor Safeguards  
570th Meeting

Docket Number: (n/a)

Location: Rockville, Maryland

Date: Friday, March 5, 2010

Work Order No.: NRC-098

Pages 1-238

**NEAL R. GROSS AND CO., INC.**  
**Court Reporters and Transcribers**  
**1323 Rhode Island Avenue, N.W.**  
**Washington, D.C. 20005**  
**(202) 234-4433**

1 UNITED STATES OF AMERICA  
2 NUCLEAR REGULATORY COMMISSION

3 + + + + +

4 570TH MEETING

5 ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

6 (ACRS)

7 + + + + +

8 FRIDAY,

9 MARCH 5, 2010

10 + + + + +

11 ROCKVILLE, MARYLAND

12 + + + + +

13 The Advisory Committee met at the Nuclear  
14 Regulatory Commission, Two White Flint North, Room  
15 T2B1, 11545 Rockville Pike, at 8:30 a.m., Said I.  
16 Abdel-Khalik, Chairman, presiding.

17 COMMITTEE MEMBERS:

18 SAID I. ABDEL-KHALIK, Chairman

19 J. SAM ARMIJO, Vice Chairman

20 JOHN W. STETKAR, Member-at-Large

21 GEORGE E. APOSTOLAKIS, Member

22 SANJOY BANERJEE, Member

23 DENNIS C. BLEY, Member

24 MARIO V. BONACA, Member

25 CHARLES H. BROWN, JR., Member

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

## 1 COMMITTEE MEMBERS: (cont.)

2 MICHAEL L. CORRADINI, Member

3 DANA A. POWERS, Member

4 HAROLD B. RAY, Member

5 MICHAEL T. RYAN, Member

6 WILLIAM J. SHACK, Member

7 JOHN D. SIEBER, Member

8  
9 ACRS STAFF PRESENT:

10 EDWIN M. HACKETT, Executive Director

11 ZENA ABDULLAHI

12 CHRISTINA ANTONESCU

13 MAITRI BANERJEE

14 KATHY WEAVER  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1  
2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

T-A-B-L-E O-F C-O-N-T-E-N-T-S

Opening Remarks by the ACRS Chairman ..... 4

Digital Instrumentation and Control (I&C)

    Design Acceptance Criteria (DAC)

    Inspection Methodology ..... 5

New Advanced Reactor Designs ..... 82

Meeting with the NRC Executive Director

    for Operations ..... 157

Further ACRS Activities/Report of the

    Planning and Procedures Subcommittee ..... 215

Adjourn

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

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

8:30 a.m.

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

This is the second day of the 570th Meeting of the Advisory Committee On Reactor Safeguards. During today's meeting, the Committee will consider the following: Digital Instrumentation and Control Design Acceptance Criteria Inspection Methodology; New Advanced Reactor Designs; Meeting with the NRC Executive Director for Operations; Future ACRS Activities and Report of the Planning and Procedures Subcommittee; Reconciliation of ACRS Comments and Recommendations; and Preparation of ACRS Reports.

The meeting is being conducted in accordance with the provisions of the Federal Advisory Committee Act. Ms. Christiana Antonescu is the Designated Federal Official for the initial portion of the meeting.

We have received no written comments or requests for time to make oral statements from members of the public regarding today's sessions. Westinghouse staff members will be on a phone bridge line listening to the discussion on digital

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

(202) 234-4433

[www.nealrgross.com](http://www.nealrgross.com)

1 instrumentation and control design acceptance criteria  
2 inspection methodology. To preclude interruption of  
3 the meeting, the phone will be placed in a listen only  
4 mode during the presentations and committee  
5 discussions.

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

11 Mr. Bley will lead us through the  
12 discussions of the first item on the agenda for today.

13 MEMBER BLEY: Thank you, Mr. Chairman.

14 We're beginning with the discussion of the  
15 Digital I&C Design Acceptance Criteria and this  
16 follows up last fall's, I think in November,  
17 initiation of the task working group and a part of the  
18 staff to look at how DAC closure following a COL would  
19 progress. And the folks on staff will know that the  
20 Committee is quite interested in this topic.

21 We had a little discussion on this area  
22 and the human factors engineering side earlier this  
23 week in the ABWR Subcommittee. This is an information  
24 briefing and we're looking forward to hearing how the  
25 work's progressing and what we expect in the future.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           At this time, I turn it over to Tom  
2 Fredette on staff.

3           MR. FREDETTE: Thank you, Mr. Bley. My  
4 name is Thomas Fredette. I'm an Operations Engineer  
5 in the Construction, Assessment, Enforcement and  
6 Allegations Branch, Division of Construction,  
7 Inspections and Operational Programs, Office of New  
8 Reactors.

9           As Mr. Bley mentioned, this is an  
10 informational brief for the Committee. We wanted to  
11 continue the dialogue that was set forth in 2009  
12 regarding the staff's planning for an approach to the  
13 issue of design acceptance criteria in the current  
14 crop of DCDs and COL applications and the actions that  
15 the staff has taken to address that issue. I'm also  
16 the Designated Lead for the Design Acceptance Criteria  
17 or DAC Resolution Working Group which was commissioned  
18 or chartered back in November of 2009.

19           Some objectives for this meeting. We want  
20 to provide the Committee basically some details of our  
21 DAC inspection methodology. We want to provide a  
22 little overview of our approach and plan for  
23 conducting a pilot DAC inspection in conjunction with  
24 South Texas Project Units 3 & 4 design. And I'll  
25 provide a little brief summary of some long-term goals

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that we envision for integrating the lessons learned  
2 that we gained from the DAC inspection process with  
3 the ITAAC Closure process.

4 A little background. In mid-2009, the  
5 staff was initiating some inspection framework for  
6 what we call complex ITAAC or DAC. These are ITAAC  
7 that generally are not seen until the end. They're  
8 generally not ITAAC that involve as-built verification  
9 or testing in the field. These are ITAAC that involve  
10 review of detailed technical reports.

11 As we were developing that framework at  
12 about this same time, South Texas project requested in  
13 a letter in June 2009 a staff review or audit of some  
14 of their early digital I&C design elements. These  
15 were high level planning reports, things like that.

16 As a result of that letter, the staff  
17 decided to commence a pilot effort to address the  
18 South Texas project request. And that's basically  
19 what led to the development of the DAC Resolution  
20 Working Group.

21 The benefit of a pilot effort. We felt  
22 that it would allow the staff to gain some confidence  
23 in the early stage in the South Texas project digital  
24 I&C design. It will help inform our envisioned DAC  
25 inspection process which will ultimately enable us to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 optimize our resources for future DAC inspection.

2 Just a little overview of the DAC Working  
3 Group.

4 MEMBER APOSTOLAKIS: What is the benefit  
5 for South Texas? Why did they initiate it?

6 MR. FREDETTE: Our understanding is that  
7 they had some early design products that were going to  
8 be related to their overall digital I&C design and  
9 they were looking for some review of those products  
10 basically to gain some confidence that they were on  
11 the right track.

12 MEMBER APOSTOLAKIS: Okay.

13 MEMBER CORRADINI: If I may. I'm looking  
14 ahead. Is somewhere in this are we going to see like,  
15 not a time line, at least a process line as to when  
16 this appears relative to certification and to fuel  
17 load?

18 MR. FREDETTE: Not really.

19 MEMBER CORRADINI: Is that eventually  
20 going to be part of the working group? Because at  
21 least with another certification some of the Committee  
22 members on my subcommittee have angst about timing  
23 relative to certification and where in the COLA this  
24 occurs. So I guess I assume this kind of trial will  
25 help clarify that.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. FREDETTE: Yes, it should, Mr.  
2 Corradini. As we envision it, most digital I&C DAC  
3 inspection will be conducted deep into the  
4 construction phase.

5 MEMBER CORRADINI: And the question we are  
6 and we can hold off and let you continue is how deep.  
7 That is that's where I think the uncertainty seems to  
8 be.

9 MR. TANEJA: I can speak from the --

10 MEMBER CORRADINI: If you're going to get  
11 into it later, that's fine.

12 MR. TANEJA: I can speak from the site --

13 MR. FRYE: If I can jump in. I'm sorry,  
14 Dinesh. My name is Tim Frye. I'm the Chief of the  
15 Construction Assessment Branch and Tom works for me.

16 I don't know that we're actually going to  
17 get into that because the purpose of this brief is  
18 really to discuss our strategy for DAC inspection.

19 MEMBER CORRADINI: Whenever it occurs.

20 MR. FRYE: Whenever it occurs. Now the  
21 decision when that occurs is a separate topic that  
22 we're not really covering.

23 MEMBER CORRADINI: That's fine. I just  
24 wanted to bring it up because I think to the extent  
25 that at least for the ESBWR I'm looking -- the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 Committee members can tell me if I'm misinterpreting -  
2 - where the concern was wasn't that staff, once we  
3 understood the process, wasn't going to do the process  
4 appropriately. It's when it would occur and could we  
5 have a chance to look at it and comment on it in some  
6 fashion. That was part of our concern. I'm looking  
7 at Dennis. Am I misinterpreting?

8 MEMBER BROWN: Can I make an observation?

9 MEMBER CORRADINI: I just want to make  
10 sure. Do I have --

11 MEMBER BLEY: Yes, that was part of our  
12 concern.

13 MEMBER BROWN: One of the issues we  
14 brought up on emphasizing the ESBWR in the meeting,  
15 the earlier meeting, was with the DAC there are two  
16 aspects to the DAC/ITAAC or ITAAC/DAC, however you  
17 want to phrase it. There are the design attributes  
18 that you're supposed to meet when you're designing the  
19 equipment or to design the functionality and  
20 everything that you establish in development. Whether  
21 it's hardware, software, it doesn't make any  
22 difference but that you're going to use to construct,  
23 manufacture and test to make sure it meets its  
24 performance requirements.

25 Then there's the ITAAC part, the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 inspection. The installation doesn't get hooked up  
2 right or the wires connected to this, all that type of  
3 stuff. Do the switches operate with the other  
4 integrated systems in the plant? All those other. So  
5 there are two aspects to it.

6 Obviously, one part will be done deep into  
7 the construction phase when you've installed the  
8 equipment and you're running your integrated test  
9 program at the site. The design phase where you prove  
10 that you've got independence, redundancy, determinacy.

11 You meet EMI requirements, environmental  
12 requirements, all that. That's done early. Somebody  
13 has to look at that.

14 And the question in my mind was who looks  
15 at that and when. And if it's done too late, then  
16 that's a problem.

17 MR. FRYE: Right.

18 MEMBER BROWN: I'm not saying you have to  
19 define that now. I'm just saying --

20 MR. FRYE: I'll let -- I'll give it back  
21 to Tom and Dinesh in a second. But I just wanted to  
22 make sure everyone understands that I think the first  
23 question is really a licensing question, you know, how  
24 DAC is being used in the licensing process and this is  
25 really an inspection brief. This is a briefing on the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 inspection that we're developing to review the  
2 licensee's closeout of DAC. And I think you're really  
3 in the licensing area. So we had not planned to cover  
4 that.

5 MEMBER CORRADINI: That's fine. But I'll  
6 say it one last time which is okay, it doesn't fit  
7 here. But unless we understand where it fits, we're  
8 not going to stop asking questions.

9 MEMBER-AT-LARGE STETKAR: I think the  
10 problem is that when we talk to as you characterize it  
11 the licensing folks they say --

12 MEMBER CORRADINI: They throw it to you.

13 MEMBER-AT-LARGE STETKAR: -- it's in your  
14 responsibility to perform that design review. That's  
15 why you're here and if you're saying it's their  
16 responsibility, now we're getting that's back where we  
17 came from.

18 MEMBER APOSTOLAKIS: That's exactly the  
19 problem.

20 MR. WILSON: This is Jerry Wilson. I'll  
21 speak for Licensing.

22 (Laughter.)

23 MEMBER CORRADINI: I knew you were there  
24 for something.

25 MR. WILSON: Remember. We have addressed

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 this in the past. I'll just restate our basic  
2 position we've taken on this. There's really three  
3 main opportunities where we see DAC being resolved.  
4 One is during the design certification, more  
5 specifically an amendment to design certification.  
6 And you're seeing some of that in the amendment review  
7 for AP1000.

8 MEMBER CORRADINI: Right.

9 MR. WILSON: Another opportunity is during  
10 the combined license review. The last opportunity is  
11 during the construction phase. Timing as to when is a  
12 choice made by the applicant or licensee. We're not  
13 controlling this. The NRC is encouraging applicants  
14 and licensees to do it as soon as possible. We see  
15 that the later you do it the more problems or more  
16 difficulty there's going to be.

17 So that's where we're at. But the choice  
18 is the applicant's or licensee's choice as to exactly  
19 when they submit that documentation.

20 MEMBER-AT-LARGE STETKAR: We recognize  
21 that opportunity. I will give you specific example in  
22 the North Anna COLA process in which case the DAC are  
23 not being resolved at all with respect to digital I&C  
24 at the DCD. There is simply very high level  
25 functional programs.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           And the COL applicant has directly passed  
2 through all of that. There will be no addressed DAC  
3 on digital I&C at the COL phase. So it's a complete  
4 pass-through. And that's a real example that's on our  
5 table right now.

6           So it's not a hypothetical opportunity  
7 situation. It's not a revision of an AP1000 design  
8 certification. It's a real world/real time situation  
9 that we're facing.

10           MEMBER CORRADINI: So just to emphasize  
11 because I think John said it perfectly. So what I  
12 hear from you, Jerry -- and it's not the topic of this  
13 thing, so I'll stop with this point -- is if we come  
14 to a certification of ESBWR we have to have faith --  
15 at least I have to have faith -- that downstream it's  
16 going to be done early enough that we can understand  
17 it and comment on it so that when I come to a  
18 certification of a particular design we either pass it  
19 through saying, "Yes, we have faith" or what?

20           MEMBER APOSTOLAKIS: Coming back to the  
21 North Anna example, is there still a distinction  
22 between licensing and inspection now?

23           MEMBER-AT-LARGE STETKAR: Essentially no  
24 because there will be no review, there will be no  
25 closeout, of those DAC except by the inspection folks.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: That's exactly the  
2 point so?

3 MEMBER CORRADINI: But I think Jerry's  
4 answer. I understand Jerry's answer -- at least I  
5 thought it did -- which is --

6 MEMBER APOSTOLAKIS: Well, let him explain  
7 it again.

8 MEMBER CORRADINI: I thought you said --  
9 What I heard you say in the three possibilities is  
10 that if staff thinks they've done enough on a high  
11 level phase of the certification staff will say,  
12 "Okay. You take the risk. This is good enough for  
13 certification. It will either be at COL stage or an  
14 inspection stage."

15 And we're saying "Well, even we're going  
16 to say it's not good enough because it's too vague and  
17 you've allowed other vague" -- I'll just put it on the  
18 record -- "You've allowed other vague certifications  
19 like this and you're hoping to catch it later." And  
20 this is a new group of people that worry about vague.

21 MEMBER-AT-LARGE STETKAR: And later is now  
22 is the point.

23 MEMBER CORRADINI: Yes.

24 MEMBER-AT-LARGE STETKAR: It's not ABWR in  
25 the mid-90s. It's North Anna COLA today.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. WILSON: Can I respond to Dr.  
2 Apostolakis?

3 CHAIRMAN ABDEL-KHALIK: Let Jerry speak.

4 MR. WILSON: From a licensing perspective,  
5 the creation/resolution of the DAC which are a special  
6 kind of ITAAC is the resolution at the design  
7 certification stage, Commission or future  
8 Commissioners.

9 MEMBER APOSTOLAKIS: Right.

10 MR. WILSON: As a matter of policy allowed  
11 certain design information to be resolved via DAC. So  
12 from a licensing perspective the creation of that DAC  
13 is the resolution for the design certification stage.

14 Because it's a special kind of ITAAC it doesn't need  
15 to be resolved until we get into the construction  
16 phase.

17 MEMBER BROWN: I disagree with that. If I  
18 don't have equipment that meets basic design  
19 requirements such as independent separation of data  
20 communications and stuff like that, you can't wait  
21 until construction to resolve that. See if you can  
22 get them excited.

23 MEMBER BLEY: There are three things I'd  
24 say and then I'm going to ask you folks to go ahead.  
25 You brought up the AP1000 and that's an interesting

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 case for us because there we actually see many of the  
2 DAC being resolved and being reviewed in detail. And  
3 that process is generating a fair number of questions  
4 as it would have if it had been done in the design  
5 certification stage. So we're having some trouble as  
6 you can hear coming to grips with how this will, this  
7 design will, be addressed how clearing the DAC will  
8 ensure the design is adequate and installed properly.

9 And I guess one thing I hang on words is  
10 SECY 92-053 speaks of inspections, tests and analyses  
11 to resolve the DAC. And what we hear back are just  
12 it's inspection. And to us inspection means something  
13 fairly narrow and perhaps to you it means something  
14 more broad.

15 When we were talking about this with the  
16 ABWR folks we heard that some of the inspectors in  
17 this broader sense will actually be Headquarter staff  
18 people who are experts and they're going through at a  
19 very thorough level in the review.

20 We want to hear how that all fits  
21 together. I'm going to give it back to you to work  
22 through this.

23 MR. FREDETTE: Mr. Bley, you're correct.  
24 I'm mean our strategy, and I'll get into this a little  
25 bit more, does involve using the technical staff

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 experts in the field, not in their field, in the  
2 digital I&C field as inspector resources or inspection  
3 resources. So you could look at it as first-of-a-kind  
4 type of inspection where we're broadening it a little  
5 bit, providing a little bit more rigor than just the  
6 standard of verifying type.

7 MEMBER APOSTOLAKIS: But that's an  
8 instinct. Is it going to be as rigorous as the  
9 evaluation would have been had it occurred during the  
10 DCD? I think that's really what worries this  
11 Committee. It may be rigorous, but because you know  
12 rigor is a broad spectrum of things. So if we do  
13 something --

14 MEMBER POWERS: Rigor is rigor, George.

15 (Laughter.)

16 MEMBER APOSTOLAKIS: No, it can mean a  
17 little --

18 MEMBER POWERS: It isn't possible to be  
19 half pregnant in this situation.

20 MEMBER APOSTOLAKIS: No, it is. It is.

21 MR. FRYE: Tim Frye. I'll take the first  
22 and try to respond to that. The inspection is going  
23 to be very rigorous. As we mentioned, we're enlisting  
24 our Headquarters digital I&C experts to support the  
25 inspection. But it is to be clearly understood that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 there's a clear distinction between inspection and  
2 licensing and as you'll see later in this presentation  
3 the inspection that we're doing is in no case meant to  
4 replace the licensing activities. The licensing will  
5 happen as it's supposed to happen. A licensing  
6 decision will be made. The DAC will be improved and  
7 we're going to inspect the applicant's, the license  
8 holder's, closeout of it.

9 This is not a licensing activity. This is  
10 an inspection and it will be done very rigorous. But  
11 it's a different rigor from a licensing activity.

12 MEMBER RAY: Let me say one thing here  
13 just as an outsider to this whole debate. So much of  
14 what I've seen and I have read the presentation we're  
15 about to air is on can we demonstrate that what we  
16 have conforms with the licensing criteria. I'll use  
17 that term.

18 The real question in my mind is can we  
19 determine that notwithstanding that it's still  
20 unsatisfactory for some reason. And that really goes  
21 to the question of what the DAC itself say, how  
22 prescriptive, how perfect, they can be.

23 And I think a lot of the concern among  
24 members is can we make the DAC so perfect that you  
25 can't produce something that meets the DAC and still

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 is unacceptable.

2 That's my take on this. It's not directly  
3 responsive to the dialogue you've been having, but it  
4 is to the point that we're going to inspect the heck  
5 out of this and do a really good job. Well, I'm sure  
6 you will. But the question still is is that going to  
7 ensure we don't have an unsatisfactory outcome

8 MEMBER BANERJEE: That is one of the  
9 objectives of the inspection.

10 MEMBER RAY: The inspection can only  
11 answer the question does it satisfy the DAC. That's  
12 all it can do. That's what you're telling me.

13 MEMBER BANERJEE: The underlying purpose  
14 of the inspection is to ensure that the as-built  
15 design conforms with the licensing basis as it  
16 conforms with all the regulations. That really is the  
17 underlying purpose of the inspection.

18 MEMBER RAY: You're just reinforcing what  
19 I said though. Unless you can write it down in a way  
20 that excludes the possibility of something  
21 unsatisfactory there's no way the inspection you're  
22 talking about here today can do more than say, "Well,  
23 it met the licensing basis."

24 MEMBER BANERJEE: Can you give us a  
25 concrete sort of talk problem?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1                   MEMBER RAY: I'll do it this way, Sanjoy.  
2           I did spend a lot of my life involved in contracting  
3           and to me the DAC are like a contract. I haven't seen  
4           any DAC that come even close to being sufficiently  
5           detailed to ensure you don't achieve any outcomes that  
6           you don't want to achieve or that you would find  
7           unacceptable.

8                   But you do get that in contracting and you  
9           wind up with big thick documents and the lawyers argue  
10          and so on. That would be the only way I would  
11          approach it. I can't give you specifics. You would  
12          do much better at that than I would, Sanjoy. But I  
13          still think the inspection process is inherently  
14          limited to saying, "Yes. Well, you met the licensing  
15          basis as you wrote it down" and that's all we can do.

16                   MEMBER BLEY: I think at this point I  
17          would like to ask Tom to go ahead. The thing we did  
18          hear on Tuesday was that that inspection process on  
19          the human factors engineering is actually going  
20          through the steps of the review that would have been  
21          done if it were earlier.

22                   So I want to hear what the inspection is  
23          and what the plan is and then we can work from there.

24          So, Tom.

25                   MR. FREDETTE: Okay.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Back to you.

2 MR. FREDETTE: Just a little overview of  
3 our working group. We were chartered in November to  
4 develop the methodology that we could use on a test  
5 case basis with South Texas. It's a collaborative  
6 effort amongst various divisions and organizations.  
7 Jerry Wilson and Dinesh here sitting beside me,  
8 they're part of our working group. And we have a  
9 region. We've engaged Region II because they do have  
10 the lead for ITAAC inspection.

11 Our primary focus has always been digital  
12 I&C DAC. However, just as an aside, the working group  
13 did also consist of a human factors expert and a  
14 mechanical design expert. So we initiated strategy  
15 documents to support subsequent human factors, DAC  
16 inspection and pipe stress analysis DAC inspection at  
17 a later time.

18 MEMBER BLEY: Will there be separate  
19 guidance for them?

20 MR. FREDETTE: Separate guidance.

21 MEMBER BLEY: Okay.

22 MR. FREDETTE: Yes sir.

23 And the process that they're going to go  
24 through to construct the inspection tools that they  
25 need is a little different also.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           The charter was later modified to include  
2 -- We realized that we don't want to just limit  
3 ourselves to developing a pilot methodology. We want  
4 to integrate this long term with the overall ITAAC  
5 Closure process. It's not integrated now.

6           The activities we've been engaged in since  
7 November were development of a framework, a process  
8 framework, that would coordinate the staff expertise  
9 that we need to do these types of inspections and the  
10 development of some special inspection tools that  
11 we're going to need, basically, inspection strategies  
12 and a procedure for digital I&C DAC/ITAAC inspection.

13           The current crop of ITAAC inspection  
14 procedures or the current ITAAC inspection procedure  
15 for instrumentation and control is not geared toward  
16 this type of inspection. So we needed a new tool.

17           Some considerations that we have  
18 deliberated on are the scope and the depth of  
19 inspection in this area, recognizing that it's not a  
20 licensing review. This is inspection. ITAAC  
21 inspection is independent of the licensing decision.  
22 And we're focused primarily on the licensee's  
23 processes and the Acceptance Criteria that are  
24 outlined in the ITAAC.

25           Our overarching objective is very

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 verification that the design detail provided will meet  
2 the acceptance criteria and thereby conforming with  
3 the licensing basis.

4 One of the specialized tools that we  
5 engage in the development of was digital \*&C DAC  
6 inspection strategies. Basically these are documents  
7 that we're developing that support development of a  
8 subsequent inspection procedure. They're primarily  
9 envisioned to be a planning tool for inspectors to  
10 use, just another tool in their arsenal so to speak.

11 They'll provide all the technical  
12 information and insight that the inspector is going to  
13 need when he's engaged in the inspection of digital  
14 I&C development processes. And they're envisioned to  
15 be generic for any DAC inspection in the digital I&C  
16 area. They're not licensee specific or application  
17 specific or ITAAC specific. They are discipline  
18 specific.

19 MEMBER CORRADINI: So what does that mean?

20 Does that mean that the inspector is -- I mean I'm  
21 still trying to understand. So the inspector is  
22 sitting there looking at a more detailed analysis of  
23 the plant protection system which is a digital I&C  
24 system and they're walking through the logical and as  
25 they look at it on scene or tested out they make notes

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 to something. I don't understand what this is.

2 MR. FREDETTE: It's designed to be a  
3 support. Just more technical information that the  
4 inspector can use.

5 MEMBER CORRADINI: As they're doing their  
6 inspection.

7 MR. FREDETTE: Or something that they can  
8 research prior to performing the inspection.

9 MEMBER APOSTOLAKIS: Okay. So this  
10 technical information for example will include things  
11 like tests or see whether the particular channel is  
12 independent of other channels and so on, the stuff  
13 like Mr. Brown brings up all the time. Is that what  
14 the inspector is going to do?

15 MR. FREDETTE: No, that's not. No, these  
16 are more geared toward the software development life  
17 cycle.

18 MEMBER APOSTOLAKIS: Okay.

19 MR. FREDETTE: And the development  
20 process.

21 MEMBER APOSTOLAKIS: This particular  
22 aspect of independence is actually evaluated during  
23 the DCD. Right? During the design certification?

24 MEMBER BROWN: You can't. There's not  
25 enough information.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1                   MEMBER APOSTOLAKIS: But in principle it  
2 should be.

3                   MEMBER BROWN: In principle it should be,  
4 but that's not what's going on, George.

5                   MEMBER APOSTOLAKIS: And my question is  
6 when I reach this stage it seems this is part of the  
7 licensing now (Background noise)

8                   MEMBER BROWN: This is not part of the  
9 licensing. This is post licensing.

10                  MEMBER APOSTOLAKIS: This is the last  
11 step. How can it not be? (Inaudible) that's where  
12 we're going. Am I missing here? They are skipping  
13 all the steps and they're saying, "Okay. Finally the  
14 inspection will do that." Right? Is that correct,  
15 John? It's correct.

16                  MEMBER-AT-LARGE STETKAR: That's then our  
17 concern.

18                  MEMBER APOSTOLAKIS: Are we going to be  
19 asking those questions about independence and  
20 diversity? Unless I'm lost here.

21                  MEMBER BROWN: You're not lost.

22                  MEMBER APOSTOLAKIS: So who is going to  
23 ask those questions?

24                  MEMBER CORRADINI: To put it differently,  
25 (1) they do the inspection. I guess I want to connect

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 what Jerry said to what you guys are doing. When  
2 they're doing the inspection and they're looking  
3 through something and they see an attribute that  
4 concerns them and it matches the contractual nature,  
5 but it doesn't satisfy their warm and fuzzy feeling  
6 that it's right, what basis do they have of saying,  
7 "Nope, stop, unsatisfactory, go back to square one"?

8 MEMBER APOSTOLAKIS: The question is  
9 whether they will even have this warm and fuzzy  
10 feeling.

11 MEMBER CORRADINI: Or even look at it from  
12 that standpoint.

13 MEMBER-AT-LARGE STETKAR: To even have the  
14 charter to what?

15 MEMBER CORRADINI: I don't know. To bring  
16 it up.

17 MEMBER-AT-LARGE STETKAR: To question  
18 whether or not they have a warm and fuzzy feeling in a  
19 particular aspect.

20 MEMBER APOSTOLAKIS: Right. And that  
21 comes to the technical information it seems to me. I  
22 mean, what is it that they're going to be instructed  
23 to do?

24 MEMBER RAY: Big thick document, George.

25 MEMBER APOSTOLAKIS: You guys are

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 confusing me now. Is what I'm saying nonsense?

2 MEMBER CORRADINI: No, no.

3 MEMBER APOSTOLAKIS: Oh okay.

4 MR. JUNG: This is Ian Jung with the Chief  
5 of the I&C Branch speaking about this staff decision  
6 on this fundamental design principles, GDCs, defense-  
7 in-depth, independence and redundancy, staff  
8 decisions. I think it's an issue of what level detail  
9 the staff makes the decision on.

10 It's high level when the system  
11 description at Tier 1 level all applicants come in  
12 with some high level description as well as the  
13 process to be followed, typically their commitment to  
14 use certain reg. guides or IEEE standards, other  
15 methods. If you are talking about that high level,  
16 staff can make a decision at that level. Yes, this is  
17 a data communication from this and this. We'll follow  
18 IEEE 7-3.2. From that level, staff can make a  
19 decision on.

20 But if you're looking to actually see the  
21 equipment and verify that, that's the piece that we  
22 are generally talking about. I believe that a  
23 licensing basis level/design basis level description  
24 is sufficient to say they meet it. Whether it's a  
25 discretion on have you seen it, have you seen the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 equipment, have you seen the platform, specific  
2 information to conform, Commission has established a  
3 policy using that. And when you have proof of that, I  
4 guess as part of the design certification, Commission  
5 including ACRS endorsement concluded that there was a  
6 reasonable assurance that the facility has been  
7 constructed and will be operated in conformity with  
8 licensee, the provisions, the Atomic Energy Act as the  
9 Commission rules and regulations.

10 So as part of the design certification  
11 ABWR, System 80+, all this design certification we  
12 have gone through. The agency, the NRC, made the rule  
13 that, yes, this complies with the regulations if these  
14 DAC items laid out are followed. Then it will reach  
15 the same plant.

16 But another thing I want to emphasize is  
17 the responsibility of following DAC and resolving DAC  
18 clearly resides with the COL applicant and holder. So  
19 staff's role there is if we are cautioning the ability  
20 of the applicant or COL holders to carry out ITAAC or  
21 DAC that should have been handled at the licensing  
22 stage. And if at this point the capability of the  
23 licensee or COL holders to carry out their mission is  
24 questionable, that's not something the staff is ready  
25 to question that.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 CHAIRMAN ABDEL-KHALIK: Can we go back to  
2 slide number eight please, the previous slide? I  
3 guess the issue that was brought earlier by Mr. Ray.  
4 Does verification that the design detail will meet the  
5 acceptance criteria will always assure that the design  
6 is acceptable? That is the question. Can we write  
7 these design acceptance criteria in sufficient  
8 specificity and detail so that the outcome of this  
9 verification process will always assure that the  
10 design is acceptable?

11 MR. FREDETTE: Well, I think we've seen  
12 improvement in how the ITAAC are written in some of  
13 the later documents. Like for the ESBWR, the DAC are  
14 written very specific. They're very expensive, but  
15 they're also very specific not like what we see in the  
16 ABWR DAC ITAAC. They're very general, but that's what  
17 we have to work with.

18 CHAIRMAN ABDEL-KHALIK: But that is the  
19 heart of the question, right? Given the fact that  
20 there's been a wide range of detail and specificity,  
21 it means that this verification will not always assure  
22 that whatever design that meets the specified  
23 acceptance criteria will always be acceptable.

24 MR. TANEJA: The way I envision this thing  
25 is the way the DAC is laid out right now the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 acceptance criteria is -- one of the acceptance  
2 criteria is complying with a GDC or in the case of I&C  
3 would be IEEE 6-0.3 1991. And IEEE 6-0.3 1991 gets  
4 very explicit with multiple requirements with  
5 separation, qualification, diversity. These are the  
6 criteria laid out.

7 So the way I envision is when you're  
8 developing an I&C system design, one of the earlier  
9 phases in the requirement phases, those requirements  
10 that are in the licensing document need to be  
11 captured. And then those requirements become your  
12 design basis for that I&C system as long as you're  
13 complying with all those requirements.

14 One of the inspections that we are going  
15 to -- we're envisioning on doing is verifying those  
16 requirements, adequacy of those requirements, for  
17 example. Do they capture all the licensing basis? Do  
18 they capture all the regulatory compliance that  
19 they're committed to? And then the design naturally  
20 the subsequent phases of the life cycle needs to pull  
21 the thread on it and verify that they are complying  
22 with all the requirements.

23 MEMBER BROWN: But if that's not written  
24 in a doc.

25 MR. TANEJA: It is written in a doc.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           MEMBER BROWN:   And the DAC says -- I'll  
2 give you an example.  The reliability, the fundamental  
3 precept of the I&C is to maintain independence  
4 between divisions.  If you don't have that, you really  
5 -- you're not capable or you can't really say that  
6 these things are truly redundant because they can be  
7 compromised.

8           And in the old things that have been the  
9 spec, IEEE 6-0.3, it states that you have to have  
10 electrical isolation and physical separation,  
11 mechanical and electrical separation.  However, and  
12 that's easy to look at in an analog system because  
13 you're hooking wires.  If you don't hook dead wires  
14 with electrical signals going between them, you're  
15 pretty clean.

16           In these new systems, we have data going  
17 between processor to processor.  It's data  
18 communications independence.  There's no DAC anywhere  
19 in here that says you have to go look at all the  
20 ranges of data packages that can be sent and that all  
21 the ranges cannot compromise that independence or  
22 there's algorithms that are going to ensure that  
23 corrupt data cannot compromise that independence  
24 because it's sent to every channel.  There's no DAC  
25 that covers that anywhere.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. TANEJA: Mr. Brown.

2 MEMBER BROWN: Let me finish the point.  
3 The point I'm trying to make is that if you look at  
4 the DAC whether it's ESBWR, ABWR, run it across the  
5 gamut, they're not specific enough to cover that level  
6 of detail and there's no -- I mean how does that get  
7 captured? I mean I just looked at the ABWR one and it  
8 talks about electrical isolation and it talks about  
9 physical separation.

10 MR. TANEJA: There is a commitment made  
11 through the licensing basis for compliance with Branch  
12 Technical Position 7-14. Those are our staff guidance  
13 which we use to inspect digital I&C systems design  
14 basis. Okay. So that becomes and that's one of the  
15 basis of our tools as using those tools of Chapter 7.  
16 It's IEEE 7-4. you know.

17 MR. FREDETTE: 4.32.

18 MR. TANEJA: 4.32, 7.14 and that's what  
19 these licensees or the applicants are committed to  
20 complying with. So those become the requirements.  
21 And those become the methods for inspection.

22 MEMBER BONACA: It seems to imply that  
23 just because they're committed to meet the standards  
24 they do meet the standards. An identification process  
25 is supposed to verify that that commitment is being

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 met and you're not doing that. It can only verify  
2 that they're committed to separate standards in  
3 general.

4 MR. FREDETTE: The tools that we'll use in  
5 the inspection space will be the tools that Dinesh  
6 just talked about, the criteria that's set forth in  
7 the Branch Technical Position or other portions of the  
8 Standard Review Plan. We've gathered these acceptance  
9 criteria from a lot of different sources. But the  
10 Standard Review Plan remains our core resource.

11 MEMBER BLEY: I think what we need to hear  
12 is how you're going to use the subject matter experts  
13 at NRC to do exactly what you just said.

14 MEMBER-AT-LARGE STETKAR: Can I just --  
15 Just to get something in the record, I want to quote  
16 something from an SRM regarding SECY 91-178 and in  
17 that SRM the Commission states, "In regard to the  
18 level of detail required in the applications for  
19 design certification and reflected as necessary in  
20 ITAAC, the staff should assure that it has all the  
21 details necessary to make the final safety decisions  
22 on the underlying design of the plant -- not decisions  
23 on the functions. Commitments to meet requirements  
24 are not substitutes for details of the designs which  
25 actually meet those requirements. However, the level

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 of detail required for those final safety decisions is  
2 expected to vary with the significance of systems,  
3 structure or components to the safety of the plant."

4 I maintain that an integrated digital  
5 safety system is one of the most important systems to  
6 the safety of the plant. Therefore, the design review  
7 should include necessary decisions to make the  
8 determination that it's safe. And that's a quote from  
9 -- My later was my own opinion, but it's a quote from  
10 an SRM. So that seems to clearly indicate at least in  
11 1991 the Commission's feelings on the level of detail  
12 and the review with regard to actual design versus  
13 commitments to meet requirements.

14 MR. WILSON: Let me speak to that. You  
15 have to understand we're going back in history now and  
16 there are two things going on here. The papers you're  
17 talking about are the difference between staff design  
18 review and verification under ITAAC with traditional  
19 ITAAC in mind.

20 But a special situation came up with  
21 certain types of design information that were rapidly  
22 evolving and the Commission in their discretion issued  
23 a policy statement and said we are going to accept DAC  
24 in lieu of detailed design in those areas that we've  
25 been talking about today, digital I&C and human

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 factors. So that subsequent SECY interaction with the  
2 Commission --

3 MEMBER-AT-LARGE STETKAR: It's in the SRM  
4 though.

5 MR. WILSON: Yes, I understand.

6 MEMBER-AT-LARGE STETKAR: That says  
7 anything beyond this one.

8 MR. WILSON: I'm just explaining that what  
9 you're talking about is a traditional ITAAC and its  
10 relationship to the detail design review that we  
11 normally do. Commission said that in these areas  
12 we're going to do something different. We're  
13 accepting DAC in lieu of that detail design  
14 information and it's going to be verified in the  
15 normal ITAAC process. And that's just where we are.

16 Now if the Commission is accepting that on  
17 a case-by-case basis, the staff goes up with our  
18 design certification reviews to the Commission. And  
19 we say, "Okay. In this particular design, we  
20 understand there's two DAC here and as your approval  
21 of that you're also approving use of DAC in those  
22 areas."

23 We're also discouraging applicants in the  
24 future that we want to hold this down and hopefully  
25 one day eliminate it. Right now, we are where we are

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and so we're trying to make the best of that decision.

2 MR. SHUAIBI: This is Mohammed Shuaibi  
3 with the staff. I'm Acting Deputy Division Director  
4 in the Division of Construction and Inspection of  
5 Operational Programs.

6 I would like to add a few things. Number  
7 one is I'm sensing that there are three things we're  
8 talking about. Number one is does the DAC process  
9 actually work which we're working with the Commission  
10 decision that we're using the DAC process in a few  
11 areas. So if we're questioning whether the actual DAC  
12 process works and whether that's a legitimate process  
13 to use in licensing we're not really -- we're not  
14 questioning that here. We're actually implementing a  
15 decision that was previously made.

16 Another sense that I'm getting in this  
17 decision is is the licensing decision in terms of the  
18 detail of the ITAAC that's being decided in design  
19 certifications and COLs is at the right level. Again,  
20 that's where your inspection staff will tell you  
21 that's a licensing type decision in terms of defining  
22 what the DAC reads like and when it gets accepted and  
23 goes through legal to rulemaking and becomes a DAC.  
24 That's why sometimes you hear the two different staff  
25 pointing at each other. So that gets decided in

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 licensing space in terms of what the DAC looks like,  
2 what it reads like. And in terms of design  
3 certification, that goes through Commission and then  
4 it gets decided through a rulemaking process.

5 So what we're working with here DAC that  
6 have already been established. So we're looking to  
7 get the right people out, inspect the licensee's  
8 implementation of that DAC to make sure they're doing  
9 it correctly, if they're implementing that DAC  
10 correctly. And that's the focus of this presentation.

11 And as a pilot program that we want to go  
12 out and try and sell Texas -- Remember South Texas is  
13 one of the earlier designs. This is the more general  
14 DAC that we're talking about. Will learned since  
15 then that they're getting more and more specific in  
16 terms of the information we're requiring to go into  
17 DAC. Not suggesting we agree on ESBWR yet. But in  
18 the area where we're looking at for this pilot, it's  
19 one of the more general DACs. So we expect for this  
20 to be one of the more challenging DAC inspections.

21 It's also digital I&C and we picked  
22 digital I&C because it's one of the more complex and  
23 challenging DAC to look at. So the purpose of this  
24 presentation is to show what we're doing in order to  
25 make sure that we have the right inspection happening

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 at the time we would go out and look at DAC.

2 So if it's okay with the Committee, what  
3 I'd like to request is if we could proceed with the  
4 presentation so that we can to what we're trying to do  
5 to make sure that we're doing the right thing on the  
6 South Texas DAC.

7 MEMBER BLEY: Let's do that.

8 MR. FREDETTE: Dennis, you asked about  
9 more detail on how we intend to use the technical  
10 staff and inspection.

11 MEMBER BLEY: Yes.

12 MR. FREDETTE: If I could run through the  
13 slides, then we could address that at the end.

14 MEMBER BLEY: Or as you go through, yes.

15 MR. FREDETTE: I don't have a slide that  
16 really talks in any detail about that, but I can  
17 expound on it a little bit.

18 MEMBER BLEY: Great.

19 MR. FREDETTE: Okay. We talked about the  
20 inspection strategies. It's basically a planning  
21 tool, but it's also a foundation for an inspection  
22 procedure that we're developing now. This is how we  
23 envision it. Okay. We're taken a lot of different  
24 sources that exist that are at our disposal. We tried  
25 to consolidate them and focus them into what we call

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 digital I&C system/software phase oriented strategy  
2 documents. These strategy documents generally match  
3 up with the software life cycle that's shown in the  
4 Branch Technical Position 7-14. They don't exactly  
5 match up because what I did was I consolidated a  
6 little bit in the interest of manageability.

7 But we have six of these strategy  
8 documents that we're developing that in general match-  
9 up with the software or the digital system development  
10 life cycle. And from those strategy documents, the  
11 Center for Construction Inspection which is in Region  
12 II will take those and develop the inspection  
13 procedure that I alluded to earlier.

14 The strategy documents as I mentioned they  
15 take input from the industry standards, existing  
16 guidance, staff expertise, lessons learned from  
17 audits, passed SERs, that type of thing. They are  
18 lifecycle phase-oriented. They feature key  
19 inspectible attributes and acceptance criteria and  
20 inspection techniques that the inspectors will use.  
21 And as I mentioned they are the precursor to the DAC  
22 inspection procedure.

23 MEMBER BLEY: Before you look at that one,  
24 are they reaching the point that you have drafts of  
25 them?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. FREDETTE: I've got drafts of four of  
2 them, four of the six.

3 MEMBER BLEY: We'd love to see your drafts  
4 whenever you're willing to share them with us.

5 MR. FREDETTE: Well, I think we committed  
6 in previous correspondence that we would provide a  
7 look at our process once we've refined it.

8 MEMBER BLEY: Right. We'd like to look  
9 along the way if there's a way to do that. Go ahead.

10 MR. FREDETTE: Okay. The focus for  
11 lifecycle phase-oriented inspection, it's process and  
12 technical activities within each lifecycle phase and  
13 not just the activities within the phase but the  
14 transition or the handoff between phases. In other  
15 words, when the digital system development goes from  
16 the planning phase to the requirements phase, from the  
17 requirements phase to the design phase, design and  
18 integration, we look at the hand-offs between those  
19 activities.

20 And our inspection intent is to typically  
21 start when activities for a given phase are complete.

22 That's a lesson that we've learned from audits that  
23 have been done at AP1000 or for the AP1000 design  
24 where we were told that activities were complete and  
25 we get there and start doing an audit and find out

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 activities aren't really completed.

2 Lifecycle Phase Inspection, it's  
3 assessment of design processes and documentation  
4 within each phase. It's a sampling of all the  
5 inspectible attributes that we've outlined within the  
6 phase. We'll conduct vertical slice or thread audits  
7 were appropriate. And the last two are really the  
8 key, assessment of software QA processes and the  
9 independent V&V activities for each lifecycle phase.  
10 This is really the core of what our inspection process  
11 is going to entail.

12 The level of effort, we're still working  
13 on identifying what the level of effort is going to  
14 be. But it is front-loaded toward activities early on  
15 meaning the planning and requirements phases and we  
16 can scale it as we deem necessary depending on our  
17 level of satisfaction or our level of acceptability  
18 with the front-loaded effort. And this type of  
19 inspection will be conducted for each safety-related  
20 platform and software application.

21 In the case of South Texas, they're using  
22 two platforms, one for their RPS and one for their  
23 SFAS.

24 CHAIRMAN ABDEL-KHALIK: These six strategy  
25 documents are meant to be "universal," meaning

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 application independent.

2 MR. FREDETTE: That's right. Because in  
3 digital system development, everyone uses basically so  
4 type of lifecycle process. So they're meant to be  
5 tailorable depending on what process you might be  
6 looking at.

7 CHAIRMAN ABDEL-KHALIK: So regardless of  
8 the level of detail or specificity in the DAC these  
9 strategy documents would be applicable and would  
10 provide an appropriate level of guidance.

11 MR. FREDETTE: We believe so, yes. The  
12 attributes that we've identified in each one are  
13 attributes that you would see no matter what digital  
14 system you're looking at. They're common attributes  
15 amongst that the technical staff is used to looking at  
16 or looking for.

17 Just a little bit about the South Texas  
18 pilot effort. It's scheduled and driven by  
19 availability of the South Texas DAC products. There  
20 are some early products that are available now. We're  
21 just not ready to inspect them now. Originally, the  
22 pilot inspection was planned for the second quarter of  
23 this year. And at a public meeting we had a month  
24 ago, South Texas presented basically their forecast or  
25 their schedule for their entire development for both

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 of their platforms. Based on the schedule we feel  
2 like for the pilot effort that more a two-part or a  
3 two-stage inspection would be more appropriate. And  
4 that's what we've planned on engaging in.

5 Part one would be a program inspection of  
6 their high-level lifecycle planning and process which  
7 we anticipate to be conducted in June. And then there  
8 are some implementation activities that they're going  
9 to complete for one of their platforms later in the  
10 year. So we anticipate that we'll do an  
11 implementation inspection around in November 2010 time  
12 frame.

13 MEMBER BLEY: I was looking at slides from  
14 your public meeting a month or so ago. And I thought  
15 I saw a schedule that had this piloting running over a  
16 couple of years. Is that right?

17 MR. FREDETTE: No, the pilot won't run  
18 over a couple of years. I think we anticipate being  
19 able to finish the pilot at least 2010 or early 2011  
20 at the latest.

21 MEMBER BLEY: Okay. So what you're going  
22 to do in November, how small a piece of the DAC pie on  
23 I&C is this?

24 MR. FREDETTE: This is a very small piece,  
25 Dennis. And this would be equivalent to the planning

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 phase or early stages of the planning phase of a  
2 development project. And recognize that a digital  
3 system development project can last three to four  
4 years. We're looking -- Our intent is to get in early  
5 on, look at the processes and the management documents  
6 that they've developed that are going to guide --

7 MEMBER BLEY: It's more of a process look.  
8 You're not getting into one system or subsystem in  
9 detail.

10 MR. TANEJA: The second part of the phase  
11 was that intended, right? The first part of the pilot  
12 was look at the process.

13 MR. FREDETTE: The process and then there  
14 are some -- As I mentioned, there are implementation  
15 activities that are part of that planning process that  
16 they're going to complete later this year. So we felt  
17 we don't want to just look at process. We want to  
18 look at some implementation activities that they've  
19 completed. Anyone can develop a process. It's  
20 implementation that's the key here.

21 MEMBER BLEY: We've been thinking the same  
22 thing. Go ahead.

23 MR. FREDETTE: The planned activities that  
24 we have, this is short-term anyway. We're working on  
25 completing the inspection strategies. Region II has

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 already started developing a new ITAAC inspection  
2 procedure. We've more or less selected the DAC  
3 product that we wanted to inspect internally. We  
4 haven't really publicized that yet with South Texas.

5 In the May time frame, we plan to tabletop  
6 our entire process with them so sort of validate with  
7 them how we envision this will work. We still have to  
8 identify the inspection staff that they're going to be  
9 engaged in this and then we'll conduct a pilot  
10 inspection as I said starting in June hopefully.

11 The pilot inspection is governed by the  
12 ITAAC inspection process which is Manual Chapter 2503  
13 and the inspection documentation process which also  
14 includes inspection screening which is 0613. Issues  
15 will be screened and documented and docketed in an  
16 inspection report. The inspection report as we  
17 envision in the ITAAC inspection process, inspection  
18 report issues and anything else that we identify in  
19 the inspection will be used to support subsequent  
20 closure verification of that ITAAC at some later date  
21 which we envision will be in the construction phase.

22 MEMBER BLEY: Now let me ask you as  
23 question about how you -- And maybe it's come up. Put  
24 me off if it's come up -- envision this part of the  
25 process working. Because is DAC and as you described

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 in the sum of the DAC and the references to the IEEE  
2 standard and specific requirements there, aren't  
3 things -- you look at a panel and say, "Yes, they got  
4 one of these."

5 To meet those kind of criteria, for  
6 instance independence, you have to look a little  
7 deeper and understand how it's put together. And once  
8 you do that you will almost certainly have some  
9 questions of things that don't work. So is there some  
10 kind of a envisioned questioning process or do you  
11 think you'll just be able to take a look and write a  
12 report?

13 MR. TANEJA: This inspection is not really  
14 just looking at the equipment. This inspection is  
15 actually looking at the development stages that will  
16 take you to an as-built equipment.

17 MEMBER BLEY: But eventually I trust it's  
18 going to look at the end product which is a design and  
19 equipment.

20 MR. TANEJA: End product would be, for  
21 example, a factory acceptance testing. That is one of  
22 the final phases where you actually test the equipment  
23 in factory. Then the other opportunity would be on  
24 the pre-op testing. So there is plenty of opportunity  
25 to inspect the actual functionalities.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           What we are looking at actually early on  
2 is the engineering that is required to develop these  
3 systems. Right. That would be even from the point of  
4 how many panels do I need, how many input cards do I  
5 need, you know, whether it's 2,000 inputs, whether  
6 it's 5,000 inputs and how are they segregated, all the  
7 divisions divided up. How do they assure that there  
8 is independence. All these things would happen in  
9 early stages, planning, requirement, design phase.

10           So a lot of that product would be paper.  
11 Tons of paper I imagine, at least what our impression  
12 has been since what we've seen so far on some of the  
13 other products.

14           MEMBER BLEY: I think you're close to what  
15 we've been asking.

16           MR. TANEJA: Yes.

17           MEMBER CORRADINI: I guess I want to make  
18 one thing just -- This is just for my clarification.  
19 So all that you're talking about which I'd love the  
20 others to decide the adequacy these are not amendments  
21 to the ABWR Design Cert. These are details from the  
22 generally licensed and accepted ITAAC/DAC for just  
23 South Texas COL.

24           MR. FREDETTE: That's right.

25           MEMBER CORRADINI: And the thought is once

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you look at them here at least not the realization for  
2 South Texas but the intermediate part that we're  
3 talking about the detail design, then this will become  
4 a reference for future ones.

5 MR. TANEJA: If they choose to.

6 (Simultaneous comments.)

7 MR. FREDETTE: They'd have to use the same  
8 platform and the same application.

9 MEMBER CORRADINI: I understand. Okay. I  
10 just wanted to make sure that I understood that this  
11 was. So since you said early in response to his  
12 question, explain to me what early is. Does that mean  
13 before even I mean in the next few months? In the  
14 next year?

15 MR. FREDETTE: There is a schedule that's  
16 put forth by South Texas and the schedule, the details  
17 of the schedule, are proprietary.

18 MEMBER CORRADINI: Okay. Fine.

19 MR. FREDETTE: But I believe, Dennis, I  
20 think you've seen the schedule.

21 MEMBER CORRADINI: That's fine. You've  
22 answered my question.

23 MR. FREDETTE: We have South Texas here  
24 today and Mike Murray is the I&C manager at South  
25 Texas.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Is there anything you want to add to that,  
2 Mike, as far as your schedule goes?

3 MEMBER BLEY: And as Mike's coming over,  
4 some of this stuff has to be done quite soon if this  
5 is going to be in place to support upcoming operations  
6 some time in the future.

7 MR. MURRAY: Yes. Again I've met a number  
8 of you. Is this mike on?

9 MEMBER RYAN: It never is. Way on the  
10 bottom, Mike. There's a little slide switch. Yes.

11 MR. MURRAY: Okay. This is on.

12 MEMBER RYAN: It's tiny.

13 (Off the record comments.)

14 MEMBER CORRADINI: Just come sit at the  
15 table.

16 MR. MURRAY: Okay.

17 (Off the record comments.)

18 MR. MURRAY: Again, my name is Mike  
19 Murray. I've met a number of the folks earlier in the  
20 week. Some I haven't. I'm the I&C manager at South  
21 Texas 3 & 4. My background is I've lived at South  
22 Texas since 1985 and through the start up of both  
23 units. I've had different management perspective  
24 including I&C maintenance/management, maintenance  
25 engineering management, system engineering management.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 So I've had a lot of opportunities at South Texas.

2 As far as the question was on the schedule  
3 and we've provided and I can't give details on it is  
4 what we've provided is the programmatic products that  
5 are developed. Some of those are available and that's  
6 one of the first phases that will be looked at.

7 And then what we've laid out is as we've  
8 gone through in specifically the software development  
9 for the I&C digital we've laid out in that schedule  
10 when each phase will be completed so that what we can  
11 do is inspect as we complete to have that assurance  
12 that we're meeting the regulations and that we will  
13 successfully be able to resolve the DAC, the ITAAC and  
14 DAC. So that's the schedule that we've laid out and  
15 provided.

16 Does that answer the question?

17 MEMBER CORRADINI: Yes. That helps.  
18 Thank you so much.

19 MR. FREDETTE: Our long term intention  
20 here is to be in lockstep with the licensee as they're  
21 going through their development so that we can be what  
22 I'd like to say on time on target at the various major  
23 milestones in their development process. So we have  
24 our finger on the pulse of their development process  
25 as it's going forward. It's marshaling the right

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 inspection resources with the right expertise in  
2 lockstep with the licensee that's really kind of the  
3 key as we go over the next two to three or three to  
4 four years in the process that Mike's basically given  
5 an overview of.

6 MR. TANEJA: This is Ian Taneja and Mr.  
7 Apostolakis earlier asked about why are we doing this  
8 now. It has to do with the critical path of the South  
9 Texas Units 3 & 4. Regulatory Guide 1.206  
10 specifically requires the COL applicants to provide  
11 the schedule knowing the potential critical path of  
12 this in addition to that, the desire to have the  
13 design information very early on.

14 The critical path we have to understand  
15 now very clearly. It's going to be I&C design,  
16 simulator completion, operator training. There's no  
17 way out. It's known. It's going to be early  
18 resolution, a clear success path, understanding the  
19 schedule.

20 It's very important and that's why staff  
21 specifically asked from the beginning of the COL  
22 application to provide the schedule. Without the  
23 schedule, staff would not have the resources, budget  
24 and expertise necessary to fully support the  
25 verification of these activities.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 South Texas has been very supportive of  
2 the request and that's why we are having a pilot. And  
3 that's why timing and scheduling resources is very  
4 important.

5 MR. FREDETTE: Post-pilot. As with a lot  
6 of pilot efforts, we want to compile and incorporate  
7 lessons learned, modify our process and ultimately  
8 integrate with the ITAAC Closure process.

9 MEMBER BROWN: Let me ask one question.

10 MR. FREDETTE: Yes, Mr. Brown.

11 MEMBER BROWN: When are you going to  
12 inspect for independence?

13 MR. FREDETTE: That's the requirements  
14 phase, Mr. Brown.

15 MEMBER BROWN: That's when? When is that?  
16 I mean the climate's already there. It's in IEEE  
17 6.03. It says you need to be independent, data  
18 communications, all the walk-through. When are you  
19 doing to do that?

20 MR. JUNG: Mr. Brown, it's going to be  
21 throughout the process. The questions of  
22 independence, redundancy and diversity, these are so  
23 fundamental to NRC's inspection process. And I can't  
24 imagine we go out there and not asking data  
25 communication. It's so fundamental to digital I&C.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1                   MEMBER CORRADINI:       No, I think we  
2 understand that part. I think where we're asking it  
3 just to use this as an example is just this is an  
4 example. Is this going to be on series of audits? Is  
5 this going to be early when there is all kinds of  
6 paper? Or is it going to be at the -- That's what I  
7 guess I think Charlie's asking.

8                   MR. FREDETTE:    It's early on in their --  
9 If I look at their lifecycle which might be three or  
10 four years long, we're talking about in the first  
11 quarter.

12                  MEMBER BROWN:    You're talking about the  
13 design lifecycle.

14                  MR. FREDETTE:    The design lifecycle.

15                  MEMBER BROWN:    When the person designing  
16 and building the system that you want, you've placed  
17 an order. He's designing it. He's got these  
18 requirements imposed on him as part of the contract.

19                  MEMBER CORRADINI:   And the certification.

20                  MEMBER BROWN:    As part of the contract.  
21 He's not in -- This guy's a subvendor. Okay. And he  
22 now goes -- When do you go say, "Okay. How does this  
23 design," as he designs it functionally, "going to meet  
24 the independence requirement? How is he going to  
25 execute or implement those design attributes that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 allow you to determine that they are truly independent  
2 even though you're communicating from channel into  
3 division?"

4 I'm not arguing against that because you  
5 have to do some. It's a matter of how you would see  
6 the independence as you do it.

7 MR. TANEJA: Mr. Brown, this inspection,  
8 these key attributes, are without focus on inspection  
9 is. Essentially there may be, I don't know, 100,000  
10 requirements. Those requirements could be trivial.  
11 But our key inspection points are going to be these  
12 key attributes and these are going to be inspected  
13 from day one from the time they lay out the  
14 requirement traceability metrics. That requirement  
15 document better have those requirements because the  
16 following design, the detail design, is going to have  
17 to meet those requirements. Correct? So our  
18 inspections start very early and it follows through  
19 each space.

20 MEMBER APOSTOLAKIS: But I would agree  
21 with you if I hadn't heard earlier that there is a  
22 distinction between a licensing decision and  
23 inspection.

24 MEMBER BLEY: Right.

25 MEMBER APOSTOLAKIS: Somebody said that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 this issue of independence and so on is licensing. So  
2 the inspectors don't worry about it.

3 Now you're saying, "No, no, no. The  
4 inspectors worry about it from the very first step."  
5 I must say I'm a little -- more than a little confused  
6 here. If everything was ready during the design  
7 certification process, I know that the experts from  
8 the staff and our experts here at the ACRS, they would  
9 check these things and they would pass judgment.

10 MR. TANEJA: Let me draw a parallel.

11 MEMBER APOSTOLAKIS: Okay.

12 MR. TANEJA: Through mechanical systems.  
13 We say this pipe system is going to comply with the  
14 ASME Section 3. Right? It's not built.

15 ASME Section 3 is a very validated out  
16 process. We know exactly what materials are used,  
17 what the inspection processes are, what the testing  
18 requirements are. Right? So we say, "Yes, if you do  
19 ASME Section 3, this design is good, certified."  
20 Right?

21 Essentially take that process, same  
22 thinking. Here we're saying, "This design is  
23 complying with IEEE 6.03." Right? Now we are  
24 essentially saying that this design is not built. I  
25 mean naturally it's not built. It's as-built

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 verification that you are verifying that, yes, your  
2 design does comply. So that verification stages you  
3 are verifying those attributes.

4 MEMBER APOSTOLAKIS: But there is a  
5 problem with the example though. During the design  
6 certification process, I'm sure the staff and  
7 certainly some members of this Committee would ask the  
8 question whether this particular piping is independent  
9 or is subject to common cause-failure with some other  
10 pipe.

11 The ASME Code does not address that as far  
12 as I know. The ASME Code tells you what materials to  
13 use or how to build the pipe.

14 This is the same thing now with the  
15 digital I&C. At the DCD phase the way I understand it  
16 we would worry about diversity and independence and so  
17 on. After we have satisfied ourselves that they are  
18 truly independent, then there may be some rules how  
19 you build it.

20 So the question -- I mean there is really  
21 different things here that are involved. And I don't  
22 think the example with the ASME Code is an appropriate  
23 one because at the system level I may have  
24 interactions that the ASME Code really doesn't  
25 address.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. TANEJA: At the design stages the  
2 design details is given at a higher level for the I&C  
3 systems. Right? At a block level diagram, it very  
4 clearly lays out for example for the Reactor  
5 Protection System there are four divisions. They are  
6 physically independent. They're located in four  
7 different rooms. They are --

8 You know what we see in the design for the  
9 ABWR that was certified and the communications  
10 protocols are very well explained that the  
11 communications will only take place from this division  
12 to three divisions in one-way mode and it's done in  
13 that fashion. So those are the requirements that are  
14 spelled out.

15 So what we are doing in the inspection  
16 phase right now is verifying that the design is  
17 capturing those requirements and as-built design will  
18 conform to those requirements.

19 MEMBER BROWN: But one-way doesn't meet  
20 the test. I mean the one-way communication does not  
21 mean it's independent. Fiber optic does not mean it's  
22 independent because it's the nature of the data and  
23 how it's utilized in the other divisions that can  
24 compromise the independence.

25 MR. TANEJA: That's where we can up with

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the --

2 MEMBER BROWN: Let me finish quickly here.

3 And you can't do that as-built after the equipment is  
4 designed and manufactured. You have to do that as part  
5 of the early part of the design stage.

6 That's the point of getting in early  
7 because it's -- And it's not a matter of -- I'm not  
8 trying to save these guys from some bad things  
9 happening. It's a point of understanding because we  
10 don't have that understanding as part of the DCD  
11 process. It's not in there.

12 MR. TANEJA: The DCD process makes  
13 commitments to complying with the ISGs that we put  
14 together on communication.

15 MEMBER BROWN: I understand that.

16 MR. TANEJA: The advanced technical  
17 position -- See, those are the guidance that are there  
18 that would be used for inspection also. For us, if  
19 the design was there at the design phase for the NRC  
20 agency engineers' review, we would use those guidance  
21 documents. That's what we would use.

22 MEMBER SHACK: I think in a sense the  
23 design --

24 (Simultaneous comments.)

25 -- certainly you'd call that a review.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 You're calling it an inspection now.

2 MR. TANEJA: Same thing they're doing.

3 MEMBER SHACK: But the process is the  
4 same.

5 MR. TANEJA: They are doing the same  
6 thing.

7 MEMBER SHACK: He's got the same  
8 requirements whether -- You know he's got the branch  
9 tech. It comes back to Said's thing. There's no  
10 guarantee that we have every regulation that we need  
11 in order to assure. But we're in no different in the  
12 DAC sense than we are in any regulatory sense that we  
13 never know our regulations are absolutely complete.

14 But the inspection he's talking about here  
15 is not some guy looking at the wire. It's some guy  
16 reviewing the report as he would --

17 MEMBER BROWN: It's the design not the  
18 report.

19 MEMBER APOSTOLAKIS: Let's put it in a  
20 different -- Okay. Jerry mentioned earlier there are  
21 three or four places where there are opportunities to  
22 review the DAC.

23 MR. WILSON: Three options.

24 MEMBER APOSTOLAKIS: Three options.

25 MEMBER BROWN: DCD, COL and --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: And this inspection -  
2 - And there is an inspection after the third one or  
3 the third one is the inspection.

4 MR. WILSON: The third one is --

5 MEMBER BLEY: The first two get the normal  
6 kind of review with the --

7 MEMBER APOSTOLAKIS: Okay. Suppose now  
8 that there has been a satisfactory review at option  
9 number one.

10 MEMBER CORRADINI: Certification.

11 MEMBER APOSTOLAKIS: So in one case there  
12 has been a successful licensing option one. In the  
13 second case, it hasn't been. What would you do  
14 different when you go to inspect and you know that  
15 there has been a review of the DCD option and in the  
16 other case you know that it hasn't. Are you going to  
17 do anything different?

18 MR. TANEJA: The ITAAC would be more --

19 MEMBER APOSTOLAKIS: I don't understand.  
20 If you clarify that for me, I'll be happy.

21 MR. WILSON: Let me try. Remember now --  
22 Let's back up. In a normal situation you would design  
23 review. The ITAAC is a verification of the as-built  
24 of the hardware. DAC is special.

25 MEMBER APOSTOLAKIS: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. WILSON: So in those cases that design  
2 review is being shifted out. So option 2, the  
3 combined license applicant could provide that design  
4 information for their particular application. We  
5 would do that review as part of the combined license  
6 review. Option 3 which is where we're going to be in  
7 most circumstances is that design verification is  
8 going to be done as part of the ITAAC inspection  
9 process.

10 MEMBER CORRADINI: Clarification. You  
11 shifted from review to verification. I noticed that  
12 word.

13 MR. WILSON: Yes.

14 MEMBER CORRADINI: And that's why I went  
15 to Jerry. So is South Texas example option three?

16 MR. WILSON: Yes.

17 MEMBER CORRADINI: Okay. So we're clear  
18 on that. So now going forward that you've made that  
19 very interesting change of words, now we're not into  
20 design review. We're into verification. Can you go  
21 forward now?

22 MR. WILSON: Because it's an ITAAC  
23 inspection, it's a special type of ITAAC. But what  
24 we're looking at is design information and it's not  
25 generally -- I'm making a general statement now.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER CORRADINI: So let me give you a  
2 hypothetical.

3 MR. WILSON: It's not the typical  
4 inspector coming out of Region II. We're going to be  
5 relying on Headquarters staff for that verification  
6 effort. But it's still an inspection.

7 MEMBER CORRADINI: So can I just take this  
8 a bit further with numbers? I'm sorry. I'm just an  
9 engineer. The certification was done a decade ago.  
10 The COL is in process now. A year from now in 2011  
11 the COL is granted. We're into option three. Now we  
12 start seeing details. Where in the time that the COL  
13 is granted to, let's just assume it takes five years  
14 to build this thing, are we going to start seeing the  
15 early phase verification to satisfy these two  
16 gentlemen just as a way of trying to example this out?  
17 That's where we're struggling.

18 MR. WILSON: I understand and as I said  
19 that's a decision made by the licensee. They are  
20 going to decide when they start sending those closure  
21 letters in and notifying us. One of the requirements  
22 we place in the licenses is give us your schedule for  
23 closing out ITAAC and that it includes the DAC so that  
24 we can -- As Tom points out, we want to be out there  
25 doing that as this is happening. But that's their

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 decision.

2 MEMBER BROWN: So as a member what we have  
3 to be since we are looking at the COL if we want to  
4 have a warm fuzzy that the design that's going to be  
5 executed, we need to be extra vigilant in terms of our  
6 review. For instance when Chapter 7 comes up, we're  
7 going to have to expect more information to allow us  
8 to be comfortable because we won't know what's going  
9 on five years from now when you do this other  
10 inspection.

11 MEMBER CORRADINI: Verification.

12 MEMBER BROWN: Verification.

13 MR. WILSON: Well, I understand. We're  
14 back to the South Texas case.

15 MEMBER BROWN: Look at their --

16 MR. WILSON: South Texas is referencing  
17 the ABWR. There's no additional information in their  
18 combined license application.

19 MEMBER BROWN: In ABWR, they're changing  
20 the architecture so there is more information, more  
21 details, that have to be provided to show it. All  
22 architecture is changing. So it's all got to come in  
23 to be reviewed.

24 MEMBER BLEY: The COL.

25 MEMBER BROWN: The COL, part of the COL,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 yes. Correct. So what we should -- I'm just trying  
2 to understand where we should expect to be able to ask  
3 the kind of questions and get these answers to know  
4 how are you going to do this. How are you  
5 functionally, not the detail but functionally going to  
6 accomplish these major attributes? Because you've got  
7 to have some feeling that that's going to come out  
8 okay. Otherwise how in the world do you say Betty  
9 Crocker/Good Housekeeping seal of approval on it.

10 MEMBER CORRADINI: They're just going to  
11 be tough and not let the plant start up?

12 MEMBER BLEY: I think we've got this on  
13 the record. I'm going to try to take an optimistic  
14 approach and ask you guys at the table a question. My  
15 optimistic approach is I'm going to assume that these  
16 DAC inspection strategies you're developing will give  
17 the kind of answers we're talking about.

18 And I'm going to ask you to tell us when  
19 we can start looking at those. And we don't need to  
20 have the whole bunch. We could look at them one at a  
21 time. We'd be happy.

22 MR. FREDETTE: They're in draft stage  
23 right now.

24 MEMBER BLEY: Understand.

25 MR. FREDETTE: Now draft is just a word.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Okay?

2 MEMBER CORRADINI: It can be a draft for a  
3 very long time. I understand.

4 MR. FREDETTE: The meat of those documents  
5 at the four that I've developed so far is sufficient  
6 that Region II can start working on their procedure.  
7 The attributes are there. The techniques are there.  
8 They acceptance criteria is laid out. So I can  
9 provide those as soon as you want.

10 MEMBER BLEY: We'd love to have them now,  
11 not at the table, but --

12 MEMBER-AT-LARGE STETKAR: This afternoon  
13 would be okay.

14 (Laughter.)

15 MEMBER BLEY: We'd like to look at them  
16 and then of course later we'd like to talk to you  
17 about them. So I give it back to you to go ahead.  
18 You've got only a few more slides I think.

19 MR. FREDETTE: Yes, just a couple more.

20 MR. MURRAY: Mr. Chairman, can I add some  
21 more on the schedule?

22 CHAIRMAN ABDEL-KHALIK: Yes.

23 MR. MURRAY: I feel that I need to on  
24 that. Looking at it and I'm going to use a colloquial  
25 term "where the rubber meets the road" which is

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 implementation. We clearly understand that that is an  
2 important piece of it. In our schedule, we've laid  
3 out not only like you said earlier anybody can write a  
4 program and we understand that.

5 But we've laid out the programmatic  
6 portion in our schedule and it's complete a large  
7 portion by 2013 area. So that's how rapidly we're  
8 moving and when I say "rapidly" that's not as in  
9 taking shortcuts. That is in to support our schedule.

10 And in that laid along the way is where  
11 the rubber meets the road on each piece of the  
12 process. And the example that Tom has discussed is  
13 one piece of it programmatically. Part two is how did  
14 you do it, South Texas project licensee? Did you meet  
15 what your program said and is the program meeting the  
16 requirements?

17 I want to go back to the requirements.  
18 The requirements are laid out. We have to meet the  
19 regulations as we design it. We have to ensure that  
20 it meets the diversity, defense-in-depth. We have to  
21 meet all those requirements as we go. And our  
22 schedule lays out where we expect the rubber to meet  
23 the road.

24 MEMBER BLEY: In my case and as I  
25 understand it, you have the pilot starting in the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 fall. Is the anticipation that even after the pilot  
2 this is going to proceed as you get more things along  
3 your development path the review will follow along?

4 MR. MURRAY: And that's the schedule --

5 MEMBER BLEY: The verification will follow  
6 along.

7 MR. MURRAY: And that is the schedule we  
8 laid out so that the NRC Inspection Branch can  
9 understand where we'll be as we implement the  
10 resources. Both ours and the branch's are available  
11 for the inspections to take it through the process.

12 MEMBER BLEY: And we'll be very interested  
13 in following this process all the way through.

14 MR. SHUAIBI: And that's what I wanted to  
15 say is I think what I'm sensing is what would probably  
16 be most useful for the Committee is after we go  
17 through the pilot is if maybe we can come back and  
18 share with you what we've learned. Again going back  
19 to this South Texas, this is ABWR. This is probably  
20 the most general DAC you're going to see.

21 It's digital I&C, one that you're very  
22 interested in. It's very complex. We're trying to  
23 pilot this so that we can decide how to move forward  
24 in this area. So maybe we'll come back and share with  
25 you what we're learning from the pilot and we'll see

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 where that goes.

2 MEMBER BLEY: Let me sneak in a quick  
3 question. We haven't gotten Chapter 7 of the COL yet  
4 from you guys, the FSAR. But we've just done the  
5 human factors engineering and what we learned there  
6 was that something equivalent to the details that are  
7 beginning to show up now in DAC in that area is  
8 actually in an appendix to the Chapter 18 and that's  
9 the process they're going to go through.

10 Is there something kind of equivalent in  
11 I&C? When we get Chapter 7, will there be an appendix  
12 that's really laying out the requirements and how  
13 you're meeting them? That will help us in this  
14 process.

15 MR. MURRAY: I understand.

16 MEMBER BLEY: I'm just curious.

17 MR. MURRAY: And we've discussed that and  
18 our plan is to show the regulations and requirements  
19 that we are following with the design.

20 MR. SHUAIBI: And I guess we can take that  
21 back as a question and get it back to our --

22 MR. SWANNER: I have the answer to that.  
23 Hi. My name is Craig Swanner. I'm with Toshiba  
24 America. I'm supporting South Texas licensing of the  
25 DAC and Chapter 7. The same analogous chapter you're

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 asking about from human factors is also in Chapter  
2 7(b) Tier II. So if you take a look at that,  
3 basically the requirements, the more detailed  
4 requirements from DAC, are laid out in there for the  
5 software/hardware development.

6 MEMBER BLEY: Perfect. Thank you. We'll  
7 look at that before we have further conversations.  
8 Tom. I'm sorry.

9 MEMBER BROWN: Tier II is not being  
10 revised. That's my understanding. I asked that  
11 question in the meeting.

12 MEMBER BLEY: So it might already be there  
13 in the --

14 MEMBER BROWN: It's the COL.

15 MEMBER BLEY: It's the thing we're  
16 reviewing, the COL document for Chapter 7.

17 MR. WILSON: The FSAR.

18 MEMBER BROWN: Thank you. The FSAR.  
19 Thank you.

20 (Off the record comments.)

21 And is that what you're talking about?  
22 The FSAR chapter?

23 MR. WILSON: Yes.

24 MEMBER BROWN: Okay. We're on the same  
25 page. Thank you.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MEMBER BLEY: Tom, back to you.

2 MR. FREDETTE: Just to wrap up here.  
3 Long-term as I had mentioned, South Texas provided a  
4 schedule for DAC availability through factory testing.  
5 Mike just expounded on that a little bit. We're  
6 working on identifying all the DAC inventory among all  
7 the designs. South Texas is kind of an outlier. As I  
8 mentioned, ESBWR DAC is very extensive, but it's also  
9 much more specific than what you see in ABWR. And  
10 then we're working to identify the other DAC related  
11 ITAACs that are out there and we'll plan accordingly  
12 to accommodate inspection of all of them.

13 For the future Post-Pilot, we need to work  
14 with NEI to modify NEI 08-01 and the reg. guide. The  
15 language in the 08-01 for DAC inspection refers to the  
16 EDV process and that's really not going to be the  
17 process. So that will need to be updated.

18 MEMBER BLEY: I have a little question.  
19 But you have this task working group. So you guys are  
20 working together. You were saying after you finish  
21 these you pass them onto Region II who will write the  
22 procedure. But given the nature of some of this  
23 verification process and the need for expertise here,  
24 I'm assuming, maybe I'm wrong, that there will be  
25 quite a bit of interaction in the development of the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 inspection guide to make sure it goes beyond the usual  
2 kind of descriptions like picking up the things you're  
3 writing down.

4 MR. FREDETTE: I mentioned this early on,  
5 Mr. Bley. It's first of a kind type of inspection.  
6 So Region II is developing the procedure only because  
7 they developed all the other ITAAC procedures. So we  
8 want some uniformity there.

9 As we envision it, the procedure is  
10 basically going to contain a series of attachments  
11 that basically take all of the input that we've  
12 provided in those strategy documents and translate  
13 them over into inspection type steps.

14 MEMBER BLEY: Very good. Are you finished  
15 or do you have more?

16 MR. FREDETTE: I do. I'm finished and I  
17 wanted to get back to you asked a question about --

18 MEMBER BLEY: Are you going to use these  
19 experts?

20 MR. FREDETTE: Understand more how we  
21 intend to use the expertise that exists here in  
22 Headquarters. It was recognized earlier on that for  
23 digital I&C being a complex discipline the only  
24 expertise that we had within the agency resides here  
25 in Headquarters to do those types of inspections.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           As we envision it because Region II has  
2 the lead for ITAAC inspection, they will open an  
3 inspection report on the South Texas docket. They  
4 will lead the inspection, but the inspection will be  
5 done -- it will be a detailed review of all of the  
6 products that come out of the design process. And  
7 those will be done wherever those products are made  
8 available.

9           MR. FRYE: Tom, if I could just kind of  
10 add to what you just said. This is Tim Frye again,  
11 NRO Construction Assessment. Headquarters has the  
12 lead for developing the inspection procedures. We're  
13 working closely with Region II to get their input.  
14 We're the program office. We're developing the  
15 inspection procedures.

16           MEMBER BROWN: For the digital I&C.

17           MR. FRYE: Right. And in fact we just  
18 recently had a workshop with Region II and our  
19 technical branches the last two days on developing the  
20 ITAAC inspection procedures and the strategy  
21 documents. And they are very closely tied.

22           So I just wanted to emphasize that Region  
23 II is not independently developing the inspection  
24 procedures. We had the responsibility for that. They  
25 have some expertise down there. We certainly farm out

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 some of the development work to them. But we're  
2 coordinating the work by Region II and the technical  
3 branches. I just wanted to clarify that.

4 MEMBER BLEY: And we understand what a big  
5 project this is. How difficult.

6 Would you hit 13 and return? It will jump  
7 you back to 13. Okay. There is a couple things on  
8 this slide I wanted to get some details on. Thread  
9 audits where appropriate. Requirements design and  
10 we've been talking about that, code and testing. I'd  
11 like you to talk a little more about this.

12 Depending on who we talk to, we hear that  
13 there will be sample audits or because DAC is a new  
14 thing and the I&C system is so pervasive and  
15 important. The verification on DAC will be complete.

16 All of them will be reviewed in detail. What do we  
17 mean by audits? And you talked about horizontal and  
18 vertical slices. Is it really going to be 100 percent  
19 look at the DAC?

20 MR. FREDETTE: I don't think we could say  
21 it's 100 percent look. A thread audit is a -- Some  
22 people call it a vertical slice, but it's basically  
23 taking -- Dinesh mentioned the requirements  
24 traceability matrix earlier. When we do audits of the  
25 design process, we'll conduct a threat audit where

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 we'll look at a sampling of requirements and be able  
2 to trace how that requirement was translated from the  
3 safety analysis and the plant functional requirements  
4 to the functional requirements/design requirements and  
5 then the outcome of the requirements phase is  
6 typically a software requirements spec which sets the  
7 stage for the next phase of the design process which  
8 is taking the software requirements and translating  
9 them into a software design description and a systems  
10 specification.

11 The systems specification is then  
12 translated into instructions for writing code  
13 translate which basically is a translation of your  
14 safety analysis requirements, your functional  
15 requirements down to someone actually typing out code  
16 and then identifying how that requirement is going to  
17 be tested. It's the ability to trace from the  
18 requirements phase all the way through to testing and  
19 back and forth. That's what I consider a thread  
20 audit.

21 MR. JUNG: This is Ian Jung. There are  
22 two ways to look at it, Mr. Bley, in terms of you  
23 heard about sampling of ITAAC. My understanding is  
24 all DAC are targeted ITAAC. That's one thing you  
25 should understand.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1                   MEMBER BLEY: Explain that because that's  
2 close to what I think I've heard before, but give me a  
3 little more detail on that.

4                   MR. JUNG: What that means is that as-  
5 built ITAAC, you know you've been briefed on .4 of  
6 this point system that anything beyond a .4 they are  
7 considered targeted ITAAC given the safety  
8 significance and high value on that attribute. My  
9 understanding is all DAC are considered targeted  
10 ITAAC. That means some type of verification will  
11 happen for each of the DAC items.

12                  MEMBER BLEY: Okay. That's what I had  
13 heard.

14                  MR. JUNG: Secondly, in terms of these  
15 items, there are words like "assessment," "sampling,"  
16 "thread audit. I believe it will have to do a  
17 combination of this. For those types of information  
18 that we should have seen in the licensing review that  
19 are not available at the time of licensing, we'll do a  
20 -- Our verification will be more like reviews, like  
21 document reviews.

22                  But implementation activities such as  
23 testing, those type of activities, more of the  
24 implementation activities, we'll do more of a sampling  
25 thread audit, those approaches, because we are talking

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 about sometimes several cabinets full of documents.  
2 Simply we cannot do every case of scenarios for  
3 tracing all the requirements which is exactly a lot of  
4 times what happens even in the licensing space. And  
5 in those spaces where we don't have resources, we have  
6 to sample to make sure the process is followed and  
7 those cases demonstrate they're following the right  
8 process and right requirements are being checked to  
9 see they are compliant.

10 MEMBER BLEY: Okay.

11 MEMBER APOSTOLAKIS: I have a simple  
12 question. Maybe it has been answered. But after a  
13 DAC is successfully resolved, is there going to be a  
14 letter from the ACRS to the Commission?

15 MR. WILSON: No.

16 MEMBER APOSTOLAKIS: There is a letter  
17 from the ACRS when the Commission is deliberating  
18 whether to satisfy a design.

19 MR. WILSON: Yes.

20 MEMBER APOSTOLAKIS: A DAC is a piece of  
21 that that is postponed. And yet the ACRS will not  
22 write a letter?

23 MEMBER CORRADINI: That is true. That's  
24 my understanding.

25 MEMBER APOSTOLAKIS: Well, why not? I

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 mean the law says that the ACRS has to write a letter  
2 when it comes to such serious licensing actions.  
3 There ought to be a letter from the ACRS. How can the  
4 Commission make a decision?

5 MR. FRYE: If this is an inspection  
6 activity, it's not a licensing activity.

7 MEMBER APOSTOLAKIS: No. I'm sorry.

8 MEMBER CORRADINI: It's a verification  
9 activity. It's neither.

10 VICE CHAIRMAN ARMIJO: That's a central  
11 issue, George, in that the ACRS' last involvement is  
12 at the COL or the DCD.

13 MEMBER SIEBER: It won't be resolved.

14 VICE CHAIRMAN ARMIJO: And in those  
15 proceedings you have to decide whether the DAC are  
16 sufficiently detailed and specific that we can trust  
17 that process to build the plant properly and that's  
18 our problem.

19 MEMBER APOSTOLAKIS: Absolutely. And  
20 especially for digital I&C. It seems to me it's not a  
21 simple verification.

22 MEMBER CORRADINI: So I want to ask Jerry  
23 this since he asked the question, but I was thinking  
24 it. Since it's neither licensing nor is it inspection  
25 and it's this new word verification, has it yet to be

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 clear whether ACRS should comment on something like  
2 this?

3 MR. WILSON: Don't' draw a distinction  
4 between me saying verification and inspection.

5 MEMBER CORRADINI: But we did.

6 MR. WILSON: It's the same thing.

7 MEMBER CORRADINI: We were listening  
8 closely.

9 MR. WILSON: An inspection is a  
10 verification.

11 MR. FREDETTE: Using the words  
12 interchangeably.

13 MR. WILSON: Yes.

14 CHAIRMAN ABDEL-KHALIK: It is not a  
15 review.

16 VICE CHAIRMAN ARMIJO: But it's said by  
17 two different people.

18 MR. FREDETTE: That's right. That's the  
19 key right there. We're not doing -- The activities  
20 that we would be doing in an inspection space are  
21 similar to what you would do in an audit. We're just  
22 not calling it an audit because we're in ITAAC space  
23 now.

24 MEMBER APOSTOLAKIS: Is there a direction  
25 from the Commission that says that the ACRS does not

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 need to write a letter?

2 MEMBER CORRADINI: There's no comment.  
3 It's silent as far as I can tell.

4 MR. WILSON: Let me go back in history and  
5 just say that when the DAC process was created and the  
6 Commission approved its use this point that Dr.  
7 Apostolakis is making my recollection is was not  
8 considered.

9 MEMBER APOSTOLAKIS: Was not considered.  
10 So there really isn't really any clear direction as to  
11 which way we should go.

12 MR. WILSON: That's correct.

13 Let me speak to members of the Committee  
14 who may be changing their position in the near future.

15 (Laughter.)

16 They can ready in at the appropriate time.

17 (Off the record comments.)

18 MR. FREDETTE: On this particular slide,  
19 Dennis, did we --

20 MEMBER BLEY: Yes. I was a little  
21 uncomfortable the first time when you said that  
22 software QA assessment and the assessment of V&V was  
23 the heart of everything. I've heard enough now that I  
24 don't think I want to pursue that with you.

25 MR. FREDETTE: Not the heart but those are

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 key assessment activities.

2 MEMBER BROWN: What was the second one you  
3 said?

4 MEMBER BLEY: The last two bullets here.  
5 Tom said these are really key things and I think they  
6 are, but the design, looking at the design is the  
7 piece I wanted to hear more about and I still want to  
8 see more about that as we get these documents.

9 Anybody on the Committee have anything  
10 more they want?

11 MEMBER CORRADINI: No.

12 MEMBER BLEY: Gentlemen, thank you very  
13 much for your presentation and discussion. Very  
14 helpful. We look forward to seeing your strategy  
15 documents and seeing you again.

16 MR. FREDETTE: Thank you.

17 MEMBER BLEY: Back to you, Mr. Chairman.

18 CHAIRMAN ABDEL-KHALIK: We do look forward  
19 to receiving your strategy documents. We will see if  
20 we can schedule subcommittee meetings to review the  
21 strategy documents and perhaps a full Committee  
22 meeting following that. Thank you.

23 At this time, we're going to go off the  
24 record. We have a break scheduled at 10:15 a.m. for  
25 10:30 a.m. So we have about ten minutes. I would

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 like to read the first draft of Mr. Ray's letter in  
2 the next ten minutes and we will start our break at  
3 10:15 a.m. We're off the record, sir.

4 (Whereupon, a short recess was taken.)

5 CHAIRMAN ABDEL-KHALIK: We're back on the  
6 record. At this time, we will hear about new advanced  
7 reactor designs. And Mr. Bley will lead us through  
8 this discussion. Dennis?

9 MEMBER BLEY: Thank you, Mr. Chairman.

10 Well, this is, I think, going to be an  
11 interesting one for all us. It's an overview from NRA  
12 of some of the new designs that they are beginning to  
13 look at and where things are headed. And it's  
14 certainly an information briefing so we're delighted  
15 to have you here and look forward to hearing.

16 Mike, I'll turn it over to you.

17 MR. MAYFIELD: Thank you, Mr. Chairman.

18 The first thing I will promise you is you  
19 will not hear us say a single phrase called DAC or  
20 ITAAC.

21 (Laughter.)

22 MR. MAYFIELD: I promise you we will not  
23 utter those words today. I have no promises for the  
24 future.

25 Bill, can we get the first slide?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 I am the Director of a thing called the  
2 Advanced Reactor Program. There we go. We started  
3 seeing a lot of interest from the industry, a lot of  
4 people coming in and wanting to talk to us on pre-  
5 application discussions and interactions with domestic  
6 suppliers. Congress passed the Energy Policy Act of  
7 2005, which established the Next Generation Nuclear  
8 Plant, so a collaboration between us and DOE looking  
9 at licensing a high temperature gas reactor.

10 There is just a phenomenal amount of  
11 interest in the class of reactors called small modular  
12 reactors in the international community, principally  
13 from the so-called new entrant countries, these are  
14 folks that don't have a current domestic civilian  
15 nuclear program but want one. And many of them have  
16 figured out that first of all, they can't pay for a  
17 two to six billion dollar nuclear power plant, and  
18 even if somebody gave them the money, they don't have  
19 the grid to support it. So there's a lot of interest  
20 from those folks. And they keep looking to us for  
21 certified designs. So that has been an interesting  
22 tidbit.

23 We established the Advanced Reactor  
24 Program a little over a year ago. It's one of the  
25 three major subprograms in the Office of New Reactors.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Our responsibility is licensing for anything that is  
2 not a large LWR. Now I should emphasize power  
3 reactors. We're not doing research and test reactors.

4 We're not doing medical isotopes. Power reactors, if  
5 you're not a large light water reactor, you're going  
6 to come chat with us.

7 We -- let me emphasize for you, this is a  
8 licensing program. Historically when advanced  
9 reactors have been discussed with the Committee, it  
10 has been in the context of a research activity,  
11 getting ready, exploring some of the new technologies.

12 This -- the Advanced Reactor Program is a  
13 licensing program. We have a strong interaction with  
14 our Office of Research. We can't be successful in  
15 doing this without them. And we have an active  
16 dialogue with our colleagues up on Church Street. But  
17 the fact is this is now a licensing program.

18 Our priorities, as with any bureaucratic  
19 organization, start with staffing and resources.  
20 Absent that, we're not going to be very effective.

21 We're looking -- and you'll hear a little  
22 bit more about developing regulatory infrastructure,  
23 addressing generic policy issues, both of those things  
24 are likely to appear before the Committee as we go  
25 along, particularly so the policy issues.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           The Commission has historically wanted to  
2 hear from the ACRS on staff's proposals for addressing  
3 policy matters. So we would expect to bring our  
4 proposals for addressing policy issues to the  
5 Committee as we go along. And we'll talk a little bit  
6 more about what some of those things are.

7           We are focused on being prepared for the  
8 next generation nuclear plant. The interactions with  
9 DOE, both through the research program and now more  
10 directly in the context of licensing, we have active  
11 interactions with them. You're going to hear some  
12 about that, their presentations next week at the RIC  
13 dealing with some of this. But that has been a very  
14 active and continues to be an active bit of  
15 interaction.

16           And then we are starting to really gear up  
17 for interacting pre-application review -- pre-  
18 application discussions with the other small modular  
19 reactor applications, the integral PWRs in particular.

20           Next one, Bill. This just -- again, to  
21 emphasize our interaction with the Office of Nuclear  
22 Regulatory Research, they are here -- I believe it's  
23 next month -- to talk about some of their research  
24 activities focused on advanced reactor work.

25           Their sort of the principle activities,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 they're focused on NGNP, coordination with DOE,  
2 development of independent analytical models and  
3 tools, materials research. And they have just this  
4 year started at looking at some plans for the integral  
5 PWRs with the helical steam generators, natural  
6 circulation. Are the tools really adequate -- the  
7 analytical tools adequate for those applications?

8 We're paying some limited level of  
9 attention to the sodium-cooled fast reactors, limited  
10 attention in the sense that the time horizon for them  
11 is probably further out. Even though some of the  
12 vendors would like to bring design cert applications  
13 as early as 2012, the fact is that the customer base  
14 appears to be more interested in the integral PWRs  
15 than in sodium fast reactors.

16 So we are maintaining some low level of  
17 interest and paying attention to those, looking at any  
18 specific policy issues where we would need to be  
19 prepared to deal with it but we're not ramping up at  
20 the same level as we are for the integral PWRs and the  
21 high temperature gas.

22 MEMBER CORRADINI: Can I ask a question at  
23 this point? May it's the wrong point but when we once  
24 had this -- and I don't remember if it was a  
25 combination of NRO and Research or just Research back

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 in January of '09, what we heard at that time was we  
2 are aware, we're paying attention, we're preparing.  
3 But until we see a potential Applicant to build  
4 something in the United States, we're aware, we're  
5 watching, we're preparing. And the only thing on the  
6 agenda is NGNP because of the EAct of 2005.

7 MR. MAYFIELD: Right.

8 MEMBER CORRADINI: Has that changed?

9 MR. MAYFIELD: There's been a shift in the  
10 Commission's view on that. And the direction we've  
11 been getting through some budgeting decisions is start  
12 moving. We're not going wholesale but we're starting  
13 to get resources that support a more active  
14 engagement.

15 We do not yet have resources to fully take  
16 on a design cert review. But we're getting enough  
17 that we can take that next step. It's not quite just  
18 -- we're sitting back waiting and watching.

19 MEMBER CORRADINI: So to say it  
20 differently, just so I'm clear, even though there may  
21 not be a customer for integral water reactor A or  
22 integral water reactor B, there is going to be funding  
23 available so that you can staff up and prepare for  
24 pre-application processes?

25 MR. MAYFIELD: Yes. And to take it -- and

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 to be ready to take it to the next step.

2 MEMBER CORRADINI: Okay.

3 MR. MAYFIELD: That, of course, won't come  
4 until `12, `13. So the expectation is we will be  
5 ready to move forward.

6 One of the things that we have learned  
7 from the large light water reactor reviews is doing  
8 these things in parallel, design cert and COL is not  
9 such a great idea.

10 (Laughter.)

11 MR. MAYFIELD: The notion of requiring a  
12 domestic customer sort of sets you up for that bit of  
13 failure.

14 MEMBER CORRADINI: Right.

15 MR. MAYFIELD: You're almost guaranteed  
16 then to do the COL and design cert in parallel. And  
17 so we've sort of recognized that that's maybe not the  
18 best idea we ever had. And so the Commission is  
19 supportive, within limit, of being prepared to move  
20 forward.

21 VICE CHAIRMAN ARMIJO: But it's not a good  
22 idea to do a design cert and a COL 15 to 20 years  
23 apart either --

24 MR. MAYFIELD: Exactly.

25 VICE CHAIRMAN ARMIJO: -- which is what we

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 managed to do. So as long as you don't say DAC.

2 (Laughter.)

3 MR. MAYFIELD: You said it, I didn't.

4 MEMBER CORRADINI: The second, I guess,  
5 part of my question is so given that, at least in NGNP  
6 space, the EAct 2005 allowed DOE and NRC to come up  
7 with an MOU on proper resource sharing and planning.  
8 In the -- are we going to -- when we get to it, is  
9 there something being planned in terms of the integral  
10 -- so the small water reactors, in this regard,  
11 because of the fact the DOE now has in their program  
12 plan to fund this and, therefore, I assume part of  
13 that funding is going to have to be --

14 MEMBER BANERJEE: But it hasn't -- the  
15 White House has had problems with that.

16 MEMBER CORRADINI: Well, I mean --

17 MEMBER BANERJEE: Yes.

18 MEMBER CORRADINI: -- we'll let the  
19 politics go along but assuming DOE is that -- has  
20 there been discussion in that regard? Or is it --

21 MR. MAYFIELD: Not in the same context of  
22 an NGNP-like structure.

23 MEMBER CORRADINI: Okay.

24 MR. MAYFIELD: However, we do have active  
25 dialogue with the folks at DOE that are responsible

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 for the integral -- the small modular --

2 MEMBER CORRADINI: Okay.

3 MR. MAYFIELD: -- things other than NGNP.

4 MEMBER CORRADINI: Thank you.

5 MR. MAYFIELD: So there is an active  
6 dialogue but it's probably not -- and you never know  
7 exactly where the Administration will finally come  
8 down. We do not expect that it would like an NGNP  
9 program.

10 MEMBER CORRADINI: Okay. Thank you.

11 MR. MAYFIELD: Okay?

12 MEMBER APOSTOLAKIS: The Energy Policy Act  
13 of '05 explicitly states that the prototype for NGNP  
14 should be licensed using some probabilistic something.  
15 And then the second one, risk based.

16 Is part of your development of analytical  
17 models include addressing that part? Is that  
18 something you are going to do? I mean there is a  
19 letter from us --

20 MR. RECKLEY: When we talk about NGNP,  
21 I'll get into that --

22 MEMBER APOSTOLAKIS: Good.

23 MR. RECKLEY: -- a little bit.

24 MEMBER APOSTOLAKIS: Okay, okay, good.

25 MR. MAYFIELD: But we did, in conjunction

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 with DOE, explicitly address a licensing strategy.  
2 And that report went back to the Congress.

3 MEMBER APOSTOLAKIS: Right, right.

4 Now you also have sodium-cooled reactors  
5 and all that, what happened to that poor technology  
6 neutral framework NUREG-1860? Is that languishing  
7 some place? Are you guys planning to --

8 MR. MAYFIELD: Languishing is probably not  
9 a fair term but --

10 MR. RECKLEY: But what we --

11 MR. MAYFIELD: Go ahead, Bill.

12 MR. RECKLEY: What we informed the  
13 Commission was that the timeline that had been set out  
14 for that which was, compared to now, near future, I  
15 forget exactly what it was but we were supposed to be  
16 making recommendations either this year or next year  
17 on regulatory changes to address that, so we informed  
18 the Commission in a policy paper last year that we  
19 wanted to do that in parallel with the NGNP review,  
20 which would push that recommendation out into the 2015  
21 kind of time frame.

22 I know it sounds a long way away but what  
23 it does is it allows us to develop that in parallel  
24 with the actual review of the NGNP application.

25 MEMBER APOSTOLAKIS: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. RECKLEY: So it's not been dropped but  
2 it was deferred such that we wouldn't develop it to  
3 support NGNP necessarily but we would do it in  
4 parallel.

5 MEMBER APOSTOLAKIS: What does it mean  
6 doing it in parallel? I mean you would put yourself  
7 in the situation and you would say -- where you would  
8 say if I were to license the NGNP with a technology-  
9 neutral framework, how would I do it, is that a  
10 logical way to proceed?

11 MR. RECKLEY: Well --

12 MEMBER APOSTOLAKIS: It's not actually  
13 licensing.

14 MR. RECKLEY: Yes. The way I envision  
15 this is as we're looking at NGNP, we'll be at least  
16 looking at one technology such that we can know how it  
17 works with one technology.

18 VICE CHAIRMAN ARMIJO: And it's a very  
19 different technology.

20 MR. RECKLEY: And then we can --

21 MEMBER APOSTOLAKIS: Well, that's the  
22 point.

23 MR. RECKLEY: And then we can -- but then  
24 we are in a better position, I think, to look over and  
25 say, okay how would this work for a fast reactor

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 technology? And does it work? And if it does, then  
2 you have the beginning of a technology-neutral  
3 approach.

4 MEMBER APOSTOLAKIS: But do it in parallel  
5 with the NGNP?

6 MR. RECKLEY: Right.

7 MEMBER APOSTOLAKIS: So you're going to  
8 think about the sodium reactor at the same time?

9 MR. RECKLEY: No. As we develop an  
10 approach for NGNP or HTGRs, we can then look at that  
11 approach and see is it so specific to HTGRs or is it  
12 possible to take that concept and phrase it in such a  
13 way that it would be technology neutral and work for  
14 other technologies.

15 MEMBER APOSTOLAKIS: I think that's  
16 something -- I mean obviously it is too early in the  
17 process. But that's certainly something that I think  
18 is worth thinking about because if we miss this  
19 opportunity, we will keep saying, you know, in the  
20 year 2030, they will come in with some exotic reactor  
21 -- well, there isn't really time to risk inform  
22 anything.

23 MR. RECKLEY: Right. And then --

24 MEMBER APOSTOLAKIS: So this is the  
25 opportunity.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. RECKLEY: Well, and it is. And, you  
2 know, we are, in the industry, are looking and, you  
3 know, as they do ANS 53.1 -- I think I've got the  
4 numbers right -- for the HTGR, the community is  
5 starting to pick up ANS 54.1 for the fast reactor  
6 technologies. So with these things going on at the  
7 same time, I think --

8 MEMBER APOSTOLAKIS: But at some point,  
9 you gentlemen will develop some sort of a plan type to  
10 actually do these things.

11 MR. MAYFIELD: Well, let's wait. It's  
12 actually a little further along than that.

13 MEMBER APOSTOLAKIS: Good.

14 MR. MAYFIELD: In the paper that Bill  
15 mentioned from last year, the commitment we made to  
16 the Commission is that as we are invoking the  
17 licensing strategy for NGNP, we will also test  
18 basically the 1860 technology.

19 MEMBER APOSTOLAKIS: Yes, good, good.

20 MR. MAYFIELD: And look to see if you get  
21 sensibly the same kind of answers on licensing NGNP.

22 MEMBER APOSTOLAKIS: Or better.

23 MR. MAYFIELD: Or better.

24 MEMBER BLEY: In some sense.

25 MR. MAYFIELD: You and I have been down

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 this path, we're not going there again. But we will  
2 give it a fair test on that technology contrasted to  
3 the deterministic supplemented by risk information.  
4 So it will be a fair test --

5 MEMBER APOSTOLAKIS: Good.

6 MR. MAYFIELD: -- of that technology --  
7 that approach to licensing. We can then inform the  
8 Commission of those findings. And use that as a basis  
9 for deciding well, how far -- how much further do we  
10 go. There's a lot of interest nationally as well as  
11 internationally in a technology-neutral framework. So  
12 this isn't something that is likely to slip,  
13 particularly some of the new Commissioners that may be  
14 coming on.

15 This is not like something that is likely  
16 --

17 MEMBER CORRADINI: The second one of the  
18 day --

19 MR. MAYFIELD: -- to slip a lot. It's not  
20 going to go until 2030 before it gets some additional  
21 attention.

22 MEMBER APOSTOLAKIS: Now you said that you  
23 submitted the document to the Commission. Is that the  
24 secret document or what?

25 MR. RECKLEY: No.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: Can this Committee  
2 have it?

3 MR. RECKLEY: We have it.

4 MR. MAYFIELD: It's a SECY paper that  
5 we'll be happy to make sure that you have it.

6 MEMBER APOSTOLAKIS: Yes, I'd like to see  
7 that. I don't know about the rest of you.

8 MEMBER BLEY: I haven't noticed it going  
9 by so it would be nice to get.

10 MR. MAYFIELD: Well, we will take an  
11 action to make sure that the Committee has it.

12 MEMBER APOSTOLAKIS: Thank you very much.

13 MEMBER CORRADINI: So last thing, I know  
14 you're -- this is all one intro but what the heck --  
15 so is this an appropriate priority list? Is this  
16 prioritized? Or it just happens to be a list in  
17 alphabetical order?

18 MR. MAYFIELD: It's quasi-prioritized.

19 MEMBER CORRADINI: Okay.

20 MR. MAYFIELD: I think we write things  
21 down in the way we -- sort of the order we're thinking  
22 about them.

23 MEMBER CORRADINI: Okay.

24 MR. MAYFIELD: NGNP is the first order of  
25 business. It is mandated in law so it sort of

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 naturally attracts --

2 MEMBER CORRADINI: Funding.

3 MR. MAYFIELD: -- bureaucrats' attention  
4 and funding.

5 MEMBER CORRADINI: The only reason I asked  
6 it like that is I know DOE has, because of their  
7 rethinking of policy with GNEP and all this sort of  
8 stuff, have diminished the third one on your list.  
9 But nonetheless, my understanding is they are going  
10 through a series of gap analysis, kind of like mini-  
11 PIRTs, on things necessary to actually push this  
12 forward relative to the licensing. And I guess I'd  
13 encourage if staff is aware of and is going to get  
14 copies of what they're doing.

15 MR. MAYFIELD: We are staying plugged in.  
16 There is a trilateral arrangement between the U.S.,  
17 Japan, and France, looking specifically at sodium fast  
18 reactors. DOE invited us to go with them at the last  
19 meeting. Bill went with the team to represent U.S.  
20 interests. And the focus was they -- the trilateral  
21 move from a research activity to starting to bring the  
22 regulators to the table.

23 One of the themes we have been sounding  
24 with the Gen IV folks and others is it really doesn't  
25 serve you very well to develop a technology, develop

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 what you believe to be an adequate regulatory  
2 structure, without a single regulator in the room. So  
3 you might bring us along with you. And that's been  
4 gaining interest from the people pushing the  
5 technologies.

6 So when -- from the trilateral activity,  
7 there was interest in reaching out to the regulatory  
8 bodies from each of the three countries. We shifted  
9 some resources, made Bill available to take the trip.

10 We have continued that activity and expect to be  
11 involved in the next trilateral meeting, which is some  
12 months away.

13 MEMBER CORRADINI: The reason I asked  
14 specifically about the sodium-fast reactor is that at  
15 least the French program, with the ASTRID design  
16 concept, the French safety authority is being pretty  
17 proscriptive as to what their demanding relative to  
18 requirements on a new version of we'll call PHOENIX.

19 MR. MAYFIELD: Right.

20 MEMBER CORRADINI: A new PHOENIX relative  
21 to void coefficients, relative to a number of things  
22 that -- I would just say more proscriptive. And I  
23 just want to make sure that staff here is aware of it.

24 MR. MAYFIELD: We actually have a couple  
25 of -- so yes, we share that interest. We have a

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 couple of entrees with the French in particular. One  
2 is the trilateral I just mentioned. The other one is  
3 through the MDEC activities, I think the Committee has  
4 been briefed on for the large light water reactor  
5 activity.

6 Through that interaction, there is  
7 continuing dialogue about having nothing forward,  
8 nothing concrete yet, but dialogue among the members  
9 about having a working group dealing with non-large  
10 light water reactor technologies.

11 Now they've talked about it. It just  
12 hasn't moved forward yet. Although we are looking at  
13 additional bilateral arrangements, sometimes multiple  
14 bilateral arrangements, looking at the same thing but  
15 it is moving. There is interest in the international  
16 community in sharing information, sharing regulatory  
17 insights.

18 MEMBER APOSTOLAKIS: The big problem they  
19 had was sodium leaks. It had nothing to do with  
20 reactor.

21 MEMBER CORRADINI: But -- yes, you're  
22 right.

23 MEMBER APOSTOLAKIS: There were other  
24 problems but that's why the reactor was shut down.

25 MEMBER CORRADINI: No, but you're thinking

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 super PHOENIX. I'm thinking --

2 MEMBER APOSTOLAKIS: Yes.

3 MEMBER CORRADINI: -- primarily with  
4 PHOENIX.

5 MEMBER APOSTOLAKIS: Yes.

6 MEMBER CORRADINI: But you're aware,  
7 you're aware.

8 MR. MAYFIELD: Yes.

9 MEMBER CORRADINI: Okay, fine.

10 MR. MAYFIELD: And we continue to have  
11 that --

12 MEMBER APOSTOLAKIS: Can we make the staff  
13 aware of more proscriptive regulations?

14 (Laughter.)

15 MEMBER APOSTOLAKIS: Sorry guys. They  
16 were lessons learned.

17 MEMBER BANERJEE: And what's the time  
18 scale that you are expecting? You said something like  
19 2012 for certification requests or --

20 MR. MAYFIELD: Well, we're going to share  
21 with you, I think, a little bit more information as we  
22 go through the presentation on timing. But design  
23 cert applications, depending on how much credit you  
24 give to the optimistic views of some of the suppliers,  
25 some have said as early as 2011. I think it would be

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 late 2011 --

2 MEMBER BANERJEE: The difference --

3 MR. MAYFIELD: -- if it happens.

4 MEMBER BANERJEE: -- between the high  
5 temperature gas-cooled reactors and the sodium-cooled  
6 fast reactor, that this is in the world where sodium-  
7 cooled fast reactors are being built, 500-megawatt  
8 devices.

9 MR. MAYFIELD: Yes.

10 MEMBER BANERJEE: So that's a completely  
11 different reality scale.

12 MR. MAYFIELD: Yes. We agree. The  
13 interest in this country right now because of the  
14 Energy Policy Act, pushes high temperature gas a  
15 little further -- in fact a lot further than the  
16 sodium. However, there is commercial interest in the  
17 sodium-cooled fast reactors.

18 MEMBER BANERJEE: Because they're being  
19 built.

20 MR. MAYFIELD: Yes.

21 MEMBER BANERJEE: So it's sort of  
22 different.

23 MR. MAYFIELD: It takes you to a different  
24 world.

25 MEMBER BANERJEE: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. MAYFIELD: That's true.

2 MEMBER BANERJEE: They're a different  
3 purpose.

4 MR. MAYFIELD: With that, I think I'd like  
5 to turn to Bill and let him go through the NGNP  
6 activities.

7 MR. RECKLEY: You're received some  
8 information on NGNP over the course of the last couple  
9 years in that context, the research plan. So I'll try  
10 to go through these and just bring you up to date  
11 where things may have changed somewhat.

12 Just as background, and it's been  
13 mentioned several times here, NGNP is laid out in the  
14 Energy Policy Act with a schedule, with arrangements  
15 between DOE and the NRC. We developed a joint  
16 licensing strategy. And that was issued in August of  
17 2008.

18 And we're all shooting for the timeline  
19 that's in the act, which would be operation by 2021,  
20 which, when you look at the licensing strategy, backs  
21 out to a COL application around 2013. I believe the  
22 members are familiar with the basic technology. Triso  
23 fuel, this is still the proposal so it's designs are  
24 still in play, Pebble Bed and Prismatic.

25 I guess one update that's worth mentioning

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 is that in the advanced test reactor in Idaho, they  
2 are currently doing testing. And the first test came  
3 back relatively -- I guess very successfully in that  
4 they made the triso fuel particles for the megaton  
5 pack, put them in the ATR, achieved the burnup that  
6 they were seeking to get without failure of the  
7 particles.

8 VICE CHAIRMAN ARMIJO: When will the  
9 decision be made, as far as you know --

10 (Laughter.)

11 VICE CHAIRMAN ARMIJO: -- I mean Prismatic  
12 and Pebble Bed, because they're really two very  
13 different reactors.

14 MR. RECKLEY: If you look at the last  
15 bullet on this slide --

16 VICE CHAIRMAN ARMIJO: Okay.

17 MR. RECKLEY: -- the DOE schedule is they  
18 went out last year with the funding opportunity that  
19 required the -- basically the three vendors to come in  
20 and make proposals.

21 They will be picking, in the very near  
22 future, perhaps next week, getting the announcement on  
23 the Phase I vendor or vendors.

24 VICE CHAIRMAN ARMIJO: All right.

25 MR. RECKLEY: The funding opportunity said

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 approximately two. So we look at it and feel that  
2 could be one, two, or three and still be approximately  
3 two. So we don't know that decision yet.

4 However Phase I is a relatively short  
5 activity for the development of a conceptual design.  
6 It goes out to basically the end of this fiscal year  
7 at which time there will be another funding activity  
8 and a selection for Phase II, which is the longer term  
9 program and the development of the NGNP reactor that  
10 would be built.

11 So in response to your question, I would  
12 say early 2011 is when we'll see it narrowed down.

13 MEMBER CORRADINI: To a design?

14 MR. RECKLEY: Concept.

15 MEMBER CORRADINI: Right.

16 MR. RECKLEY: The act calls for and the  
17 licensing strategy calls for it to narrow to a single  
18 design.

19 MEMBER CORRADINI: Okay. The reason I  
20 think Sam's asking that and we're all interested is  
21 last time, I think it was January of '09, the last  
22 time we had you guys -- I can't remember. Sometime in  
23 early 2009 when we had a group from, I think, both NRO  
24 and research or maybe just research, is that our  
25 comment back was you guys are being, in some sense,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 set up because certain things are very much design  
2 specific, certain things are very much simply  
3 technology. Graphite, et cetera, et cetera.

4 MR. RECKLEY: Right.

5 MEMBER CORRADINI: So the earlier that you  
6 can -- the earlier DOE can make a design on a  
7 technical basis, the better off we all are.

8 MR. RECKLEY: We fully agree but we are  
9 where we are and right now we have to do exactly what  
10 you said, which is what can we do that's not necessary  
11 as dependent on either Pebble Bed or Prismatic. And  
12 there are some things that can be done.

13 MEMBER CORRADINI: Sure.

14 MR. RECKLEY: And in some cases, we're  
15 doing both.

16 MEMBER CORRADINI: Okay.

17 MEMBER BANERJEE: Doesn't Pebble Bed  
18 remind me also run a steam turbine?

19 MR. RECKLEY: One of the things I wanted  
20 to make on this slide was one of the things that's  
21 happened in the last year or so, maybe even since  
22 you've been briefed, is that the designs are changing.

23 They've generally gotten smaller. They're  
24 down on the order of 150 megawatts thermal. They had  
25 ranged between the vendors from 400 up to even 600 or

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 more. But they are coming down. And there is a  
2 convergence to around 250 megawatts.

3 The outlet temperature for the program has  
4 come down to around 750 degrees in order to clear some  
5 of the difficulties with the development and  
6 qualification of high temperature materials. And  
7 lastly, there has been a convergence that it will be  
8 steam cycle plant, not a --

9 MEMBER BANERJEE: Yes, nobody has ever  
10 been able to build a good end turbine. There is a  
11 small problem there.

12 MR. RECKLEY: So those things, I believe  
13 at least for the first plant or the prototype plant,  
14 there has been a convergence on that.

15 PARTICIPANT: Absolutely the right thing  
16 to do.

17 MEMBER CORRADINI: But then that -- I mean  
18 and that's independent -- I just want to make sure --  
19 that independent of those designs you were talking  
20 about?

21 MR. RECKLEY: We're seeing that from the  
22 vendors.

23 MEMBER CORRADINI: Okay. So that brings  
24 up the generic issue of steam linkage into the --

25 MR. RECKLEY: Water intrusion comes back

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 in.

2 MEMBER CORRADINI: Yes, right.

3 MR. RECKLEY: Our current activities,  
4 we're -- we are evaluating our existing requirements,  
5 largely based on light water reactors, to see how they  
6 need to change to address this technology.

7 We're identifying significant policy and  
8 technical issues, both for HTGRs and where we can, and  
9 we'll talk about it a little later, where they cross  
10 over to other small modular reactor designs, and we're  
11 developing an overall licensing plan that includes a  
12 licensing approach and then coordinates with research  
13 being done by DOE, by the vendors, by our Office of  
14 Research, and lays out a plan as to, you know, what  
15 papers are we going to have to send up to the  
16 Commission, what other actions are we going to have to  
17 take in order to support the licensing schedule.

18 Near term activities, the DOE, through  
19 Idaho National Lab, are submitting papers for us to  
20 look at on approaches. These tend to be higher level.

21 Some you will recognize right off the bat. Defense  
22 in depth, licensing basis event selection, safety  
23 classification -- it goes to Dr. Apostolakis' issue of  
24 how we're going to do this and what role PRA would  
25 play --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: The LBE is, or for  
2 the members who are not very familiar, central to the  
3 technology neutral framework.

4 MR. RECKLEY: Right. Then other more  
5 technology-specific things like fuel design, high  
6 temperature material, qualification programs, and  
7 validation of the computer --

8 MEMBER APOSTOLAKIS: Are they doing a PRA?

9 MR. RECKLEY: They will. There are some  
10 that exist in various levels. But they will  
11 ultimately do one, yes.

12 MEMBER APOSTOLAKIS: But, I mean you can't  
13 really identify the licensing basis events without a  
14 PRA.

15 MR. RECKLEY: And they have done it in the  
16 past. They --

17 MEMBER APOSTOLAKIS: Who is they, by the  
18 way?

19 MR. RECKLEY: Well, PBMR, General Atomics  
20 --

21 MEMBER APOSTOLAKIS: Okay, okay, fine.  
22 It's not Idaho.

23 MR. RECKLEY: Right.

24 So in the near term, these white papers  
25 are what we'll be looking at for the next year or so.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: So you do have those  
2 white papers? Is that what you said?

3 MR. RECKLEY: The first white paper we  
4 received was defense in depth. We expect most of the  
5 others in the summer, this summer.

6 MEMBER CORRADINI: So from a process  
7 standpoint --

8 MEMBER APOSTOLAKIS: Oh, very good.

9 MEMBER CORRADINI: -- I guess I just  
10 wanted to ask a process standpoint, so these come in.  
11 Are you treating these as pre-application information  
12 that you can then ask questions back to DOE as the --  
13 I'll call them interim Applicant and say, you know --

14 MR. RECKLEY: Yes.

15 MEMBER CORRADINI: -- what does this mean?

16 MR. RECKLEY: Yes.

17 MEMBER CORRADINI: Clarify that. What  
18 does this system do?

19 MR. RECKLEY: Yes. In the end, the goal  
20 would be that we can write them back a response that  
21 says your approach or framework for how you will do  
22 mechanistic source term looks reasonable. And then  
23 whoever they pick will pick up that white paper and  
24 use that framework. And we will have -- we will be  
25 one step further than we would have otherwise been if

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 we had just waited for the vendor to do --

2 MEMBER CORRADINI: Good approach.

3 MR. RECKLEY: -- to do 2013 applications.

4 MEMBER CORRADINI: So let me ask this  
5 question. I'm sorry that I'm too interested in this.

6 I'm worried about the fact that DOE spends all this  
7 money, Idaho does all this work, they pick a vendor  
8 and the vendor goes thank you very much but we're  
9 going to develop our tool, we're going to do our  
10 tests, we're going to develop our framework. And they  
11 use things over here.

12 Is this time well spent over here with  
13 DOE? That goes back to Sam's question about picking a  
14 design and getting a vendor involved with it.

15 MEMBER BANERJEE: Mike, that's a separate  
16 -- what can they do about that issue?

17 MR. RECKLEY: But the assumption, the  
18 assumption really is what DOE is doing is laying the  
19 groundwork and for the vendor not to take advantage of  
20 it.

21 VICE CHAIRMAN ARMIJO: The vendor would be  
22 --

23 MR. RECKLEY: They would have to pay for  
24 all that stuff.

25 VICE CHAIRMAN ARMIJO: Yes, the vendor

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 would be foolish to ignore what you've already --

2 MR. RECKLEY: Right, right.

3 VICE CHAIRMAN ARMIJO: -- I mean DOE is  
4 spending hundreds of millions of dollars to do this  
5 work.

6 MEMBER BANERJEE: Unless the vendor wants  
7 some DOE money.

8 MR. RECKLEY: They always do.

9 MEMBER CORRADINI: Gee, I wonder.

10 MEMBER APOSTOLAKIS: That's a good guess.

11 MR. RECKLEY: Right.

12 MEMBER CORRADINI: It's possible.

13 MR. RECKLEY: And, by the way, DOE is  
14 talking -- the vendors are playing in this game even  
15 now. And so it's not as if this is independent of  
16 that activity.

17 MR. MAGRUDER: Okay, thanks, Bill.

18 I'm going to take a few minutes and talk a  
19 little bit about the integral pressurized water  
20 reactors. That's a term that we're using for these  
21 small light water reactors.

22 I want to do a kind of a high, high level  
23 description of the designs that we've been looking at  
24 so far, talk a little about the interactions we've had  
25 with the vendors, and upcoming interactions.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           So as you can see, the way we've defined  
2 this is designs that are -- use light water for  
3 cooling, in moderation have basically, you know, the  
4 steam generator, control rods, pumps that they have  
5 them all contained within a reactor vessel.

6           The three vendors that we are working with  
7 are listed there. They are listed in the order of the  
8 beginning of interactions with the staff, not in any  
9 priority order or anything.

10           From discussions with the vendors, it  
11 appears that their -- you know, at least their  
12 proposals, are that they will be in compliance with  
13 almost all of the GDC. There may be a few exceptions  
14 here or there but their goal is to license these  
15 plants relatively quickly and not push the envelope  
16 with new technology. There will be some exceptions.  
17 I'll talk a little bit about that. But that's the  
18 overriding message, I guess, we got from them.

19           I'm going to talk a little bit about  
20 schedules on the individual side. I will mention that  
21 we published a regulatory information summary, a RIS,  
22 a few weeks ago asking for an update from these  
23 vendors and any vendors actually that are interested  
24 in working with us on their schedules.

25           Next slide please. Let's start with the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Westinghouse IRIS design.

2 MEMBER CORRADINI: Can I ask a generic  
3 question?

4 MR. MAGRUDER: Yes.

5 MEMBER CORRADINI: Because you said some  
6 things about all of them in general. So I guess a few  
7 things. One, I'm curious about staffing. I've got a  
8 modular reactor that's 50 megawatts, 60, a hundred.  
9 Am I going to require a staffing plan that if I have  
10 three of these, I've got to have three separate  
11 staffs? I want to know how these things couple  
12 together because this concerns me relative to staffing  
13 requirements --

14 MR. MAGRUDER: Yes.

15 MEMBER CORRADINI: -- because you could  
16 drive the staffing up that these things are not at all  
17 of any interest.

18 MR. MAGRUDER: Yes.

19 MEMBER CORRADINI: The second thing is  
20 emergency planning relative to an EPZ zone. So, I  
21 mean, there's a number of generic things. Are you  
22 going to come to that?

23 MR. MAGRUDER: Yes.

24 MEMBER CORRADINI: Okay.

25 MR. MAGRUDER: Yes. Those are exactly the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 things that we've been thinking about.

2 MEMBER CORRADINI: Fine.

3 MR. MAGRUDER: And hopefully the vendors  
4 have been thinking about as well. So that's a perfect  
5 intro.

6 The IRIS design, IRIS stands for  
7 International Reactor Innovative and Secure, that's  
8 the Westinghouse approach. They describe it as a PWR  
9 with a reactor vessel helical coil steam generators,  
10 reactor coolant pumps, and a pressurizer within a  
11 reactor vessel, which is enclosed in a spherical steel  
12 containment vessel. This is a -- as you can see --  
13 about a thousand megawatt thermal plant design.

14 It's a little hard to read the labels on  
15 this slide here but there are eight steam generators  
16 and eight reactor coolant pumps within this vessel.  
17 At least that's the proposal.

18 MEMBER SIEBER: Where are the pumps? The  
19 pumps are in the vessel?

20 MR. MAGRUDER: The pumps are in the  
21 vessel.

22 MEMBER SIEBER: Up high?

23 MR. MAGRUDER: Yes, up high. Basically  
24 the difference with these designs is the primarily --  
25 I mean the course at the bottom of the vessel there,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 primary coolant flows up and then down through the  
2 outside of the core. In this case, the water is  
3 forced down. And the primary water is on the outside  
4 of the steam generator tubes for all these designs,  
5 which has a lot of advantages and some disadvantages.

6 MEMBER SHACK: We make steam in the tube  
7 this time.

8 MR. MAGRUDER: Yes.

9 MEMBER SHACK: Yes, that's a big plus.

10 MEMBER SIEBER: Just like burning coal.

11 MR. MAGRUDER: Yes, almost.

12 MEMBER SHACK: It is.

13 MEMBER BANERJEE: But what is this?

14 PARTICIPANT: It's got the tubes in the  
15 front I see.

16 MEMBER BANERJEE: Vertical steam  
17 generator.

18 MEMBER CORRADINI: And you have expertise.

19 MEMBER BANERJEE: Yes.

20 MR. MAGRUDER: The -- as you can see, they  
21 are proposing -- and actually all three of the vendors  
22 are proposing to use standard PWR fuel 17 by 17 design  
23 --

24 PARTICIPANT: Shorter.

25 MR. MAGRUDER: -- standard enrichment --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 yes, they are just going to be shorter. Westinghouse  
2 has told us that their plan is to come in for a design  
3 certification. Best estimate right now of when  
4 they'll come in is mid to late 2012.

5 CHAIRMAN ABDEL-KHALIK: Is there a scale  
6 on this picture? Vessel height 45 feet or something?

7 MR. MAGRUDER: It's -- I don't have a -- I  
8 don't think I have a scale. It's relatively -- it's  
9 larger than the other design, let me put it that way.

10 I have dimensions on the NuScale design, which we'll  
11 get to in a couple of slides.

12 That vessel is 60 feet tall by 15 feet in  
13 diameter. But this is larger than that.

14 CHAIRMAN ABDEL-KHALIK: This is larger.

15 MR. MAGRUDER: Yes.

16 PARTICIPANT: Higher powered, too.

17 MR. MAGRUDER: But I can't give you the  
18 specifics.

19 MEMBER CORRADINI: These are kind of like  
20 not Bs and not Ps. Somewhere in between in terms of  
21 operating pressures.

22 MR. MAGRUDER: Yes. They're --

23 MEMBER CORRADINI: They're not 2250.

24 MR. MAGRUDER: Right.

25 MEMBER CORRADINI: They're lower pressure.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. MAGRUDER: They're lower pressure.

2 MEMBER BLEY: You said the core is shorter  
3 than in a -- do you know how tall the core is?

4 MR. MAYFIELD: They're nominally half  
5 height.

6 MR. MAGRUDER: Yes, about --

7 MEMBER BLEY: Half height.

8 MR. MAGRUDER: -- about half height.

9 MEMBER BLEY: Okay. So that helps.

10 PARTICIPANT: Six or seven feet.

11 MR. MAGRUDER: Right.

12 MEMBER SIEBER: Looks like it would be a  
13 pain to refuel.

14 MR. MAGRUDER: Maybe.

15 MR. MAYFIELD: They talk about refueling  
16 strategies that they have that simplifies some of the  
17 problem. But it's --

18 MEMBER SIEBER: Well, it's tough to take  
19 apart.

20 MR. MAGRUDER: Yes.

21 (Laughter.)

22 MEMBER SIEBER: Maintenance is --

23 MR. MAGRUDER: You're right. And you can  
24 see that the refueling cycle for this proposal right  
25 now is three to three-and-a-half years. So they're --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 you know, they --

2 PARTICIPANT: Consider this an issue, yes.

3 MR. MAGRUDER: -- more difficult to  
4 refuel.

5 MEMBER CORRADINI: It's been coming down.

6 IRIS started at eight.

7 MR. MAGRUDER: Yes, yes. They've been  
8 working with some utilities. I mean there is  
9 obviously a trade off for a lot of different things  
10 you have to consider for when you refuel these  
11 reactors.

12 Next slide, as I mentioned, they were the  
13 first to come in and talk to us about a design. They  
14 came in actually in 2003.

15 MEMBER APOSTOLAKIS: Stewart?

16 MR. MAGRUDER: Yes?

17 MEMBER APOSTOLAKIS: Can you quickly tell  
18 me why these vendors are proposing these small  
19 reactors? Is it market driven?

20 MR. MAGRUDER: That's a good point.

21 MEMBER APOSTOLAKIS: Safer?

22 MR. MAGRUDER: They are -- they claim they  
23 are safer. We have yet to verify that. But a lot of  
24 it is market driven. The IRIS design, as the name  
25 implies, is a very international design.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: I know.

2 MR. MAGRUDER: And as Mike mentioned  
3 earlier, there is a lot of interest around the world  
4 in smaller reactors both from an economic point of  
5 view from the --

6 MEMBER APOSTOLAKIS: Really international  
7 or just U.S./Italy?

8 MR. MAGRUDER: No, it's more than just  
9 U.S. and Italy.

10 MEMBER-AT-LARGE STETKAR: Well, Southeast  
11 Asia, for example, has a lot --

12 MEMBER APOSTOLAKIS: IRIS?

13 MEMBER-AT-LARGE STETKAR: Well, they have  
14 a lot of interest for smaller plants.

15 MR. MAGRUDER: Yes, but you were asking  
16 about the consortium specifically?

17 MEMBER APOSTOLAKIS: Yes.

18 MR. MAGRUDER: IRIS specifically.

19 MEMBER APOSTOLAKIS: Yes, the design  
20 itself.

21 MR. MAGRUDER: Yes, it's mostly Italian  
22 and U.S. But there are some other universities and  
23 companies around the world involved.

24 VICE CHAIRMAN ARMIJO: The international  
25 is Westinghouse and you say and Italian company?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: Italian, yes.

2 MR. MAGRUDER: Yes. ENSA, ENEA, several  
3 Italian universities are involved.

4 MEMBER BANERJEE: But not Breda or  
5 Finmeccanica, none of the major Italian fabricators,  
6 right?

7 MR. MAGRUDER: Not that I know of.

8 MEMBER APOSTOLAKIS: MIT was involved. I  
9 Ansaldo involved?

10 MR. MAGRUDER: I don't know. They are  
11 using the SPES facility in Italy to do a lot of the  
12 testing. They've modified it now. It's called the  
13 SPES III.

14 They have submitted a couple of reports to  
15 us, which we have not really looked at. As we have  
16 mentioned before, you know, up until recently, our  
17 interaction with these vendors has been very minimal.  
18 We didn't have the resources to do much.

19 And we basically told them they could  
20 submit reports and we would look at them when we got  
21 the time. But we really haven't done much on these  
22 reports.

23 So we do have a report in house on  
24 emergency planning where they propose reducing the EPZ  
25 basically to the site boundary. And they cite, you

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 know, a lot of experience and a lot of good  
2 information in that report, which we have not  
3 officially reviewed yet. But that's a goal actually  
4 for many of these plants is to reduce the EPZs so they  
5 can be sited in a lot of different places.

6 MEMBER CORRADINI: But by the siting  
7 criteria, my understanding is no matter the size, five  
8 miles is the smallest. That's my interpretation of  
9 the regulation. Am I misinterpreting?

10 MR. MAGRUDER: Well, no, that's not quite  
11 true. There is -- there are exceptions written into  
12 the -- or the possibility of those exceptions are  
13 written into the emergency planning rule on a case-by-  
14 case basis.

15 MEMBER CORRADINI: Because the one that I  
16 know is La Crosse boiling water reactor, 50 megawatts  
17 electric, I still thought their emergency planning  
18 zone was --

19 MR. RECKLEY: It probably was as was Fort  
20 St. Vrain's. But the regulation allows us to do a  
21 case-by-case --

22 MEMBER CORRADINI: And they could ask.

23 MR. MAGRUDER: Yes.

24 MEMBER CORRADINI: Okay, thank you.

25 MR. MAGRUDER: I mean I think it is fair

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 to say emergency planning is probably more of a  
2 political issue than a technical issue.

3 VICE CHAIRMAN ARMIJO: Seismic isolators,  
4 that's interesting.

5 MR. MAGRUDER: Yes. Seismic isolators is  
6 an interesting topic. They came in and submitted a  
7 report on that. I mean their goal obviously is to  
8 isolate the whole NSSS essentially and try to take  
9 seismic out of the list of issues they need to.

10 Minimal recent interactions within them,  
11 the last meeting was in July of 2009 on the seismic  
12 isolators.

13 Next design to talk about is NuScale.  
14 This is the smallest of the three that we're looking  
15 at. As you can see, it's only 4,500 megawatt. Low  
16 pressure, this is a natural circulation design. No  
17 reactor coolant pumps.

18 Their proposal is kind of interesting.  
19 These are small modules. This proposal is to build a  
20 plant or their design certification would be for a  
21 facility with 12 modules and controlled by one control  
22 room. So the issue of --

23 MEMBER CORRADINI: Up to 12, right?

24 MR. MAGRUDER: Up to 12.

25 MEMBER CORRADINI: Right.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. MAGRUDER: But their proposal is to  
2 come in and certify a design for 12. And the  
3 applicants can build how many ever they want. As a  
4 matter of fact, one of their, you know, selling points  
5 is that the plant could be sited for 12 modules, the  
6 infrastructure could be built, at least part of it,  
7 and you could maybe bring in one or two modules, hook  
8 them up, start producing power. And then as you need  
9 more power or as you can afford to build more, you  
10 could just bring in more of these modules.

11 VICE CHAIRMAN ARMIJO: That's exactly what  
12 the old PRISM idea was 20 years ago.

13 MR. MAGRUDER: Right.

14 VICE CHAIRMAN ARMIJO: In that case, those  
15 guys were actually going to move the reactor modules  
16 around until they decided no, they'd better keep them  
17 unmovable.

18 MR. MAGRUDER: Well, NuScale actually is  
19 proposing to move their modules within a pool.

20 MEMBER CORRADINI: For refueling.

21 MR. MAGRUDER: For refueling, yes. They  
22 describe their design as an integrated reactor vessel  
23 enclosed in an air-evacuated containment vessel. So  
24 what you're actually looking there is both a reactor  
25 vessel and a containment vessel. And it is immersed

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 in a pool of water below grade.

2 Their best estimate proposal is to come in  
3 for a design cert application in early 2012.

4 VICE CHAIRMAN ARMIJO: Are they in the  
5 seismic isolation, too? Are all of these guys  
6 thinking about that?

7 MR. MAGRUDER: They are thinking about it.  
8 Their proposal is to have this -- the containment  
9 vessel supported on trunnions. And that would isolate  
10 the reactor.

11 MEMBER CORRADINI: But the whole thing,  
12 according to your cartoon, the whole thing sits in a  
13 pool of water. It's kind of like a trigger reactor  
14 that makes electricity.

15 MR. MAGRUDER: Yes.

16 MEMBER CORRADINI: A trigger reactor with  
17 a containment.

18 MR. MAGRUDER: Yes. And it's pool is  
19 obviously, you know, serves a bunch of different  
20 purposes.

21 This design actually started out of Oregon  
22 State which got some DOE funding from the MASLWR  
23 program, which you may be aware of, the multi-  
24 application small light water reactor. So they've  
25 done some work. They have a one-third scale test

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 facility built out there.

2 They have submitted some topicals to us,  
3 one on codes and methods, one on refueling operations.

4 As I mentioned, their proposal is to actually move  
5 the vessels within this pool to do refueling.

6 They've provided some data to our Office  
7 of Research on updating the TRACE and MELCOR codes  
8 also, which has been helpful for the staff.

9 Significant interactions, several meetings  
10 over the last few years, most recently in the fall on  
11 the PRA and severe accident analysis. They have  
12 completed the Phase I PRA and they're going to do more  
13 work -- or Level One, I should say, Level One PRA.

14 Upcoming topical reports, they've  
15 submitted a list of interactions they'd like with us  
16 over the next couple of years. In the near future,  
17 they want to talk about human factors approach, their  
18 LOCA PRT and diversity in defense in depth.

19 MEMBER APOSTOLAKIS: Do you happen to  
20 remember who did the PRA for this?

21 MR. MAGRUDER: Yes, Dr. Medaris of  
22 Maryland.

23 I've seen reports in the press and I don't  
24 want to -- I'm only telling you what I've seen in the  
25 press --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER APOSTOLAKIS: Okay.

2 MR. MAGRUDER: -- but I know that Energy  
3 Northwest has been talking with NuScale about teaming  
4 up to use this design.

5 MEMBER BANERJEE: Do you have any idea  
6 when they may come in for certification?

7 MR. MAGRUDER: Yes, as I mentioned, they  
8 are planning to come in early 2012 with a design cert  
9 application.

10 MEMBER BANERJEE: And if Westinghouse  
11 comes, when would they come? Around the same time?

12 MR. MAGRUDER: Westinghouse is later in  
13 2012.

14 MEMBER BANERJEE: Later?

15 MR. MAGRUDER: Yes, that's the best  
16 information to date.

17 MEMBER BANERJEE: Okay.

18 CHAIRMAN ABDEL-KHALIK: This is the --  
19 when you say the outlook condition, 150 psig, 575,  
20 that's the steam condition? That's super-heated  
21 steam.

22 MR. MAGRUDER: That's for the -- for the  
23 mPower you mean?

24 CHAIRMAN ABDEL-KHALIK: For NuScale.

25 MR. MAGRUDER: Or NuScale rather? That's

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the outlook conditions, yes. I think it is the  
2 outlook conditions of the core outlet.

3 CHAIRMAN ABDEL-KHALIK: It can't be, 150  
4 psi saturation, 1,500 --

5 MR. MAYFIELD: They've got external  
6 turbines, turbine generators.

7 MEMBER CORRADINI: But I think Said's  
8 question is correct. I think that's a typo. It's  
9 1,500.

10 MR. MAGRUDER: Oh, oh, oh.

11 CHAIRMAN ABDEL-KHALIK: Saturation  
12 temperature at 1,000 psi is hot.

13 MR. MAGRUDER: You're right.

14 MEMBER CORRADINI: Otherwise you've got a  
15 BWR there.

16 MR. MAGRUDER: Yes, the difference  
17 technically between IRIS and NuScale is very little.  
18 It is essentially a pressure range just below  
19 saturation in the core. Thank you.

20 CHAIRMAN ABDEL-KHALIK: It's just the  
21 pressure is wrong.

22 MEMBER BANERJEE: Then it might be  
23 boiling.

24 MR. MAGRUDER: Moving to the mPower  
25 reactor proposed by B&W, this is kind of size-wise in

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 between the smaller NuScale design and the larger IRIS  
2 design. You can see 125 megawatt electric is their  
3 proposal. A little bit longer refueling cycle.

4 They're thinking about -- they are talking  
5 about -- they're thinking about -- they are talking  
6 about a design cert application in mid-2012. So  
7 they're all around that same time frame right now.

8 MEMBER-AT-LARGE STETKAR: We're going to  
9 be busy.

10 MEMBER BANERJEE: What's the difference?  
11 I missed it. Could you go back?

12 MR. MAGRUDER: Sure. This design --

13 MEMBER BANERJEE: I have seen this design.

14 MR. MAGRUDER: It has one -- I think they  
15 call it -- they don't call it a reactor coolant pump.  
16 They call it --

17 MEMBER CORRADINI: Circulator.

18 MR. MAGRUDER: -- circulator, thank you.  
19 One steam generator, you know, very tall, thin vessel.  
20 The goal of mPower and NuScale is to be able to  
21 manufacture the vessels within the U.S. and ship they  
22 by rail around the U.S.

23 So these facilities would be manufactured  
24 in a factory.

25 MEMBER BANERJEE: You mean there are and

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 heavy forging plants left in the U.S., Stu?

2 MR. MAGRUDER: Sure. Yes. For this size  
3 there are.

4 VICE CHAIRMAN ARMIJO: For real small  
5 stuff, yes, we can do that still.

6 MR. MAGRUDER: And that's gotten a lot of  
7 interest from Congress as well, you know the fact that  
8 they can be manufactured in the U.S.

9 MEMBER BANERJEE: It's time we built a few  
10 real heavy forging plants.

11 MR. MAGRUDER: Let's see, the mPower, they  
12 actually started talking with us just last year. This  
13 is based on the B&W design at the old German ship, the  
14 Otto Hahn. They had actually operated for many years.

15 MEMBER BANERJEE: They had refueling every  
16 three or four years on this ship?

17 MR. MAGRUDER: I don't know how often they  
18 refueled that ship.

19 MEMBER BANERJEE: That would be strange  
20 for a naval ship.

21 MR. MAGRUDER: Yes, it was a merchant  
22 ship. It wasn't a naval ship.

23 MEMBER BANERJEE: Oh, okay.

24 MEMBER CORRADINI: Like the Savannah.

25 MR. MAGRUDER: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER BANERJEE: All right.

2 MR. MAGRUDER: Of note on this design is  
3 that they are proposing an option for an air-cooled  
4 condenser. Ultimately the heat sink would be here or  
5 could be here for this design, which would obviously  
6 open up a lot of other -- a lot more sites in the  
7 country.

8 A lot of recent interactions with them.  
9 The latest meeting was in October on several issues.  
10 And there is another meeting about to schedule for the  
11 end of March where they're going to come in and talk  
12 about their ECCS design, integral systems testing  
13 plan, and some of their thermal hydraulic codes.

14 You may have seen there was a Wall Street  
15 Journal article a few weeks ago that mentioned that  
16 they have signed an MOU with TVA, First Energy Corp.,  
17 and Oglethorpe Power Corp. And I understand that they  
18 are going to be meeting next week to start talking  
19 about interactions and facilitating the approval of  
20 this design with the NRC.

21 MEMBER BANERJEE: There has been talk  
22 about sort of more no-touch designs in the press like  
23 with much longer periods between refueling. Is there  
24 any sort of interactions you've had with any vendors  
25 or anybody --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. RECKLEY: I'll get to that in the next  
2 slide.

3 MR. MAGRUDER: The way we've broken up the  
4 ARP is Bill has all the non-light water designs and I  
5 have the light water designs.

6 MEMBER BANERJEE: And there are no light  
7 water designs which are more naval with more --

8 MR. RECKLEY: No, not at this time because  
9 the enrichment to drive that would be --

10 MEMBER BANERJEE: Too high.

11 MR. RECKLEY: Right, yes.

12 MEMBER CORRADINI: Too high or require a  
13 whole bunch of front end fuel cycle facility -- I call  
14 relicensing.

15 MEMBER BANERJEE: Yes. Yes, yes, and yes.

16 VICE CHAIRMAN ARMIJO: Yes and yes.

17 MEMBER CORRADINI: I thought just the  
18 second one was yes.

19 VICE CHAIRMAN ARMIJO: No, there are a lot  
20 of yeses. It's a big barrier.

21 MR. MAGRUDER: Okay, next slide please.  
22 My final slide is just to talk about the current  
23 activities. As we've mentioned, we're looking at the  
24 existing requirements, doing gap analysis for areas  
25 that we think we need to focus on.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           You mentioned some of them already, you  
2 know, the staffing issues, the EP issues, human  
3 factors, how to deal with multi-modules out of sight -  
4 -

5           MEMBER CORRADINI: I guess the other one  
6 that crossed my mind was some of these use  
7 construction. Maybe this is an old thing for NRC but  
8 to have these things close enough in proximity to have  
9 one operating and one being built.

10          MR. MAGRUDER: Yes. We're definitely  
11 thinking about that.

12          MEMBER RYAN: Are there any projections on  
13 these designs regarding waste? High level? Low  
14 level? What kind of waste are they looking at? Or  
15 are they at that stage yet?

16          MR. MAGRUDER: Standard, same as the  
17 current plants for the IBWRs, it will be high level  
18 waste, I think.

19          MR. MAYFIELD: But there's also been  
20 discussion from at least two of the vendors that they  
21 would store the -- the pool size would be such they  
22 would store the full 60-year operating life in a pool  
23 at the facility. And then deal with it subsequently.

24          MR. MAGRUDER: Right.

25          MR. MAYFIELD: There are a number of

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 strategies that will be discussed, I'm sure, as they  
2 come in for design certs.

3 MEMBER RYAN: Okay, thanks.

4 MR. MAYFIELD: Sure.

5 VICE CHAIRMAN ARMIJO: So seismic  
6 isolation could be generic? Is that a technology that  
7 the NRC would start looking into?

8 MR. MAGRUDER: Yes, we will start looking  
9 at the proposals. I don't know that mPower has talked  
10 about seismic isolations. I know that IRIS and  
11 NuScale have.

12 VICE CHAIRMAN ARMIJO: But different  
13 approaches.

14 MR. MAGRUDER: Different approaches, yes,  
15 yes.

16 Okay, Bill?

17 MR. RECKLEY: I'll try to quickly go  
18 through all of the other material. It's, in many  
19 respects, interesting still but we're not as active in  
20 these areas.

21 As we mentioned, sodium fast reactors are  
22 being pursued so it's not something that we can just  
23 let go without paying any attention. But we are, both  
24 in the Office of Research and in the Office of NRO,  
25 only doing a limited amount of work in regards to fast

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 reactors.

2 We are continuing to develop a knowledge  
3 management system, trying to capture previous work  
4 that we've done on PRISM and safer international  
5 activities such that as we gear up, we'll have some of  
6 the tools available to us in our knowledge management  
7 systems.

8 We are having some pre-application  
9 interactions and I tend to divide the fast reactors  
10 into two groups. The one is 4S. And these are the  
11 smaller units aimed at remote locations and they tend  
12 to operate for a long period of time. But the target  
13 audience is remote-location kind of customers.

14 And then the other group being those that  
15 could tie into closing the fuel cycle. And those  
16 would include PRISM, General Electric's PRISM design  
17 as well as some of the other international designs  
18 coming out of the Europeans or Japanese efforts.

19 And going into that, then the last bullet,  
20 we do, on a limited basis, go to international  
21 meetings just to follow what's going on, not only in  
22 the trilaterals but also what's going on in Russia,  
23 and India, and other places with very active fast  
24 reactor programs.

25 MEMBER BANERJEE: Has China got one under

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 construction, too?

2 MR. RECKLEY: I think so.

3 MEMBER APOSTOLAKIS: Yes, I think they are  
4 building one.

5 MEMBER BANERJEE: I think India and China  
6 are actually --

7 MR. RECKLEY: Yes.

8 MEMBER CORRADINI: Well India has -- India  
9 is in the process of -- they already installed their  
10 core and they are about to be moving their steam  
11 generators in place.

12 MEMBER BANERJEE: Yes, the safety issues  
13 there are interesting though. They have to do with  
14 the potential for pulling a little bit -- you know,  
15 these fast designs. They have a free surface. And  
16 the amount of air or the cover gas that they might be  
17 pulling down is one of the major safety issues there,  
18 which is --

19 MEMBER CORRADINI: It was in the pool  
20 designs.

21 MEMBER BANERJEE: Yes, I think it was also  
22 in the French one. They had this problem.

23 MEMBER CORRADINI: And the Japanese.

24 MEMBER BANERJEE: Yes, they saw anomalous  
25 voiding in the core. So that's sort of interesting.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And they have, of course, void coefficient.

2 MR. RECKLEY: Yes. And we're trying to  
3 follow, again, trying to balance out, trying to stay  
4 informed at the same time not being -- not have many  
5 resources.

6 Then the last category of our technology  
7 groups is just everything else. You may have saw  
8 General Atomics announce week a development of a  
9 design for a gas-cooled fast reactor, EM2, energy  
10 multiplying module, or something, I think, is the  
11 name.

12 The only other category of the Generation  
13 IV designs that we've actually heard about here in a  
14 commercial sense, other than high temperature gas and  
15 sodium fast reactors. The Hyperion is a lead bismuth  
16 design similar to SSTAR that was developed at the  
17 National Labs that they are proposing. Some work,  
18 although we're not doing anything in the area of  
19 accelerator-driven systems or fusion or fission  
20 fusion.

21 MEMBER BANERJEE: What is the Hyperion?  
22 Can you just --

23 MR. RECKLEY: The Hyperion is a lead  
24 bismuth -- we have limited interactions with them.  
25 We have yet to have a detailed design meeting. They

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 say maybe later in the year. But the basic design,  
2 based on what we know, is a lead bismuth --

3 MEMBER BANERJEE: Homogenous or --

4 MR. RECKLEY: Lead bismuth with uranium  
5 nitrite fuel. Again, based on what I've been able to  
6 hear them say and look, I compare it with the SSTAR  
7 design that I think was developed primarily by  
8 Lawrence Livermore in Argonne Laboratories as part of  
9 the transportable reactors for military applications.

10 MEMBER CORRADINI: Like a battery, it's  
11 like the battery design. A lead-cooled battery design  
12 by Argonne. Dave Waite's group.

13 I guess I'm curious about -- just from --  
14 if you go back a slide, just from if you had 100  
15 percent of your time -- if you had 100 hours, how  
16 would you -- taking NGNP out of it, how -- I guess  
17 what I'm trying to ask is can you give me a feeling  
18 for -- are you just watching these things other than  
19 NGNP?

20 MR. RECKLEY: Yes.

21 MEMBER CORRADINI: Okay.

22 MR. RECKLEY: Well, no. Let me just say,  
23 the integral PWRs and NGNP are basically 50-50  
24 roughly. And then everything else is some fraction.

25 MEMBER CORRADINI: That's all I wanted to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 make sure. Thank you.

2 MR. RECKLEY: Now one of the things that  
3 we've talked about is building the infrastructure.  
4 And Mike went into the organization. We're getting  
5 contracting vehicles in place, arranging for training  
6 of the staff.

7 The other big area that we're doing right  
8 now is to try to identify where issues go across the  
9 technologies. And if they don't go all the way across  
10 all technologies, are they at least going across  
11 technology groups? So we're trying to minimize how  
12 many times we look at an issue in order to resolve it.

13 And, again, NRO's theme, you know, one issue, one  
14 review, one position. So we're trying to maximize  
15 that even across technologies if we can.

16 Some of these have already been mentioned.  
17 Emergency planning, physical security, staffing  
18 requirements, even financial and modular. If you look  
19 at all of the designs, what we're going to try to do  
20 is to see if we can characterize them in terms of  
21 attributes such as source terms, how long does it take  
22 a severe accident to progress, driving forces,  
23 pressures, whatever, look at a number of attributes  
24 and say okay, these things have enough in common that  
25 we can come up with an approach in emergency planning

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that goes across all the technologies. Or not.

2 That will say whether something is generic  
3 or something we'll have to pursue a design or  
4 technology-specific approach. But, again, most of  
5 these things go to those kind of inherent features and  
6 mitigating systems. And do they support things like  
7 you have much more time to respond? So you can then  
8 use that in arguments for both staffing and emergency  
9 planning.

10 So that's -- really, we're just kind of  
11 defining those attributes now. And going forward to  
12 see how this might play out.

13 MEMBER RYAN: How do things like outages,  
14 expected and unexpected, and radiation protect  
15 practice and all that fit in. Those can be fairly  
16 generic programs, I guess.

17 MR. RECKLEY: Right. And similar to that  
18 would carry over pretty much from the light water and  
19 existing technologies. I mean you are going to have  
20 to do certain things as you get into the technologies.

21 You know gas cooled is going to have  
22 different -- some differences in the radiation  
23 protection program and light water reactors will. But  
24 programmatically it will carry over relatively well  
25 from the existing regulations in addition to the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 current practices.

2 MEMBER RYAN: Are you sure?

3 MR. RECKLEY: Well, I think.

4 MEMBER RYAN: I mean I understand what  
5 you're saying but I'm not -- that doesn't strike me as  
6 something I would just accept up front.

7 MR. RECKLEY: Well, we'll get into it and  
8 some of this we will see as the vendors come forward  
9 what kind of -- I mean obviously --

10 MEMBER RYAN: You'll need detail to get  
11 into it.

12 MR. RECKLEY: Yes, they're going to come  
13 forward. And they're going to making proposals on  
14 waste systems and other things. And we'll see how it  
15 plays out.

16 MEMBER RYAN: Yes, that was the other one  
17 I was going to ask. The waste system are going to be  
18 seeing a lot of that action anyway.

19 MR. RECKLEY: Yes. And obviously that  
20 design on a gas-cooled reactor is going to have a  
21 different waste systems and different concerns in  
22 terms of radiation protection than even a prismatic or  
23 some of the others.

24 MEMBER RYAN: One last question on the  
25 Pebble Bed, that tends to be pretty hot stuff coming

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 out of the reactor. How about shipping and  
2 transporting the spent fuel around?

3 MR. RECKLEY: They have proposals. I must  
4 admit it is not an area I've looked into very much at  
5 this time.

6 MR. MAYFIELD: Some years ago, Bill Brock  
7 and his colleagues in spent fuel looked at a cask  
8 design -- that was a while back -- but they looked at  
9 a cask design for Pebble Bed and concluded that yes,  
10 it could be accommodated.

11 MEMBER RYAN: Oh, okay.

12 MR. MAYFIELD: But that was then and this  
13 is now. So we're --

14 MR. RECKLEY: Right. Not necessarily that  
15 we have a design before us right now but just looking  
16 at it enough to say it is a technical problem that can  
17 have a resolution.

18 MEMBER SIEBER: It looks at though several  
19 of these designs sort of push the envelope on  
20 materials issues. Is there enough of a database, for  
21 example, in the higher temperature ranges for one to  
22 determine the adequacy of materials? And secondly  
23 with four- or five-year intervals on refueling, the  
24 opportunities to survey all and otherwise inspect  
25 materials, it looks like it is going to be an issue to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 me.

2 MR. RECKLEY: For a lot of the light water  
3 reactors, actually they're cooler and lower pressures  
4 in most cases.

5 MEMBER SIEBER: Well, 636 for two of them  
6 which is above the Inconel threshold.

7 MR. MAYFIELD: But by and large for the  
8 integral PWRs, the Westinghouse, NuScale, mPower,  
9 we're in reasonably good shape in terms of the  
10 technology, the information databases.

11 MEMBER SIEBER: Yes.

12 MR. MAYFIELD: The surveillance, in-  
13 service inspection, in-service testing intervals, are  
14 something where the vendors have noted they have to  
15 come and deal with it. But they have strategies.

16 When you really start pushing some of the  
17 designs that are wanting to go significantly longer,  
18 that is an area where we would anticipate some active  
19 discussion with the vendors if and when they bring us  
20 --

21 MEMBER SIEBER: Well, I think it is going  
22 to -- there is going to need to be a larger body of  
23 research that --

24 MR. MAYFIELD: Right. And we would  
25 completely agree.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           MEMBER SIEBER:    The other issue in the  
2 materials issue is I would presume that some of these  
3 designs end up with relatively high burnup levels in  
4 the fuel.  No?

5           MEMBER CORRADINI:  No, at least the ones -  
6 - the point designs -- all of these are point designs,  
7 I guess, and my impression is at least with some of  
8 these, they've de-rated -- their linear powers are  
9 actually relatively low.  So their burnups over their  
10 three years is less than you would first imagine.

11           I think in NuScales, they are only like  
12 40,000 megawatt-days per ton, for example.

13           MEMBER SIEBER:  Yes, which is --

14           MEMBER CORRADINI:  Gas reactor burnups are  
15 going to be a bit higher.  But the light water ones  
16 are, in some sense, they are de-rated.  They are  
17 pretty conservative in their operating parameters.

18           MEMBER SIEBER:  It just didn't seem that  
19 way.  They cut the assembly height in half and only  
20 put 12 in --

21           MR. MAYFIELD:  But the other thing --

22           MEMBER SIEBER:  -- for five years.

23           MR. MAYFIELD:  -- yes, the other thing  
24 that the three integral PWR vendors have all  
25 emphasized, recognizing we have yet to see the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 application, but the going-in proposition of the staff  
2 is they are not seeking to push licensing boundaries.

3 They are seeking to get ease of licensing and move on  
4 to getting the units installed and operating. That's  
5 the going in premise. We'll see how that plays out.

6 MEMBER SIEBER: That's today.

7 MR. MAYFIELD: Yes. That's the going-in  
8 premise. And we'll see how that plays out. I agree  
9 that's where they are starting. How that will modify  
10 over time --

11 MEMBER SIEBER: Well, the economies of  
12 operation strive for the highest burnup you can  
13 achieve without everything falling apart.

14 MR. MAYFIELD: Okay, Bill.

15 MR. RECKLEY: Okay. Thanks.

16 So those were the generic issues. And  
17 just as we were talking, there will be technology-  
18 specific issues, materials qualifications, fuel  
19 qualification among them.

20 How we're looking at prioritizing, there  
21 is a large number of issues and how to decide which  
22 ones to attack first, obviously safety significance is  
23 the driver. Then we go down, again trying to maximize  
24 efficiencies here, how many technologies or designs  
25 are effected. And we'll look at those that go across

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the Board.

2 What is the impact of the issue on the  
3 design? And so if we're looking at a generic issue  
4 that has a high probability of fundamentally changing  
5 a design, that's one we have to look at first let's  
6 say versus emergency planning, which would be a COL  
7 kind of concern, important to the economics, but may  
8 or may not actually change the design of the facility.

9 Method of resolution, if we're looking at  
10 changes to Price-Anderson, that requires us to go to  
11 Congress, which means we have to be doing it --  
12 probably we're already late. But it moves up its  
13 priority just because the method of resolution takes a  
14 long time.

15 MEMBER CORRADINI: I guess can you expand?

16 MR. RECKLEY: Yes.

17 MEMBER CORRADINI: I don't appreciate that  
18 one. Could you explain that one?

19 MEMBER BANERJEE: The ramifications are  
20 not clear. What is it?

21 MEMBER CORRADINI: I assume it has to do  
22 with their insurance policy grant.

23 MR. RECKLEY: Well, there's two -- there  
24 are a couple of factors. One, the way Price-Anderson  
25 and our implementing rules are structured, if you

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 don't -- if your tower is less than 300 -- I'm looking  
2 at Don because he probably remembers the number -- 300  
3 megawatt electric, then you fall into the first  
4 category and it's all the standard numbers that apply.

5 And then if you don't meet that, then you  
6 fall down into a second category where there is a  
7 calculation of what is needed. We need to look at  
8 that because those were developed with different  
9 reactor sets in mind.

10 Even in the first one, we need to look  
11 because it is phrased in terms of megawatt electric  
12 wherein in the gas-cooled side, we're talking about  
13 processes applications where there may or may be an  
14 electric generator. And so we just need to look at a  
15 number of issues to see how it lines up.

16 MEMBER CORRADINI: Okay. Thank you.

17 MR. RECKLEY: It may be okay. But it may  
18 not.

19 Industry participation, what kind of  
20 cooperation are we going to get from the industry on  
21 some of these issues? There are a number of things  
22 going on. NEI is beginning to be involved in these  
23 although they clearly state this is not their highest  
24 priority.

25 There is an American Nuclear Society

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Special Committee that's looking now at some of these  
2 issues. And we're participating. And we'll see what  
3 comes out of that effort.

4 Then the other factors are kind of the  
5 schedule things. What -- you know, how might the  
6 generic issue effect a deployment schedule of either a  
7 prototype or commercial plant?

8 And then lastly, the dependencies. Some  
9 of these will depend on items like source term. And  
10 until the work is done on mechanistic source term, we  
11 may not be able to progress all the way to completion  
12 on an item like emergency planning. So we'll just  
13 have to lay out and kind of have a plan as to how this  
14 plays out.

15 MEMBER BANERJEE: So if there are some  
16 concepts which require adjustments to the GDCs to  
17 begin with, how would you handle that?

18 MR. RECKLEY: Well, for the first-of-a-  
19 kind plant or the prototype under NGNP, we'll use  
20 exemptions and imposition new requirements for that  
21 specific license. Then as --

22 MEMBER BANERJEE: Okay.

23 MR. RECKLEY: Then if it appears that  
24 there is a prospect for commercialization, we'll look  
25 to changing the regulation so that, you know, all

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 future plants would not be based on exemptions and  
2 impositions, that the rules would be set to support  
3 that commercialization effort.

4 But for the -- we don't have in place for  
5 the first-of-a-kind plant the rule changes that may  
6 come later. We would do that on a case-by-case basis.

7 MEMBER BANERJEE: So something like the  
8 fast reactor with the positive void coefficients, you  
9 are going to try to get an -- they would try to get an  
10 exemption on that?

11 MEMBER CORRADINI: Well, if they were  
12 licensed -- I was just going to say -- I'm sorry but I  
13 can't remember the one --

14 PARTICIPANT: Clinch River.

15 MEMBER CORRADINI: -- Clinch River was  
16 licensed under Part 50.

17 MR. RECKLEY: Yes. So we write an SER.

18 MEMBER CORRADINI: It made it enough  
19 through the system that I thought that these sorts of  
20 questions were answered.

21 MR. RECKLEY: They were, yes.

22 MEMBER BANERJEE: Okay. So you have a  
23 prototype there?

24 MEMBER SHACK: PRISM you may have heard  
25 once before.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER CORRADINI: Well, what about FFPF?

2 MEMBER SHACK: That wasn't an NRC license.

3 MEMBER CORRADINI: FFPF.

4 MR. RECKLEY: FFPF --

5 MEMBER SHACK: But did it have the  
6 positive void coefficient?

7 MEMBER CORRADINI: Yes. But it went  
8 through DOE rules. I don't think it appeared here.

9 MEMBER BANERJEE: No, DOE rules are  
10 completely different. Yes.

11 MR. RECKLEY: Okay, last slide. What we  
12 would envision as future ACRS interactions, we have  
13 one coming up in a month where the Office of Nuclear  
14 Regulatory Research will be done to talk about the  
15 HTGR research plan. This is our plan to support NGNP.

16 Then we would be back on some of the  
17 policy issue in terms of writing papers or Commission  
18 policies or approaches. And we would be back to get  
19 the advice and, in some cases, probably letters from  
20 the ACRS on those proposals.

21 We're talking about applications in the  
22 2012, 2013 time frame. So we can talk to your staff  
23 and have pre-application kind of briefings. These are  
24 probably ones where the vendors would come in and  
25 participate a little more so.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           Then shortly thereafter, we're going to be  
2 in the design mode. And so we'll get into the  
3 traditional interactions of SER with open item and SER  
4 meetings.

5           And then lastly whenever you guys decide  
6 you want to or I guess whenever we think we would  
7 benefit and we'd ask and try to come before you.

8           So we'll start to talk to the staff. I  
9 mean some of these, the middle ones, the pre-  
10 application briefings and so forth, we are talking,  
11 you know, a couple of years from now, 2012. But it's  
12 not too early to start to think about how we would fit  
13 those into your schedules and what other licensing  
14 reviews you are going to have at the time and all of  
15 that.

16           MEMBER BANERJEE: Well, we are going to  
17 need a lot more time with some of these concepts  
18 because they are very unfamiliar. There needs to be a  
19 lot more sort of background built up.

20           MR. MAYFIELD: Well, the other thing to  
21 not lose sight of is the going-in assumption is that  
22 we're going to see NGNP as sort of a first activity,  
23 followed or in parallel with the integral PWRs. The  
24 other technologies, the ones that will be more  
25 challenging to develop infrastructure, to settle

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 policy issues, will be staged somewhat later.

2 So frankly there just aren't enough  
3 resources for us to take on no matter how much money  
4 Congress might give us. There just aren't enough  
5 technical resources to take all of these things on in  
6 parallel. It's just not feasible.

7 So we expect that there will be some  
8 sequencing of activities so that we are not faced with  
9 all of these things at the same time. And we have  
10 some control over how that happens with support from  
11 the Commission.

12 This is starting to move fairly quickly.  
13 Commissioner Svinicki, in other contexts, has  
14 cautioned the staff -- or urged the staff to remain  
15 nimble. For an old guy, this nimble thing is a  
16 challenge.

17 I just -- anecdotally --

18 MEMBER CORRADINI: I saw you with your  
19 running shoes on last night.

20 MR. MAYFIELD: Yes, but I wasn't running  
21 very damn fast.

22 (Laughter.)

23 MR. MAYFIELD: The -- just to give you a  
24 sense of how quickly this is evolving, a year ago we  
25 didn't know there was an mPower. Okay? We hadn't

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 heard of it a year ago.

2 So this is evolving very quickly. And one  
3 of the things we are doing and actually the industry  
4 is starting to do this same thing, is introduce some  
5 stability. We have no intention and the NEI mantra is  
6 that these designs don't become a distraction from  
7 licensing the large light water reactors.

8 We are completely on board with that  
9 notion. At the same time, we need to move forward and  
10 meet this need. So there is a balancing act that we  
11 will be performing.

12 And we would ask the Committee to try to  
13 be as nimble as we are. I submit to you --

14 MEMBER CORRADINI: Nimble? We're all old  
15 guys, too.

16 (Laughter.)

17 MR. MAYFIELD: That won't be much of a  
18 challenge because we're not moving very fast these  
19 days.

20 MEMBER CORRADINI: So I guess I had a  
21 question that isn't any of these reactors but I keep  
22 on reading about it which is the concern about medical  
23 isotopes and the Markey bill coming in with  
24 potentially two applications, one in a research  
25 reactor for commercial production of medical isotopes

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 and B&W coming in with an aqueous reactor. Where  
2 does that fit?

3 MR. MAYFIELD: That fits in NRR under the  
4 Research and Test Reactor heading.

5 MEMBER CORRADINI: Not you guys?

6 MR. MAYFIELD: It's not us.

7 MEMBER CORRADINI: Thank you.

8 MR. MAYFIELD: No, we're power reactors.

9 MEMBER CORRADINI: And Research -- that's  
10 right, even though it would be a reactor --

11 MEMBER SIEBER: Is that NRR?

12 MR. MAYFIELD: It is NRR.

13 MEMBER CORRADINI: Thank you.

14 MR. RECKLEY: They actually changed the  
15 name of one of their branches to Non-Power Reactors.

16 MEMBER CORRADINI: Thank you.

17 MEMBER BANERJEE: So can I just sort of  
18 ask just when you expect this certification requests  
19 to come in, which is 2012, what would be your staffing  
20 levels in rough terms? Will you be able to handle all  
21 of that?

22 MR. MAYFIELD: All three of them at the  
23 same time plus NGNP, the answer to that is no.

24 MEMBER BANERJEE: You said three of them.

25 MR. MAYFIELD: Well, there are three that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 have said they wish to come in.

2 MEMBER BANERJEE: Right.

3 MR. MAYFIELD: How that actually  
4 sequences, we'll see. It is unrealistic to think that  
5 we will have sufficient staff on board or resources  
6 made available to us to do all three of those plus  
7 NGNP. That's not likely.

8 What we have seen is just a natural  
9 progression of things from the industry where you have  
10 plans and good faith commitments but the reality  
11 overtakes it. And there is a natural sequencing that  
12 happens.

13 We're anticipating a similar thing here.  
14 We'll see how it actually plays out. Worse case  
15 scenarios for us is they all three show up as  
16 projected. We'll see.

17 We would anticipate some technology down-  
18 selecting from the Department of Energy, some support  
19 there. We would look to NEI to also help us -- NEI  
20 and the industry to help that sort of sequencing.

21 The approach we are taking with the  
22 advanced reactor reviews is we will matrix the  
23 organization. NRO is pretty strongly matrixed to  
24 begin with. We will continue that activity. We are a  
25 project management organization in the advanced

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 reactor program.

2 We are reaching out to the existing  
3 engineering systems divisions within NRO to provide  
4 the technical review support. We will also leverage  
5 contractor resources significantly as we go forward.  
6 And that is starting, we think, imminently.

7 So will we be ready, would we be ready to  
8 deal with NGNP plus all three integral PWRs, the  
9 answer is no. Will we be ready to deal with NGNP and  
10 perhaps two of them, I think the answer to that --  
11 just given the sequencing we're looking at, I think  
12 the answer to that is we can handle it.

13 Gentlemen, that's all we had. I will be  
14 happy to come back and visit with the Committee at  
15 your request and certainly as we start moving some of  
16 these issues forward.

17 MEMBER BLEY: Thank you very much for the  
18 briefing. Anything from members?

19 (No response.)

20 MEMBER BLEY: Thanks very much.

21 Mr. Chairman?

22 CHAIRMAN ABDEL-KHALIK: Thank you. At  
23 this time, we will recess for lunch. We will  
24 reconvene at 1:00 p.m. and then we'll get back on the  
25 record at 1:30 p.m.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 (Whereupon, the foregoing matter went off the record  
2 at 11:54 a.m. to be reconvened in the  
3 afternoon.)  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

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

2 1:28 p.m.

3 CHAIRMAN ABDEL-KHALIK: Our next  
4 presentation is a meeting with the NRC Executive  
5 Director for Operations. We are fortunate to have  
6 with us the EDO and associates. We're glad to have  
7 you here. We are very pleased to have you and look  
8 forward to hearing your presentation.

9 MR. BORCHARDT: All right. Well, thanks,  
10 thanks for the invitation.

11 CHAIRMAN ABDEL-KHALIK: Sorry you missed  
12 the lunch but --

13 MR. BORCHARDT: Yes, well we'll reschedule  
14 that. It looked like it was going to be a little bit  
15 of a cramped lunch to get back in time. So I think it  
16 will work out better to have that in the spring or  
17 something.

18 CHAIRMAN ABDEL-KHALIK: Thank you.

19 MR. BORCHARDT: And thanks very much for  
20 the invitation. I think it has been quite a while  
21 since the EDO been before the ACRS. And I've been in  
22 the position for almost two years now. So it's my  
23 first time in this capacity.

24 So what we were hoping to do is just to  
25 provide a very broad overview of NRC activities from

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 our perspective, give you some context. I don't think  
2 we're going to talk about any issue in enough detail  
3 to satisfy the ACRS, especially not any technical  
4 detail.

5 But I think by the overview, you get an  
6 idea of what is going on in all of the program areas  
7 that fall under our purview. And it will give you  
8 some context for where the technical issues fall and  
9 the review activities.

10 If I was to look at the current situation  
11 that we're in now, I think I would list five  
12 priorities that I have. Number one has been, always  
13 will be for the end of time, the safety of the current  
14 licensees. We spend a lot of time and there is a lot  
15 of attention given to new reactors.

16 And Bruce is going to talk a little bit  
17 about that, improving infrastructure, and Darren is  
18 going to talk about that, and Marty will talk about  
19 things in the waste area. But we start and end every  
20 single day with a focus on operating reactors. So, I  
21 mean, and that's first and foremost, always will be.

22 However, to round out my top five, it's  
23 the new applications. And it's not just the new  
24 reactors because there are new applications throughout  
25 the fuel cycle that are getting a lot of attention.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And increased resources.

2 Third -- and these aren't necessarily in  
3 priority order other than the first one -- is human  
4 capital issues. I'll mention that we have about 50  
5 percent of the staff has been with the NRC for six  
6 years or less. So that brings along with it some  
7 training challenges, some knowledge management,  
8 knowledge transfer challenges that I think we're doing  
9 a very good job of. We're bringing on some incredibly  
10 motivated, very skilled and knowledgeable people. But  
11 nonetheless --

12 MEMBER SHACK: Can I just ask how is that  
13 split between headquarters and the regions? Is that  
14 split the same?

15 MR. BORCHARDT: Yes, it's roughly the  
16 same. Yes, I'm not aware of any significant  
17 difference. The numbers that I look at tend to be  
18 Agency-wide.

19 MEMBER SHACK: So everybody is growing.

20 MR. BORCHARDT: Yes. We had about a four  
21 percent attrition rate over the last year. Most of  
22 the growth over the last six years that took us from  
23 about 3,000 to about 4,000 staff, most of that was in  
24 headquarters. But there was a good number of people  
25 in Region II because that is our construction center

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 of excellence for new reactors.

2 But that number of, you know, 50 percent  
3 roughly being six years or less is pretty much Agency-  
4 wide.

5 CHAIRMAN ABDEL-KHALIK: And the attrition,  
6 the four percent is mostly on the experienced end of  
7 the scale?

8 MR. BORCHARDT: Oh, yes, of course. Yes,  
9 it's mostly retirements. I mean we're the number one  
10 federal agency in which the work in the government,  
11 people actually do like working here.

12 And so we have very few attritions to go  
13 to other government agencies. I mean there are some  
14 for personal reasons because of location, people, you  
15 know, spouses transfer, that kind of thing. But very  
16 few leave and go to work somewhere else compared to  
17 other government agencies.

18 So most of those are retirements. You  
19 look at the near-term retirement list, there may be  
20 ten or 12 people on that list right now. I don't  
21 think there is a single one with less than 30 years.

22 MEMBER CORRADINI: Just out of curiosity,  
23 have you ever investigated the reasons for that? Is  
24 it that there is less stress here? Or more stress  
25 other places? Or what's the environmental conditions

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that have caused that? Do you know what I'm asking?

2 MR. BORCHARDT: Yes.

3 MEMBER CORRADINI: Do you do root cause  
4 analysis of --

5 MR. BORCHARDT: We do. We don't want to  
6 look too hard because we don't want it to change, you  
7 know. We like the current results.

8 But I mean I think we do exit interviews  
9 with every single person that leaves the Agency. And  
10 we do -- the IG does safety culture surveys every  
11 couple years. OPM now does a survey. In fact, it's  
12 out before the staff now, every single year that looks  
13 at quality of life issues, training opportunities,  
14 career development issues.

15 And on all of those, NRC ranks  
16 exceptionally high. Either number one or number two  
17 in every single category that is evaluated as part of  
18 those surveys. I think that's largely the reason.

19 There are some others that aren't quite so  
20 defined in these surveys -- really my opinion maybe.  
21 But I think we have a very important but easy to  
22 understand mission. So people can get their head  
23 around why we are here and really get on board with  
24 it.

25 I mean they are enthusiastic about how

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 they contribute to the mission. And I think that's  
2 one of them. And the location, you can't beat. I  
3 mean there's actually a physical benefit to not being  
4 inside the beltway. It's easier to get to work for  
5 most people.

6 I think the aggressiveness of our  
7 Flexiplace, you know, the programs that we have for  
8 work hours and those kinds of things, makes people  
9 enjoy the opportunity of working here. So I think it  
10 is a number of factors. But --

11 MEMBER CORRADINI: Okay. Thank you.

12 CHAIRMAN ABDEL-KHALIK: Back to the  
13 attrition issue, you say most of the people are  
14 retirees.

15 MR. BORCHARDT: Yes.

16 CHAIRMAN ABDEL-KHALIK: Don't you have a  
17 probationary period for new employees? Does that  
18 imply that very few, if any, are actually let go after  
19 the probationary period?

20 MR. BORCHARDT: Yes, actually it is very  
21 few. It is a two-year probationary period for new  
22 employees.

23 We have a very aggressive training or  
24 hiring program, if you will, in that -- and again, in  
25 contrast to many other federal agencies, our

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 supervisors go out and do the recruiting and hiring.  
2 So it's not like we have a human capital -- human  
3 resources department that goes out and hires somebody  
4 and it's not really a good match. That supervisor  
5 knows the individual before they come on board.

6 So there is a, you know, very close  
7 relationship. And we're doing a lot to improve our  
8 on-boarding process. It's now automated. It's being  
9 rolled out. If it hasn't been rolled out in the last  
10 couple of weeks, it will be soon, to help people get  
11 acclimated into the NRC in a more -- even before they  
12 get here. So this human capital knowledge management  
13 is a big deal for us.

14 Infrastructure upgrades is probably the  
15 number four item that I would list. And Darren is  
16 going to talk a lot about that.

17 But ADAMS is ten years old. It is getting  
18 antiquated. It's getting harder to do work. I mean  
19 some would argue it's never been easy to use ADAMS.

20 (Laughter.)

21 MEMBER CORRADINI: We would never say that  
22 here.

23 MR. BORCHARDT: That's not my official  
24 position, all right. But there's a lot of places  
25 where we have not invested the necessary capital to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 keep up to date with those things. And we're having  
2 to do that now. So that's why that's high on the  
3 list.

4 And then my number five item is something  
5 that probably won't be there a year from now but  
6 because of the recent changes having to do with Yucca  
7 Mountain, the spent fuel integrated management issue  
8 is up high on my list because we now need -- are faced  
9 with the situation of considering dry cask storage for  
10 longer a time period than what we had originally  
11 anticipated. So it is going to have to result in some  
12 kind of an expanded research program and different  
13 analysis to justify what some future approaches might  
14 be.

15 So if we can go to the next slide please.

16 MEMBER CORRADINI: Could I ask about the  
17 last one?

18 MR. BORCHARDT: Yes.

19 MEMBER CORRADINI: So you really think in  
20 a year at least from the standpoint of spent fuel  
21 management, you'll have it sorted out here?

22 MR. VIRGILIO: Well, I'll actually get  
23 into that in my presentation.

24 MEMBER CORRADINI: Okay.

25 MR. VIRGILIO: And I'll tell you the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 components of the program and sort of the timeline.

2 MEMBER CORRADINI: Okay. Fine. Thank  
3 you.

4 CHAIRMAN ABDEL-KHALIK: Who is manning the  
5 slides?

6 MR. BORCHARDT: Yes, I did. Next slide  
7 please. There we go. Okay.

8 So I'll, in a couple of minutes, just wrap  
9 up the overview. Bruce Mallett, Dr. Bruce Mallett,  
10 has been the Deputy EDO in Charge of Reactor Programs  
11 for three years now. Unfortunately for us, he is  
12 going to be retiring in June. He's one of the  
13 attritions.

14 (Laughter.)

15 MEMBER APOSTOLAKIS: You will interview  
16 him to find out why?

17 (Laughter.)

18 MR. BORCHARDT: When you see me stab him  
19 in the leg, you'll understand what the problem is.

20 (Laughter.)

21 MR. BORCHARDT: And actually on Monday  
22 we'll be announcing Bruce's replacement. So we're  
23 doing that well ahead of time so we can have good  
24 knowledge transfer for his replacement.

25 MEMBER SHACK: Work out a little pool.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 See if there are several going.

2 MR. BORCHARDT: Marty Virgilio is in  
3 charge of the Materials Program. He's got the longest  
4 title in the office.

5 And then Darren Ash, he came -- Darren  
6 came with outside NRC experience. He's been with the  
7 NRC how many years?

8 MR. ASH: 2007. Almost three years.

9 MR. BORCHARDT: Three years now but is in  
10 charge of the corporate support part of the staff.

11 Next slide please. So the budget for this  
12 year is about a billion dollars, which is starting to  
13 talk about real money.

14 The dilemma that we, the four of us, and  
15 the Commission have is that about 70 percent of that  
16 billion dollars is fixed costs; 60 percent roughly is  
17 salaries and benefits and then another ten percent or  
18 so, a little bit more than ten percent really is what  
19 I would call the fixed costs of keeping the lights on,  
20 paying the rent, building infrastructure, keeping  
21 desktop computers on everybody's desk, those kinds of  
22 things.

23 So within that billing, there's only about  
24 300 million that there is any flexibility whatsoever.

25 But then once you start to consider kind of the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 mandatory work of maintaining the licenses for the 104  
2 operating reactors and the materials licensees, then  
3 that kind of not-so-discretionary work consumes the  
4 bulk of that remaining percent.

5 And then what's left to do really long-  
6 term research, IT upgrades beyond what you just need  
7 to do to keep the lights on, really gets to be a very  
8 difficult decision that the Commission has to face  
9 every single year. About 70 percent of that budget  
10 goes to the Reactor Program and 30 percent to the  
11 Materials Program.

12 Budget trends, we, as I mentioned, went  
13 from 3,000 people to 4,000 people over the last five  
14 years or so. We are -- have been from 2009 to 2010  
15 and then even going out into the future years, expect  
16 our budget to be flat. There will be essentially zero  
17 growth, maybe up to two percent growth. But it will  
18 be essentially flat.

19 And that will be the challenge to  
20 accomplish the new reactor licensing, the new fuel  
21 cycle licensing activities, and do the infrastructure  
22 upgrades within the current budget constraints.

23 MEMBER RAY: Bill, do you have any  
24 leverage at OMB and the fact that licensees pay a good  
25 portion of that?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. BORCHARDT: No. You know of that  
2 billion -- of a billion dollar budget, about 138  
3 million actually comes from tax money. And the rest  
4 of it is derived from fees. But that concept, it just  
5 does not communicate with any lasting stay power to  
6 OMB.

7 MEMBER CORRADINI: Is that -- I guess you  
8 -- I was guessing 100 million. But so you said 138  
9 then? I thought it was -- is it a fixed 90/10 split?  
10 Or is it something that you can, as Harold was  
11 saying, make the case and actually get more from the  
12 feds?

13 MR. BORCHARDT: I believe the Congress can  
14 adjust that. But it's -- I think the actual  
15 legislative language says approximately 90 percent.

16 MEMBER CORRADINI: Right.

17 MR. BORCHARDT: So that's what it has come  
18 out to be.

19 VICE CHAIRMAN ARMIJO: Bill, a couple of  
20 years ago, we were all seeing anticipated this huge  
21 bow wave of work. And in the interim there's been,  
22 you know, escalation in the cost of nuclear plants and  
23 cancellations, some deferrals. What is your forecast  
24 now? About the same, after all these puts and takes,  
25 things?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. BORCHARDT: Yes, Bruce will probably  
2 get into this a little bit. We've seen some  
3 deferrals. I think there has always been about five  
4 plants that were really serious. And I think that  
5 number is still pretty good.

6 I was at Vogtle last week. And they've  
7 spent a billion dollars roughly already on the  
8 project. So they are committed, right? You don't  
9 spend a billion dollars as a company at a half-hearted  
10 effort.

11 And they have more money being invested  
12 for the long-term procurement types of issues. So --  
13 and there's a number of other projects that are very  
14 serious. The rest, I think, you know, maybe they are  
15 waiting to see how the first five go.

16 VICE CHAIRMAN ARMIJO: Thank you.

17 MR. BORCHARDT: Next slide please. I  
18 already mentioned the changing workforce a little bit.

19 About 25 percent of the people that we bring on board  
20 are entry level, people right out of college. That's  
21 a very conscious management decision that we've made  
22 in order to try to flatten the age profile of the  
23 Agency.

24 We, ten years ago, were very age end of  
25 the profile loaded. And that's really flattened quite

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 a bit. Our average age now is down around 47 years  
2 old. It was up to 50 not too many years ago. So it's  
3 a reasonable age profile for us.

4 Three White Flint, we're really happy to  
5 have got that through GSA. We're going to be breaking  
6 ground in the next month or so. I forget the exact  
7 date.

8 But it is going to be right over by the  
9 White Flint metro station, just adjacent to the  
10 station there. And that will allow us to move all of  
11 the five offices where we have people scattered  
12 throughout the Rockville area back into the complex  
13 here. And that will make staying connected that much  
14 easier because it's a bit of a challenge.

15 We just signed a collective bargaining  
16 agreement within the last several months with the  
17 union. The most significant thing that did was allow  
18 us to expand the work hours flexibility for workers.  
19 So now rather than having a core hours and I can't  
20 remember exactly what the hours, but it's like 6:00  
21 a.m. to 5:00 p.m. or 6:00 p.m., something like that,  
22 it's now expanded to earlier in the morning and later  
23 at night. It actually can go, with supervisor  
24 approval, out to 11:00 p.m. at night.

25 So we have the flexibility now in

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 considering people's balanced lives that if somebody  
2 has a childcare issue, they can come in to work early  
3 in the morning, leave for four hours in the middle of  
4 the day, pick up their child, do what they need to do,  
5 and then come back to work later at night. Or they  
6 can start at noon and work until night.

7 And we're monitoring that to make sure it  
8 actually improves our productivity. And I think it  
9 will.

10 MEMBER CORRADINI: How's the productivity  
11 measured for stuff like that?

12 MR. BORCHARDT: Well, just -- every office  
13 has an operating plan. We measure licensing actions  
14 in NRR for example. And so we would see the output  
15 essentially, yes.

16 MR. MALLETT: And you measure how much it  
17 takes, how much budget it takes for the same number of  
18 licensing actions. So you can get some comparison.

19 MEMBER CORRADINI: Do you find -- I guess  
20 I'm kind of curious about that -- do you find that the  
21 staff is, even though they're not physically -- take  
22 you example of in for something, out because of four  
23 hours, and then going to come back in, that in those  
24 four hours, they're still communicating, still  
25 contacting? I mean the impression I get from

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 telecommuting in other instances such as the  
2 university and laboratories is that you leave but you  
3 really don't leave. You're still in contact. Is that  
4 something you --

5 MR. BORCHARDT: Absolutely. You stay  
6 connected.

7 MEMBER CORRADINI: Do you encourage that?  
8 Or do you try to --

9 MR. BORCHARDT: My approach, my philosophy  
10 to the staff is we want people to have a balanced,  
11 reasonable lifestyle. And we want them -- when  
12 they're home to dedicate time to their kids or  
13 whatever their home life is. But that when they're  
14 here, to be here.

15 The one anecdotal story I'll mention about  
16 your staying connected in, you know, the federal  
17 government was shut down for a number of days because  
18 of the snowstorm. Essentially we didn't skip a beat.

19 We had people working from home. I was stuck -- I'm  
20 not asking for any sympathy -- in New Orleans for that  
21 time.

22 (Laughter.)

23 MR. BORCHARDT: I mean it was awful. It  
24 was Super Bowl weekend, you know, Mardi Gras, so that  
25 was tough. But I was able to, you know, stay

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 connected. I had my laptop, I had my BlackBerry. We  
2 did our events brief at 8:00 every morning.

3 MEMBER CORRADINI: Ankle bracelet so you  
4 didn't get near the Superdome?

5 MR. BORCHARDT: So we actually did not  
6 skip a beat. We had -- a number of offices have to  
7 shut down for various reasons that week. And we had  
8 the responsibilities shifting between offices. It  
9 worked out really very well.

10 Next slide. My last slide, International  
11 Activities, is actually a growth area. It is  
12 increasing intensity. Bilateral activities, our  
13 relationship with individual countries continues to  
14 grow and stays intense.

15 Next week with the Reg Info Conference is  
16 a big week. I forget -- 17 different counties, I  
17 think, are coming. For some reason that number sticks  
18 in my head. I'm not exactly sure that's right. And  
19 we have probably meetings with each of them separately  
20 even outside of the RIC in various forms.

21 Multinational Design Evaluation Program,  
22 you've probably had some discussion or a briefing on.

23 This is a cooperation between various countries  
24 having review activities for some of the new reactor  
25 designs. So we share our review information.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           And then in October of this year, we're  
2 going to have an International Regulatory Review  
3 Service Mission, which is an IAEA mission come to the  
4 United States to do what is, in essence, an inspection  
5 of the NRC. And it's going to focus on the reactor  
6 program. This is a big deal for us. It is a big deal  
7 for the rest of the world to come here and do that  
8 activity.

9           MEMBER BLEY: Do you know if anything like  
10 that ever happened in the past?

11           MR. BORCHARDT: Not in the U.S.

12           MEMBER BLEY: I never heard of that, yes.

13           MR. BORCHARDT: We've participated in a  
14 number of missions --

15           MEMBER BLEY: Right.

16           MR. BORCHARDT: -- around the world. But  
17 this is the first time that we're hosting a mission.

18           MEMBER APOSTOLAKIS: And what is it that  
19 prompted this?

20           MR. BORCHARDT: It was just a commitment  
21 to show that we are a full partner in the process of  
22 improving nuclear safety worldwide.

23           MEMBER CORRADINI: So allowed to be  
24 reviewed as well as review.

25           MR. BORCHARDT: Right. Okay, next slide

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 please. Bruce, hit it.

2 MR. MALLETT: It's a pleasure to be here  
3 to share some insights with you in all of our  
4 programs. There is not a topic bullet that I've put  
5 on any of the slides that we couldn't spend four or  
6 five hours discussing. I know this group.

7 So what I'm going try to do is to give you  
8 a high level what we think are some of the issues and  
9 the path forward in each of these areas. And I'll go  
10 fairly quickly in the interest of time. But please  
11 feel free to chime in and stop and ask questions.

12 I selected topics that I thought would be  
13 of interest to you. There are many topics in this as  
14 well as the other areas that we do business in. And I  
15 would echo what Bill said. We have a fantastic staff,  
16 very well qualified, and we're recruiting well-  
17 qualified people into the Agency. And that makes my  
18 job very easy.

19 The first topic is power uprates. A  
20 couple of things I wanted to say here was that we have  
21 issued 129 power uprates over the past several years,  
22 all the way from the instrument uncertainty power  
23 uprates up through what we call the extended power  
24 uprates.

25 And we've appreciated the ACRS's input. I

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 think you've helped us get in the right place on many  
2 of those. We've added something around 5.7 megawatts  
3 electric to the grid because of that, essentially the  
4 equivalent to five nuclear plant units in today's  
5 world.

6 We have not been without some problems in  
7 power uprates. And I think we have to work with  
8 those. You all have talked about containment accident  
9 pressure. I think it is a margins issue. And we have  
10 to deal with that. And I think we're seeing some  
11 effects of some of extended power uprates on the  
12 boiling water reactors on the steam dryers and other  
13 areas. So we are continuing to monitor in that area.

14 Non-power reactors, what I wanted to  
15 mention here is we have non-power reactor licensees  
16 that -- out of the 32 licensees, 19 of them are in for  
17 renewal, some almost ten years old since we received  
18 the application. So we have a huge backlog.

19 What we decided about a year, year and a  
20 half ago, was that was unacceptable. And we needed to  
21 do something different about it. And in the past what  
22 we've done is thrown resources at it. What we decided  
23 this time was to do that but also change how we're  
24 doing business.

25 And so we're embarking upon a streamlined

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 approach to license renewals for research reactors or  
2 non-power reactors. And that's paying off in many  
3 ways with us. And we're actually in the middle of  
4 determining what is the minimum you need for a  
5 research reactor.

6 And what we're actually finding is some of  
7 the documentation in the file in the safety evaluation  
8 report is not very clear. So one of the things we  
9 want to do is clear that all up during these renewals.

10 And I think we're calling this a streamlined renewal  
11 process and I'm very pleased with the initiatives in  
12 that area.

13 MEMBER CORRADINI: Can I ask a question  
14 about that? If your not going to --

15 MR. MALLETT: Sure.

16 MEMBER CORRADINI: -- I'm kind of curious  
17 about -- I asked earlier today in another session and  
18 I was told it was non-power reactors. The need for  
19 medical isotopes and this particular initiative  
20 relative to the Markey bill and potentially some  
21 unusual reactors to do this, will that rise to a very  
22 high priority if necessary because of the lack of  
23 medical isotopes?

24 MR. MALLETT: Yes, what we've done on the  
25 last bullet there, I mention that, is that as Mike is

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 saying, there has been a need because of a couple of  
2 the main suppliers of molybdenum-99 from the research  
3 reactor world, have had significant problems with  
4 their facilities and not having run time. So that  
5 created a shortage for the diagnostic world in the  
6 medical arena.

7 And so what the Chairman asked us to do,  
8 and Bill, and we did that is make sure we are ready to  
9 do reviews of applications as they come in the door.  
10 Don't promote them but make sure we're ready to do  
11 that.

12 We have in the budget resources to do some  
13 of that work. It depends on how many come in. We  
14 anticipate -- there has been interest from about eight  
15 different entities with us. We've met with them to  
16 discuss that interest and what they might need to come  
17 in for a reactor.

18 Now there are really two that I think are  
19 far along in this process and maybe a third. One is  
20 the MIPS facility with B&W. It's actually a --

21 MEMBER CORRADINI: Right.

22 MR. MALLETT: -- uranium solution-type  
23 reactor. And the other is the MURR facility looking  
24 at low enriched targets for making molybdenum-99.  
25 There is a third and it is an accelerator facility

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 that has come in and talked to us about using low  
2 enriched targets with an accelerator combination.

3 So the interest is there not only in this  
4 country but in others to try and get there first to  
5 get a part of this market. DOE has money they are  
6 putting in, seed money for people to develop this.

7 MEMBER CORRADINI: But you answered my  
8 question.

9 MR. MALLETT: I probably gave you too  
10 much, Mike.

11 MEMBER CORRADINI: No, it was just  
12 curiosity. I wanted to understand how it fit. Thank  
13 you.

14 MR. MALLETT: Okay. But that doesn't have  
15 to do with any of the streamlining. We're just set  
16 for the license.

17 And I would say if it is no unique  
18 technology, we can do it. If they come in with  
19 something different and unique in that technology,  
20 then it's going to take a while to develop the  
21 framework.

22 MEMBER POWERS: Doesn't the -- isn't there  
23 a problem with the value of the market being incapable  
24 of sustaining the cost of decontamination and  
25 decommissioning of a reactor?

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. MALLETT: Well, there might be Dana.  
2 And that's an issue that has to be factored in  
3 certainly when you go it. It is a risk from a  
4 business standpoint.

5 One of the questions we answered with B&W  
6 was along those lines of well what kind of waste  
7 streams do you have in a facility like this if it a  
8 solution-type reactor --

9 MEMBER POWERS: Right.

10 MR. MALLETT: -- so to speak. And that  
11 would circumvent -- well, not circumvent but that  
12 would alleviate some of those if they don't have that  
13 waste stream. But you would still have  
14 decommissioning costs.

15 MEMBER POWERS: I would just -- I mean my  
16 examinations to some of these markets suggest to me  
17 that it is just very difficult to have enough to cover  
18 the cost of decontamination and decommissioning for a  
19 venture that might only be viable for a short period  
20 of time.

21 MR. MALLETT: And what some people are  
22 doing as well, and I'm not an expert at all, just what  
23 I've heard them say, is they are trying to split the  
24 facility. For example, they might produce the  
25 molybdenum-99 and ship it somewhere to be processed,

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 get FDA approval as a radiopharmaceutical company.  
2 And that way it would defray some of those costs.

3 License renewal beyond 60 years, we used  
4 to call this aging but I'm very sensitive to that now  
5 so we call it license renewal beyond 60 years. The  
6 issue here is we have some operating reactors now that  
7 have started into their beyond 40 year cycle. And  
8 there are others that are coming up in the next few  
9 years that we have given license renewals to.

10 So it's not too early to start thinking  
11 about what are the issues we are going to have to  
12 address if we do have the interest in operating  
13 existing plants beyond 60 years.

14 So our Office of Research is working with  
15 Department of Energy and EPRI internationally to try  
16 and come up what are the areas of questions we have to  
17 answer such as the radiation of cables, maybe the  
18 vessel itself, things that I'm sure you all are deeply  
19 involved in and we will have to have you involved in.

20 So I think it's not too early and we've  
21 put money in the budget to start the research in  
22 Marty's Office of Research under Brian Sheron.

23 MEMBER POWERS: But I guess the real  
24 question that comes down on that is where is the  
25 dividing line between the research that the Agency

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 should be doing and the research that the potential  
2 Applicant is going to do? How do you draw that line?

3 As in the example, the NRC paid for all of  
4 the heavy section steel research for decades. And who  
5 benefitted from that? Well, the primary benefit I'll  
6 say accrued to the licensees. But I mean there's a  
7 dividing line in there someplace and I don't know how  
8 you draw that.

9 MR. BORCHARDT: It's really difficult to  
10 draw it. Of course, we're really doing confirmatory  
11 research. And the licensee --

12 MEMBER POWERS: But the primary research  
13 hasn't been done.

14 MR. BORCHARDT: Right. Yes and that's the  
15 dilemma. And what happens, you know, you'll see with  
16 some of the advanced reactors, not the light water  
17 reactors, is that there is a need for a great deal of  
18 research and infrastructure development, standard  
19 review plans, et cetera.

20 But we don't know which designs are real.  
21 And you can't do it all. And so that's part of the  
22 dilemma why we need to coordinate with EPRI for  
23 example on the beyond 60.

24 MEMBER POWERS: You are going to see, I  
25 think, people coming in with fairly elaborate computer

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 codes.

2 MR. BORCHARDT: Yes.

3 MEMBER POWERS: And the next question is  
4 at what point do you say this issue is so important  
5 that I really do demand experimental validation? I  
6 don't live on your multi-colored computer outputs and  
7 things like that. I mean it's a question that I never  
8 get a very clear answer on.

9 MR. MALLETT: I believe you are ahead of  
10 us right now. We're still in what are the questions  
11 we should have answered. And not to who should answer  
12 them.

13 (Laughter.)

14 MR. MALLETT: It's a very good point.

15 MEMBER CORRADINI: But I guess to follow  
16 Dana's point because I think he's hit upon something  
17 that is that if you go down to the DOE side with all  
18 the change in administration, when I ask Shane Johnson  
19 this, I get an answer that says well, it's not our  
20 responsibility. It's the licensee's responsibility.

21 NRC provides some of the primary stuff.  
22 But I do -- I just wonder if there is a conversation,  
23 although informal, between that because I sense that  
24 it is not a clear boundary. But at least it ought to  
25 be a decision.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           At least in NGNP, you are about to use a  
2 non-light water reactor. So you guys actually have a  
3 conversation. And I sense a chart is being developed  
4 that this is DOE's responsibility. This is ours and  
5 so on.

6           But in the beyond 60, I sense that the  
7 industry still is -- it is kind of mushy so to speak.

8           MR. VIRGILIO:           From a research  
9 perspective, Mike, we're just beginning the dialogue.

10          MEMBER CORRADINI: Okay.

11          MR. VIRGILIO:    But I think you get a  
12 different answer if you ask Pete Miller and Pete Lyons  
13 than you got from Shane Johnson. And we've been in --  
14 Bruce and I have both met with them.

15          MEMBER CORRADINI: Okay.

16          MR. VIRGILIO:    And Brian Sheron is meeting  
17 with them. And it really will be, at least at first  
18 to define where are the areas of interest, a  
19 combination of work with us, the Department of Energy,  
20 and EPRI.

21          MEMBER CORRADINI: Okay.

22          MR. MALLETT:    And I think that we are in  
23 the process of making sure we don't duplicate efforts.  
24 That's another issue to keep in mind.

25          If I could go to slide seven, this one is

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 getting too controversial. We'll move on.

2 (Laughter.)

3 MR. MALLET: If we look at the inspection  
4 program, all I want to mention about that is we have a  
5 very robust reactor oversight program. Many of you  
6 were involved in that process. It is still live and  
7 well today. The basic premises are still there.

8 But a couple of things that I would  
9 mention that are premises that we are looking at this  
10 year, one was it is a dynamic program. We are  
11 supposed to take current experience and operating  
12 experience and feed that back into the program and  
13 make sure we incorporate changes into the program.

14 We do that. There are operation  
15 experience program and I'll talk about that in one of  
16 the upcoming slides.

17 The other is I do believe a key to it are  
18 our people in maintaining the right skill sets for  
19 that program. And we've focused this last year on  
20 doing that as well as increasing the pool of people  
21 ready to be resident inspectors at the power reactor  
22 sites.

23 We were getting to where if there would be  
24 a vacancy, you had to go out and recruit for people to  
25 go there. Now we have this ready pool in each

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 regional office.

2 Buried piping, we put down there. The  
3 reason for that, as many of you know, has been around  
4 for years, that you've had buried piping, you've had  
5 issues with various mechanisms that cause leaks in  
6 that piping.

7 But it has come to light really since the  
8 2005/2006 time frame when we had contaminated piping,  
9 mostly tritium, to where we put together an industry  
10 initiative and NRC initiative for groundwater  
11 contamination and what you do in response to that.

12 The along during the 2009 time frame,  
13 early in the April time frame, we can across license  
14 renewals where licensees were having significant  
15 problems showing up again with buried piping that was  
16 not only carrying radioactive materials but also  
17 safety related. And Oyster Creek is one of those  
18 facilities.

19 We decided we needed to look at this area  
20 to see if we needed to do something different. And so  
21 we've done that review and determined that many of the  
22 programs are still solid but some of the inspection  
23 procedures we have in place need to be revised so  
24 everybody is clear on what we do when you do have a  
25 facility with this problem. And factoring that in to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 what kind of inspection should they do and how often.

2 We also are starting -- Bill is going to  
3 assign today a task force to go back and look at the  
4 2006 recommendations in groundwater contamination to  
5 determine if they are still effective, do we need to  
6 do something more in view of the Vermont Yankee issues  
7 that people are raising.

8 It's really a public confidence issue  
9 though, in my view, versus a technical issue.

10 Yes, Mike?

11 MEMBER RYAN: I agree with you. I think  
12 it is a public confidence issue. But some of the  
13 other areas that they've touched with decommissioning,  
14 you know, Yankee Rowe, you know, had a lot of  
15 discovery of extra contaminated materials they didn't  
16 expect.

17 And I guess the question I have is these  
18 materials actually shift from being regulated under  
19 one part to the next part when they go from operating  
20 circumstances to decommissioning to offsite. And I  
21 wonder if there is a regulatory analysis that needs to  
22 be done to see how all this connects.

23 MR. MALLETT: Yes, that's part of this  
24 task force to look at this. But they actually  
25 connected this back in the 2006 time frame when a

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 previous task force looked at this.

2 And they put some proposed changes for  
3 Part 50 in the decommissioning rules for licensees to  
4 document when they have these incidents and document  
5 characterization of what radioactive materials were  
6 and what they did to try and correct it.

7 MEMBER RYAN: That's a great example  
8 because they documented spills but didn't have any  
9 requirement to clean them up at the time they  
10 occurred.

11 MR. MALLETT: Yes, exactly. And there's -  
12 - it's a little stronger in that area now. And this  
13 industry initiative we push them to do also takes  
14 cares of that I believe.

15 MEMBER RYAN: Well, okay.

16 MEMBER BONACA: One issue clearly is  
17 accessibility of components and maybe for the new  
18 plants, that's an issue because the problem is that  
19 this piping is buried. The cables are buried. And  
20 you begin to see leakage at 40 years of operation.  
21 And these plants are going to run for 60 years. So  
22 this is likely to be a major issue.

23 MR. MALLETT: It is. And thank you.  
24 That's an excellent point. Our Office of New Reactors  
25 under Mike Johnson are factoring these lessons into

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 their reviews for the new plants to see if we can't  
2 design them better and so that you don't have those  
3 unaccessible places.

4           Underground cables, all I wanted to  
5 mention there is we have had and we put out a generic  
6 letter in 2007, issues at nuclear power plants with  
7 underground cables that were environmentally qualified  
8 to be in a dry environment and some of the inspectors  
9 find that the manholes are flooded up to the top. So  
10 they are obviously not in a dry environment.

11           And so we have put together a generic  
12 letter to see the licensee's responses. And we're  
13 having inspectors go out and inspect for these and  
14 what licensees are doing to correct it.

15           The issue, to me, I believe industry needs  
16 to get more proactive in this area. And prevent water  
17 from getting into some of these areas and controlling  
18 the environment where the cables are.

19           Aging management, I think we covered that  
20 one a little bit when we talked about buried piping.  
21 But there are a lot of issues that we are now finding  
22 in the license renewal process. You have helped us  
23 with those like the Beaver Valley containment liner,  
24 things that have come up that we have now factored  
25 back into our program to say well we need to look at

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 those during our aging management reviews.

2 If I could have the slide eight, otherwise  
3 Darren and Marty won't have any time to talk. One  
4 other thing on operating reactors, we have issued a  
5 major security rule, as many of you know, on Part 73  
6 this last year. And we are working through the  
7 implementation of that.

8 Licensees have to implement it by March --  
9 end of March of this year. And what we found is that  
10 licensees have gotten on board with what they have to  
11 do but some of the physical changes that are needed in  
12 the plants are taking longer than they or we  
13 anticipated.

14 And so we're going through a process where  
15 we did not want to modify the rule if it is just  
16 having to do with the implementation date. So we are  
17 doing a case-by-case review as an exemption for each  
18 of these facilities. There are about 24 exemption  
19 requests for the sites in now. And we're working  
20 feverishly to get those issued before the end of  
21 March.

22 They all have to do with dates for  
23 implementation. And usually it is just a few months  
24 to get to another refueling outage or maybe a year in  
25 some cases to get parts.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 VICE CHAIRMAN ARMIJO: Bruce, what kind of  
2 physical changes are you talking about?

3 MR. MALLETT: Well, what I can say in the  
4 public arena is if you remember in that rule, some  
5 parts of the rule were implementing things that were  
6 in the orders previously after 9/11/2001. Those  
7 changes were already made.

8 But there were some enhancements we felt  
9 would better security. Like some plants did not have  
10 their microwave zone inside a fenced area. It was  
11 actually outside the fence.

12 VICE CHAIRMAN ARMIJO: Okay.

13 MR. MALLETT: And now the new rule require  
14 that that has to be protected by another barrier  
15 outside of that one.

16 Some -- we're talking about backup power  
17 for some of the systems, the central alarm stations,  
18 and those areas, and they have to be -- run new  
19 cabling and things like that.

20 VICE CHAIRMAN ARMIJO: Okay. Thank you.

21 MR. MALLETT: The other thing about the  
22 security rule, the last bullet on this slide,  
23 cybersecurity plans, it required people to also factor  
24 into their plans defense, if you will, strategies  
25 against any cyber attacks on safety-related control

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 systems, digitally-controlled systems.

2 And so it requires them to go through  
3 various steps to identify what those systems are and  
4 what areas of protection that they will put in place.

5 We received everybody's plan. It was due in November  
6 23rd. We are in the process of reviewing those to  
7 determine whether there are any holes that we need to  
8 fix.

9 I think what we are going to come across  
10 is that for certain control systems, there is an  
11 isolation of those systems for many kinds of a  
12 cyber/internet system. And that gives us some  
13 gratification.

14 But some of the other systems that are  
15 maybe support systems, don't have that. And so  
16 licensees will have to implement controls for those.

17 The last item on this slide that I will  
18 mention is the emergency response data system. We  
19 have worked on upgrades to our system to actually have  
20 it faster, collect more data, do more things. And  
21 we've also -- those are done on our end.

22 We have now gone out to licensees and  
23 modified their end and are in the process of them  
24 having modify their communication system to go from  
25 the old analog modems to new digital systems in a --

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Darren can help me here -- virtual -- what's it called  
2 -- virtual internet if you will.

3 But because of that, now they've raised  
4 the issue back to us well what about your own Part 73  
5 rule. Now you've caused us to go from a dedicated  
6 line, physically isolated, to a system that could be  
7 connected to the internet.

8 And so we put some controls in place and  
9 worked with them. Glad they raised the issue to  
10 correct that.

11 If I could have Slide 9, I mentioned  
12 operating experience for new reactors. We do still do  
13 the trends analysis every year. And we look at  
14 certain indicators for operating plants. They are all  
15 getting better. We don't have any trends that are in  
16 a negative way.

17 Also the rate of excellent precursors that  
18 we look at in our sequence precursors are getting  
19 lower. So definitely improved performance out at the  
20 facilities in the nuclear power plant arena.

21 I would mention a couple of things here,  
22 though. One is the key to success of operating  
23 experience to me is that we take individual cases and  
24 feed them back into our program and share that. And  
25 we have a tremendous staff in our Office of Nuclear

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Reactor Regulation that handles operating experience.

2 And I don't know if you've tried it on our  
3 web, it's fairly easy to get experience in the  
4 information on various events and share them. And it  
5 has been very helpful to us in looking for generic  
6 issues and actually training in early identification  
7 of issues.

8 There is this factor we've been trying the  
9 past couple of years. I hesitate to mention this to  
10 this group but the BRIIE, the baseline risk integrated  
11 --

12 MEMBER POWERS: You could get your hand  
13 slapped.

14 (Laughter.)

15 MR. MALLETT: -- incident or initiating  
16 events. A lot of indicators -- the school is still  
17 out to me as to what that is giving us. And so we're  
18 taking a look at it.

19 I'm not going to mention safety culture  
20 other than to mention that Marty Virgilio talked to  
21 this group about things we're doing in that arena I  
22 think last November.

23 MR. VIRGILIO: No, it was in January.

24 MR. MALLETT: In January of this year.  
25 And I really don't have much more to say on that other

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 than we do believe whether you call it safety culture,  
2 organizational culture, whether you call it open  
3 collaborative work environment, that it is very  
4 important to any organization's performance. And it  
5 has helped us to have early indicators of plant  
6 performance problems.

7 If I could go to the new reactor arena on  
8 Slide 10, we talked a little bit about this. Bill  
9 mentioned it. We have 17 applications now in house  
10 that we are actively reviewing for combined operating  
11 and licenses.

12 Of those, they are in various stages.  
13 Some have obviously been suspended for a while.  
14 Others are very active. I fully support Bill that we  
15 are going to have maybe five or six that are going to  
16 come to fruition early. And clearly the reference COL  
17 plants are going to occur early.

18 And it looks like per schedule, the Plant  
19 Vogtle site for the AP1000 will be one of the first  
20 out of the gate for us to make a decision and for you  
21 to obviously input to that as to whether it is ready  
22 to where we could issue that license.

23 We do have some challenges. One of them,  
24 I think, is to identify -- that we've learned through  
25 this first round, the design-centered approach, the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 center of excellence approach to teams reviewing these  
2 has been very helpful, getting everyone together to  
3 look for issues.

4 But we have struggled with identifying  
5 things early so that they don't become a crisis in the  
6 schedule. And, for example, we found the tech spec  
7 issue putting in place for some of these applications  
8 where you don't have their new design, you don't have  
9 ready numbers to put into the tech specs was an issue  
10 we had to address. And that kind of thing you can't  
11 wait until the 11th hour to identify. You have to  
12 identify it early. So we're working -- I think that's  
13 a big challenge.

14 Another challenge is to maintain this  
15 expertise. Once these people have been through this  
16 process, we don't want to lose them or the parts or  
17 you won't gain efficiencies in the next set of  
18 reviews. They also will be very helpful during the  
19 construction inspection program.

20 But if you go to the design certification  
21 on Slide 11, there are several in the works. Probably  
22 the most notorious is the AP1000 shield building  
23 design. What I'm most proud of our Agency there is  
24 schedules are one thing but safety is another.

25 And the group identified some significant

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 issues with that design, addressed them to  
2 Westinghouse, and we're working through them. And I  
3 believe we will. But what I'm gratified is that the  
4 whole Agency, from the Chairman on down, supported the  
5 reviewers and the fact that they had issues they had  
6 raised that were legit, that they were real safety  
7 issues that had to be corrected in the design.

8 And Westinghouse, I think, has appreciated  
9 that in working through them.

10 CHAIRMAN ABDEL-KHALIK: Now we recently  
11 sent you an amendment regarding how ACRS can sort of  
12 optimize its review process with regard to amendments  
13 to DCDs. And sort of moving in the direction of  
14 issue-centered reviews versus chapter-by-chapter  
15 reviews.

16 Are you at a stage where you can comment  
17 on that?

18 MR. MALLETT: Yes, I don't think at this  
19 point. But we have that suggestion. And I think I  
20 could give you a personal comment but I'd rather give  
21 you the views of Mike Johnson and his staff. And we  
22 really haven't discussed it unless Bill has.

23 But that's a good question, Said, I'll get  
24 back to you.

25 MEMBER POWERS: One of the issues that

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 we've seen, especially concerning new reactors, I  
2 suspect offhand that we'll see it in the COL  
3 applications, maybe not in the reference designs but  
4 in subsequent ones, is incomplete, tentative  
5 applications coming in.

6 Are you trying to address that issue?

7 MR. MALLETT: For the COLs?

8 MEMBER POWERS: Yes. Well, COLs, design  
9 certifications, whatever it is.

10 MR. MALLETT: We have found incomplete  
11 ones. I think the acceptance application process has  
12 helped that at least from early on, looking -- and we  
13 have sent some back to say that you haven't addressed  
14 all of the areas.

15 As far as a quick and dirty review --

16 MEMBER POWERS: Yes.

17 MR. MALLETT: -- you can do that. As far  
18 as when you get into the details of the design, is it  
19 adequate to perform its function, that usually isn't  
20 discovered until you are actually doing the detailed  
21 review.

22 MEMBER POWERS: Yes, it takes the TBD  
23 things that show up.

24 MR. BORCHARDT: If I can, I guess I'm  
25 partially to blame because before this job, I had the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Office of New Reactors. And we very consciously  
2 decided to accept some incomplete applications because  
3 we had an office of several hundred people on hot  
4 standby and an untested process.

5 So we decided it would be better in the  
6 long view to start review of an incomplete application  
7 than to just reject it and have us sitting around.  
8 Let's learn something in the process. So we did that.

9 I fully expect that when we said that at  
10 that time that that would be the only time we would do  
11 that. And subsequent incomplete submittals would have  
12 to pass the appropriate threshold. So I would expect  
13 if we got some that were clearly deficient, we would  
14 return them.

15 MR. MALLETT: The other thing we are doing  
16 is we're meeting now with applicants and with industry  
17 and vendors as groups and we're feeding that back to  
18 them. Hey, these were incomplete in these areas.  
19 Make sure when you send yours in that you complete  
20 that area. And I think that helps the process.

21 The other challenge obviously is this  
22 process was designed to have the design certifications  
23 complete before the COL application reviews. That's  
24 not occurring or occurring at the same time. And so  
25 we're running tight windows now between when the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 design certification would be done and if approved and  
2 when the COL review needs that because it has  
3 referenced it.

4 So far we're okay. We've been able to  
5 extend the schedules out. And don't have a problem.  
6 But if you keep having some holes in the design, you  
7 run a close time frame between that and when the  
8 applicants were wanting to start construction in their  
9 new facility.

10 If I could go to Slide 12, the only thing  
11 I'll mention here, new reactors, we are working very  
12 hard and heavily in the vendor inspection program. We  
13 have now in the budget to do about 15 of these a year.

14 We're sharing information internationally. We're  
15 also in a construction inspection program.

16 As Bill mentioned, Region II is our center  
17 of excellence in that arena. They're sharing  
18 information internationally and sharing inspectors to  
19 go over. I think we've helped several sites in  
20 foreign countries identify issues. And we're getting  
21 information from them that have helped us in this  
22 arena. So I think that's all positive.

23 We have a strong program laid out for the  
24 construction inspection program. Don't have all the  
25 answers but we're working through them. And we are

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 about ready to start a resident inspector construction  
2 program at the Plant Vogtle site. We've posted for  
3 that position and we'll be selecting.

4 Probably there are many issues left  
5 unanswered. I know this Committee has raised several  
6 of them to us. ITAAC and that issue and how you  
7 maintain ITAAC once it is established, and, of course,  
8 the DAC and how you certify DAC and make sure it is a  
9 complete design review, we understand your issues  
10 there and are working through those.

11 I did want to mention operator licensing  
12 in simulators. We don't want to forget this area. We  
13 are embarking in the Agency on creating our own  
14 simulators for an ABWR and an AP1000 to start on  
15 platforms that can be shared -- on a digital platform  
16 that can be shared, we hope. And then all you would  
17 do is change models, depending on the vendor, and, of  
18 course, you would have to change the human factors  
19 control room design for each of the vendors.

20 And that's our goal. We have a back up.  
21 If we don't get that done, we have the vendors, those  
22 two areas have committed to us they will let us put  
23 our operator examiners through their simulator. I've  
24 been to the two and they don't have the -- of course,  
25 ABWR is operating. But AP1000 is not done yet.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           And so we have also agreed to share  
2 lessons learned, which is an amazing feat to me  
3 between Westinghouse and NRC. And between Mitsubishi  
4 and a different vendor and NRC in formulating and  
5 building a simulator.

6           It behooves us all to have ones that work,  
7 that actually model the plant, and that are consistent  
8 between the vendors and NRC.

9           MEMBER-AT-LARGE STETKAR: Bruce, do you  
10 have anything in the pipeline for the EPR?

11          MR. MALLETT: We don't as of yet.

12          MEMBER-AT-LARGE STETKAR: Okay.

13          MR. MALLETT: But we will have to think  
14 that. We're hoping these general generic platforms at  
15 the training center will support an EPR as well. But  
16 we haven't gone down that route yet.

17          The next slide on advanced reactors, I  
18 believe you were briefed by NRO this morning. So I  
19 don't have to say much.

20          A couple of things though. There are two  
21 arenas we're focusing on, the NGNP, the next  
22 generation nuclear plants, working with DOE on what  
23 that design is going to be. We have in the budget to  
24 review a design and review an application for a  
25 prototype facility in that design.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           We also have in the budget to review one  
2 design for a small modular reactor for some use in the  
3 country. And depending on whether that's a light  
4 water reactor or whether it is a liquid metal or a  
5 high-temperature gas, we have the framework ready if  
6 it is a light water. If it is not, then we probably  
7 have to develop the framework for that reactor.

8           And we have -- I'd probably say the one  
9 that is the farthest along on a small modular reactor  
10 is the mPower reactor by B&W. They seem to have the  
11 most backing right now, support carrying that through.

12           And I think with that, I'll turn it over  
13 to Marty Virgilio.

14           MR. VIRGILIO: Thank you, Bruce. And good  
15 afternoon.

16           What I -- just like Bruce, I have to start  
17 off by saying it is really hard to pick a few things  
18 to talk to you about given the time constraints. So I  
19 picked a few things that I thought would be  
20 interesting to you.

21           What I tried to do, the method for the  
22 selection was is to look out maybe over the horizon a  
23 little bit, not so much to talk about what we're  
24 working on today but what I think we will be working  
25 on tomorrow. And maybe for the next two years.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1           And each one of these areas I think  
2 presents a challenge to the Agency. And so let me  
3 start with this slide. And it is the fuel cycle  
4 facilities.

5           While we have a number of fuel cycle  
6 facilities under review today, these first two, the  
7 AREVA facility and the GE-Hitachi facility are ones  
8 where we are beginning the review. And the review  
9 will continue out until about 2012 when we make our  
10 final decision.

11           AREVA is basically the Urenco technology.

12           This facility, also known as the Eagle Rock facility,  
13 is located out in Idaho. And I don't see that there  
14 are significant technical challenges there but, you  
15 know, we're just beginning our review.

16           The GE-Hitachi is extremely interesting  
17 because it is the laser isotope separation process.  
18 And so we have little or no experience in this area.  
19 We have the test loop now. This is a facility that is  
20 going to be constructed in Wilmington, North Carolina.

21           And it is based on a technology that was developed in  
22 Australia. And it presents it own very unique  
23 challenges.

24           I would say for all the fuel cycle  
25 facilities, one of the challenges that we are still

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 working on is information security. I mean when you  
2 think about criticality, and you think about chemical  
3 safety and fire protection and some of the traditional  
4 issues, this puts a whole new overlay on top of what  
5 we are doing, including things all the way out to  
6 counterintelligence program, which are very new to  
7 this agency. So that's all I really wanted to say  
8 about those two facilities.

9 International Isotopes was sort of a New  
10 Year's Eve gift to us. They brought us the  
11 application at the end of the year. And this is a  
12 facility that will convert depleted uranium into more  
13 stable forms. It will actually -- what they are after  
14 is the fluorine. And they will use that for building  
15 and developing microchips.

16 But the real benefit, I think, to the  
17 nation is the disposal of about 25 percent of the  
18 depleted uranium that is going to be generated by all  
19 these new fuel cycle facilities that can be processed  
20 at this facility once it is constructed and if we  
21 approve the license. This will be located down in  
22 Southeast New Mexico, not far from the LES facility.

23 The next slide in terms of the operating  
24 fuel cycle facilities, I see our challenges in a  
25 number of areas. One is what we call this integrated

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 safety analysis framework, which is based on the  
2 integrated safety analysis that are conducted in  
3 accordance with Part 70 for each of these facilities.

4 And I know we've had some interaction with  
5 you all just recently. And we received the letter at  
6 the end of February with your recommendations about  
7 how we could advance the standard review plan and how  
8 we could use the ISAs or maybe build on the ISAs in a  
9 way that maybe more akin to the way we've done the  
10 reactor program in terms of risk informing.

11 You know we are going to use this  
12 information and I think it has got some advantages. I  
13 recognize the drawbacks of starting out with a process  
14 that is more based on engineering judgment and  
15 elicitation of expert opinion than maybe some harder  
16 data and numbers that we've used in the reactor  
17 programs but I still see some advantages. We've just  
18 got to use this tool appropriately and not outside the  
19 bounds, I think, of where you can push it.

20 The Revised Fuel Cycle Oversight Program  
21 is another challenge area for us. We've been working  
22 on -- we've had a program -- I would say we've had a  
23 program for a number of years for assessing the  
24 performance of the fuel cycle facilities.

25 It was called the Licensing Performance

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Review Program. And it was developed maybe a decade  
2 ago, maybe a little bit more. And it has evolved over  
3 time.

4 But I think what we're ready to do or what  
5 we want to do is take it to the next level to make it  
6 look a little bit more like the reactor oversight  
7 process, to make it a little bit more predictable,  
8 scrutable, and to make it clear as to when a licensee  
9 crosses that boundary as like we do at the reactor  
10 program where we move from columns to columns to  
11 columns, that we know exactly what the actions are  
12 going to be as far as the NRC is concerned and as far  
13 as the licensee is concerned. So that's the operating  
14 fuel cycle facilities.

15 The next slide, on 16, this, Bill alluded  
16 to this in his opening remarks about spent fuel  
17 management, and so where do we go? How do we adjust  
18 NRC's programs in light of this new Administration and  
19 their views on Yucca Mountain?

20 So we're trying to be nimble and trying to  
21 think through the various elements of our new program.

22 And they appear on this slide and the next slide.

23 Extended spent fuel storage, as Bill said,  
24 our technical knowledge, I think we can extrapolate  
25 and get out to maybe 120 years of dry fuel storage.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 That is going to require some maintenance and it is  
2 going to require probably some additional inspection  
3 activities beyond what we do today.

4 But you look out beyond 120 years, and I  
5 think we are really stretching. And so where I think  
6 we are going to have to go here is develop the tools  
7 in order to advance our technical understanding around  
8 material degradation, what happens to the fuel, can  
9 you still move the fuel without criticality concerns  
10 at some point in time, maybe 100, maybe 200, maybe 300  
11 years down the road. I mean that's the kind of thing  
12 that we've got to think about because I just don't see  
13 the Administration backing down.

14 And I just don't see Yucca Mountain coming  
15 back again. The motion is to withdraw with prejudice  
16 which means they can't resubmit that license  
17 application. So we're almost starting over again.

18 MEMBER CORRADINI: But technically you  
19 used 120. What is the determinant that came up with  
20 that number?

21 MR. VIRGILIO: It's just where we -- it's  
22 an extrapolation of the test data that we have --

23 MEMBER CORRADINI: Oh.

24 MR. VIRGILIO: -- from where we are today.

25 MEMBER CORRADINI: Okay. And then from

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 just a licensing standpoint, the current spent fuel  
2 dry cask storage, they are licensed in 25-year  
3 increments?

4 MR. VIRGILIO: Twenty-year increments.  
5 But there is a rulemaking now that is headed to the  
6 Commission that would take that out to 40. That would  
7 allow 20-year extensions.

8 MEMBER CORRADINI: Okay.

9 MR. VIRGILIO: So that's about where -- so  
10 almost -- 40 is almost a no-brainer at this point, if  
11 you'd pardon that expression. But now getting out to  
12 60 and then getting out beyond 60, I think starts to  
13 become technically challenging.

14 MEMBER BANERJEE: What is the technical  
15 challenge there really to go beyond 120 let's say?

16 MR. VIRGILIO: I worry about the integrity  
17 of the fuel and criticality concerns if you try to  
18 move it. I mean I just -- there are other issues.

19 MEMBER BANERJEE: Do you think it will  
20 fall apart? Do you think basically it will fall  
21 apart?

22 MR. VIRGILIO: I don't know what it is  
23 going to do especially with the higher burnup fuel  
24 that we're using today. And the increased industry  
25 interest in going to higher and higher burnups. The

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 fragility, I mean to me that's a significant issue  
2 that we're going to have to deal with.

3 MEMBER BANERJEE: Okay.

4 MR. VIRGILIO: So that's one piece of  
5 that. The other piece of that is no matter what  
6 technology we go to, even if you go to reprocessing,  
7 you are still going to probably need some form of  
8 waste disposal.

9 Now everything we've done for the last  
10 several decades has been focused on the geology and  
11 the material out in the area of Yucca Mountain, the  
12 volcanic tuff.

13 So now we have to change gears and start  
14 thinking about what other media might use for long-  
15 term disposal of the fuel. And what are the technical  
16 challenges there. So that's a component of our  
17 longer-term program.

18 MEMBER POWERS: Are you paying attention  
19 to this DOE initiative in deep bore hole?

20 MR. VIRGILIO: Yes. And not only DOE but  
21 that's more of an international. I think we're  
22 picking up quite a bit of information through the IAEA  
23 and through some of our bilateral exchanges on what is  
24 happening in deep bore hole disposal.

25 The third area is reprocessing. And we're

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1       trying to ensure that we're ready. We've had two  
2 letter of intent in terms of application that we could  
3 see in the 2012 time frame. Interestingly enough,  
4 we've got signals that DOE and this Administration is  
5 looking at maybe 20 years from now when we will be in  
6 a position to support reprocessing.

7               So there is a little bit of, I think,  
8 tension between the industries and maybe this  
9 Administration. But we'll see how that plays out.

10               CHAIRMAN ABDEL-KHALIK: Do we have the  
11 stream of manpower requirements in chemical nuclear  
12 engineering for, you know, a very active reprocessing  
13 program?

14               MR. VIRGILIO: From the gap analysis, we  
15 know where we've got the strengths and where we need  
16 additional technical support. And we are building the  
17 regulatory infrastructure in terms of the regulations  
18 and guidance.

19               So we may not have everybody on board yet.  
20 But I think we've got a very clear understanding of  
21 what we need in terms of the mix of skills.

22               MEMBER CORRADINI: So can I ask a  
23 different question? I guess I'm not -- so if you  
24 picked a point in time and worked backwards, that is  
25 let's just say that tomorrow it was near Whit in salt

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 or it was in Hanford in basalt and you work backwards  
2 from that, what is the timing you would need from a  
3 licensing standpoint and all the things you needed to  
4 have ready so that once they changed the geological  
5 medium, you actually are ready for it?

6 I mean when you said 120, I kind of  
7 looked. And then when you started saying other  
8 things, I thought -- but aren't we talking decades?  
9 We're not talking millenniums?

10 MR. VIRGILIO: I hope we're talking  
11 decades. I mean it's a political issue right now.  
12 It's not a technical issue.

13 MEMBER CORRADINI: That's why I want to  
14 just focus on the 20-years renewal.

15 MR. VIRGILIO: Yes.

16 MEMBER APOSTOLAKIS: So when you say 120  
17 years, let me understand, you mean there may not be a  
18 permanent repository by then? That's what I'm asking  
19 you.

20 (Laughter.)

21 MR. VIRGILIO: You're about to walk into  
22 an SRM. You get to vote.

23 MEMBER CORRADINI: Did you say thank you?

24 MEMBER RYAN: But just to shift gears to  
25 reprocessing, could you talk a little bit about the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 interagency regulatory matrix that would probably  
2 govern what reprocessing in addition to the NRC's  
3 role? Or how has that shaped up?

4 MR. VIRGILIO: I can't with authority -- I  
5 really -- there is going to be --

6 MEMBER RYAN: There's work to do there, is  
7 that fair enough?

8 MR. VIRGILIO: Yes, I think there is going  
9 to be a lot of work to do with DOE, possibly with  
10 NNSA.

11 MEMBER RYAN: And EPA?

12 MR. VIRGILIO: Yes, everybody will be  
13 players in this.

14 MEMBER RYAN: Yes. Thanks.

15 MEMBER POWERS: Could I just touch on a  
16 question on reprocessing? When you say you've got the  
17 manpower, I completely believe that for aqueous  
18 reprocessing because we've done that and we kind of  
19 know the length and the breadth of it.

20 When it comes to the pyro reprocessing, I  
21 don't think anybody has done that.

22 MR. VIRGILIO: I would agree with you.

23 MEMBER POWERS: And I don't think we have  
24 a clue what we need there. I mean I certainly draw a  
25 blank in the area.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MR. VIRGILIO: The two potential  
2 applicants, I don't think either are talking about  
3 pyro. So --

4 MEMBER POWERS: But the Department of  
5 Energy, that is one of their lead technologies. And  
6 they're fairly -- and it's like all new technologies.

7 The effort has gone heavily into how to make it work  
8 and very little into how does it not work.

9 MR. VIRGILIO: Yes, I agree.

10 MEMBER POWERS: We've got time.

11 MR. VIRGILIO: Yes, fortunately.

12 On Slide 17, just a few more things to  
13 talk about, the research activities and I would assume  
14 that at some point, you will be working very closely  
15 with our research staff on some of what we are going  
16 to need to get out beyond 120 years in terms of  
17 research activities. But I would say that we've  
18 started interactions with EPRI, with DOE, and NEI.

19 And we've had two technical exchange  
20 meetings so far. And we've developed three -- we've  
21 developed a structure that includes three working  
22 groups. The first working group to kind of look at  
23 where we are today, what is the technology that we  
24 have in place, and where might the gaps be.

25 And the second group is to start thinking

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 about what are the modeling and experimental  
2 facilities and activities that we would need to close  
3 those gaps.

4 And the third group is looking at the  
5 actual demonstration projects, what sort of facilities  
6 might we need, what kind of demonstrations would we  
7 actually  
8 have to conduct for these experiments.

9 CHAIRMAN ABDEL-KHALIK: A time frame of  
10 120 years, given the uncertainties, may require a  
11 step-changing technology. How would you address that?

12  
13 MR. VIRGILIO: This is going to be the  
14 function of these working groups.

15 MEMBER POWERS: It seems to me that I  
16 would count aboveground spent fuel storage as one of  
17 the real successes of the Agency. And it seems to be  
18 a technology that is extrapolatable fairly  
19 confidently.

20 VICE CHAIRMAN ARMIJO: I'm not so  
21 pessimistic about that. But I'd sure like to have  
22 early subcommittee reviews of plans in that area.

23 MR. VIRGILIO: And I would urge you to  
24 open the dialogue with our Office of Research --

25 VICE CHAIRMAN ARMIJO: Yes.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701

1 MR. VIRGILIO: -- because I think that now  
2 is the time if you want to get in early.

3 MEMBER CORRADINI: So I guess I want to  
4 ask that question since we are already thinking about  
5 reviewing what you are planning to do. Where does it  
6 -- I guess I don't know the answer to this but I'm  
7 curious, not that the current repository is officially  
8 off the table, does that mean that this committee  
9 looks at things on spent fuel stopped or centralized  
10 storage facilities, where does the ACRS stop being  
11 asked of its opinion? After spent fuel? Or after  
12 centralized storage facilities?

13 MR. VIRGILIO: I think that is an issue  
14 that you and the Commission have to discuss.

15 MEMBER CORRADINI: Because you already  
16 have PNS --

17 MR. VIRGILIO: Which we license.

18 MEMBER CORRADINI: -- and it's licensed.

19 MR. VIRGILIO: But that was, again, a  
20 political issue with the state and other agencies.

21 MEMBER CORRADINI: It is still in front of  
22 the courts to undo that knot.

23 MR. VIRGILIO: Right. But similarly with  
24 the high level waste, while there is a motion to  
25 withdraw, that motion has got to be adjudicated and

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 could even be appealed to the Commission.

2 So we're continuing -- as of today, we're  
3 continuing to work on our SER, we're continuing to  
4 conduct our review activities for high level waste.  
5 We haven't stopped. And we cannot stop until the  
6 Commission directs us to stop.

7 MR. HACKETT: Mike, I was just going to  
8 mention really quickly with the charter revision that  
9 came our way in 2009, it is clear that the ACRS has  
10 the responsibility to do things in the spent fuel  
11 storage area.

12 MEMBER CORRADINI: Even centralized  
13 facilities?

14 MR. HACKETT: Yes, correct.

15 MEMBER CORRADINI: Okay. I didn't know  
16 that. That what I was kind of curious about. Okay,  
17 thank you.

18 MR. VIRGILIO: And the last bullet on that  
19 slide is we're just looking at how we can enhance our  
20 licensing process in this area. As you know, that's a  
21 rulemaking process. And it is cumbersome and takes a  
22 fair amount of time.

23 The next slide, on 18, just to talk a  
24 little bit about radioactive sources, looking ahead --  
25 well, let me look back for a second, in 2005, the

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 Energy Policy Act tasked the Chairman of the NRC with  
2 leading a task force on the safety and security of  
3 radioactive sources.

4 And we provided our first report to  
5 Congress in the 2006 time frame. And we owe our  
6 second report to Congress now in 2010. So we're  
7 currently working on that report.

8 And basically what will come over the next  
9 several years is the recommendations that come out of  
10 that report. And the staff implementation of those  
11 recommendations, in some cases looking to increase the  
12 security of radioactive sources.

13 One of the elements that I hope to take  
14 credit for in that report is Part 37. That's a new  
15 rulemaking that would include -- what it does is it  
16 codifies the orders that we put in place following  
17 9/11 for the security of radioactive sources.

18 And then it also picks up on lessons  
19 learned that we've gained through the implementation  
20 of those orders. It picks up on the independent  
21 external review panel that Mike participated on, which  
22 provided additional recommendations to the staff.

23 So all of that is wrapped into Part 37.  
24 And right now, that rule is before the Commission. It  
25 is in a draft form. And we're asking the Commission

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 to let us put it out for public comment.

2 Another element of the program is a policy  
3 statement on cesium chloride. As you may know, cesium  
4 chloride is highly dispersable and mobile. And it is  
5 probably a radionuclide of choice if you wanted to  
6 cause mass disruption.

7 I don't think it is a radionuclide that  
8 you are going to have any serious injuries or impacts  
9 on public health and safety but it is a tool of, I  
10 think, it could be a tool of choice. For that reason,  
11 we've got very tight security on the cesium chloride,  
12 particularly in the blood irradiators which is where  
13 it is used around this country.

14 But we're still, with this policy  
15 statement, urging the development of alternative  
16 technologies. And ultimately I think that's where we  
17 would want to go. But we have to do that very  
18 carefully because there's medical applications.

19 Blood irradiators are extremely important  
20 and the doctors are not -- there are portions of the  
21 medical community that are not convinced that there  
22 are other viable alternatives at this point. And so  
23 the last thing we want to do is get in the middle of  
24 this and really cause --

25 MEMBER POWERS: You don't want to get into

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the healthcare debate? I mean you're missing  
2 everything. This is where the fun is.

3 (Laughter.)

4 MR. VIRGILIO: So the policy statement is  
5 a gradual approach toward looking for alternative  
6 forms of cesium chloride. And if anything in the  
7 threat environment would change, well then our posture  
8 would change. But at least right now, we believe that  
9 it can be done very thoughtfully and over some period  
10 of time.

11 The next slide, just a little bit more,  
12 we're very proud of the National Source Tracking  
13 System that's gone into place. It's been in operation  
14 for a little over a year now. And it tracks the  
15 sources owned by over a thousand, roughly 1,300  
16 different licensees, tracking on the order of 50,000  
17 sources.

18 That is just a source tracking system.  
19 What we're headed for in the next few years is web-  
20 based licensing and the licensing verification system.

21 So we have a web-based understanding of where any  
22 source is, who is the licensee, where is it moving to  
23 and from on almost a real time basis.

24 And that's the goal to be able to have  
25 that additional measure of security around the sources

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 by knowing at all times where they are. So that's a  
2 goal that we'll be striving to achieve over the next  
3 couple of years.

4 And then finally in this area, I want to  
5 mention that we're looking at revising our radiation  
6 standards. This is Part 20, Appendix I for the  
7 release of effluence.

8 We're looking at -- and it all starts with  
9 the International Commission on Radiological  
10 Protection. They came out with their recommendations  
11 in 2007. And we're studying those recommendations to  
12 determine if and how we should be modifying our  
13 recommendations.

14 This is going to be a multi-year project  
15 to develop the technical basis to move forward. And  
16 I'm sure there will be lots of opportunities to  
17 interact.

18 MEMBER SIEBER: I have a question on the  
19 source management. What are you doing, if anything,  
20 in the area of unlicensed sources that have come to  
21 attention from time to time in new articles, for  
22 example, exit signs in Wal-Mart had a --

23 MR. VIRGILIO: General license -- there  
24 are general license sources, yes. I think the biggest  
25 thing that you are referring to that we've faced over

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 the last year is the Wal-Mart issue --

2 MEMBER SIEBER: Right.

3 MR. VIRGILIO: -- where basically these  
4 are exit signs --

5 MEMBER SIEBER: Right.

6 MR. VIRGILIO: -- and they've basically  
7 lost control of the exit signs.

8 MEMBER SIEBER: Right.

9 MR. VIRGILIO: And we've gone out to all  
10 similar licensees and with requests for information.  
11 And we're developing a plan to follow up and close on  
12 that. Wal-Mart -- actually we went to enforcement on  
13 Wal-Mart. And it was a significant action.

14 MEMBER SIEBER: They actually did pretty  
15 good but I think that there is a ton of other folks  
16 out there and a lot of material. And it doesn't seem  
17 to me like there is a way for you to identify where  
18 all this stuff is and who has it and how they are  
19 dealing with it.

20 MR. VIRGILIO: Right. Now what we're  
21 going to have to do at some point is draw the line  
22 because even with Wal-Mart, while it does create a  
23 problem in terms of extensive cost for clean up --

24 MEMBER SIEBER: Yes.

25 MR. VIRGILIO: -- when you think about it

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 from a risk significant perspective, I think you can  
2 easily draw the line and say, you know, enough is  
3 enough. We need to do better going forward. But I'm  
4 not sure that we are going to go back out and capture  
5 all of the big box stores that may have lost control.

6 And it's just we don't -- it's not worth it.

7 MEMBER SIEBER: Or even little box stores.

8 On the other hand, who makes the decision as to where  
9 you draw the line below which you are not going to  
10 bother? Is that a rulemaking? Or does that take  
11 Congress? How do you get there?

12 MR. VIRGILIO: I think the staff is going  
13 to have to make a recommendation to the Commission as  
14 to, you know, this is good enough. I mean we'll  
15 continue to operate under the general license system.

16 If we want to change that, yes, that would have to be  
17 a rulemaking.

18 MEMBER SIEBER: Okay.

19 MR. VIRGILIO: If we wanted to -- and, we  
20 are, in fact, as a matter of fact, there is  
21 rulemaking, not in this area, but to take some of the  
22 sources that are -- what IAEA has five different  
23 ranges for sources. And now we're looking at one-  
24 tenth of Category 3 to require everything from that  
25 point and above to be specifically licensed sources.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 MEMBER SIEBER: Okay.

2 MR. VIRGILIO: So we really are  
3 reexamining what we have a tight control over and what  
4 we have lesser control over from a risk perspective.  
5 And we are changing our regulations.

6 MEMBER SIEBER: How long do you think --  
7 you know changing a regulation is, at the very  
8 minimum, a two-year process. But how long do you  
9 think it will be before all of this is sort of under  
10 better control? Five years maybe?

11 MR. VIRGILIO: To implement the new  
12 rulemaking, it will probably be five years if you  
13 think about the agreement states as well.

14 MR. BORCHARDT: It's at least five years,  
15 I think.

16 MEMBER SIEBER: Yes, I was being -- well,  
17 it is an issue. I'm not sure how important it is but  
18 it makes the newspapers and that makes it important.

19 MR. VIRGILIO: It is a public perception  
20 issue more than a health and safety issue.

21 MEMBER SIEBER: Right.

22 MR. VIRGILIO: I agree.

23 MEMBER SIEBER: Thank you.

24 MR. VIRGILIO: The last slide I have in my  
25 set is on decommissioning and low level waste. And if

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 I look out over the next couple years, decommissioning  
2 continues on. I really don't see any significant  
3 challenges in the reactor arena.

4 In the materials arena, we still are  
5 tending to deal with licensees that don't have the  
6 funds necessary to complete the decommissioning  
7 activities. And that is going to be our challenge.  
8 Some of these sites wind up listed by EPA. Some of  
9 them find money through other sources.

10 Uranium recovery, that's the other end of  
11 the expansion from this nuclear renaissance. And we  
12 continue to receive additional applications for in  
13 situ leach and other types of uranium recovery  
14 facilities. And I don't know that that is technically  
15 challenging but we do have a lot of stakeholder  
16 interest.

17 There are -- I think there are a lot of  
18 bad memories around some of the legacy sites. And so  
19 as you see, the start up of some of these new uranium  
20 recovery sites, we often find that we are dealing with  
21 concerns that date back to some sites that are still  
22 not cleaned up, most of which are under DOE's control,  
23 under UMTRA and not necessarily our sites.

24 Under low level waste disposal, a number  
25 of challenges in that area. I think one that we are

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 going to be facing over the next year is depleted  
2 uranium and how is that disposed of. The Commission  
3 has asked us to develop a very narrow rulemaking to  
4 ensure that depleted uranium is disposed of safely.

5 The staff's view is this is Class A waste.

6 But I want to be abundantly clear. We want to make  
7 sure that people are actually performing performance  
8 assessments for the disposal of depleted uranium. And  
9 so that is the focus of our rulemaking, to lay out  
10 what would be our expectations around a very focused  
11 performance assessment.

12 MEMBER RYAN: Marty, just so everybody  
13 knows, we've got a briefing on that this week. And  
14 we'll be writing a letter.

15 MR. VIRGILIO: Oh, good. Okay. Great.

16 The next area is blending of low level  
17 waste. I don't know if you've been briefed on that  
18 yet. But the staff has been tasked by the Commission  
19 to provide a paper. And we will be doing that  
20 sometime in April.

21 And that's a very controversial issue.  
22 And what we're basically looking at is blending like  
23 substances. And you could use resins from the  
24 reactors as an example of taking resins and blending  
25 maybe more radioactive to less radioactive. So you

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 are blending from Class B down to maybe Class A for  
2 disposal.

3 And I think that's got a lot of concern.  
4 And we've had a lot of stakeholder interest. We've  
5 had a couple of workshops.

6 The last issue is the larger revision to  
7 Part 61. I mentioned the DU is a very narrowly-  
8 focused revision. The Commission has also asked us to  
9 go out and look at should we be re-looking at our  
10 entire low level waste disposal schemes and how that's  
11 done.

12 And I think Mike Ryan and the ACNW, some  
13 of the best work that I think we will be able to  
14 leverage come out of reports that were developed by  
15 the ACNW on low level waste disposal. And I look  
16 forward to moving out from the points that you all  
17 took us to to maybe where we need to be to deal with  
18 the decades to come.

19 That's all I had in my presentation.  
20 Thank you.

21 MEMBER RYAN: One final point on 61, that  
22 includes the waste classification system as a whole?

23 MR. VIRGILIO: Yes.

24 MEMBER RYAN: Yes, okay.

25 MR. VIRGILIO: The Commission has asked to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 re-look at everything.

2 MR. ASH: Okay. Thank you. This is the  
3 opportunity to address the ACRS. This is my first  
4 time.

5 MEMBER POWERS: I think we look upon this  
6 as fresh meat.

7 (Laughter.)

8 MR. ASH: I was told I had an hour and a  
9 half, is that right?

10 (Laughter.)

11 MEMBER POWERS: That should get you  
12 through Slide 1.

13 MR. ASH: Yes, actually what I've agreed  
14 to do is next time I come brief, I'll go first.

15 (Laughter.)

16 MR. ASH: In all seriousness, I know that  
17 -- I'm cognizant of the time we've got. And my  
18 interest was to go through my slides fairly quickly  
19 and really touch on those types of things that I  
20 thought would be of interest to the ACRS but also of  
21 note, Ed and his staff, but everybody here in terms of  
22 when you are visiting the NRC complex, the White Flint  
23 Complex, and when you are touching the NRC systems.

24 So with that on Slide 21, Bill had touched  
25 on really briefly Three White Flint North. We've

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 obviously signed the lease. We're in the midst of  
2 staffing the project team.

3 We're in the midst of standing up and  
4 actually we've stood up all of the planning teams,  
5 inclusive of NTEU, to define the requirements, really  
6 the more discreet detailed requirements for what will  
7 Three White Flint be. And the types of amenities, the  
8 types -- how it is going to be outfitted. That is now  
9 going on. And that will continue up to the point  
10 obviously that we are planning to occupy the building  
11 in 2012.

12 On a more immediate front, knowing that  
13 particularly One White Flint dates back to the late  
14 '80s and it shows its age, Bruce had talked about  
15 aging management, the building shows its age. We need  
16 to ensure that as the regions have improved their  
17 space, we've got our interim facilities that have nice  
18 space. This is nice space where we are right now.

19 We need to ensure that both One White  
20 Flint and Two White Flint are brought up to the 21st  
21 century. Everything from carpet to bathrooms to  
22 whatever as well as security, there will be things  
23 that will be happening that are currently going on  
24 right now as well as things that will be going on over  
25 the next year, even inclusive of a better perimeter

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 security that we knew that was imperative. We needed  
2 to improve.

3 We also know that once Three White Flint  
4 is stood up and people have occupied it, that is also  
5 our opportunity to start to renovate both One White  
6 Flint and Two White Flint, using Church Street as a  
7 swing space. So eventually -- and I can't tell you  
8 what year it would be -- there will be floors that  
9 will be unoccupied because we'll go for full-scale  
10 renovation.

11 We know One and ultimately Two have to be  
12 renovated. Everybody has to be on equal footing in  
13 terms of the space.

14 MR. MALLETT: Before you go to the next  
15 slide --

16 MR. ASH: Yes?

17 MR. MALLETT: -- I've asked for one thing  
18 in the new building, no unique angles.

19 (Laughter.)

20 MR. ASH: I'm waiting for Bruce to ask for  
21 a room to be named after him.

22 PARTICIPANT: Could we get somebody to  
23 pave the road, the street between White Flint Station?

24 MR. ASH: Okay. I won't even talk about  
25 the discussions we've had about even getting honestly

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 people safely between One White Flint and Three White  
2 Flint. That is one of our top priorities from an  
3 agency, ensuring the safety of our workforce but also  
4 our visitors. Yes? Okay.

5 I think everybody here would agree that  
6 the public's confidence in us as a regulator depends  
7 on their ability frankly to understand what we're  
8 doing. To have access to information, to be able to  
9 participate and attend public meetings in particular.

10 And there are a variety of things that are  
11 underway, one of which, the first bullet which is open  
12 government, which was one of the President's agenda  
13 items, how can we, as a federal government, improve  
14 how we are more collaborative, participatory, and open  
15 of everything from data and so forth?

16 For us, General Counsel said we are one of  
17 the should agencies as opposed to a shall agency. But  
18 it was a natural. This is one of our values. Us  
19 being open, the NRC being open.

20 We've taken this, established a website.  
21 We're in the midst of finishing up an open government  
22 plan. The heart of it is what are the ways, putting  
23 forth before the American public, what are the ways  
24 that we can improve? What are the ways we can enhance  
25 how we share information but also allow the public to

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 understand what we do? And we're very excited about  
2 that.

3 Website redesign, not one of the best  
4 websites in the federal government. I underscore not.  
5 We're in the midst of updating that one.

6 MEMBER CORRADINI: Your search engine is  
7 pretty good actually.

8 MEMBER SIEBER: Yes, it's not bad.

9 MR. ASH: Yes, the search engine for ADAMS  
10 leaves a lot to be desired.

11 MEMBER SIEBER: Yes, it does.

12 MR. ASH: And that's one of the top  
13 complaints of what we do. Bill talked about ADAMS.  
14 In '99, it was state of the art, 2010, it needs to be  
15 replaced. It has to be replaced.

16 If I were to identify my top IT  
17 initiative, it is the replacement of ADAMS. I think  
18 many of you probably use it, try to use it, or try to  
19 find information. We know. It has a significant  
20 number of weaknesses.

21 One of my lessons learned pretty early on  
22 after I arrived at the NRC, it was down for a couple  
23 of days because of a technical issue, I heard about  
24 that. And that was my lesson in terms of how the  
25 public uses ADAMS to frankly understand what we do.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 And when that's down, their confidence in us  
2 diminishes.

3 MEMBER POWERS: One thing you might want  
4 to at least thank or acknowledge some of the people,  
5 especially in NRR, on very high profile issues, GSIs  
6 and things like that, have been very good about  
7 keeping the website up to date with information on  
8 meetings and progress and things like that. They've  
9 done a really bang up job on that.

10 MR. ASH: The key thing for me for the  
11 website is making it extremely easy for anybody to  
12 find the information they need. That's what anybody  
13 should expect from these types of websites,  
14 particularly one from the NRC.

15 Multimedia, quickly, that's improving.  
16 And we've been doing that over the last year or so.  
17 How do we ensure for a stable, reliable means for the  
18 public and people to be able to see what we do? Be it  
19 webstreaming, audio conferences, and so forth.

20 We had some serious challenges about a  
21 year ago. We have made improvements. We still have a  
22 ways to go. But I'm happy with the progress we've  
23 made.

24 Next slide, Bill touched on about the  
25 fixed costs, that one really does effect IT. About 80

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 percent of our IT spend frankly is on operating and  
2 maintaining what we've got.

3 Now we need to find the balance of how do  
4 we introduce new technologies, keep the things that  
5 we've got going, going, and that's the fine line that  
6 we're having to deal with. And realizing that we've  
7 got a lot of applications and systems that are  
8 outdated. ADAMS was one but a lot of other legacy  
9 applications are outdated. We need to modernize that.

10 How do we deal with it from a funds  
11 perspective, particularly when we are basically in a  
12 relatively flat budget?

13 I'm going to flip to the next slide real  
14 quick. This is something that we introduced about a  
15 year ago. Sat in front of the Commission, talked  
16 about it. The Chairman, one of his top priorities is  
17 working from anywhere.

18 Pretty much everybody around the table  
19 works from anywhere. You do. How do we ensure that  
20 you, as the ACRS, employees, construction, inspection  
21 employees, how do they get access to the information  
22 they need wherever they might be?

23 I use the best example. If I'm at Vogtle,  
24 what broadband capability do I have? It may be very  
25 limited. Do I have the means to be able to do what I

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 need to do to do the work, communicate, find  
2 information?

3 We need to be able -- we've been testing  
4 that out. We've been very fortunate to be able to  
5 work with ASLBP, OIG, and with OIS to test out what  
6 types of equipment, what types of requirements are  
7 necessary to be able to support that type of ideal?  
8 Given the need for a mobile workforce, the reality of  
9 that, we have to be able to support that.

10 Next slide, real quickly. Other  
11 management improvements. An imperative from the  
12 Chairman, improving how we do contracting. Training  
13 techniques, Bruce had mentioned about the training  
14 simulators for the new reactors. That's one aspect to  
15 it. We have to go beyond what we've currently got:  
16 iLearn, electronic learning, to other types of  
17 innovative techniques.

18 MEMBER CORRADINI: iLearn is right up  
19 there with ADAMS.

20 (Laughter.)

21 MR. ASH: We do the surveys, we know. I  
22 think I shouldn't have used iLearn.

23 (Laughter.)

24 MR. ASH: Next slide. Yes, next slide is  
25 questions. We also have to ensure that we do IC

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 security correct. We protect the information, protect  
2 the network, protect the data.

3 Disaster recovery, we've briefed the  
4 Commission a variety of times to talk about how do we  
5 ensure that this Agency continues to operate in an  
6 event we have an issue. Bill talked about when we had  
7 the snow event. We continued to operate. And  
8 continue to mature that.

9 And measuring success, and I use these  
10 forms but also the surveys we do. A lot of frankly  
11 what is important to be, be it me visiting the  
12 regions, me visiting the ACRS, my staff is getting the  
13 feedback. We do it through the surveys, the in-person  
14 meetings. We have to get that feedback.

15 The only way for us to improve and frankly  
16 even know what we need to improve is to get that type  
17 of feedback. That's the way we either know that we  
18 are succeeding or we need to frankly do something  
19 different.

20 With that, I'll turn it over to Bill.

21 MR. BORCHARDT: Mr. Chairman and Committee  
22 members, thank you very much for the opportunity. We  
23 really do very much value your contribution to our  
24 mission as an Agency. I mean the independent review  
25 that you give and the thoughtful insights that you

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 provide to us are invaluable.

2 Even though you have noticed as one of my  
3 management philosophies, I have done a lot of work  
4 throughout the staff to get signature authority and  
5 those things to the right level to hold office  
6 directors accountable for their responsibilities.

7 Even though you may see some responses  
8 come back from office directors, they all get reviewed  
9 up in the EDO's office. And the expectation is that  
10 when there is any disagreement or contentious issue,  
11 that it gets a very detailed reviewed from one of my  
12 colleagues sitting up here with me.

13 CHAIRMAN ABDEL-KHALIK: Nevertheless, I  
14 think there was a recent example of that.

15 MR. BORCHARDT: Yes.

16 CHAIRMAN ABDEL-KHALIK: It is our  
17 preference that your responses come directly from you.

18 Just as a matter of tracking over long term of sort  
19 of resolution of issues, we would like to be able to  
20 track, you know, responses to issues from a single  
21 source rather than trying to sort of find where  
22 responses to a specific issue came from in the past.

23 And we can talk about that offline.

24 MR. BORCHARDT: Okay. We'd be happy to  
25 talk to you about that.

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS

1323 RHODE ISLAND AVE., N.W.

WASHINGTON, D.C. 20005-3701

1 CHAIRMAN ABDEL-KHALIK: As you may have  
2 noticed, we never wait for a slide that says  
3 questions.

4 (Laughter.)

5 CHAIRMAN ABDEL-KHALIK: We really  
6 appreciate your taking the time to come and brief us  
7 and we also very much appreciate your punctuality,  
8 starting on time and finishing on time. Thank you  
9 very much.

10 MR. BORCHARDT: Our pleasure. Thank you.  
11 Have a good afternoon.

12 CHAIRMAN ABDEL-KHALIK: Off the record.  
13 We'll take a break.

14 (Whereupon, the above-entitled open  
15 meeting of the Advisory Committee on Reactor  
16 Safeguards was concluded at 3:02 p.m.)

17  
18  
19  
20  
21  
22  
23  
24  
25

**NEAL R. GROSS**

COURT REPORTERS AND TRANSCRIBERS  
1323 RHODE ISLAND AVE., N.W.  
WASHINGTON, D.C. 20005-3701



# **Presentation to the ACRS**

## **Digital I&C Design Acceptance Criteria**

### **Methodology and Approach to Inspection and Resolution**

**March 5, 2010**

# Objectives

## Provide the Committee:

- **Details of proposed Digital I&C (DI&C) Design Acceptance Criteria (DAC) inspection methodology**
- **Overview of staff approach and plan for conducting pilot DAC inspection for South Texas Project 3&4 (ABWR Design)**
- **Summary of long-term goals for integrating pilot lessons learned and DAC inspection process enhancements with ITAAC Closure process**

# Background

- **Staff initiated complex ITAAC/DAC inspection framework development in mid-2009**
- **South Texas Project (STP) requested staff verification/audit of early DI&C DAC elements in 6/09 letter**
- **Staff commenced development of DAC inspection methodology that would be “piloted” with STP**

# **Pilot DAC Inspection Benefit**

- **Staff gains confidence in STP processes at early stages of design & implementation effort**
- **Informs NRC DAC inspection process**
- **Enables optimization of process and resources for future DI&C DAC inspection**

# **DAC Working Group Overview**

- **Chartered 11/09 to develop and implement DAC inspection methodology in test case (pilot) with STP**
- **Collaborative effort between NRO divisions, RII/CCI, OGC and NRR**
- **Primary focus is DI&C DAC (piping and HFE DAC efforts also initiated)**
- **Charter later modified to include integration with ITAAC Closure process**

# **Working Group Activities**

- **Development and refinement of DAC inspection process (framework) that coordinates staff expertise**
- **Development of inspection strategies and procedures**

# **DI&C DAC Inspection Considerations**

- **Scope and depth of inspection**
- **Not a licensing review**
- **Focus on the licensee's process and the Acceptance Criteria**

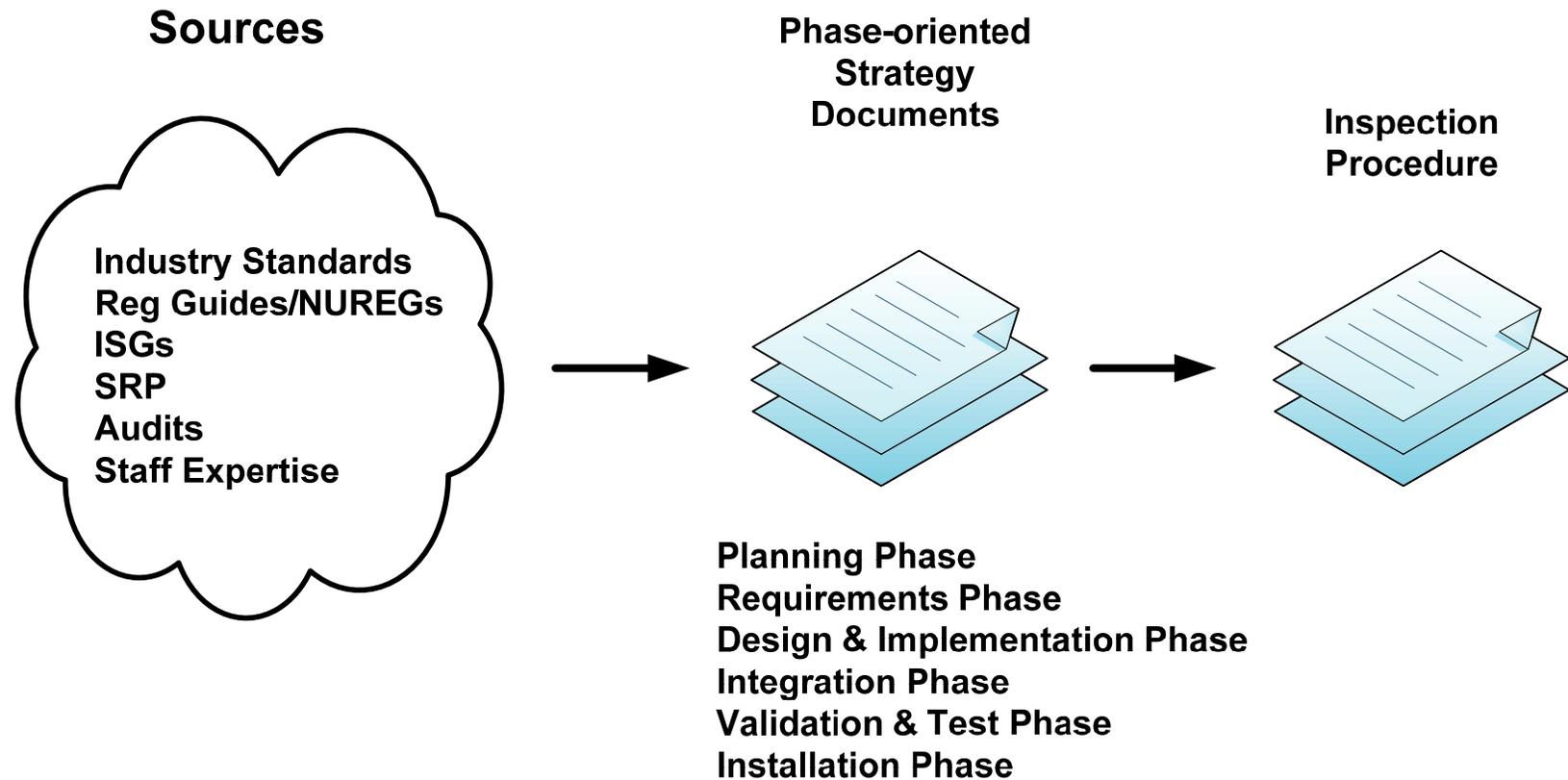
# **DAC Inspection Objective**

**Verification that the design detail will meet the acceptance criteria (complies with licensing basis)**

# **DI&C DAC Inspection Strategies**

- **Planning tool for DI&C inspection activity**
- **Technical information and insight for the inspector**
- **Generic for any DI&C DAC inspection**

# Inspection Tool Development



# Strategy Documents

- **Input from industry standards, guidance, staff expertise, etc.**
- **DI&C system/software lifecycle phase-oriented**
- **Feature key attributes, acceptance criteria, inspection techniques**
- **Precursor to the DAC inspection procedure**

# **DI&C Lifecycle Phase-oriented Inspection**

- **Focus:**
  - **process and technical activities within each lifecycle phase**
  - **transition activities between phases**
- **Phase inspection typically starts when activities for a given phase are complete**

# Lifecycle Phase Inspection

- **Assessment of design processes and documentation**
- **Sampling of attributes within the phase**
- **Thread audits (where appropriate);**  
    [Requirements-Design-Code-Testing]
- **Assessment of Software QA processes and activities**
- **Assessment of Independent V&V activities**

# **Inspection Level of Effort**

- **Front-loaded effort for the Planning and Requirements phases**
- **Effort is scalable based on early findings**
- **Inspection will be conducted for each safety-related DI&C platform and software application**

# South Texas Pilot

- **Schedule driven by availability of STP DAC products**
- **Originally, pilot inspection planned for 2<sup>nd</sup> Qtr 2010**
- **Based on STP schedule, a two-part pilot inspection is more appropriate**

# Two-Part Pilot Inspection

- **Part 1: Program inspection of high-level DI&C lifecycle planning and process (June 2010)**
- **Part 2: Implementation inspection of selected DI&C platform planning phase activities (Nov 2010 (tentative))**

# **Planned Pilot Activities**

- **Complete Inspection Strategies**
- **Develop new DAC inspection procedure**
- **Select DAC product for inspection**
- **Tabletop process with STP**
- **Identify inspection staff**
- **Conduct the Pilot Inspection**

# Pilot Inspection

- **Governed by IMCs 2503 (ITAAC Inspection) and 0613 (Inspection Documentation)**
- **Inspection issues will be screened and documented in a docketed Inspection Report**
- **Inspection Report will be used as applicable to support closure verification for related ITAAC**

# Post-Pilot

- **Compile and incorporate lessons learned**
- **Modify, refine and enhance process as necessary for generic industry applicability**
- **Integrate with ITAAC Closure process**

# **Long-Term DAC Inspection**

- **STP provided a schedule for DAC availability through factory testing**
- **Staff working on identifying DAC inventory among all designs**
- **Staff will plan accordingly to accommodate DAC inspection**

# **Future Activities**

- **Post-Pilot, work with NEI to modify NEI 08-01**
- **Reg Guide 1.215 will be updated accordingly**

# ***Discussion/Committee Questions***

# *Advanced Reactor Program*



*ACRS Meeting*

*March 5, 2010*

# **Advanced Reactor Organization**

**Michael E. Mayfield, Director**

**Advanced Reactor Program**

**Office of New Reactors**

# Background

- Pre-application interactions with potential domestic suppliers increasing
- Energy Policy Act of 2005 established Next Generation Nuclear Plant Project
- Significant global interest

# Background

- Established the Advanced Reactor Program
- One of three subprograms in NRO
- Lead licensing project management organization for all advanced reactors

# Background

## ■ Advanced Reactor Program

### ■ Priorities to:

- Building organization (staffing, resources)
- Developing regulatory infrastructure and addressing generic policy issues for SMRs
- Preparations for Next Generation Nuclear Plant (NGNP)
- Preparations for other near-term SMR applications (e.g., integral PWR designs)

# Background

- Office of Nuclear Regulatory Research
  - Current RES focus is related to high temperature gas-cooled reactor technology (NGNP)
    - Coordination of research activities with DOE
    - Development of analytical models and tools
    - Materials and high temperature environments
  - Currently developing research plans for integral PWRs and for sodium-cooled fast reactors

# Advanced Reactor Program

- Program addresses four technology groups
  - High Temperature Gas-Cooled Reactors (i.e., Next Generation Nuclear Plant (NGNP))
  - Integral pressurized water reactors
  - Sodium-cooled fast reactors
  - Other Designs

# **Next Generation Nuclear Plant (NGNP)**

**William Reckley, Branch Chief**

**Advanced Reactors Branch 1**

**Advanced Reactor Program**

**Office of New Reactors**

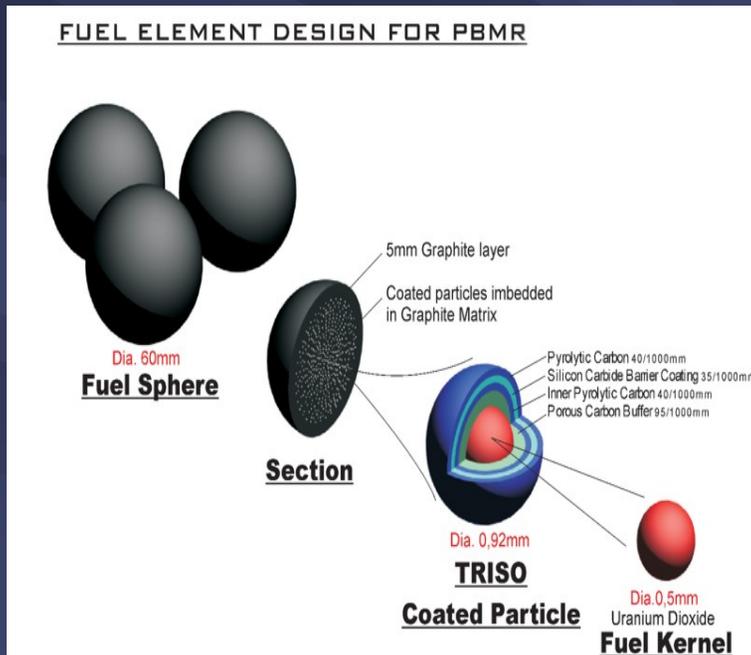
# NGNP-Overview

## ■ Energy Policy Act of 2005

- The NRC shall have licensing and regulatory authority....
- The DOE and NRC shall jointly submit ...a licensing strategy for the prototype nuclear reactor...
  - August 2008 report states success depends on:
    - Productive use of pre-application period (now to 2013)
    - Meeting major milestones, including supporting research and code development
    - Developing supporting regulatory infrastructure
- No later than September 2021, complete construction and begin operation...

# NGNP - Technology

## FUEL ELEMENT DESIGN FOR PBMR

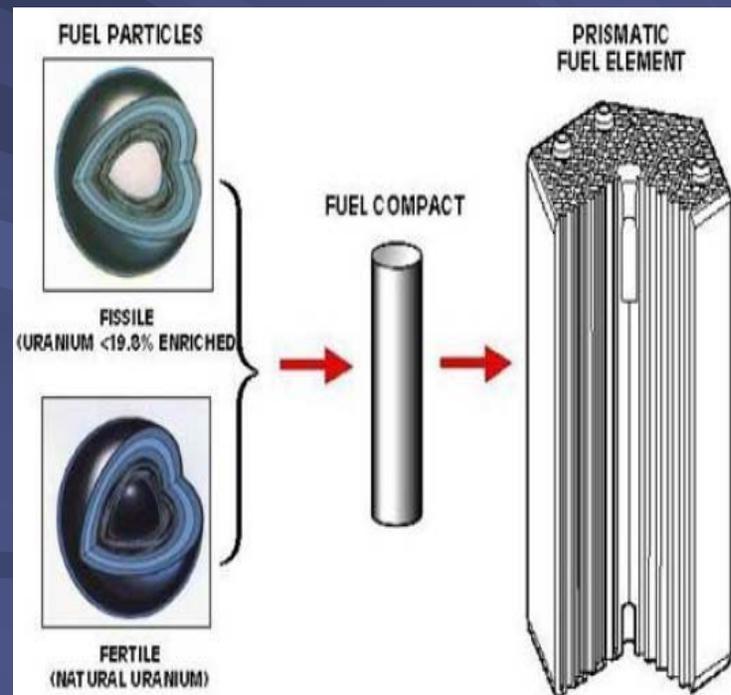


## Pebble

(e.g., Pebble Bed Modular Reactor (PBMR))

## Prismatic

(e.g., Areva Antares & General Atomics Modular Helium Reactor (MHR))



# NGNP Reactor Designs

**Fuel:** Triso Fuel Particles

**Power Level:** ~ 250 MWt

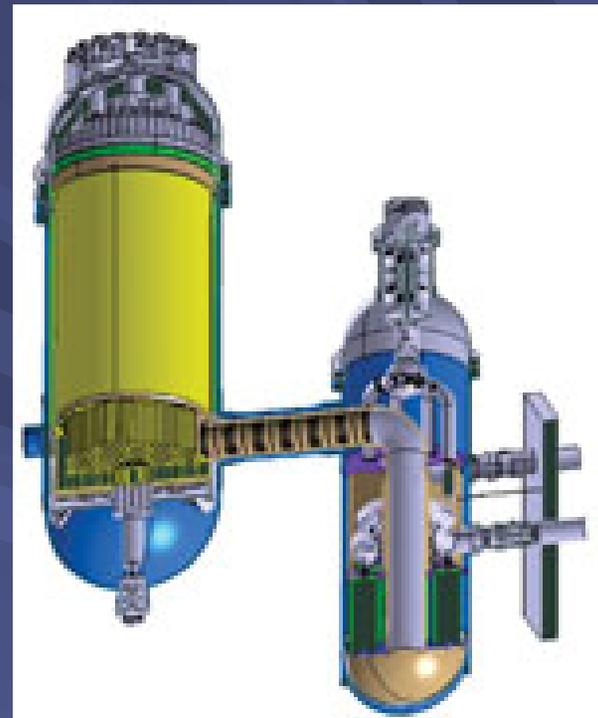
**Outlet Conditions:** ~ 750°C

**Coolant:** Helium

**Power Cycle:** Steam Turbine

**Phase 1 – conceptual designs (Aug 2010)**

**Phase 2 - decision point – early 2011**



# NGNP – Current Activities

- Evaluating existing requirements and guidance to identify needed changes (gaps)
- Identifying significant policy and key technical issues
- Developing overall licensing plan that coordinates:
  - DOE/vendor research and development
  - NRC confirmatory research & development of evaluation tools
  - Required changes to regulations, policies and guidance
  - Development of infrastructure and technical expertise for new technology

# Near Term Reviews

## ■ NGNP White Papers

- Defense-in-depth
- Fuel design and qualification
- Mechanistic source term
- High temperature materials
- Licensing basis event selection
- Safety classification of systems, structures, and components
- Analytical code verification and validation

# **Integral Pressurized Water Reactors**

**Stewart Magruder, Branch Chief**

**Advanced Reactors Branch 2**

**Advanced Reactor Program**

**Office of New Reactors**

# Integral Pressurized Water Reactors

## ■ Technology

- Pressurized Water Reactors with nuclear steam supply components (e.g., steam generator, control rods, reactor coolant pumps) within the reactor vessel

## ■ Current pre-application discussions regarding:

- Westinghouse IRIS
- NuScale
- B&W mPower

# Westinghouse IRIS

**Reactor Power:** 1000 MWt

**Electrical Output:** 335 MWe

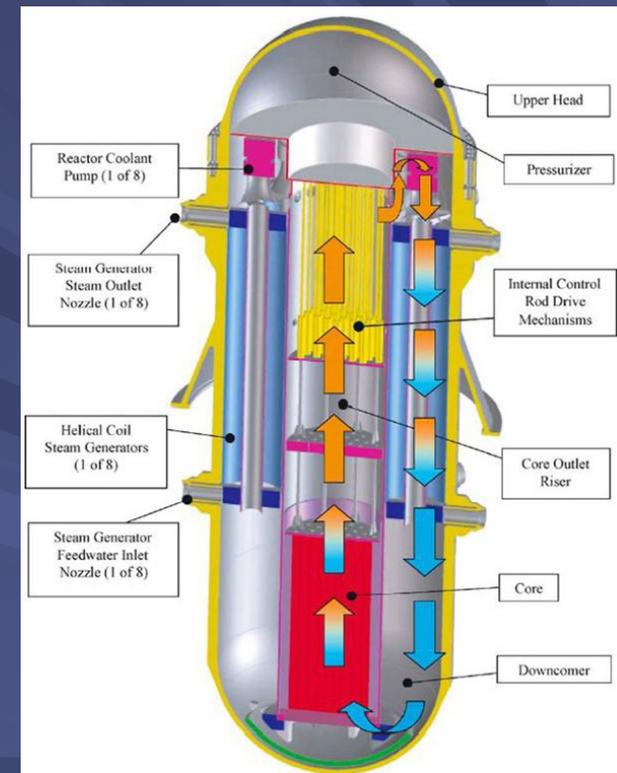
**Outlet Conditions:** 330°C

**Coolant:** Light water

**Fuel Design:** 17 x 17 assemblies  
4.95% enrichment UO<sub>2</sub>

**Refueling:** 3-3.5 years

**Licensing Plan:** Design Certification



# Westinghouse IRIS

- Engagement with NRC began in 2003
- International effort
- Report on Emergency Planning
- Report on Seismic Isolators
- Minimal recent interactions

# NuScale

**Reactor Power:** 150 MWt

**Outlet Conditions:** 150 psig, 575°F

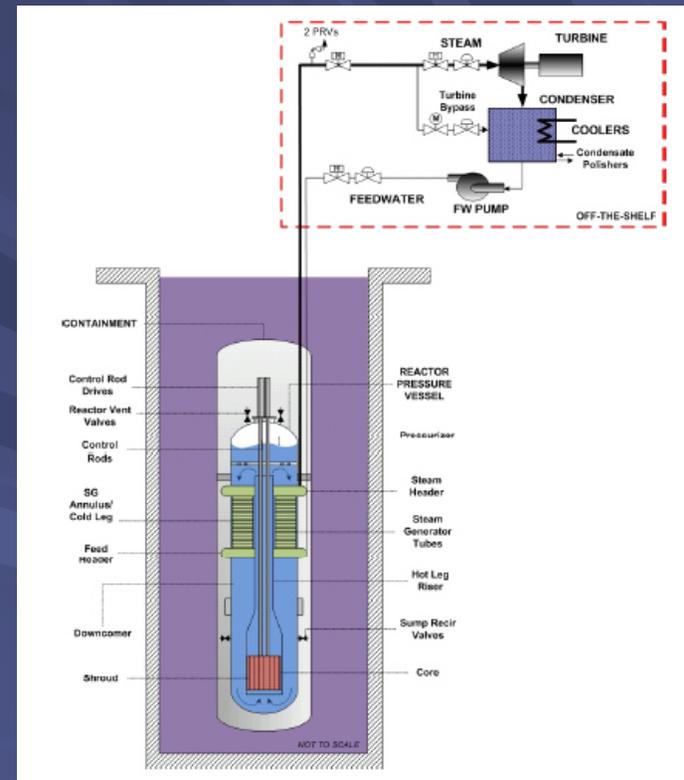
**Electrical Output:** 45 MWe

**Coolant:** Light Water

**Fuel Design:** 17 x 17 fuel bundles,  
6', 4.95% enrichment

**Refueling:** 24 months

**Licensing Plan:** Design Certification



# NuScale

- Began interaction with NRC in 2008
- Based on Oregon State University MASLWR design
- Report on codes and methods
- Report on refueling operations
- Significant recent interactions

# B&W mPower

**Reactor Power:** 400 MWt

**Electrical Output:** 125 MWe

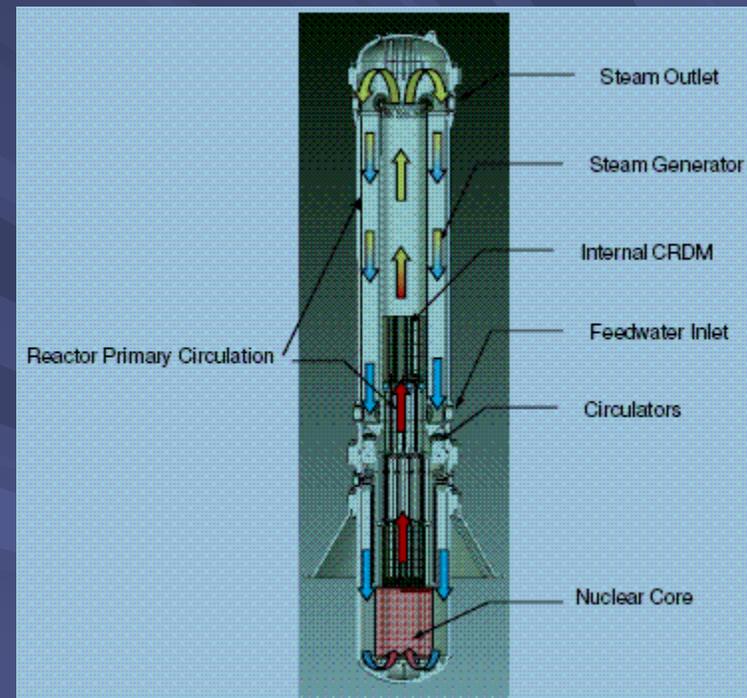
**Outlet Conditions:** 327°C

**Coolant:** Light water

**Fuel Design:** "Standard PWR fuel"

**Refueling:** 4-5 years

**Licensing Plan:** Design Certification



# B&W mPower

- Began interaction with NRC in 2009
- Based on German ship *Otto Hahn* design
- Air cooled condenser
- Significant recent interactions

# Integral PWRs – Current Activities

- Evaluating existing requirements and guidance to identify needed changes (gaps)
- Identifying significant policy and key technical issues
- Developing overall licensing plan that coordinates:
  - NRC confirmatory research & development of evaluation tools
  - Required changes to regulations, policies and guidance
  - Development of infrastructure and technical expertise for new technology

# **Other Technologies**

**William Reckley, Branch Chief**

**Advanced Reactors Branch 1**

**Advanced Reactor Program**

**Office of New Reactors**

# Sodium Fast Reactors (SFRs)

- Limited NRC activities
- Knowledge management
- Some pre-application interactions regarding:
  - Toshiba 4S
  - General Electric PRISM
- International interactions

# Other Technology Groups

- Some interactions and/or aware of efforts related to various other designs:
- Generation IV
  - Gas-Cooled Fast Reactor (GFR)
  - Very High Temp Reactor (VHTR)
  - Supercritical-Water Cooled Reactor (SCWR)
  - Sodium-Cooled Fast Reactor (SFR)
  - Lead-Cooled Fast Reactor (LFR)
  - Molten Salt Reactor (MSR)
- Hyperion Power Module
- Accelerator-Driven System (ADS)
- Fusion & Fission-Fusion Hybrids

# Infrastructure & Generic Issues

## ■ Infrastructure

- Organization & Staffing
- Contracting Strategy
- Training, Tools & Guidance

## ■ Generic Issues

- Address generic issues identified by NRC, industry, or other stakeholders
  - Generic to SMRs
  - Generic to a technology group or other subset of SMR technologies

# Policy and Technical Issues

## ■ Generic issues

- Emergency Planning
- Physical Security
- Staffing requirements
- Financial requirements (e.g., fees, Price-Anderson)
- Modular/expandable facilities

## ■ Technology specific

- Fuel qualification
- Materials qualification

# Prioritization Factors

- Safety significance
- Affected technology groups/designs
- Impact on design
- Method of resolution
  - (research, legislation, rulemaking)
- Industry participation
- Schedule for prototype/commercial deployment
- Dependencies on other policy/technical issues

# Future ACRS Interactions

- HTGR Research Plan (April 2010)
- Resolution of specific policy or technical issues
- Design or application briefings
  - pre-application/application
- Design or licensing reviews
  - SER with open items, draft final SERs
- Specific topics identified by ACRS or staff



# Briefing for ACRS on Topics of Mutual Interest

Office of the Executive Director for Operations

Bill Borchardt

Bruce Mallett

Marty Virgilio

Darren Ash

March 5, 2010

# Overview

- Agency Overview – Bill Borchardt
- Reactor & Preparedness Programs – Bruce Mallett
- Materials, Waste, Research, State, Tribal, and Compliance Programs – Marty Virgilio
- Corporate Management Programs – Darren Ash

# Agency Budget Priorities & Trends

- FY2010 Budget
- Breakdown Across Programs
- Budget Trends
- Agency Priorities

## NRC Staffing

- Changing Workforce
- Knowledge Management
- Three White Flint North (3WFN)
- Collective Bargaining Agreement
- Future Challenges

## International Activities

- Bilateral Activities
- Multinational Design Evaluation Program (MDEP)
- Integrated Regulatory Review Service (IRRS) Mission

# Operating Reactors - Licensing

- Power Uprates
- Non-Power Reactors
- License Renewal Beyond 60 Years
- Medical Isotopes

# Operating Reactors - Oversight

- Inspection Program
- Buried Piping
  - Tritium
- Underground Cables
- Aging Management

## Operating Reactors – Oversight (Cont.)

- Reactor Security Rule
- Emergency Response Data System
- Cybersecurity Plans

## Operating Reactors – Oversight (Cont.)

- Operating Experience
  - Trends
  - Analysis
- Safety Culture

# New Reactors – COLA Reviews

- Applications
  - Status and Progress
- Challenges

## New Reactors – Design Certifications

- Applications
  - Status and Progress
- Challenges

## **New Reactors – Vendor/Construction Inspection**

- Vendor Inspection
- Construction Inspection
- Operator Licensing/Simulators
- Challenges

# New Reactors – Advanced Reactors

- Building Regulatory Framework and Infrastructure
- Potential Application Reviews
- Challenges

# New Fuel Cycle Facilities

- AREVA
- GE-Hitachi
- International Isotopes (INIS)

# Operating Fuel Cycle Facilities

- Integrated Safety Analysis Framework
- Development of New Oversight Program

## Integrated Spent Fuel Management Plan

- Extended Storage of Spent Nuclear Fuel
- High Level Waste Disposal
- Reprocessing

## **Integrated Spent Fuel Management Plan (cont.)**

- Near-term actions for Spent Fuel Storage and Transportation
  - Research to Support Long-Term Storage
  - Enhancements to Licensing Process

# Nuclear Material Users

- Source Security
  - Chairman’s Task Force: 2010 Report to President and Congress
  - Part 37: Byproduct Material Security Proposed Rule
  - Policy Statement on CsCl

## **Nuclear Material Users (cont.)**

- Integrated Source Management Portfolio
  - National Source Tracking System (NSTS)
  - Web-based Licensing
  - License Verification System
- Revision to Radiation Protection Regulations

## Decommissioning and Low Level Waste

- Decommissioning
- Uranium Recovery
- Low Level Waste Disposal
  - Significant Quantities of Depleted Uranium Rulemaking
  - Blending of Low-Level Radioactive Waste
  - Revisions to Part 61

# Reconsolidating and Modernizing

- Three White Flint North (3WFN)
  - Status, Progress, and Opportunities
- Modernization of Existing Infrastructures
- Physical Access Upgrades

# Enhancing Public Participation

- Open Government Initiative
- Website Redesign
- Modernization of ADAMS
- Multi-Media Excellence Plan

# Managing Information Technology

- Sustaining Current Operations
  - Need for Balance
- Introduction of New Technology
  - Status, Progress, and Opportunities

## Working from Anywhere

- Staff Can Securely Access and Use the Systems and Information They Need, Regardless of Where They are Located
- Proven and To-Be Discovered Benefits

# Supporting Mission Performance

- Other Management Improvements
  - Strategic Approach to Contracting
  - Modern Approach to Training Techniques
  - IT Security
  - Disaster Recovery
- Measuring Success

- Questions ???