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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON NUCLEAR WASTE AND MATERIALS

5 (ACNWM)

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7 180th MEETING

8 + + + + +

9 VOLUME I

10 + + + + +

11 TUESDAY,

12 JUNE 19, 2007

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14
15 The meeting was held in Room T-2B3 of Two
16 White Flint North, 11545 Rockville Pike, Rockville,
17 Maryland, at 10:00 a.m., Dr. Michael T. Ryan,
18 Chairman, presiding.

19 MEMBERS PRESENT:

20	MICHAEL T. RYAN	Chair
21	ALLEN G. CROFF	Vice Chair
22	JAMES H. CLARKE	Member
23	WILLIAM J. HINZE	Member
24	RUTH F. WEINER	Member

25

1 NRC STAFF PRESENT:

2 CHRISTOPHER BROWN

3 LATIF HAMDAN

4 AMY COVIDGE

5 JOHN FLACK

6 EDWARD O'DONNELL

7 WILLIAM R. OTT

8 JEAN-CLAUDE DEHMEL

9 BOBBY EID

10 ALSO PRESENT:

11 CHRISTOPHER KOUTS

12 MARTY MALSCH

13 TIM MENEELY

14 ERIC ABELQUIST

15 ERIC DAROIS

16 ERIC KIRSTEIN

17 RALPH ANDERSEN

18 STEWART BLAND

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C O N T E N T S

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Adjourn

P R O C E E D I N G S

(9:56 a.m.)

CHAIRMAN RYAN: This is a meeting of the NRC's Advisory Committee on Nuclear Waste and Materials. During today's meeting, the Committee will consider the following:

The U.S. Department of Energy briefing on the transportation, aging and disposal (TAD) canister and the total system model (TSM) in support of the Yucca Mountain Repository Effort.

We'll have election of ANCW&M officers for the period of July 1, 2007 to June 30, 2006.

We'll also have this afternoon a working group meeting on the implementation of 10 CFR 20.1406, where we will have practitioners participating in an afternoon long working group meeting.

Antonio Diaz is the Dias is the designated federal official for today's session.

We have received no written comments or request for time to make oral statements from members of the public regarding today's session. Should anyone wish to address the Committee, please make your wishes known to one of the Committee staff.

It is requested that the speakers use one of the microphones, identify themselves, and speak

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1 with sufficient clarity and volume so that they can be
2 readily heard.

3 It's also requested that if you have cell
4 phones or pagers that you currently turn them off at
5 this time.

6 Thank you very much.

7 Without further ado, the first session
8 this morning will be lead by Dr. Weiner. So, Dr.
9 Weiner, I'll turn the meeting over to you.

10 MEMBER WEINER: Thank you, Mr. Chairman.

11 Our first speaker is Christopher Kouts.
12 Ah, there he comes, who holds the position Manager of
13 Technical Public Policy for the Department of Energy,
14 Office of Civilian Radioactive Waste Management, and
15 in that position he's responsible for managing OCRWM
16 activities for transportation of nuclear waste,
17 commercial spent fuel interim storage, and he has
18 supported the Director's office in interaction with
19 Congress on policy matters.

20 And without further ado, I'd like to
21 introduce Mr. Kouts.

22 Go ahead, Chris, with your presentation on
23 the TAD canister system status and total system model.

24 MR. KOUTS: Thank you very much, Dr.
25 Weiner.

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1 CHAIRMAN RYAN: Let me also mention while
2 Chris is getting ready that we have one participant as
3 far as I know on the phone. If you would check your
4 microphone, please, and introduce yourself.

5 MR. FITZPATRICK: I'm Charles Fitzpatrick,
6 State of Nevada.

7 CHAIRMAN RYAN: Thank you, Charles.

8 Anybody else on the phone?

9 (No response.)

10 CHAIRMAN RYAN: Okay. I guess that's it.
11 Thank you.

12 MR. KOUTS: First of all, I want to thank
13 the Committee for inviting me give a presentation on
14 the transportation, aging, disposal canister system
15 progress and the total system model. I also want to
16 thank you for accommodating my schedule. As you may
17 or may not know, we have a series of management
18 meetings every third week of the month in Las Vegas,
19 and I'll be leaving from this meeting to go directly
20 to those, and I thank you for accommodating me to have
21 this presentation this morning.

22 Although we usually don't make major
23 announcements at ACN&W meetings, I do want to mention
24 that as of this morning the department is issuing a
25 press release on the issuance of the final TAD

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1 specification. That announcement also indicates that
2 we will be shortly initiating a procurement on the
3 final design activities associated with the TADs.

4 In addition to that, that press release
5 also indicates that the department will be entering
6 into discussions shortly with contract holders,
7 utility contract holders to modify their existing
8 contracts to facilitate the use of TADs in the waste
9 management system.

10 And that press release, unfortunately I
11 have it on my Blackberry, but I don't think it's too
12 appropriate for me to hand my Blackberry around for
13 people to review it, but it is available on our
14 Website, as well as the final TAD specification, and
15 I'll get into some details associated with that in
16 just a few minutes.

17 The other thing I'd like to mention before
18 I get into the presentation is that typically when you
19 come before the Committee you provide a rationale as
20 to why you're before the Committee. My interest here
21 is to inform the Committee of the strategy and the
22 approach that the department is taking to implement a
23 canister based system of what we call a primarily
24 canister based system.

25 CHAIRMAN RYAN: Chris, excuse me for

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1 interrupting your introduction.

2 MR. KOUTS: Sure.

3 CHAIRMAN RYAN: If it is available on the
4 Civilian Radioactive Waste Management Website you
5 said?

6 MR. KOUTS: It should be, yes.

7 CHAIRMAN RYAN: Could I ask that maybe
8 staff see about downloading it and maybe we could
9 facilitate and help you by making some copies
10 available to attendees here at this meeting.

11 MR. KOUTS: Sure, that would be great.

12 CHAIRMAN RYAN: If that would be helpful.

13 MR. KOUTS: That would be great.

14 CHAIRMAN RYAN: Okay. Terrific. We'll be
15 happy to do that.

16 MR. KOUTS: Okay. Again, I've given
17 similar presentations where the staff has ben present.
18 We have not had a technical exchange with the staff
19 for a variety of reasons.

20 THE REPORTER: Chairman Ryan.

21 CHAIRMAN RYAN: Yes. I'm sorry?

22 THE REPORTER: That bad is a little bit
23 problematic.

24 CHAIRMAN RYAN: Excuse me. I'm sorry. I
25 won't do it again. Done.

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1 MR. KOUTS: Okay. I totally lost my train
2 of thought.

3 CHAIRMAN RYAN: I apologize.

4 (Laughter.)

5 MR. KOUTS: It's age I'm sure.

6 At any rate, let me get into the
7 presentation, and we'll walk through what I intended
8 to cover today. I'll talk a little bit about the
9 background of TADs, why we're going to a primarily
10 canister based system, and this is, again, for
11 commercial fuel. We're not going to put any defense
12 materials in any of these canisters. They are being
13 designed solely for the purpose of the disposal for
14 the transportation, aging, and disposal of commercial
15 spent fuel, not high level radioactive waste.

16 I'll talk a little bit about where we are
17 in terms of program implementation, the process for
18 that. I'll discuss the contents of the final TAD
19 specification, which should be now on our Website, and
20 also how we envision TAD operations to occur.

21 So back in October of 2005, the department
22 made an announcement that we're going to essentially
23 primarily a canister based system. When I say that,
24 what do I mean primarily? Our belief is that our goal
25 is, if you will, that we'll have about 90 percent of

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1 all commercial fuel that comes into the system in
2 TADs. There will be a residual, and what our plans
3 are now is roughly about ten percent, which will be
4 bare fuel that we can also handle at our sites and our
5 wet handling facility.

6 But anyway, back in October of 2005, we
7 essentially announced that approach. We believe that
8 there are a variety of benefits that provide to the
9 department. It standardizes, if you will, the
10 handling of commercial spent fuel for storage,
11 transport and aging purposes and disposal purpose at
12 Yucca Mountain.

13 We get to utilize the fuel handling
14 experience at utility sites, and in doing some of the
15 packaging for the process, it simplifies our
16 operations and simplifies our facilities, and it
17 reduces our low level waste production, and basically
18 it reduces our cost to a certain extent.

19 Now, I've already touched on this, but TAD
20 canisters will be a key interface component that we
21 feel will be helpful for the management of spent fuel
22 throughout the utility system and also the transport
23 system and the handling at the repository, and as I've
24 said many times, the TAD canister system will comply
25 with all regulatory requirements, 10 CFR Part 71,

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1 which is for transport. Part 72 is for storage at
2 reactor sites and independent spent fuel installations
3 and for disposal purposes at Yucca Mountain.

4 The philosophy that we use to develop the
5 TAD is actually to use proven industry practices,
6 guidance and experience. I should also note that the
7 Nuclear Waste Policy Act directs the department
8 certainly in the transportation area to use private
9 industry to the maximum extent feasible, and that's
10 what we're doing in this regard.

11 Back in the mid-'90s, you might remember
12 the department, for those of you who have been around
13 as long as I have, you might remember that the
14 department embarked on a canister based approach
15 called the multi-purpose canister system, and we
16 learned, I think, a lot from that experience, and
17 learning from that experience, essentially we decided
18 instead of selecting one vendor to develop TADs or the
19 canister itself. We wanted as many vendors as
20 possible to do that.

21 So we did that through the use of a
22 performance specification. We issued a preliminary
23 performance specification back last November, and
24 today were announcing the issuance of the final
25 specification which the vendors will use in their

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1 design processes.

2 In terms of the development of the
3 specification, this was somewhat of a difficult
4 birthing within the program. We spent a lot of time
5 working with the repository components of the system,
6 both the pre-closure and post closure groups.
7 Essentially the canister itself embodies all of the
8 needs that we feel we need for disposal purposes.

9 If you looked at our historical waste
10 package design, what we essentially did was create an
11 interior canister that would slip into an outer over
12 pack, if you will. It does provide another barrier,
13 if you will, but essentially this is a stainless steel
14 can that goes in an over pack, our disposal over pack,
15 and meets the same requirements that we've
16 historically had for disposal purposes.

17 In addition to that, in the development of
18 the preliminary specification through the auspices of
19 the Nuclear Energy Institute and also the U.S.
20 Transport Council, we had a variety of meetings with
21 utility industry and vendors to get their input on
22 essentially the utilization of this canister at their
23 sites and what their needs might be.

24 So we did quite a bit of homework and
25 hopefully we've developed the specification that will

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1 fulfill our needs and also be widely distributable to
2 the industry and for use in the industry.

3 As I mentioned earlier, we issued
4 preliminary specification in November of last year.
5 At that point in time, we energized four vendors, four
6 qualified vendors to develop what we call proof of
7 concept designs. Those were submitted to the
8 department, and we completed that review in March of
9 this year, and the vendors have all been paid, and we
10 thank them very much.

11 The next procurement process will
12 essentially be for the final design of those
13 canisters.

14 Let's talk a little bit about TAD
15 implementation and what the department's approach is
16 in that regard. After we've initiated the
17 procurement, our expectation is that the vendors will
18 develop a canister transportation over pack and also
19 an aging over pack which would be used exclusively for
20 the purposes of Yucca Mountain and a repository at
21 Yucca Mountain. Part 72 requirements and the needs at
22 a utility site will be dealt with by the vendors
23 directly with utilities who decide to use these on
24 their sites.

25 But prior to the time that any SARs are

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1 submitted to the staff, the department will have to
2 review the designs to make sure that they are
3 consistent with our performance specification as we
4 published.

5 And as the vendors go through the
6 certification process with the NRC, any changes to the
7 canister designs or any of the designs essentially
8 will have to come back to the department for our
9 review to make sure that, again, any changes are still
10 consistent with the specification, and again, our
11 primary interest here is our ability to handle these
12 canisters on site and also that those canisters still
13 will meet our disposal specification.

14 Let's go on to the next slide.

15 After a similar -- let's speed forward in
16 time, assuming that the NRC certifies designs for '71
17 and '72, at some point in time after the certificates
18 are issued we will again review the designs to make
19 sure they're consistent, and we will develop a list,
20 if you will, of certified designs, acceptable designs
21 to the department, those that are certified by the NRC
22 and acceptable to us from the standpoint of meeting
23 our performance specification.

24 And that list will be updated regularly,
25 and my expectation is that as we move forward in the

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1 future, TADs may evolve. The requirements that we put
2 in them today may evolve and change somewhat as we go
3 into the future, and there may be different
4 generations of TADs.

5 What we would initially use, assuming
6 Yucca Mountain is licensed by the NRC, what we would
7 use on day one may be different than what we use in
8 year 20. And that's something that I think we're
9 flexible enough that as we learn more and if we can
10 demonstrate analytically that these canisters could be
11 made differently, less expensively or whatever, that
12 we will certainly be flexible enough to do that, but
13 at every step along the way, again, the NRC is the
14 regulator of all three aspects, and the department
15 will have to assure as the licensee that any TADs that
16 are used at the repository, again, meet our
17 specifications and also meet whatever disposal
18 requirements that the NRC may make, assuming Yucca
19 Mountain if found suitable for disposal purposes.

20 So when we get into the fabrication
21 process, again, we're into the same situation where if
22 there are any tweaks that occur during the fabrication
23 process, again, that we will have to review them to
24 make sure that, again, there is no inconsistency with
25 our specification.

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1 Now, this is also an issue that I think
2 we'll discuss further with the staff, but DOE will
3 require -- at least our perspective at this point is
4 that we will require -- that any utilities that are
5 using TAD based systems for reactor certify that those
6 systems are fabricated in accordance with our
7 requirements, approved design drawings,
8 specifications, and of course, they will all be using
9 an NRC approved QA program.

10 And any modification to anything, to any
11 of those components essentially will again have to
12 undergo a DOE review for us to satisfy ourselves that
13 we are still consistent with the specification.

14 This gets somewhat into a contractual
15 matter, but utilities that use TAD systems for at
16 reactor storage or at the time of transfer to the
17 department and for taking fuel from a pool which
18 they're putting into a TAD for them to put into a
19 transportation cask for us to move to Yucca Mountain,
20 again, we will require the utilities to certify that
21 they're loaded and prepared in accordance with our
22 needs and also with the qualified QA program.

23 And as I said earlier, we will require
24 utility certification prior to the acceptance of each
25 of those canisters.

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1 And of course, this is something that
2 should go without saying, but we have no regulatory
3 authority nor do we assert any regulatory authority
4 over the sites that will be preparing these canisters.

5 Let's talk a little bit about the final
6 specification. It delineates the requirements that we
7 will rely on in order for us to make a presentation in
8 the license application to the NRC that we are
9 complying with Part 63. It also includes other
10 requirements basically associated with the handling on
11 site to allow us to move them through our facilities.
12 Drop heights, leak requirements, those kinds of things
13 you will all find in the specification.

14 And let's get into what some of the
15 highlights of those are. From the preliminary to the
16 final there has been no change in terms of the
17 capacity of these devices. There will be 21 PWR or 44
18 BWR assemblies.

19 The canister length, now this is a change
20 from the preliminary specification, and we got
21 certainly a lot of feedback from the vendors, that
22 where we had a one size fits all concept, which was
23 212 inches, we're now allowing the length of the
24 canister to drift downward to no less than 186 inches.
25 So the vendors will have flexibility between 186 and

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1 212 inches to develop TADs that will meet fuel types
2 that they're most familiar with.

3 And our desire is to, again, have as many
4 vendors as possible participate in this because there
5 are a variety of vendors that deal with the industry,
6 and we want to cover the entire industry and feel the
7 best way to do that is to have multiple vendors
8 accomplish that.

9 The diameter is 66 and a half inches.
10 Maximum weight is around 54 tons, and that's loaded
11 weight. The average dose rate from the top, and this,
12 again, meets our pre-closure needs of 800 millirem per
13 hour. That's an average. There can be slightly
14 higher at certain aspects of the top as long as the
15 average, if you will comes out to 800 MR per hour.

16 A change from our historical designs as we
17 moved away from nickel gad as the neutron absorber of
18 choice and moved to borated stainless steel. And let
19 me diverge here for a moment because I think this is
20 kind of an interesting area to tell you how everything
21 is kind of interrelated with the TAD and how it works
22 with the system.

23 When we initially developed and we were
24 developing the specification, we thought we were going
25 to use a nickel gadolinium neutrol absorber for our

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1 post closure needs, and essentially what we found from
2 talking to the vendors is that it was unclear that
3 this would potentially work from the standpoint of
4 being able to certify this for other purposes, Part 71
5 and 72 purposes.

6 So we went back to look at perhaps
7 something else that might change that, and the other
8 issue that came into play was the use of carbon steel
9 in the waste package. We had used carbon steel in the
10 waste package and the vendors also told us that that
11 was going to be very challenging to use in borated
12 fuels and in spent fuel pools.

13 So when we pulled out the carbon steel,
14 what we found out is that the pH of the waste package
15 basically went up in the post closure world, which
16 allowed us to look at an absorber, if you will, that
17 did not have the long term corrosion needs that were
18 as extreme as we needed with the nickel gadolinium.

19 So that's how we basically evolved to
20 borated stainless as the nickel gad. Also, from the
21 standpoint if you don't know where nickel gadolinium
22 comes from, most of it right now is, I believe, mined
23 in Mongolia. So we would have had some very
24 interesting supply issues with that.

25 But we moved on to borated stainless

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1 steel, and we feel that that will meet our post
2 closure needs, and this has all been addressed with
3 our post closure people, and so that's how, if you
4 will, borated stainless steel got to be the absorber
5 of choice for disposal as opposed to the nickel
6 gadolinium if you followed our designs over the years.

7 Moving on, the canisters themselves will
8 be seal welded, and there will be a common lifting
9 fixture to facilitate our handling at the repository.
10 All handling and aging at the repository will be done
11 in a vertical configuration. That's not to say that
12 these can't be stored horizontally at reactor sites,
13 and that's up to the vendors if they choose to design
14 it to be also stored horizontally.

15 And organic, pyrophoric and RCRA materials
16 are prohibited from use in the canister. What you're
17 looking at now is a simulation of how this would work
18 and how you would load a TAD in a spent fuel pool at
19 a reactor site. You're seeing the canisters going
20 into the transfer caskets, going into the pool. We
21 will not go through 21 PWRs or 44 BWRs here, but there
22 will be two assemblies that are pulled out and put
23 into the canister.

24 We'll go to number two here.

25 I don't think it will be quite this rapid

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1 at utility sites.

2 (Laughter.)

3 MR. KOUTS: But nonetheless for the sake
4 of simulation, we'll do this fairly quickly.

5 Then what will happen is the lid should be
6 placed on this. There's the lid. It is pulled out.
7 It will be drained. Of course, you won't see that
8 step, and it will be inerted, and this is the welder
9 coming over, and it will be welded, and that's
10 schematically how it would work at the spent fuel
11 pool. There it's being drained and so forth.

12 Let's see if we can go on to the next
13 simulation.

14 This next one is just transferring that
15 canister through use of a transfer cask into dry
16 storage in a vertical configuration. This could be at
17 a reactor site or it could actually be at the
18 repository. Essentially the lid is going to go on,
19 the lifting device coming over, and lifting devices
20 will be put on the top here, and the transporter will
21 come in and, again, will not go this rapidly, but it
22 will be taken out to the storage location.

23 You basically go through -- this is
24 transfer to dry storage in a vertical configuration.
25 Okay. This is another similar concept. The lid will

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1 come on. Here the lifting device is put on and away
2 it goes.

3 Let me see if I can get beyond this one.
4 I don't know. I need some IT support.

5 There we got. This is the horizontal
6 configuration. I think we've seen enough vertical,
7 and the difference with this, it has to be upended and
8 placed on the device horizontally. The truck will
9 take it out, be tipped over here and essentially put
10 into a storage device.

11 This would be typically at a reactor site.
12 This we're planning on a vertical aging configuration
13 at the repository.

14 There we go, and this is again just
15 putting it on transportation cask. Here is a transfer
16 cask, into the transportation cask. The lid will be
17 placed on -- it will be upended and placed on a
18 transportation cask, and those are the inflatable
19 impact limiters that were also not working out. But
20 impact limiters will be placed and it will go on the
21 road.

22 So let's move on to the TAD summary. The
23 final specifications now can be found on our Website.
24 We're going to be initiating a procurement very
25 shortly for final design services and other

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1 activities, and the vendors will have to make sure
2 that they are compliant with Part 71 and 72, and of
3 course, the department will have to make sure that
4 every step along the way that in meeting 71 and 72
5 that it's still consistent with our performance
6 specification for disposal purposes.

7 That completes my TAD presentation. I can
8 move on to total system models if you'd like. We can
9 do that or I can take question snow, whatever you
10 like.

11 MEMBER WEINER: I think it would be a good
12 idea to take questions on the TAD now. Dr. Hinze.

13 MEMBER HINZE: Well, a couple of
14 questions, if I might. In terms of the thermal
15 loading of the repository, the length of the canisters
16 will be variable if I understand correctly.

17 MR. KOUTS: That's correct.

18 MEMBER HINZE: And does this have any
19 impact on the thermal loading? And what is the
20 overall effect of the TAD on thermal loading?

21 MR. KOUTS: Well, regardless of whether
22 you have a TAD in the system or not, we're still going
23 to meet the same thermal requirements that are going
24 to need to be met for our post closure analyses. The
25 advantage of the TAD is that from a standpoint of --

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1 well, let me put it this way. There are no thermal
2 limits on the TAD other than those that are necessary
3 for transportation purposes, and right now that's
4 about 22 kilowatts per package.

5 Assuming if we had a TAD canister that
6 came in that hot, it would have to be obviously aged
7 at the repository until it was in a configuration or
8 in a thermal environment that it could be emplaced.

9 When I get into the total system model
10 discussion, one of the things that we're using the
11 model for is to look at, besides the 11.8 kilowatts
12 per package, which you probably heard numerous times
13 and the 1.45 kilowatts per meter, we're looking at
14 other parameters, if you will, in the underground,
15 drift wall temperature, centerline temperature between
16 the drifts, if you will, between the pillars. And
17 we're looking at what flexibility we have potentially
18 in place at a somewhat hotter than 11.8 package that
19 we've historically done that.

20 In addition, just from learning more about
21 how the mountain works, the ends of the drifts, if you
22 will, just from a thermal conductivity standpoint have
23 a lot more rock that the heat can basically be
24 dissipated in. So it is conceivable that you can put
25 hotter packages toward the ends of drifts and the

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1 cooler packages, you know, toward the middle of the
2 drifts.

3 So what we found with the total system
4 model, and I'll get into this when I go through that
5 section of the presentation, we're learning about what
6 flexibility we might have in terms of still meeting
7 our thermal goals, but not necessarily relying
8 specifically on the 11.8 kilowatts per package or the
9 1.4.

10 MEMBER HINZE: That's informative and
11 helpful.

12 Let me make certain I understand. You are
13 asking several vendors to come up with conceptual
14 designs or specific designs on these?

15 MR. KOUTS: Let me answer it this way.
16 The solicitation will be a competitive solicitation.
17 I think it would be the department's desire to --
18 we'll have to wait and see what the proposals look
19 like, but it would be the department's desire to have
20 multiple awards.

21 MEMBER HINZE: Does this mean that there
22 will be multiple designs then that will be accepted by
23 DOE and brought to the NRC for approval?

24 MR. KOUTS: That's correct.

25 MEMBER HINZE: And how much variance in

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1 the designs are you permitting? As long as they meet
2 the specifications that you've --

3 MR. KOUTS: That's correct.

4 MEMBER HINZE: -- come up with?

5 MR. KOUTS: That's correct. As long as
6 they meet specifications. Now, we allowed the length
7 of the TAD to float downward, if you will.
8 Essentially that's what we heard from the vendors
9 through the proof of concept process, which was that
10 if we had maintained the 212 inch one size fits all,
11 that it's likely that it would not have been widely
12 used within the industry.

13 So we went back and looked at what our
14 needs were, and our facilities could handle it. And
15 we're actually going to ask the vendors. If you look
16 at the specification, they'll have to come up with a
17 spacer. The waste packages themselves will still be
18 the same size, but we will have a spacer. If it's
19 shorter than the 212 inches, we'll have a spacer. So
20 the CD and so forth of the waste package, everything
21 can still be handled in the same method.

22 MEMBER HINZE: Fine. In terms of the
23 borated steel, borated stainless steel, are the really
24 problematic areas with using a borated stainless
25 steel? This has not been used for this particular

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1 application or you haven't specified this in the MPCs
2 and so forth.

3 Are there any difficult areas with this
4 borated stainless steel?

5 MR. KOUTS: Well, we'll have to see how
6 the certification process goes. In discussions with
7 the vendors, through the proof of concept phase they
8 felt it was a usable material. There are very precise
9 specifications as to how the borated stainless is to
10 be used in the basket that are laid out in the
11 specification and the vendors will have to look at
12 that and see how they can make that work with also
13 whatever Part 71 and Part 72 needs.

14 So I think the simple answer to your
15 question is we didn't see any showstoppers on this
16 through the proof of concept design until we get into
17 the certification process with the NRC and the staff
18 has had an opportunity to review it, and we'll find
19 out of there are any issues. But we haven't
20 identified any up until this point.

21 MEMBER HINZE: On page 3 of your
22 overheads, you state that you worker irradiation has
23 decreased at the DOE facilities. Is there any
24 indication that the use of the TADs will modify the
25 worker irradiation at the utilities?

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1 MR. KOUTS: Well, we don't anticipate that
2 this will be any different than loadings that
3 utilities would typically do for transportation casks
4 either. I think that our expectation is that we're
5 going to be essentially using the same practices that
6 are currently being used.

7 Now, the issue may come up with the amount
8 of canisters that have to be loaded, and this is, I
9 think, one of the questions that was asked for me to
10 address, and the simple answer to it is that the TADs
11 as we conceive them right now are the capacities 21
12 PWR and 44 BWR. That is typically less than what
13 you'll see in bare fuel casks today. That's usually
14 32 PWRs and 68 BWRs.

15 So my sense is the operations in and of
16 themselves will be no different than what a utility
17 will typically do for loading canister materials at a
18 reactor site, but the number of the loadings and so
19 forth may go up because of the decreased capacity.

20 But the actual operations in and of
21 themselves should be identical to what they are
22 currently doing now and putting out dual purpose
23 canisters right now at utility sites.

24 So the actual operations won't be
25 different, but the amount of them may increase.

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1 Again, my perspective is also that as we move into the
2 future, we'll hopefully be able to design TADs that
3 have higher capacities because that was a hard point
4 for a lot of the vendors and the industry themselves.
5 They indicated, you know, why 2144.

6 Well, at this point in time that's what
7 the design for the repository is, that our waste
8 packages are 21 Ps or 44 Bs. That's not to say that
9 some time in the future if the analytics support it
10 and if we can demonstrate from a total system
11 performance standpoint that we can put larger packages
12 in, then we could use larger TADs.

13 But at this point in time, we're starting
14 out with 21 and 44.

15 MEMBER HINZE: Thank you.

16 One more quick question. In terms of
17 quality assurance and what seems to me that one of the
18 critical areas is in terms of the welding of the lids,
19 is this in any way with the TADs -- is there any
20 difference between that and the curb process in terms
21 of welding of lids, in terms of the quality assurance
22 of the performance of the lids, et cetera?

23 MR. KOUTS: Again, our expectation is that
24 the same technologies would be used at reactor sites
25 to do the welding for the TADs that currently exist.

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1 The difference might be the leak tight requirement
2 that we may have may be somewhat different than what
3 the reactors are currently dealing with, but again,
4 this is something that the vendors will have to work
5 out in terms of the designs and meeting the
6 requirements of the specification.

7 But the simple answer to your question is
8 we don't see any difference in the technology that the
9 reactors are using now for storage and transport
10 purposes and the TAD. We're going to use the same
11 technologies.

12 MEMBER HINZE: And those animated cartoons
13 that you showed u which were very helpful, where does
14 the quality control come in on the checking of the
15 lids?

16 MR. KOUTS: Well, this is going to be an
17 interesting discussion between the staff and the
18 department. Our expectation is that the quality
19 assurance that this will be done under, which will be
20 part 50, again, that's an NRC qualified QA program
21 just as our QA program is qualified.

22 I think as I went through my slides, we
23 are going to have utilities certify to us that they
24 have met all of our needs and all our requirements,
25 and it has been done under an NRC qualified QA

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1 program.

2 Again, we are going to be the recipient of
3 the TADs, and we're going to use them at Yucca
4 Mountain, assuming it's licensed. So we do certainly
5 have an interest in that it's done appropriately, but
6 our perspective is that a Part 50 QA program should be
7 acceptable certainly to the department if it's
8 acceptable to the Nuclear Regulatory Commission.

9 MEMBER HINZE: A final question. Who owns
10 the TADs?

11 MR. KOUTS: Who owns the TADs? It depends
12 on how -- at the point in time -- for instance, let's
13 assume that Yucca Mountain is operational and we're
14 going to go to a reactor site and pick up fuel from a
15 utility. We will provide the TAD to the utility. If
16 the utility decides to use these on its own prior to
17 the time that the department comes up and they want to
18 use it for storage on site, that's an issue that we're
19 going to be addressing with the contract holders, and
20 I really can't get into that.

21 I mentioned earlier that the press release
22 indicates that the department will be entered into
23 discussions with contractor holders, and that's one of
24 the issues that we're going to have to deal with

25 MEMBER HINZE: Thank you very much, Chris.

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1 MEMBER WEINER: Allen.

2 VICE CHAIRMAN CROFF: Can you give me a
3 little bit more of a feel for what one of these
4 spacers might look like or how it's constructed, what
5 it might be made of?

6 MR. KOUTS: I believe it's stainless
7 steel. The specifications are in the specification
8 itself, and it has to do with, again, providing -- and
9 I can't remember off the top of my head, but we did
10 look at that very hard, and we provided specifications
11 as to what that specific requirement for the spacer
12 might be, and I can't pull it out of my brain right
13 now, but it's in the specification, and it should be
14 fairly obvious in terms of what the requirements are
15 for.

16 VICE CHAIRMAN CROFF: Okay. Second, the
17 time line on this, as I understand the way this will
18 work, these TADs will get 71, 70 or 72 license fairly
19 early on, but then they also need to be I guess I'll
20 call it approved under Part 63, in other words,
21 acceptable as part of the repository.

22 MR. KOUTS: That's the department's
23 responsibility.

24 VICE CHAIRMAN CROFF: Okay.

25 MR. KOUTS: The 63 aspects of the TAD

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1 basically are the department's responsibility. The
2 vendors need to do 71 and 72.

3 VICE CHAIRMAN CROFF: Okay. So someplace
4 in this specification you've included requirements
5 that lead DOE to believe the thing should be
6 acceptable under Part 63?

7 MR. KOUTS: Correct. The major aspect of
8 the specification is to deal with disposal needs and
9 also our pre-closure and handling at the site. So in
10 addition, I didn't go through this in my presentation,
11 but we're having the vendors essentially design three
12 things. It will be the canister itself, the
13 transportation over pack, and the aging over pack that
14 would be used at Yucca Mountain.

15 So that aging over pack, the
16 transportation over pack and the canister are the
17 three things the vendors will be designing, and the
18 aging over pack requirements and specifications are
19 contained in the specification itself.

20 VICE CHAIRMAN CROFF: Okay. So regarding
21 Part 63, I mean, can I expect not having seen this
22 that, I mean, there's limitations on like what
23 materials they can use?

24 MR. KOUTS: Yes.

25 VICE CHAIRMAN CROFF: And are there any

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1 other aspects to the specification that are sort of
2 directed at Part 63 compliance?

3 MR. KOUTS: The post closure criticality
4 needs, the use of borated stainless, how the borated
5 stainless needs to be configured around the basket, if
6 you will. There's very, very precise needs and also
7 the other specification, very precise specification on
8 the type of borated stainless that needs to be used.

9 So all of those aspects, all the
10 criticality, post closure criticality needs are all
11 contained in the spec, and assuming the vendors can
12 make that work and the department at every step along
13 the way, basically it has reviewed that and is
14 comfortable with the approach the vendors are taking,
15 then it should work.

16 Now, you mentioned timing. Let's talk a
17 little bit about timing. Assuming the department goes
18 out in the near future and initiates a solicitation,
19 if you will, for the final designs, our expectation
20 would be that some time next year, probably post June
21 30th, which would be the not to exceed date, if you
22 will, but we would submit the license application;
23 that the vendors would go forward to the NRC and
24 submit SARs for their review under 71 and 72.

25 When you play that out, our expectation is

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1 that potentially TADs could be available in the
2 utility environment, if you will, in the 2011-2012
3 time frame.

4 And it's important from the department
5 standpoint that we try to get TADs out there as
6 quickly as possible because ultimately what's
7 happening in the meantime is that devices that are not
8 disposable, if you will, are proliferating, if you
9 will, and that just creates issues in terms of how
10 those have to be repackaged and where those need to be
11 repackaged.

12 So the sooner we can get that out there,
13 recognizing that there is an element of risk because
14 as we go through the licensing process for Yucca
15 Mountain, there may be changes, and you know, the
16 department is going to have to deal with that risk in
17 discussions with the contractors, and that's what we
18 intend to do.

19 VICE CHAIRMAN CROFF: Will the license
20 application reflect the specific conceptual designs
21 from these vendors? I mean, will the timing be worked
22 out or will LA be sort of a generic TAD thing?

23 MR. KOUTS: My expectation is, and there
24 are several approaches we could take, but let me just
25 throw out one that we could march down. We could

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1 create an envelope, if you will, of a design for a
2 canister such that if the vendors came in with a
3 design that fell within that envelope, it would be
4 totally consistent with our pre-closure and our post-
5 closure needs. That's one approach.

6 The other would be to do, you know, a
7 point analysis and do a variation on that, but I think
8 we haven't made any final decisions on how we're going
9 to address that, but, yes, you are correct. The
10 vendors' designs will be submitted probably after we
11 submit the license application. So we're going to
12 have to accommodate that in the license application.

13 VICE CHAIRMAN CROFF: Okay. Thanks.

14 MEMBER WEINER: Mr. Chairman.

15 CHAIRMAN RYAN: Yes.

16 MEMBER CLARKE: All of my questions have
17 been answered. Thank you.

18 MEMBER WEINER: I just have a couple. You
19 say that you're looking for another design for the
20 transportation over pack. Don't you have licensed
21 certified transportation over packs that can take
22 these packages?

23 MR. KOUTS: I think the diameters and the
24 capacities are slightly different. I mean, to the
25 extent that the vendors will utilize existing designs

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1 that they may have already certified and modify those
2 to deal with the TADs, I mean, that's within the realm
3 of the vendors to do that, but my sense is the
4 dimensional needs are somewhat different. The lengths
5 may be somewhat different also.

6 So again, what we saw in the proof of
7 concept phase was that the vendors looked at their
8 existing designs and saw how they might modify their
9 existing designs to meet our needs.

10 So although they may not be able to use an
11 existing transportation over pack, they may do a
12 modification of an existing one in order to meet
13 whatever TAD requirements they have.

14 MEMBER WEINER: So you would anticipate
15 that they would start with the existing transportation
16 over packs, and if there is a slight modification
17 because it was my understanding that the TADs would
18 fit into several of the existing certified
19 transportation over packs.

20 MR. KOUTS: To the extent that they can,
21 that's great. I don't remember in the discussions on
22 the proof of concept designs whether -- you know, I
23 don't remember any vendor saying that. They said they
24 would basically use their existing designs and
25 basically modify them around that, but to the extent

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1 they can use an existing one, I think that's great.

2 MEMBER WEINER: Second question. The five
3 designs, I mean, I realize these are just cartoon
4 designs that are currently on the OCRWM Website. Are
5 those still current? Have the TADs changed markedly
6 from what's there, what people can look at already or
7 is it more or less the same?

8 MR. KOUTS: Well, we haven't actually made
9 the proof of concept designs available, as I
10 recollect, and they have to go through a public
11 release review, and there's also proprietary
12 information that the vendors provided them that, and
13 I think we're working toward that.

14 The difference, what you'll see in the
15 difference in the Website is that now as opposed to
16 the preliminary specification, the final specification
17 will be there, and again, that's been modified. One
18 of the changes was the length, and there are other
19 changes in there that have addressed other pre-closure
20 and post closure needs.

21 MEMBER WEINER: And the final question for
22 now. You talked about the difference between there
23 being more loadings at the utilities rather than less,
24 and I recognize this was a question asked at the dry
25 cask forum. If you increase the number of loadings,

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1 doesn't that also increase the probability of a
2 loading accident drop or something like that? I mean,
3 that's a proportionality.

4 So that in addition to a possible increase
5 in worker exposure, you are also increasing the
6 probability of accident.

7 MR. KOUTS: To the extent that you are
8 having more operations, if you will, that's true. I
9 don't remember. You know, there were many, many log-
10 ins at utility sites for dry storage purposes and
11 transport purposes, and I don't remember any major
12 problem.

13 Yes, as we move forward there will be
14 more, but there would be more anyway if we even had a
15 bare fuel system where we were going to 3268. So I
16 think there will be an increase. I think your point
17 is well taken, but I don't think that that's
18 necessarily going to be an issue.

19 MEMBER WEINER: That was more or less
20 enough said. I'm going to stop now because I
21 recognize you have the rest of your presentation to
22 go. So why don't you? And ask everyone else to hold
23 questions.

24 MR. KOUTS: That's fine.

25 MEMBER WEINER: Thank you. Go ahead.

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1 MR. KOUTS: Okay. All right. Well, let's
2 move into the total system model. I'll give a little
3 overview of what the model is. I think the Committee
4 indicated that there was an interest as to how we use
5 the TAD or how we use the TSM to evaluate TADs. I'll
6 go through that and also other activities.

7 And I mentioned thermal analysis earlier
8 in response to a question, and I'll go through that in
9 a little bit more detail.

10 Actually, when I assumed this position
11 back in, I guess on an acting basis, in October of
12 2002, one of the things that struck me was that we
13 didn't have an overall systems tool for our program.
14 We had a variety of models that looked at the
15 repository, that looked at transportation, and that
16 looked at, if you will, the waste acceptance
17 component, but we didn't have an integrated model that
18 kind of pulled it all together and allowed us to look
19 at synergistic effects between the three aspects.

20 So I commissioned essentially a group of
21 I will say long haired nerds at Oak Ridge National
22 Laboratory, and I say that affectionately, who looked
23 at a variety of different existing copyrighted
24 programs, and they came up with a recommendation that
25 we use a copyrighted tool called SimCat, which has

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1 historically been used in manufacturing processes by
2 various corporations, but, again, from the standpoint
3 of how an industrial manufacturing environment would
4 use these, and it's used to optimize processes, et
5 cetera.

6 One of the advantages of it, and we'll get
7 into this in the presentation, is that it has a
8 graphical user interface, which we call a GUI, if you
9 will, and you can watch the operation of the system.
10 So if the system has a choke point, you can see
11 exactly where that choke point is, and the operator
12 can intervene and say, "Okay. If this one facility is
13 having a problem meeting the needs of our baseline,
14 what can we do to affect that?"

15 And when we talk about the amount of
16 loading cells that we need in order to make waste
17 packages and so forth, that's kind of the insights
18 that this tool can provide us.

19 Anyway, we developed a first version in
20 November of 2004, which was a base case of the system.
21 We had a bare fuel handling system at that point, and
22 we utilized it just to see whether or not the
23 facilities that we were contemplating at that time
24 essentially were going to meet our baseline
25 requirements.

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1 Then as we moved to TADs, we modified that
2 bare field handling system and tweaked it, if you
3 will, and our computer programmers looked at ways that
4 facilities might operate in order to deal with TADs
5 and gave us some insight as to what a TAD system might
6 look like.

7 We now have a version four or I should say
8 we're actually moving on version six. Version four,
9 which we completed in July of 2006, basically adapted
10 all of the different TAD aspects of that initial
11 construct as modified to deal with TADs, and then in
12 version five, we also used it for analyzing what we
13 call our Critical Decision 1 study, which was the
14 formal process internally the department went through
15 to approve TADs and approve the primarily canister
16 based system for commercial fuel.

17 That version was completed earlier this
18 year, and we're tweaking that version. We're going to
19 have another version six that's out later this year.

20 Now, before we get too far into this, a
21 lot of people have said, "Well, gee, I'd love to have
22 a copy," and I have to say that this was never
23 intended for external use. It's an internal tool.
24 Although we have strict configuration control on it,
25 we don't have a manual as to how this works. We don't

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1 right now, from the standpoint of funding for the
2 program, we don't have that kind of resource in order
3 to develop it.

4 There are various groups within the
5 program that do utilize it. We do use configuration
6 control on each of the data sets and also the
7 configuration of the model, but it's also not used for
8 QA purposes. This was not developed under a QA
9 program. Again, it's to provide us insight as to how
10 the system might work and how changes might affect the
11 system, and it does give us insights in that regard.

12 But it was never intended to be used for
13 regulatory purposes. That's not why we developed it,
14 and we have not issued it publicly because primarily
15 we haven't had the resources in order to do that.

16 And in addition to that, since it is
17 copyrighted, we paid for a license, if you will, every
18 year in order to utilize this software. So there are
19 also licensing issues associated with the use of the
20 software.

21 So I've kind of gone over all of this in
22 my earlier remarks. We use it to evaluate baseline
23 performance. We can look at alternatives as we did
24 with TADs. We can look at system solutions, how to
25 make the system work better, and we can evaluate major

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1 impacts from a policy standpoint, what ifs, if you
2 will, from a policy perspective.

3 This chart essentially shows you what the
4 inputs are to develop our initial state file. We use
5 spent nuclear fuel characteristic data that we get
6 from utilities through the RWA 59 forms, which we give
7 out on a regular basis for utilities to fill out. We
8 also have a variety of databases, if you will, that we
9 use internally for the purposes of determining the
10 characteristics of the fuel.

11 We have utility capabilities in it, when
12 reactors are anticipated to close, what shipping might
13 occur, whether it's rail or truck from a specific
14 site; some unit costs and so forth.

15 From a transportation perspective, we use
16 the routes that were identified in the Yucca Mountain
17 EIS that's being updated, cask capabilities and cask
18 availabilities and so forth. Those are all factored.

19 Now, I should mention that the way the
20 model runs is we look at operations on an eight hour
21 basis. So each time step is eight hours, and when
22 you're looking at running for 50 years, it takes a
23 little while for it to run through.

24 But at any rate, and if you run a full
25 inventory case and what that looks like, that will go

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1 all the way up to the 2100. So the advantage of this,
2 again, is that we get to see the entire implementation
3 of the repository. Again, there are a lot of
4 simplifying assumptions on how this might work, and
5 we're looking at it from a macro level as to how
6 everything fits together.

7 From a repository perspective, we're
8 basically followers of the repository design. All of
9 the capabilities of the facilities, what the limits
10 are on lab storage in the individual facilities, as
11 well as age and pad size and so forth. All of those
12 basically we take from the designers and we use those
13 as inputs to the model and then the portion function
14 of the model is to meet our acceptance rates or our
15 receipt rates, if you will, in our baseline documents,
16 and typically that in the first year is 400 metric
17 tons. Next year is 600. The next year is 1,200, then
18 2,000 and 3,000.

19 So we have a five-year ramp-up to go to a
20 3,000 metric ton rate, and then we look at how the
21 system reacts to that kind of forcing function, if you
22 will, to see if it can meet that, and what I'm going
23 to show you in a little bit is that it did.

24 What we get out of the model basically, we
25 get the truck-rail selection. We get shipping

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1 schedules, cask parameters. We get doses, if you
2 will, life cycle dose. We get cost estimates. We use
3 it in our total system life cycle cost projections
4 that we use for fee adequacy every year.

5 It gives us an insight into how large the
6 storage field needs to be in order to meet specific
7 scenario, and again, it allows the interplay, if you
8 will, between the transportation segment, the
9 repository segment and the waste acceptance segment.
10 So the reactor is the transportation and the
11 repository.

12 This is kind of a useful slide to show
13 you. Each of these major components has a nested
14 model within it. For instance, if you went to the
15 GROA and you clicked on the GROA, you would see all of
16 the different facilities that we would have in the
17 GROA, and you could click on individual facilities,
18 such as one of our canister receiving closure
19 facilities, and you can see how that is operating, how
20 it is taking canisters, if you will, how it is working
21 through the system and so forth.

22 So it's not a video game, but again, it
23 allows the operator, if you will, to look at it and
24 see how the system is operating, and of course, it has
25 a variety of outputs that we use to understand how the

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1 system operates.

2 For the TAD study itself, which we did in
3 fiscal '05, we looked at basically 70 combinations, 70
4 different parameters, if you will, and 40 different
5 scenarios, and I'll show you one of those in just a
6 few minutes, and the insights that we got from that is
7 that our acceptance rates can be achieved, that the
8 repository age limit, the capacity limit, if you will
9 of the aging pads was not exceeded.

10 We can complete our 50 years of
11 operations, and get that all done in what we're saying
12 we can do it in, and we can meet our 1.45 kilowatts
13 per meter subsurface thermal line load. So that was
14 the insight. Those are the major insights that that
15 provided.

16 We also used it for our CD-1, Critical
17 Decision 1 package for internal decision making, and
18 we focused there as to whether or not we could meet
19 the 90 percent requirement or not requirement, but
20 goal if you will, and I'll show you one of those
21 scenarios in a minute, and for the ten percent that
22 are not, if you will, -- does not come in in TADs,
23 whether or not a wet handling facility as we conceive
24 it, if you will and are designing it, whether that
25 will meet that additional ten percent that would come

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1 in bare.

2 And the bottom line is that it's pretty
3 close to that. However, if the percentages go down,
4 if it's down to 60 percent TADs or whatever and we're
5 going to more bare fuel, then it's likely that we will
6 need more wet handling capability for our sites since
7 we're handling that.

8 But our going in position is, I believe,
9 three CRCFs or canister receipt enclosure facilities
10 and one pool, if you will, that would handle bare fuel
11 assemblies.

12 What we also found out from this is that
13 the six weld cells that we currently contemplate for
14 two in each, if you will, of the CRCFs would meet our
15 emplacement needs underground to meet our 3,000 ton
16 rate, and that six well cells should work well.

17 Now, this is kind of an example of some of
18 the graphical output. Let me talk a little bit about
19 what the scenario is. It's a 70,000 metric ton
20 scenario basically using 21 Ps or 44 BWR TADs, with
21 the acceptance of some dual purpose canisters, and
22 that is, again, a contractual issue between the
23 department and the utilities, but we're assuming for
24 the purposes of this analysis that that's worked out.

25 For this it's about 88 percent TADs by

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1 weight of fuel, one handling facility and six welders,
2 three CRCFs, and what you see here on the upper left is
3 what we call a valley curve, and that tells us whether
4 or not we're meeting essentially our acceptance rates
5 in any one year, and you can see it's pretty close.
6 We're 100 or two below tonnage in any specific year,
7 but, you know, it is pretty close.

8 To the right what you're seeing is
9 essentially what the TAD receipt rate is, and that's
10 the upper blue line, and then what the emplacement
11 rate is.

12 So the difference between those two will
13 tell you how much aging you will have to have at the
14 repository, and you can see from the chart on the
15 bottom that the amount of aging does not exceed in
16 this scenario more than 16,000 metric tons. So where
17 we were with internal planning, which we were
18 somewhere around 21,000 ton aging pad, we're seeing
19 here that the model is verifying that for that
20 scenario, if you will, for 88 percent TADs, three CRCS
21 in one handling facility, that we don't exceed our
22 aging requirements or what we are currently thinking
23 in terms of what our needs would be for aging at Yucca
24 Mountain.

25 So that's a little bit of the perspective

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1 as to how that provided some insights for the CD-1
2 process. I mentioned earlier that we also can use the
3 TSN to look at different parameters from the
4 standpoint of thermal analysis, and again, instead of
5 looking at a situation where you have 11.8 kilowatt
6 waste package and a 1.45 line load, let's let the
7 model look at different parameters, a 96 degrees C.
8 mid-pillar temperature, if you will.

9 If you remember, the strategy of our post
10 closure analysis is that there will be drainage
11 between the drifts, and we have a pillar of basically
12 areas between the drifts where the water has not been
13 pushed away. So if we keep that mid-pillar
14 temperature at 96 degrees and we don't exceed a drift
15 wall temperature of 200 degrees C. and we maintain a
16 cladding limit temperature of 350 C. within the waste
17 package itself, what does that look like?

18 And can we blend through the usages of the
19 larger packages? Can we still meet our thermal goals?

20 And what this did show is that if you go
21 to those parameters, it provides us a little bit more
22 flexibility, and nonetheless, we can still meet what
23 our thermal goals are. So that's the advantage of it,
24 and this is just a graphical indicator of that same
25 analysis. The dots on the left basically show you

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1 that the heat generation rate from the various waste
2 packages, the 11,000, if you will, that would come
3 into the system.

4 So that's how we address that. Our
5 version six is in progress. We're continuing to use
6 it to scope out thermal issues, and we expect that
7 this tool will still be a key tool as we move forward.

8 So this is, I think, good summary words in
9 terms of what we use the model for, which I've already
10 gone through, and it is continuing to support scoping
11 analyses, if you will, for our pre-closure and post
12 closure analysis.

13 And a final summary. I've already talked
14 about TADs, and I think I've already talked about the
15 total system model, and I'll be happy to answer any
16 questions on any aspect of my presentation.

17 MEMBER WEINER: Thanks very much for a
18 very good presentation. I'll call on Dr. Clarke
19 first.

20 MEMBER CLARKE: Thanks.

21 I agree that was a very helpful
22 presentation. Just a couple of questions. I'm a
23 little unclear on what you're varying and what you're
24 keeping fixed, and without going into a whole lot of
25 detail, is it possible to tell us more about that?

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1 You do vary the thermal load as your slide
2 showed. So you're not going with a single value for
3 a line limit or anything like that; is that right?

4 MR. KOUTS: Right. Well, we initially --
5 and perhaps my presentation wasn't clear -- but
6 initially we looked at the scenarios of 11.8 kilowatt
7 packages, in other words, aging them until they're
8 11.8 before we put them underground and putting them
9 in the repository at a 1.45 kilowatts per meter line
10 load, and that works.

11 But what we wanted to look at is let's
12 forget about those parameters for a minute and let's
13 just look at center mid-pillar temperature. Okay?
14 Let's look at drift wall temperature, and let's look
15 at cladding temperature and how those, as being the
16 limits, if you will, in terms of the constraints, if
17 you will, on the system as opposed to the 11.8 and the
18 1.45.

19 And what we're finding is that if you use
20 those different limits or constraints, if you will, it
21 gives you more flexibility, yet it's still consistent
22 with our thermal needs underground. And, again, the
23 more refined analyses will be to take into account
24 things like end effects in the drafts, I mean, putting
25 the hotter packages at the end because of the greater

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1 thermal conductivity in the rock, the greater amount
2 of rock.

3 We're going to be looking at that as we
4 move forward to the future, but in the situation,
5 we've looked at it a variety of ways. The first way
6 was to hold the 11.8 and the 1.45 and see whether that
7 works and it does, but also as to whether or not we
8 get any flexibility by putting in these other
9 constraints and seeing whether that works.

10 MEMBER CLARKE: Thank you. That was my
11 understanding. I just wanted to confirm that.

12 So you're going beyond those initial
13 constrains.

14 MR. KOUTS: Right.

15 MEMBER CLARKE: It seems that one of the
16 great values of a tool like this is you can look at
17 different scenarios and identify pinch points and what
18 could be really disruptive, and I wonder if your
19 analysis to date has identified any events that could
20 cause departures from, you know, what you'd like to
21 see.

22 MR. KOUTS: Well, one of the things that
23 we found was the amount of weld cells that we need
24 because, for lack of a better term, if waste packages
25 are ready to be or if TADs are ready to go into waste

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1 packages and the CRCFs are constipated, if you will,
2 basically because welding will take a variety of time
3 because there's several welds that we have to go
4 through, and what our analyses indicated is that we
5 need in order to meet a 3,000 metric ton per year
6 emplacement rate -- and this is, again, putting it
7 underground -- that we needed six weld cells in order
8 to do that.

9 And if one of those weld cells goes down
10 or something, then the system will become somewhat
11 more constipated and we'll have to put more into
12 aging. But what we found is that under normal
13 maintenance cycles and so forth, if we have six weld
14 cells operating and three CRCFs, you know, that's
15 helpful.

16 Now, one of the things that I've given
17 total system model presentation to our Nuclear Waste
18 Technical Review Board, and they have stated a very
19 strong preference that we should look at what ifs with
20 the model. What if transportation route across the
21 country goes down? What happens then?

22 I guess my response to that is this model
23 isn't far enough along to really look at those kinds
24 of issues. I mean, what the model would do is it
25 would just route it to different routes around the

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1 country, and I think what it would find is that we
2 could still meet our throughput needs.

3 Now, in reality, there are a lot of
4 institutional things that would occur, a lot of
5 issues. You know, we'd have to make sure that the
6 routes -- we trained over them and so forth and so on.
7 If we hadn't, you know, there would be issues.

8 But the advantage of this is that we look
9 at, for instance, if there's, you know, heavy haul to
10 a railhead. That's all put in. We looked at the
11 transportation system and how it would operate, and
12 again, in accordance with what the routes that we used
13 in the EIS.

14 The interesting thing about this, and I
15 didn't mention this, is that this model also has a
16 stochastic element to it such that if you run exactly
17 the same scenario again, you may not get exactly the
18 same results because there's a logic, and it's an
19 internal logic about how it makes decisions. So it
20 may make different decisions the second time through,
21 and that's also an advantage to the model because you
22 don't want it really hard wired. You want it to make
23 some logical choices. So we allow the model to make
24 certain choices based on its preferences.

25 So it may choose to implement a different

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1 approach, a slightly different approach. So the
2 numbers that you get out the end may be a little
3 different for exactly the same scenario.

4 MEMBER CLARKE: Can you do that
5 intentionally? In other words, can you input to the
6 model distributions around certain assumptions?

7 MR. KOUTS: Sure. We certainly have the
8 flexibility to do that. For instance, we have to set
9 up an initial state for acceptance into the system,
10 and our standard contracts require that oldest fuel
11 first sets up the queue, but in terms of what's
12 acceptable fuel under the contract, it's five years
13 cooled or older. Okay?

14 So we looked at what we call youngest fuel
15 first, five year cooled. You can look at an oldest
16 fuel first, ten year cooled. I mean, you can look at
17 a variety of different scenarios in terms of what fuel
18 might be out there in order to implement the system,
19 and you look at that and you can do a parametric
20 analysis based on what kind of fuel the utilities
21 might make available to us when we're ready to ship.

22 So there are variables certainly in the
23 initial state, you know, in terms of what we can get
24 from utility sites. And we have the capability to
25 look at that parametrically.

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1 MEMBER CLARKE: So would it be fair to say
2 based on where you are now that your design approach
3 to the surface facilities has sufficient flexibility
4 to handle variations in input parameters, you know,
5 within reasonable?

6 MR. KOUTS: We feel that it does. I will
7 say though that if, as I mentioned earlier, if we're
8 looking at a situation where we don't get around 90
9 percent TADs, you know, that could create some issues
10 for us, but we'll have to look and reconfigure what
11 service facilities we might need.

12 Now, we haven't initiated those
13 discussions with utilities yet. We're going to be
14 doing that in the near future, and I think as we move
15 forward we'll get a better idea about how much TADs
16 will be used, but the initial input we've had from the
17 industry is that I think the industry is going to work
18 with us on this, and again, you know, we'll see how
19 that comes out after we have these contractual --

20 MEMBER CLARKE: And you do have a good
21 feel of everything now for what's in dual purpose
22 canisters and might come in that way --

23 MR. KOUTS: Right.

24 MEMBER CLARKE: -- and what would be in
25 when the repository were available.

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1 MR. KOUTS: Right.

2 MEMBER CLARKE: So you can make those
3 assumptions.

4 Thank you.

5 MEMBER WEINER: Mike.

6 CHAIRMAN RYAN: No, I'm fine. I think Jim
7 covered the things I was interested in.

8 Thanks.

9 VICE CHAIRMAN CROFF: Do you expect -- I
10 understand the problem with the model, the copyright,
11 and it can't be made generally available. Do you
12 anticipate that the results of your analyses, some
13 organized maybe report or something like this might be
14 published at some point?

15 MR. KOUTS: Yeah, we plan on making this
16 available. We just haven't gotten around to it yet
17 basically.

18 MEMBER CLARKE: Okay.

19 MR. KOUTS: I've been a little busy with
20 other things.

21 MEMBER CLARKE: Thanks.

22 MR. KOUTS: But we will get some reports
23 out there.

24 MEMBER CLARKE: Okay.

25 MR. KOUTS: To document these analyses.

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1 MEMBER HINZE: Does this include fuel
2 other or waste other than the commercial spent nuclear
3 fuel or is this totally related to that?

4 MR. KOUTS: The total system model?

5 MEMBER HINZE: Un-huh.

6 MR. KOUTS: No, we also model the input or
7 the acceptance, if you will, of vitrified materials
8 from the various DOE facilities and also DOE spent
9 fuel that would be canistered. So it basically looks
10 at -- and our thermal analysis also takes that into
11 account.

12 MEMBER HINZE: Following up on Dr.
13 Clarke's questions regarding unanticipated events, are
14 they incorporated into this model, a tip-over, a
15 change in the meteorological conditions, extreme
16 weather, et cetera? Is this?

17 MR. KOUTS: No. That's something we can
18 do. In other words, if there are certain shipping
19 windows at certain sites, we can put that in and
20 that's something that we plan on doing. I mean, you
21 probably don't want to, but trying to deal with
22 meteorological delays at this point, you know,
23 envisioning 20 years into the future or 50 years into
24 the future what they may be, no, but we can look at it
25 from a macro basis, that certain sites, depending on

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1 the time of the year, that, you know, there may be
2 refueling outages or whatever in terms of when
3 individual facilities may have access to the pool for
4 shipping.

5 I mean, we can build those things in, but
6 we haven't looked at individual scenarios about
7 whether issues or things like that.

8 MEMBER HINZE: Those conditions could also
9 occur with regard to the aging pack, couldn't they, in
10 terms of meteorological conditions, not inhibiting or
11 delaying certain performances?

12 MR. KOUTS: Nevada test site doesn't have
13 that.

14 MEMBER HINZE: Yeah, I understand, but it
15 does have the extreme.

16 MR. KOUTS: There might be a couple of
17 days here and there that you may lose due to weather
18 conditions, but I don't anticipate that they would be,
19 you know, long-term weather delays.

20 MEMBER HINZE: Thank you.

21 CHAIRMAN RYAN: I have one minor question
22 if I may. Could you go to your slide where you had
23 the valley curve?

24 MR. KOUTS: Okay.

25 CHAIRMAN RYAN: Is that possible?

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1 MR. KOUTS: See if I'm -- okay. I'm
2 almost there. Right.

3 CHAIRMAN RYAN: The valley curve shows you
4 that you didn't go above what you're allowed to have
5 on the pad; is that right?

6 MR. KOUTS: The valley curve is acceptance
7 into the system. In other words, if we're looking at
8 on day one or year one, if you will, to get 400 metric
9 tons, that's what that reflects. The aging pad is the
10 difference between the receipt of TADs in the system
11 and our ability to emplace them. So the bottom curve
12 gives you how much of a backlog there would be for
13 whatever reason.

14 If they haven't met our thermal goals and
15 we have to age them or if we're not in a position
16 where we can emplace them because, you know, the
17 welders haven't gotten around to them yet.

18 CHAIRMAN RYAN: That makes sense because
19 the valley curve then is just really you haven't
20 exceeded your capacity limit for the total system.

21 MR. KOUTS: Right.

22 CHAIRMAN RYAN: That always has to be
23 below your limit.

24 MR. KOUTS: Right. The valley curve
25 basically reflects what our baseline needs are in the

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1 amounts that we would be taking in any one year, and
2 what that reflects is that we're close to receiving
3 what the baseline says we should receive, which is the
4 four, six, 12, two, three, and then three until we get
5 to the 70,000 ton limit, and that's only for
6 commercial. This only reflects commercial. This does
7 not reflect defense materials in that valley curve.

8 CHAIRMAN RYAN: So it's really not a
9 licensed fund then. It's just your optimization life.

10 MR. KOUTS: Right.

11 CHAIRMAN RYAN: Or quantities in process.
12 Okay. Why are you never above that line? If you're
13 optimizing, there should be some times you're above it
14 and some times you're below it.

15 MR. KOUTS: Well, I don't think we're in
16 the optimizing world yet.

17 CHAIRMAN RYAN: Okay. Fair enough.

18 MR. KOUTS: What we're trying to see is
19 are we meeting what we're trying to meet.

20 CHAIRMAN RYAN: Fair enough. Okay.

21 Thanks.

22 MEMBER WEINER: How are you going to get
23 a 21 PWR assembly on a truck?

24 MR. KOUTS: We're not.

25 MEMBER WEINER: And I'm asking because you

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1 have not only in your TSM you have truck as an option,
2 but from the EIS there's some reactor sites that can't
3 load rail casks. What are you going to use, heavy
4 haul for those?

5 MR. KOUTS: No, we will not be making TADs
6 or we will not be using TADs. We will essentially
7 bring bare fuel onto the site and package it on site
8 in the wet handling facility.

9 MEMBER WEINER: So you will take a number
10 of assemblies from your truck casks and package them
11 together.

12 MR. KOUTS: Right.

13 MEMBER WEINER: Thank you. Thanks for
14 that clarification.

15 MR. KOUTS: And that's what the wet
16 handling facility is for. It's that ten percent that
17 we'll not be entailed (phonetic), if you will.

18 MEMBER WEINER: Assuming that it stays at
19 ten, that what you need for the wet handling facility
20 stays at ten percent.

21 And that leads me to my other question.
22 In your total system model, are you looking at what
23 might happen if the utilities can't or won't or in
24 some way don't use TADs and you have to do more
25 repackaging? Are you looking at that?

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1 MR. KOUTS: Well, what that would --
2 again, we can look at that, and that would simply mean
3 that we would need more wet handling facilities on
4 site in order to deal with bare fuel, and to the
5 extent that, you know, we need to do that, our going
6 in position is that we'll be able to work this out
7 with the industry, and we're going to start those
8 discussions very shortly and we'll find out.

9 MEMBER WEINER: Following up on one of Dr.
10 Clarke's questions, you indicated that you can look at
11 different scenarios. Is there any way in this system
12 where you can incorporate a distributed input and
13 sample on it and look at the uncertainties in your
14 model that way, or is that totally internal to the
15 model?

16 MR. KOUTS: No, we can input a
17 distribution if you will and understand the effects of
18 that distribution.

19 MEMBER WEINER: Because my final comment
20 is I would encourage you to in some way make the model
21 available. As you know very well, different models
22 give you different answers, and somebody else is going
23 to construct a model that does the same thing and
24 gives very different answers because it's always
25 possible to do.

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1 So this is just an encouragement if there
2 is any way to do this, to do it as soon as you can.

3 MR. KOUTS: Well, there are a variety of
4 issues that we'd have to work through on that and
5 resources not being the least of them, and also the
6 copyright nature of the software and configuration
7 control, and a variety of other issues, but your point
8 is well taken, and we'll certainly look at that.

9 MEMBER WEINER: Staff questions?

10 MR. HAMDAN: I had a question.

11 MEMBER WEINER: Oh, I'm sorry. Latif and
12 then Chris.

13 MR. HAMDAN: Go ahead.

14 MR. BROWN: Thank you, Latif.

15 MEMBER WEINER: Chris and then Latif.

16 MR. BROWN: Chris.

17 The issue of high burn-up fuel has been a
18 plaguing issue in the industry for a number of years.
19 Do you see this as a problem as far as deploying the
20 TAD? I mean, what is DOE doing with respect to this
21 issue? Are they working with industry?

22 MR. KOUTS: Well, we will certainly look
23 to the vendors to assist us on that issue in terms of
24 seeing how we can accommodate the higher burn-up fuel,
25 and I think if you look at the specification, we go to

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1 fairly high burn-ups with the TAD.

2 So there may be some high burn-up fuel on
3 the drawing boards that aren't in the specification,
4 and we'll deal with that, but we have a fairly broad
5 specification for the type of fuel that would go into
6 this, and I think it does address a lot of the high
7 burn-up stuff, but you know, we'll have to deal with
8 that as we move forward in the future.

9 MR. BROWN: Because you mention in the TSM
10 that you have a spent nuclear fuel characteristics
11 data. Does that include data for high burn-up fuel?
12 Is it source term, mechanical data? What does that
13 include?

14 MR. KOUTS: All of the above, and
15 basically every few years we go out with a form to
16 utilities to tell us the type of fuel they're using
17 and what their expectations are into the future, and
18 we build that into our analyses.

19 So we don't do it too often because we
20 have to go to OMB to get approval of the questionnaire
21 and everything else. As you know, you have to get
22 approval to ask industry any questions, but we do do
23 that on a regular basis, and that information is --
24 we, of course, make that publicly available.

25 But that information is what we use. It's

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1 information we receive from the utility.

2 MR. BROWN: And with respect to the
3 borated stainless steel used as the neutron absorber,
4 will that be a structural material or non-structural?

5 MR. KOUTS: Good question. We're going to
6 let the vendors determine that. We need that for
7 criticality control, and to the extent that they can
8 demonstrate that that can also be used for structural
9 needs for their purposes in the basket, that's
10 something that the vendors will have to deal with, and
11 that's why we want to use private industry, because we
12 want to use people who have experience in dealing with
13 those kinds of issues.

14 And right now I don't think we have any
15 feeling one way or the other. All we feel is that it
16 has to be there in a configuration that we've
17 identified in the specification in order for us to
18 feel comfortable that we're meeting our post closure
19 needs.

20 CHAIRMAN RYAN: Just on that, a follow-up
21 to Latif's question, we have printed out your press
22 release and that's available for anybody that wants it
23 in the back. We did not print out the 339 page
24 specification for everybody. You'll have to do that
25 on your own, but the press release with the summary

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1 that I think you covered pretty well, Chris, is in the
2 back for everybody's benefit.

3 MEMBER WEINER: Latif.

4 MR. HAMDAN: Chris, my question concerns
5 the stochastic components, and when we achieve the
6 flexibility, the advantage that the stochastic
7 analysis would give you, but how do you plan to defend
8 the results and the ultimate model? Because every
9 time you run the program, you get a different number,
10 and to give you a little bit, in the TSB area, for
11 example, you run the model 200, 300, 400, 500
12 realizations and you have central condensing and you
13 take that as your output and you can figure it that
14 way.

15 In the TSM model, do you do the same
16 thing?

17 MR. KOUTS: No. We don't run it two or
18 300 times. We may run it a few times to see what kind
19 of variation we're getting in the ultimate results,
20 but again, the TSPA is for regulatory purposes. This
21 model is to provide the department insight as to how
22 the system might operate. It's not a QA model. We're
23 using it from the standpoint of trying to understand
24 is it telling us something that is intuitively not
25 obvious to us or is it giving us the results that are

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1 anomalous that we would not expect.

2 It's not being used -- and I tried to make
3 this point clear -- it's not being used for a
4 regulatory purpose. It's being used again to provide
5 us insight as to how the system would operate. If
6 there's slight variations in the output of the model,
7 that doesn't trouble me as much. I think that that
8 that's okay. Ultimately if we were using this for a
9 regulatory purpose such as the TSPA, then I would
10 agree with you. You'd have to run it many different
11 times and get a statistical distribution, you know,
12 show what your mean values are and so forth.

13 But that's not the intent or the purpose
14 of the model.

15 MR. HAMDAN: But other variations that you
16 are getting are slight?

17 MR. KOUTS: Yeah, they are minor
18 variations. They're not large variations.

19 MR. HAMDAN: Thank you.

20 MEMBER WEINER: Other questions from
21 anyone?

22 Identify yourself for the reporter,
23 please.

24 MR. MALSCH: Sure. Marty Malsch from the
25 State of Nevada.

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1 I had four quick questions. The first
2 one, you mentioned you were engaged in discussions
3 with the vendors and utilities. Is there going to be
4 a rulemaking proceeding, public rulemaking proceeding
5 to modify the standard contract?

6 MR. KOUTS: First of all, I said we were
7 planning on entering into discussions. We have not
8 entered into discussions as of yet.

9 MR. MALSCH: Okay.

10 MR. KOUTS: At that point that would be a
11 modification to the contract. It would have to be
12 mutually agreeable to each contract holder, and the
13 department feels that at this point in time until
14 those discussions occur, we're not anticipating that
15 we need to go through rulemaking on this.

16 MR. MALSCH: I just asked that question
17 because the current standard contract is in DOE's
18 rules.

19 MR. KOUTS: It is in DOE's rules.
20 However, the courts have ruled it's a contract.

21 MR. MALSCH: Okay. Will there be any
22 chance for members of the public or, for example,
23 Nevada to participate or influence the results of
24 these negotiations and discussions?

25 MR. KOUTS: Well, those discussions will

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1 be between the contract holders and the department.
2 To the extent that the State of Nevada wants to make
3 its views known, the State of Nevada can do that at
4 any time.

5 MR. MALSCH: Okay. My second question was
6 you mentioned that you're going to have the utilities
7 certify compliance with the specifications and
8 compliance with the QA programs and so forth. Will
9 the department be doing any auditing or otherwise
10 looking beneath those utility certifications?

11 MR. KOUTS: That issue will be addressed
12 by the department in the license application, and I
13 think that we responded to a March 6th letter from the
14 staff on that because they had several questions, and
15 the department's approach in that regard will be in
16 the license application.

17 MR. MALSCH: Okay. Third question deals
18 with if DOE files the application in mid-2008 and it's
19 docketed, let's say, late 2008, early 2009, and the
20 proceeding lasts, let's say, three to four years, that
21 brings you up to 2012. So there's the possibility,
22 assuming things move along, of a decision in 2012 that
23 would be different than your procurement
24 specifications on the TAD.

25 And the question is: how have you

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1 accounted for that possibility in your planning?

2 MR. KOUTS: Well, as I mentioned earlier,
3 there is an element of risk associated with proceeding
4 on this approach. The department at this point feels
5 that the specification is fairly robust and that we're
6 hopeful that there won't be any changes. If there
7 are, that's something that we're going to have to deal
8 with.

9 MR. MALSCH: Okay. And just last, a quick
10 question. You mentioned the capacity limit for the
11 aging pad. What is the basis for a capacity limit on
12 the aging pad?

13 MR. KOUTS: That will be provided in the
14 license application that the department will submit to
15 the NRC next year.

16 MR. MALSCH: Okay. Thank you. That's all
17 I have.

18 MEMBER WEINER: If there are no further
19 questions, I'm going to turn it back to our Chairman,
20 and again, thanks very much, Chris.

21 CHAIRMAN RYAN: Thank you, Chris. We
22 appreciate you spending the morning with us, and now
23 you have a busy travel schedule ahead.

24 I think on the tables behind you there's
25 the announcements out there for everybody's needs. If

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1 you need an extra copy or we run out, we'll make some
2 more.

3 With that I'd like to adjourn for about
4 ten minutes and take a short break and then we'll
5 reconvene in about, let's say, 20 minutes to 12.

6 (Whereupon, at 11:23 a.m., the meeting
7 was adjourned for lunch, to reconvene at 1:00 p.m.,
8 the same day.)

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

2 1:00 P.M.

3 CHAIRMAN RYAN: Okay, we'll come to order,
4 please.

5 This afternoon's session I think will be
6 an interesting and informative one and I'm going to
7 turn the meeting over to Dr. James Clarke, who is
8 going to provide an overview of the working group
9 meeting, including a meeting purpose and scope. And
10 he'll introduce our invited speakers.

11 Dr. Clarke?

12 MEMBER CLARKE: Thank you, Mike. This
13 afternoon, we will have a working group meeting
14 related to 10 CFR Part 20.1406, minimization of
15 contamination. Specifically, we will focus on the
16 draft Regulatory Guide 4012 concerning license
17 applications for new reactors.

18 Before we begin the presentations, I do
19 have some comments that I need to provide and that I
20 am sure you will appreciate by way of introduction and
21 clarification.

22 The Office of Research has been developing
23 a guidance document, a Regulatory Guide 4012, for the
24 use of new reactor licensees to implement this
25 important part of NRC requirements. Draft Reg Guide

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1 4012 will utilize lessons learned from the first set
2 of reactors decommissioned in the 1990s and first part
3 of the 2000s, plus other NRC license facilities by
4 factoring design and operating improvements at the
5 front end of the life cycle of new nuclear facilities
6 to resolve more efficient and less environmentally
7 harmful operations and consequently, less costly
8 decommissioning.

9 The Commission has asked the Committee to
10 follow these efforts closely. The Committee believes
11 that the development of this draft Reg Guide is an
12 important milestone in the staff's efforts to utilize
13 decommissioning lessons learned and is encouraged by
14 the process of the staff so far. We are pleased to
15 participate in this review of the Reg Guide.

16 The purpose of the working group today is
17 to assist the Committee in the review of the draft Reg
18 Guide. This afternoon we will hear from the two
19 vendors who have participated in the process for
20 certification of a new power reactor design and we
21 will hear their thoughts concerning meeting 10 CFR
22 20.1406 prior to the development of the staff
23 guidance.

24 As such, the presenters from GE nuclear
25 and Westinghouse Electric are basing their

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1 presentations today on information they have provided
2 to the NRC addressing this part of the regulation.
3 Nothing about each of their presentations or in
4 response to it should be interpreted as a review or
5 comment on the information submitted by the vendors as
6 to how the information addresses any part of 10 CFR
7 20.1406 or any of the draft guidance discussed today.

8 Formal review of the vendor information
9 awaits the Reg Guide becoming final, after the public
10 comment period and formal review of the documents
11 submitted including any revisions or editions that the
12 vendors may decide to make between now and the formal
13 review. The Committee is also following another NRC
14 staff effort that will address decommissioning lessons
15 learned, namely the potential revisions to 10 CFR Part
16 20.1406 intended to prevent legacy decommissioning
17 sites.

18 Some questions have arisen regarding
19 whether draft Reg Guide 4012 will need to be revised
20 when the rulemaking effort to revise 20.1406 is
21 completed. Questions have arisen concerning the
22 ramifications on vendors' efforts to meet this version
23 of the Reg Guide. The rulemaking effort is underway
24 so that these questions are at this time premature.

25 So the Committee asks the indulgence of

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1 participants not to engage in any discussion today of
2 the proposed rulemaking and guidance. We will leave
3 that discussion for future committee meetings when the
4 rulemaking will be formally presented to the Committee
5 by NRC staff. Today's efforts will focus only on the
6 draft Reg Guide.

7 The afternoon session will be conducted in
8 two parts. The first part will involve presentations
9 from invited speakers on the subject of the working
10 group. The second part will be a round table
11 discussion including the speakers and members of the
12 Committee, as well as invited decommissioning experts,
13 who continue to help the Committee in its activities
14 involving decommissioning.

15 At this point, I would like to introduce
16 our invited experts to you. On my left is Eric
17 Darois. Eric has 30 years of experience as a health
18 physicist. He has been involved in many
19 decommissioning sites and many other nuclear projects.
20 He is the president of Radiation Safety and Control
21 Services in New Hampshire. He is presently supporting
22 the Connecticut Yankee and Yankee Row decommissioning
23 projects. He has a Master of Science degree in
24 Radiological Science and Protection from the
25 University of Lowell. Eric has been on our expert

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1 panels on decommissioning guidance revisions,
2 prevention of legacy sites, decommissioning lessons
3 learned as well. Thank you, Eric. Welcome.

4 On my right is another Eric -- Eric
5 Abelquist. He is the director of the Radiological
6 Safety Assessments and Training Program at the Oak
7 Ridge Institute for Science and Education. He was a
8 major contributor to the preparation of the Multi-
9 agency Radiation Survey and Site Investigation Manual,
10 MARSIM, and is the author of a book, Decommissioning
11 Health Physics, the Manual for MARSIM Users. Eric has
12 graduate and undergraduate degrees in Radiological
13 Science Protection from the University of Lowell as
14 well. He was also a member of our expert panels on
15 proposed decommissioning guidance revisions. Eric,
16 welcome back. Thank you.

17 And at this point, I am ready to introduce
18 our first speaker to you. He is Tim Meneely, from
19 Westinghouse Electric Company. Tim is from the AP1000
20 group at Westinghouse and he will present a brief
21 introduction to the AP1000 design and how the
22 requirements of 10 CFR 20.1406 have been addressed in
23 their documentation so far.

24 Tim, thank you.

25 MR. MENEELY: I apologize if I cover basic

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1 ground for any of you, but in a group like this one
2 never knows how much you know about AP1000 and how
3 much you know about part 52, so I want to lay some
4 ground work before I get into a review versus 1406.

5 The other thing I will apologize -- well,
6 not really -- the other thing that I will comment on
7 in your handouts. We are still getting used to
8 restrictions of information that we can give out under
9 security restrictions. Our understanding is that we
10 can't make public any document which shows passageways
11 or doorways in a nuclear power plant design, so there
12 have been a number of figures omitted from your
13 handouts. They will be on the screen and we can
14 discuss them.

15 MS. COVIDGE: If you are going to put them
16 on the screen, do you need to clear the room of
17 public?

18 MR. MENEELY: I'm sorry?

19 MS. COVIDGE: Amy Covidge, Lead Project
20 Manager for ESBWR, Office of New Reactors.

21 MR. MENEELY: I'm sorry.

22 MR. FLACK: John Flack, ACNW. Anything
23 that is presented on the screen would end up as a
24 public record, so the issue will still remain.

25 MR. MENEELY: Okay, well in that case

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1 perhaps I will just skip them on the screen. It is
2 going to be a little tricky for my presentation, but
3 I can revise it. You are going to see less graphics
4 than you would have.

5 MR. FLACK: I can put the other version
6 up. It will take a couple of minutes.

7 CHAIRMAN RYAN: Sure, that would be okay.

8 MR. MENEELY: Okay. I have it on a memory
9 stick if that is quicker.

10 (Pause.)

11 I do apologize. As I say, we're still
12 getting used to the new restrictions.

13 Okay, the AP1000 plant, we have been
14 working on AP1000 specifically since about 2001. It
15 grew out of the AP600 effort. AP600 started in about
16 1986, so there is a long history on these Westinghouse
17 units. AP1000 is a direct derivative from AP600 to
18 the extent that when we made the transition from AP600
19 to AP1000, we had to specifically justify any changes
20 we made between the two plants. So to a large extent,
21 the AP1000 design has been going on since 1986.

22 Our basic design objectives in the AP1000
23 effort were in compliance with ALWR Utility
24 Requirement Documents. It's often called the EPRI
25 URD. This was an effort during the late 1980s through

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1 the 1990s to provide an upfront set of utility
2 requirements to feed into vendors such as us. We
3 committed to meeting the URD in the AP600 and the two,
4 as I say, were developed cooperatively. We had
5 meetings where the utilities would state a
6 requirement. We would come back and tell them the
7 implications of that requirement, so it was a long and
8 very fruitful effort through about 15 years.

9 Other AP1000 objectives were increased
10 margins, increased operational and safety margins,
11 particularly with respect to accidents. Licensing
12 certainty -- we're pursuing a part 52 license, so
13 undergoing the design certification process here. A
14 major issue that I'll talk about today was a greatly
15 simplified plan. This grew out of former plants of
16 the late 1970s, which we saw as becoming more
17 complicated, more expensive. So we pursued design
18 simplification within the world of improved accident
19 performance, but we were looking for simplified design
20 in order to simplify construction, maintenance,
21 operation, reduce costs.

22 We brought in modular construction as a
23 big part of our efforts, and we believe that we have
24 achieved a short construction schedule, and as a
25 result of simplifications we see improved

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1 availability, maintainability, and inspectability, and
2 occupational radiation exposure.

3 The other aspect that was sort of a
4 reclamation of something that we had done years ago
5 was this was an integrated plant design. So it was
6 designed to be fully pre-engineered and fully pre-
7 licensed, with a standard plant that includes the
8 nuclear island, turbine island, annex building,
9 radwaste buildings, as much as a we could put into a
10 standard plant design is here.

11 This greatly limits the site-specific
12 variations. It doesn't eliminate them, but it greatly
13 limits site-specific variations.

14 Current status of AP1000 with respect to
15 licensing and design. The current issue of the DCD
16 that is referenced in our design certification is
17 revision 15, which was issued in November of 2005.
18 You will see FDA from NRC in 2004 and design
19 certification in 2005. The Rev 15 of the DCD includes
20 a variety of open items, things which were left until
21 later for a variety of reasons, some of them because
22 they are site specific, some because they relate to
23 policies and procedures, some simply because we didn't
24 have enough information at the time of the design.

25 So we had open items in Rev 15. We

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1 attempted to close those open items on a standard
2 plant basis by the submittal of technical reports.
3 This was worked out with the staff that Westinghouse,
4 or one of our applicants could submit a technical
5 report to attempt to close and open item on a generic
6 basis. And then a combined license applicant could
7 reference that report and have it be already reviewed
8 by NRC and have it be not the same status as the
9 design controlled comment ,but a higher status than
10 new information.

11 So we have submitted a number of technical
12 reports, and these may be referenced by our combined
13 license applicants in the SARs that they will submit.
14 Much more recently, last month, we submitted revision
15 16 to the DCD, and we are requesting a design
16 certification amendment as part of that. This rolls
17 in all our technical reports, design changes which
18 have accumulated since Rev 15 was issued, and design
19 changes. We're requesting an amendment, so it's a
20 different status right now Rev 15.

21 Little bit of technical background on
22 AP1000. This is what it looks like. This is our
23 primary hoop design, steam generators and reactor
24 vessel. The steam generators are large steam
25 generators -- 125,000 square foot heat transfer area.

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1 They are similar to what is used, for example, in the
2 AN-O1 replacement steam generator. We have an
3 integrated head package, of course. We have no
4 bottom-mounted instrumentation. The entire plant is
5 designed for 60-year plant life. Our reactor coolant
6 pumps are proposed to be a cam motor design, a large
7 pump, but cam motor with no shaft seals. This
8 substantially reduces the support systems required.
9 And our main loops, as you see, the cam motor pumps
10 are mounted in the steam generator channel head, so we
11 have a substantially simplified main loop, reduced
12 number of welds, reduced number of supports.

13 I'm not going to talk about safety
14 systems, but this is just to give an example of the
15 way -- the AP1000 approach to safety systems and the
16 consequences of that. This is our cartoon of a
17 standard PWR with high pressure and low pressure
18 safety injection systems, a containment spray system,
19 at least two safety-related diesel generators. The
20 AP1000 combines this all into a series of passive
21 systems which are not dependent on safety-related
22 component cooling water, not dependent on safety-
23 related diesel generators. The refueling water
24 storage tank is moved inside containment instead of
25 being an outside tank. So it's a substantially

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1 different approach to safety and it leads to a very
2 significant reduction in the number of components of
3 the plant.

4 Some other simplification features which
5 we think are important from a waste processing
6 viewpoint particularly. We have mechanical shim core
7 design which forms all load follow and xenon transient
8 operations using rods, break control rod. So we don't
9 make boron changes for load follow. We use boron for
10 moderation, but we start at a high boron concentration
11 and remove the moot boron out as we deplete. We've
12 also made it a real design criteria, design pursuit to
13 have minimal primary leakage, so the cam reactor,
14 motor reactor coolant pumps, the minimization of the
15 valve count, the minimization of component count, use
16 of packless valves, use of enhanced packing valves, so
17 we really made a pursuit of the plant from day one
18 tight primary systems.

19 Lamp page for plant arrangement. What I
20 was going to show you here, I'll describe instead.
21 I'll have to use sock puppets, I guess, is that we
22 have -- the AP1000 plant design is -- there's a common
23 basemat for the safety-related buildings which are the
24 containment and the auxiliary building. We have
25 observed a rigid separation of clean and dirty in

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1 those two buildings, clean and radioactive of the
2 control room electrical, etcetera, on the clean side;
3 rad waste on the radioactive side. So there's a
4 common basemat for the containment and auxiliary
5 building and then we follow the clean-dirty separation
6 out into the annex building which has, for example,
7 the hot machine shop and the rad waste building which
8 it is adjacent to.

9 Okay, that's background. Specifically,
10 about 1406, the history. As I mentioned, the AP1000
11 grew very intentionally out of the AP600, including in
12 regulatory space and AP600 was licensed, was certified
13 prior to 1997. We base the AP1000 design
14 certification application on AP600, and we did not
15 pick up 1406. It is part of the AP1000 certification
16 DCV through rev 15.

17 So there is no discussion of 1406 in the
18 AP1000 DCD.

19 However, we think that we have complied to
20 a significant extent, a substantial extent with 1406
21 because we think that many modern design practices are
22 the same as what one we use for 1406. And these
23 include our efforts to be compliant with the utility
24 requirements document. Many of the features in the
25 utility requirements document are lessons learned from

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1 the utilities. They come from a variety of bases, but
2 site contamination was certainly one of them.
3 Maintainability and inspectability were others.

4 A lack of need to maintain things.

5 Also, we have an emphasis on ALARA and
6 occupational radiation exposure. It's been designed
7 in from the front. Simplification, as I say, and the
8 basic theory of simplification extends to if you don't
9 install a component, the component is not going to
10 fail. It doesn't need to be maintained. It doesn't
11 have to be inspected. It's not there to cause
12 problems, including any kind of contamination or
13 including being removed as part of decommissioning.

14 We also have had utility sponsors
15 throughout the process of AP600 and AP1000. They've
16 been formalized at different times. Right now, the
17 New Start organization and in parallel with that, the
18 AP1000 buyers group are giving us very specific
19 feedback, but throughout the 20 years we've been
20 working on the passive plants, we've had very specific
21 utility feedback. So as they face different
22 contamination issues, anticipated decommissioning,
23 their input has been incorporated.

24 The compliance approach for 1406, part 52
25 licensing, we have design certification on a standard

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1 plant basis. We will have a series of utility
2 applicants for combined operating licenses. However,
3 from a viewpoint of design, as well as regulation,
4 construction and operation, it's critical that we
5 maintain standardization through these. If we have a
6 proliferation of 20 different slightly changed AP1000
7 designs coming in for combined license application,
8 none of us has a resource to handle this. So it's
9 very important to Westinghouse, and we think the
10 entire AP1000 part of the industry, at least, that we
11 maintain a single standard design for AP1000.

12 There are site-specific decisions, but to
13 the extent possible, we want to maximize the
14 demonstration of 1406 compliance at the level of the
15 DCD, of the design certification plant. We think that
16 many features can be demonstrated in the DCD in a Tier
17 2 design description and some are site specific which
18 will require commitment via open items and be
19 addressed ultimately in the COL SAR. And some are
20 policy and procedure specific which are also committed
21 in open items.

22 CHAIRMAN RYAN: Would you give us some
23 examples of site-specific design issues?

24 MR. MENEELY: I will get to some --

25 CHAIRMAN RYAN: If you're going to get to

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1 it, that's fine.

2 MR. MENEELY: A quick example is, for
3 example, the design of the liquid rad waste effluent
4 discharge design. Exactly how far that's going, where
5 your licensed release point is can make that different
6 for different sites. So we'll make commitments there,
7 rather than -- geology would be different for
8 different sites.

9 CHAIRMAN RYAN: More complicated examples
10 might be the basemat or the sill underworks?

11 MR. MENEELY: The excavation, yes. And
12 especially since these plants are going in almost all
13 of them to sites which have previous excavation done.
14 There are new units on existing sites, so there are
15 some specific issues there.

16 In order to maintain our standard plant
17 design, we wanted to try to implement this in a timely
18 fashion. As you know, the COL, the combined license
19 applications could begin in fall of this year. The
20 China schedule is even more aggressive. We have four
21 units that are to begin construction in China soon and
22 we want to maintain standardization on those units as
23 well, internationally.

24 So we were asking for NRC review as early
25 as possible and that resulted in us preparing our

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1 technical report on 1406. At the beginning of 2007,
2 we were working with NEI, working with EPRI trying to
3 collect as maximum industry input as we could.
4 Ultimately we submitted this report after several
5 internal and external reviews in April of 2007.

6 And this includes a discussion of our 1406
7 compliance and a markup of rev 15 of the DCD. And
8 then we have rev 16 of the DCD that went in last month
9 as a request for an amendment to our certification and
10 it rolls this technical report into the design.

11 When we did our review with respect to
12 1406, we had a variety of resources, DG1145, as it was
13 known at the time; industry forums, both NEI and EPRI
14 had workshops and groundwater initiatives in which we
15 participated. There have been a variety of review
16 teams organized by both EPRI and the AP1000 Buyers'
17 Group and we attempted to use those forums as
18 anticipating 1406, what we could expect to review. We
19 also use the lessons learned, in particular. I'm not
20 going to try to read that number, but the lessons
21 learned for decommissioning letter report was a key
22 resource in our review, but ultimately, it was
23 Westinghouse that had to take the lead for compiling
24 the AP1000 position.

25 I have several slides here that I'm just

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1 going to go through examples. If you've had an
2 opportunity to look at our Technical Report 98, it has
3 quite a shopping list in it of different areas that we
4 are revising the DCD or that we don't see a reason to
5 revise the DCD, but I want to go through just some
6 examples pulled out of the report and talked through
7 some of the areas of what we learned as we went
8 through our review.

9 For example, source term minimization. I
10 think we'd all agree that it's key in complying with
11 a minimization of contamination of a site, that
12 minimizing the source terms is a number one priority.
13 We have included this in the design based on good
14 design practice, also based on ALARA. There's also a
15 great extent of utility requirements document, talk
16 about source term minimization, fuel performance,
17 chemistry performance, etcetera.

18 When we reviewed our DCD against the
19 concept of source term minimization, we found no
20 places we thought we needed to change the design, but
21 we did find places that we needed to make new
22 commitments in the DCD. So we have now described some
23 chemical control aspects as being important to ALARA
24 and minimization of contamination.

25 Our utilities would agree they were

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1 important to performance. They're important to
2 meeting ORE guidelines, to participating in NPO top
3 quartile, etcetera of releases, but we've now
4 formalized some of the DCD as being key to part of
5 1406 compliance.

6 Overall simplification, we think that
7 simplification is one of the most important ways to
8 comply with 1406. And it's a fundamental concept to
9 AP1000 so we ultimately, although we reviewed against
10 it, we included no changes to the design for the DCD
11 because of 1406.

12 Using monolith basemats of the auxiliary
13 building in the containment, and this is -- I think
14 this slide is still in there, yes. This is just an
15 example and if I talk too much about this I'm going to
16 get myself in real trouble because I'm neither a civil
17 engineer nor a geologist, but just an example of what
18 our auxiliary building construction is like, that it
19 has two layers of mudmat with an impermeable membrane
20 between them, plus a six-foot basemat underneath the
21 entire auxiliary building of containment, six-foot
22 minimum basemat.

23 The auxiliary building walls are then
24 designed to be monolithic, single structure. It's not
25 a single pour, but they're designed to be a single

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1 structure with the basemat. So we aren't dealing with
2 expansion joints. We aren't dealing with sealed
3 joints. It is designed for the key parts of our
4 building for radioactivity containment are designed
5 with this sort of approach.

6 So back to here, we pursued this based on
7 what we thought was good design practice and again the
8 utility requirements document, we found that we had no
9 changes to make to 1406, but we think we demonstrate
10 compliance with the intent of 1406 with these regs.

11 CHAIRMAN RYAN: While you're on that last
12 point, one of the elements of that picture if maybe we
13 could see, certainly the design elements are there
14 with an impermeable barrier and substantial concrete
15 and no seams and so on. This may be reaching past
16 what you're ready to talk about today, but are you
17 thinking about how am I going to demonstrate
18 performance of that system over time?

19 MR. MENEELY: We haven't made any
20 commitments of demonstrating the performance of the
21 system over time beyond a commitment that the operator
22 will have a procedure in place to mitigate leakage.
23 So if he finds a leak, he's got to establish the
24 procedure to mitigate it.

25 CHAIRMAN RYAN: How is he going to know he

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1 has one if he's not looking?

2 MR. MENEELY: He has to inspect to
3 mitigate.

4 CHAIRMAN RYAN: Some of the interesting
5 parts of leakage, and I don't know if this is an
6 outside wall or not --

7 MR. MENEELY: Yes, this is an outside
8 wall.

9 CHAIRMAN RYAN: Do some environmental
10 monitoring or at least try and get ahead of it. This
11 Committee has thought a lot about trying to do
12 monitoring and modeling with the idea of getting ahead
13 of issues development kind of thing.

14 MR. MENEELY: We have put more emphasis to
15 date on the standard plant level in trying to prevent
16 the leakage through the wall, so the emphasis you're
17 going to see is on not allowing liquids to puddle
18 inside here, providing multiple barriers so that we
19 don't have liquids continuously sitting against this
20 wall.

21 CHAIRMAN RYAN: So that's really your
22 confidence builder is there's no water sitting in that
23 space that could leak out?

24 MR. MENEELY: That's correct.

25 CHAIRMAN RYAN: So that is kind of a

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1 proactive control program.

2 I mean you're controlling it by
3 eliminating the water, not by waiting for it to leak
4 through to a monitoring well?

5 MR. MENEELY: Right, exactly.

6 CHAIRMAN RYAN: So that's a good example
7 of what we've been thinking an awful lot about and the
8 idea is at least we're rattling around in our heads is
9 if folks under 1406, whether it's reactors or not, are
10 proactive and do that, maybe there's a benefit of
11 reduced decommissioning costs or funds or those kind
12 of things.

13 MR. MENEELY: It's going to be really
14 painful, some of the slides I can't show you today.

15 (Laughter.)

16 For example, our spent fuel pool is
17 entirely inside the auxiliary building. It has no
18 outside walls and the floor -- it's a suspended pool.
19 It has two floors below it. So if you have a spent
20 fuel pool leak, it would in the auxiliary building and
21 you'd see stalactites or something. So it's not a
22 pressurized wall on the outside of the plant.

23 We have and I'll get to this in a minute,
24 but there is a portion of the fuel transfer canal that
25 is an outside wall and we couldn't find a way to

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1 eliminate that. So we've got a combination of
2 approaches, one is that we've made it, instead of
3 steel liner, we made it half inch steel with full
4 penetration welds done in a factory. It's a module.
5 And the other is we're committing to ground water well
6 monitoring well considerations on that side of the
7 building.

8 CHAIRMAN RYAN: That's a confirmation of
9 design kind of approach and that seems appropriate for
10 that location.

11 MR. MENEELY: Right.

12 CHAIRMAN RYAN: Okay, great. I think
13 that's interesting you using both engineering and
14 prevention and observation, all three, in an
15 appropriate way based on the specifics.

16 MR. MENEELY: We're trying to use an
17 accumulation approach.

18 CHAIRMAN RYAN: Thanks and sorry for the
19 interruption.

20 MR. MENEELY: That's fine. Except for the
21 fact that it will take me a long time to get through,
22 I enjoy taking the questions as they come up.

23 CHAIRMAN RYAN: Thank you.

24 MR. MENEELY: Okay, another item that
25 gives a little different spin is prevention of leakage

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1 through doorways. Now we have included a substantial
2 amount of areas where we've designed the buildings to
3 have floor drains, to not have very many external
4 doorways in a radiological area. A number of
5 practices which will prevent leakage through doorways,
6 but we have not committed to it until we started
7 reading lessons learned of this being an area of
8 contamination.

9 So we came back and we put new design
10 criteria into our design to have berming, to have
11 floors sloped away from doorways, to have adequate
12 floor drains to prevent water from going out. That
13 probably would have been put into the design as part
14 of good design practice, but we haven't committed to
15 it yet, and we now have, both in our internal design
16 layout guidelines and in the description in the DCD
17 and rev 16. We've proposed that we commit to some
18 specific design features.

19 Similarly, restrictions on the application
20 of concrete block walls, a lesson learned of
21 contamination into the tops, the open tops of walls.
22 The utility requirements document had some
23 restrictions on these. We still were looking at
24 concrete block walls as removable shield walls. We
25 have now included more of our internal design criteria

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1 to either eliminate or specially design concrete block
2 walls and we have put in a description in the DCD to
3 commit to this to the NRC. So there are some areas
4 where we found some things, mostly at the level of
5 detail beyond what we had really worked on much for
6 AP1000 yet, but where we thought we needed to make
7 some commitments that would directly relate to 1406.

8 This is a bit what I was just talking
9 about is the AP1000 is designed, as I mentioned, for
10 modular construction and modular construction in terms
11 of buildings, particularly the ops building, means we
12 will make very, very large steel modules which are
13 welded out of half inch plate and entire end of the
14 auxiliary building including the spent fuel pool and
15 many of the rooms will be lifted into place as a left-
16 in-place concrete form.

17 So places where we either previously have
18 had unlined walls or we would have had a relatively
19 thin stainless steel liner, we now will have half-inch
20 mostly stainless steel plate on the walls. And I have
21 a couple of really good slides that I'm not going to
22 show you because it demonstrates how this works.

23 Continuing my dry tables, since I'm not
24 showing my graphics --

25 CHAIRMAN RYAN: You're doing a very good

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1 job of explaining them, so you're okay.

2 MR. MENEELY: I am not resorting to sock
3 puppets. Design for large component removal, we have
4 the utilities have had enough experience by the time
5 we started AP600 to insist that we provide them
6 detailed demonstrations on how you'll take a steam
7 generator out of this plant, how you'll remove a
8 reactor vessel head from this plant.

9 We also had the computer tools that our
10 predecessors did not have. So we have by nature of
11 the design done a good job of designing for large
12 component removal and we didn't find that we needed to
13 make any changes.

14 Minimization of embedded pipes, we have
15 done a pretty good job, but we came back and re-
16 viewed every embedded pipe that was considered in
17 the plant. I talked just now about the spent fuel
18 pool designing to eliminate leakage to the groundwater
19 and that's a combination of it being entirely inside
20 the auxiliary building and the walls being out of
21 half-inch steel plate.

22 Upon looking in more detail at this, we
23 committed to leak chases on the welds which we have
24 had a long internal debate about whether leak chases
25 were really a beneficial design. The lessons learned

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1 document was enough that we have now committed the
2 leak chases on the welds and to specific areas where
3 our COL applicants will have to review for monitoring
4 welds.

5 I'm running through my time here, so I'm
6 conscious of that, but another key area and this came
7 directly out of our utility operations, this is
8 somewhat a different philosophy is the AP1000 has
9 installed liquid and gaseous radwaste systems which
10 are adequate to demonstrate compliance with 10 CFR 20,
11 10 CFR 50, but we also have a large radwaste building
12 installed in the plant which is the bulk of the
13 building is truck bays which allow the applicant or
14 the operator, rather, to configure after market, after
15 design, radwaste systems, skid-mounted systems, so a
16 MWPS or anything like that.

17 These systems can be installed for a short
18 period of time for use during a refueling outage.
19 They can be installed for a long period of time
20 because the system it's installed is no longer state-
21 of-the-art. Experience has shown that radwaste
22 systems get out of date and if you install only one
23 approach that means that in a generation the operator
24 will be using a less than optimum system. So we
25 designed flexibility in the AP1000 to allow the

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1 operator to bring in an after-market system and use it
2 as a supplemental system to what's already installed.

3 So the primary importance of this is
4 reducing discharges is getting good off-site
5 performance, but the fact that it's engineered in up
6 front means that they don't have to cut out and -- I
7 can't think of the right word, but cut out and do in-
8 field modifications to allow these systems to be used.
9 They're designed up front to allow the use of these
10 systems.

11 So we did not make any changes to the
12 design of the DCD 1406, but we think realistically for
13 the life of the plant this would be a very significant
14 factor in reducing contamination and off-site
15 releases.

16 I talked some about this just a few
17 minutes ago as an example of a site-specific issue of
18 liquid radwaste discharge piping design outside of
19 buildings that recent operating experience has
20 obviously brought this to our attention, but the
21 lessons learned document did it also, so we have now
22 made some descriptions and some commitments both in
23 the DCD and outside. This pipe either has to be fully
24 inspectable or it has to be guard-piped with leak
25 testing, leak detection capability. We put in some

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1 specific issues on that.

2 Similarly, we put in a requirement that
3 all radioactive tanks with the extension of the
4 condensate storage tank will be inside buildings, will
5 have alarms, over-flow connections, pipe drains,
6 etcetera and that they're designed for the life of the
7 plant. This was the way our design was before trying
8 to implement 1406, but obviously not having any tanks
9 outside is a great boon in meeting 1406.

10 That's where I'd be showing our tanks
11 inside the building.

12 Now these are the three commitments
13 extending beyond the DCD, so these are beyond the
14 standard plant bases that we are making in our -- in
15 rev 16 in DCD. And I think I've probably mentioned
16 all three of these now in our discussion, but one is
17 for the applicant to characterize site subsurface
18 hydrology. That was actually already in the design as
19 a commitment based on prior staff feedback. A second
20 is to establish groundwater monitoring program. Now
21 there's a nuance here of we started off just putting
22 in a requirement for the applicant to establish
23 groundwater programs, but we decided that one of the
24 advantages we have as plant designers, the ability to
25 identify where they need it.

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1 So we identified the key areas of the plan
2 where the applicant will need to pursue groundwater
3 monitoring programs. And we were able to therefore
4 reduce somewhat the scope of this requirement by
5 telling, pointing out sites, for example, the fuel
6 transfer canal which is on that outside wall.

7 And then finally, to establish a program
8 as we say here, to document events of interest for
9 decommissioning and to remediate leaks with the
10 potential to cause groundwater contamination.

11 CHAIRMAN RYAN: If you don't mind
12 questions as we go, so I might ask a couple. I
13 understand the second one. That's monitoring at a
14 source for a potential leak, so that's fairly
15 straightforward, but boy oh boy, characterize a site
16 subsurface hydrology. That's a broad statement.

17 MR. MENEELY: That's a broad statement.

18 CHAIRMAN RYAN: Now two questions come to
19 my mind. Before you build it or after you build it is
20 going to be real different.

21 MR. MENEELY: Well, we're into the edges
22 of what I can adequately explain, but my understanding
23 is that we want a -- or the staff will want a
24 characterization of the plant as it will operate.

25 CHAIRMAN RYAN: Okay. That's a

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1 substantial influence on the -- at least the near-
2 field surface hydrology. And near subsurface
3 hydrology.

4 MR. MENEELY: And in real life it's
5 perhaps worse than that because all of these plants
6 are going on additional units or almost all of them on
7 sites which have already had disturbed earth.

8 CHAIRMAN RYAN: Right.

9 MR. MENEELY: There's already been an
10 excavation done, so --

11 MEMBER HINZE: Could I follow up with a
12 question on that?

13 CHAIRMAN RYAN: Let me just plug in one
14 more because I've been learning hydrology from you for
15 years now and I want to show off.

16 (Laughter.)

17 I'll run out of things to say.

18 MEMBER HINZE: I'm waiting.

19 (Laughter.)

20 CHAIRMAN RYAN: It's interesting to think
21 about multiple units because it really is a complete
22 system on that site. And I guess I think about a
23 notion of you can put in wells, frankly, and go nuts
24 putting in lots of wells, but if you wait a while for
25 the first few years of the plant and as you gather

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1 rainfall data and infiltration data and water level
2 data for the whole site, you can develop a more
3 coherent model as time goes on.

4 And if you have kind of a combination of
5 the monitoring where the leaks can actually happen
6 with high confidence, and then we're doing some kind
7 of a program that's longer term in nature, we probably
8 can come up with some reasonable plan for how do you
9 build confidence in the understanding of the hydrology
10 over time without putting in a zillion wells.

11 How did I do?

12 MEMBER HINZE: Great.

13 CHAIRMAN RYAN: Next question from
14 Professor Hinze.

15 MEMBER HINZE: I was just going to ask the
16 question do you ever mitigate the existing site
17 subsurface hydrology, changes of the -- is that ever
18 considered?

19 MR. MENEELY: I'm going to have to beg off
20 and say this is specifically in as a combined license
21 applicant because it is so site specific and we're
22 beyond -- I'm sorry -- just beyond where I'm confident
23 to answer.

24 CHAIRMAN RYAN: It is very much site
25 specific, that's a fair answer.

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1 MEMBER HINZE: But the question is whether
2 this can be a possibility that one might do some
3 modification of the subsurface, put in dewatering
4 wells whatever, there are a number of possibilities.

5 I would assume that the NEI/EPRI workshop
6 on groundwater covered much of this.

7 MR. MENEELY: Yes.

8 MEMBER HINZE: And those reports on those
9 workshops are available?

10 MR. MENEELY: I believe they're publicly
11 available. NEI is nodding, yes.

12 CHAIRMAN RYAN: Sorry, Jim. Thanks for
13 the interruption.

14 MEMBER CLARKE: Let's continue too. Time
15 management is always a challenge.

16 MR. MENEELY: I'm almost done. In fact,
17 I'm sure I am. Just my summary slide.

18 I shall repeat what I've said that because
19 of our AP600 roots, the AP1000 missed 1406 in our
20 application, but we drew on a number of things which
21 we think gave us a pretty good pedigree with respect
22 to our standard plant design with respect to 1406 and
23 therefore we think that at least on a practical basis,
24 as we view it from the standard plant that we have a
25 high degree of conformance against what we think

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1 should be done with 1406.

2 And we're fairly happy after reviewing its
3 lessons learned and just let me state that the need to
4 maintain standardization, there is not an hour that
5 goes past in our office that somebody doesn't get
6 complaints about that you're diverging from the
7 standard. And I think that timeliness and
8 standardization are really giving Westinghouse some
9 concern over this issue, that if we regulate it on a
10 license -- on a combined license applicant basis
11 fully, it's going to lead to divergence of design and
12 that's something that none of us can really afford.

13 We're hoping for early feedback, rather
14 than late. And that's all.

15 MEMBER CLARKE: Tim, thank you very much.
16 The agenda doesn't provide a whole lot of detail on
17 what we're doing this afternoon, although at some
18 point we'll take 15-minute break, so here's what I'd
19 like to suggest. Let's take a round of questions,
20 starting with our expert panel and go from there.

21 So I think what I'd like to do is at this
22 point and by the way, we're scheduled for an hour
23 roundtable at the end of all the presentations,
24 however, we're asking people to hold their questions
25 until we've gone through four talks I think is a

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1 little unreasonable.

2 So let me suggest a compromise that we go
3 around the room once and see where we end up. So ask
4 your best shot, ask your best question. If you can,
5 save the rest of them for the roundtable.

6 Eric, would you like to begin?

7 MR. ABELQUIST: I have a very general
8 question. I'm not sure it might be better saved until
9 the end.

10 MEMBER CLARKE: Your decision.

11 MR. ABELQUIST: Well, let me lob it out
12 here. The summary statement, the third bullet, we
13 believe AP1000 provides a very high degree of
14 conformance. All of these items that were presented
15 are very good plant features that will address the
16 objective of minimizing contamination and providing
17 early detection, etcetera.

18 It just strikes what is good enough?
19 Where is the mark here? How do you know when you have
20 picked enough of these items to address and which ones
21 do you leave on the table that haven't been addressed
22 and say this is as fast as we are going to go? So
23 it's a very broad question, but it is the one that I
24 am struck with at this point.

25 MR. MENEELY: And I think as a backdrop to

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1 that, particularly when one is working with a
2 simplified plant in the first place and a plant where
3 we knew a lot of lessons learned in the background, so
4 that there are a lot of things are happening sort of
5 for free as far as 1406 is concerned. It's just the
6 way that you do it now is better. I have a DCD that
7 describes how far I think you should go.

8 MEMBER CLARKE: Thanks, Eric.

9 Eric Darois?

10 MR. DAROIS: Yes, I had three but I will
11 limit it to one until now.

12 MEMBER CLARKE: Thank you.

13 MR. DAROIS: It's really more of a comment
14 than anything. You are focusing on installation of I
15 guess I would qualify it as traditional groundwater
16 monitoring wells as part of the design. I guess my
17 only comment is bear in mind that there is some
18 research going on involved with some of it with EPRI
19 trying to look at more innovative ways of detecting a
20 leak to the subsurface environment, one being soil-
21 gas extraction systems and detection for tritium and
22 what not, but I won't go into the details.

23 All I would suggest is make room for that
24 in lieu of traditional wells. We don't know how the
25 research is going to come out in early phases of it,

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1 but it may be there is a better way to do this. So I
2 don't know where you are at in terms of hard-coding in
3 a traditional groundwater monitoring well.

4 MR. MENEELY: I think that although orally
5 I talked about groundwater monitoring wells, I think
6 what we have committed on behalf of our COLs is for a
7 groundwater monitoring program. So I think it leaves
8 some flexibility for -- maybe they aren't wells --
9 some different technology.

10 MR. DAROIS: Thank you.

11 MEMBER CLARKE: I just want to make a
12 quick comment and then I will turn it to Ruth, but I
13 think the observations Dr. Ryan made about your focus
14 on putting facilities where you can keep an eye on
15 them and not letting releases make it outside the
16 building or whatever containment they're in is an
17 awfully good approach. If you can't do that for
18 everything, then you are -- you need some of these
19 other things that Mike and Bill were talking about.
20 When you characterize and how you characterize are
21 awfully important, but the goal is that if you do have
22 the release of significance, and you can't see it, you
23 don't see it happen, then you have got to be able to
24 detect it. The sooner you detect it, the better off
25 you are. The sooner you deal with it, the better off

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1 you are. This is kind of where we as a Committee are
2 coming to. I just wanted to share that observation.

3 Ruth?

4 MEMBER WEINER: My question -- you may
5 want to wait until the rest of the workshop and others
6 may want to add to that. What if you do have an
7 extrusion? In other words, I'm quite impressed with
8 what you say about the fuel pool and how it is being
9 constructed to minimize the risk thereof, because you
10 can't eliminate it entirely. What is your plan in the
11 event that your system doesn't entirely work?

12 MR. MENEELY: From an overall basis, you
13 mean?

14 MEMBER WEINER: Yes.

15 MR. MENEELY: Not particularly the fuel
16 pool?

17 MEMBER WEINER: No, not particularly in
18 the fuel pool. I'm just using that as an example.

19 MR. MENEELY: I think that to keep the
20 dichotomy of the vendor versus the operator here, and
21 to the extent that we have gone in the DCD now is this
22 third point of they have to have a program, they will
23 document and provide for remediating events for the
24 potential of groundwater. That is going to be an
25 important program. We have had some discussions about

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1 what that program will look like. That's not only
2 Westinghouse that will rate that, that's our
3 applicants who will rate that.

4 So because we know that there will be a
5 drip at least outside that's tritiated water, and you
6 can't design that all out. So I'm going to put the
7 onus on that program and say that it is not written
8 yet, so we don't know.

9 MEMBER WEINER: Well, you just made a very
10 important statement. You can't design everything out
11 and I think that's one of the points I expect we will
12 come back to is what when you get something that you
13 didn't expect.

14 MEMBER CLARKE: That piece there will be
15 offered site-specific, I think, which is another.

16 MR. MENEELY: Right, and that's -- I want
17 to make two follow-up comments on that that these, as
18 I said, these are commitments extending beyond the
19 DCD. They are outside the standard design, but the
20 other fact is that there are only three of them. So
21 we have tried to push as much into the standard design
22 as we can and to limit what we do outside.

23 CHAIRMAN RYAN: Just a second on the
24 comment that I think the last statement that you made,
25 Jim, is very much on target. To me the potential for

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1 a leak isn't so much, because there are permitted
2 releases in air and water from nuclear powerplants.
3 It's where does it go? Is it, you know, on into the
4 river and then on into some long care model pollution
5 or is it to a school next door or something else?
6 There's a big site-specific aspect to how releases are
7 managed and viewed. Maybe that's just where we ought
8 to leave it for the moment, but you might do something
9 at one place that's more remote or rural, but if
10 you've got adjacent property owners or other issues,
11 you might take a different view of that same question.
12 Just from a risk management standpoint, not in a rem
13 or millirem, because those are usually pretty small
14 attributionally. But just as an overall plan.

15 MR. MENEELY: The first company that comes
16 out with a resin that's tritium-specific is going to
17 sell a lot of them.

18 (Laughter.)

19 MEMBER CLARKE: Allen, do you --

20 VICE CHAIRMAN CROFF: I will try one.

21 This may be too site-specific, but does the design say
22 anything about disposal of solid waste onsite?

23 MR. MENEELY: The AP1000 does not have a
24 long-term waste storage facility as part of it. We
25 have an accumulation area, but we do not, except for

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1 fuel and the fuel pool complex of rods, we don't store
2 solid waste on site. We do say -- we talk about
3 minimization of waste. Shall we use, for example,
4 demineralizers, ion-exchanged based systems instead of
5 evaporator based systems? Our gray rod approach to
6 load follow, those are designed to minimize solid
7 waste, but we don't talk about accumulating or storing
8 solid waste on site, because we don't do it. Does
9 that answer your question?

10 VICE CHAIRMAN CROFF: I think you used the
11 word storing and I was asking more about disposal.
12 Does the design -- do design requirements extend that
13 far or is that a site-specific decision?

14 MR. MENEELY: That is site specific.
15 You're talking about low-level waste, right?

16 VICE CHAIRMAN CROFF: Yes.

17 MR. MENEELY: So it is site-specific
18 because of different compacts. You know, for China,
19 we are pursuing a very specific solution of they want
20 not life of plant, but they want long-term waste
21 storage on the site and so they are pursuing a
22 separate facility, which will be shared by multiple
23 units to store waste on a site, but it is not part of
24 the base AP1000 design.

25 VICE CHAIRMAN CROFF: Okay. Bill, do you

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1 have a quick one?

2 MEMBER HINZE: Yes. Quick one, if I
3 might. One of the potential sources of leakage is the
4 frequency, the amplitude, the duration of vibratory
5 motion. Is there anything in this AP1000 that is
6 making the system more robust to vibratory motion?

7 MR. MENEELY: You are talking about the
8 primary system? The reactor coolants?

9 MEMBER HINZE: Yes. Right.

10 MR. MENEELY: Well, I never thought of it
11 in those terms. We have, for example, designed for a
12 leak before break. So we have done extensive fatigue
13 analyses and analyses of supports for the primary
14 loops. I think the answer to your question is we
15 haven't specifically looked at it, but intrinsically
16 the simplified primary loop arrangement and the
17 reduced number of small piping connections, I think
18 are both in the right direction. The fact that we
19 have analyzed for LBB, they show that our fatigue
20 loadings are very low through our support system. I
21 think those are in the right motion.

22 The cam motor, reactor coolant pumps, I
23 don't think -- the cam motor coolant pumps have an
24 enormous flywheel in them, which is going to tend to
25 dampen things. I'm thrashing around here. I don't

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1 have any specific answers.

2 MEMBER HINZE: Thanks

3 MEMBER CLARKE: Tim, thank you very much.

4 Our next speaker is Eric Kirstein, from GE
5 Nuclear. He is from the ESBWR Group and he will
6 present a brief introduction to the ESBWR design and
7 how the requirements of 20.1406 have been addressed in
8 their documentation so far.

9 Eric, welcome, and thank you.

10 MR. KIRSTEIN: I think I will get us back
11 on track schedule-wise. I don't think my presentation
12 will be as long.

13 Quick Summary. The DCD, the ESBWR DCD,
14 was docketed in December of 2005 for revision 0.
15 We're currently, we've issued revision three in
16 February of this year, and we're looking to issue
17 revision four by the end of the summer which will
18 incorporate COL items and various REI responses we've
19 addressed since revision three.

20 What I'm just going to do here is provide
21 a brief history of the evolution of our compliance of
22 10 CFR 20.1406 as it pertains to the DCD. We created
23 DCD section 12.6 to specifically address 10 CFR
24 20.1406. This was added in revision one as a result
25 of some comments by the staff. It essentially

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1 consolidates much of the info which is -- we had
2 examples of compliance at 20.1406 in Chapter 12 in the
3 DCD and other various sections and we went ahead and
4 consolidated those items in this newly created section
5 12.6 of the DCD.

6 If you've had a chance to look at 12.6, I
7 apologize. A lot of this is essentially pulled
8 straight out of the latest revision of 12.6. 12.6.1
9 discusses the examples that minimize contamination and
10 so that decommissioning for design features and
11 operational aspects.

12 To briefly -- to kind of go down these
13 bullets. The first few deal with crud build-up, crud
14 traps, designing the equipment to minimize the build-
15 up of material and facilitate the flushing of these
16 crud traps.

17 Obviously, our reactor rod cleanup shut-
18 down cooling system and the demineralizers that
19 minimize crud build-up, just a general design feature
20 of the plant. Provisions for -- implementing
21 provisions for draining and flushing and
22 decontaminating piping, mainly piping and equipment.
23 Any penetrations through exterior walls of a building
24 that happen to have radiation sources shall be sealed.
25 General basic practices to prevent miscellaneous leaks

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1 to the environment.

2 The sump vents are going to be piped
3 directly to the rad waste HVAC system to kind of -- to
4 remove the airborne contaminants that occur from the
5 sump discharges. We plan on designing slope floor
6 drains in areas where a potential for a spill exists
7 to limit the extent of the contamination. An
8 important feature we plan on implementing is a
9 provision for epoxy-type wall and floor coverings,
10 which will provide smooth services to use the
11 decontamination process.

12 The floor and drainage sumps are going to
13 be stainless steel lined. Crud build-up will be
14 reduced as a result. And once again, decontamination.
15 Basic principle of reactor design, areas that have
16 airborne radioactivity. Air flow goes from low
17 potential contamination to high potential
18 contamination, basic feature. Similarly, the reactor
19 building HVAC system contaminated in clean areas,
20 clean area system circulates the air through the clean
21 areas and obviously the contaminated area system
22 circulates the air through the contaminated areas of
23 the building.

24 Our Fuel and Auxiliary Pool Cooling System
25 has filtered demin. units which will reduce the

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1 radioactive contamination in the pools of ESBWR.
2 ESBWR plans to limit the use of the cobalt-bearing
3 materials, which have historically been an --
4 on moving components, I apologize, that are identified
5 as a major source of bin water contamination.

6 If I can state too this first cut that I
7 am going through right now was our initial take on our
8 compliance of 20.1406. I'll get in some future slides
9 here sort of the evolution of where we have gone since
10 then. But this was kind of our first cut. We created
11 DCB section 12.6.2 to show that -- to provide examples
12 for design procedures for operation to minimize the
13 generation of liquid rad waste. These bullets are
14 pretty basic. They essentially just discuss the
15 various aspects of the waste management systems.

16 Liquid Waste Management Systems are
17 divided up into several subsystems, so that the
18 sources are segregated and processed separately, which
19 provides the most efficient process for the specific
20 types of impurities and the chemical contents. The
21 Liquid Waste Management System removes the radioactive
22 contaminants and the bulk of the liquid is purified
23 and returned to either the condensate storage tank or
24 it is discharged to the environment, which minimizes
25 the overall liquid rad waste.

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1 Solid waste management system segregates
2 the wet and dry waste for off-site shipment and
3 burial. And then lastly, for ESBWR being at a BWR,
4 our off-gas is radioactive and our off-gas system with
5 a series of charcoal beds delays the fission products
6 through decay, through hold-up and decay of the
7 various noble gases.

8 We also stated some examples that minimize
9 the generation of rad waste during decommissioning,
10 and if you'll notice, I think these three bullets have
11 been stated previously. We just sort of restated them
12 to bring them forth. Reduction of cobalt content,
13 minimization of the crud buildup in the drains by use
14 of stainless steel linings, which obviously improve
15 the drainage and help facilitate the flushing. Once
16 again, surface decontamination eased by the epoxy-type
17 wall and floor coverings.

18 So that was our initial cut at compliance
19 of 10 CFR 26.406. We received an RAI 12.7-1. I'm not
20 sure what the ADAMS number is for that, but in bold
21 you can see -- I won't read through -- it's
22 essentially a request to provide techniques that are
23 stated in NUREG/CR-3587, and to what extent these
24 features were incorporated into the ESBWR design.

25 The basis for the RAI response that we

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1 provided back in -- just last month, May of '07 -- is
2 I believe the same -- yes, it's the same ADAMS numbers
3 my counterpart was discussing, the lessons learned
4 document.

5 So have not been incorporated into the --
6 these will be incorporated in revision 4, the DCD.
7 These are markups to the DCD. We will incorporate
8 these in revision 4 that were provided to the staff.

9 The additions are shown in red font. When
10 we discussed the slope drains, the one item and I
11 apologize. I don't have a graphic to show exactly
12 which of the items in the lessons learned document are
13 addressed as a result of these, but I think you'll see
14 a lot repeat items from the previous presentation.

15 The floor drains for ESBWR will be a
16 monolithic construction as concerned for contamination
17 to penetrate grout around the drains. The drains for
18 ESBWR will not have grout used in the installation of
19 these drains. And then on top of that, size design
20 features visual -- periodic visual inspections will
21 occur during installation of the floor drains to
22 ensure that no potential pathway exists for leakage
23 around these drains.

24 Another item to facilitate
25 decommissioning, the various buildings are designed

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1 for large equipment removal which consists of large
2 entry doors and various equipment hatches for removal,
3 for movement of large equipment throughout the
4 buildings and out for decommissioning.

5 Similarly, as discussed for AP1000, ESBWR
6 will have a mobile liquid radwaste system which are
7 skid-mounted and they're located in the liquid waste
8 treatment system bay in the radwaste building to allow
9 easy truck access and skid loading and unloading for
10 operation, obviously, and also for the decommissioning
11 process.

12 And also, embedded piping in concrete,
13 radwaste piping, minimization of the short sections of
14 the piping to the extent practical will facilitate the
15 dismantlement of these systems and decommissioning.

16 We've not gotten to the detailed design
17 phase yet where we know the actual runs, but this
18 criteria has been set up to minimize the amount of
19 piping embedded in concrete.

20 Leak detection. Spent fuel pool will have
21 a liner. This is a note I was going to make at the
22 end, but our spent fuel pool will have a liner and a
23 leak detection system to monitor any leakage during
24 plant operation. And then similarly, there's a
25 concern of the underground tunnels to and from the

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1 radwaste building which contained radwaste piping to
2 mitigate seepage of radionuclides into the concrete
3 through these tunnels. The concrete in the radwaste
4 tunnels will be sealed. One is to halt the seepage of
5 radionuclides and also for ease of decontamination.

6 The tunnels also have floor drains to
7 remove any potential fluid that might leak from the
8 piping, and plant procedure is not from a design
9 standpoint, but plant procedures will require visual
10 inspection of the radwaste piping of these tunnels.

11 And the criterion of concrete block wall
12 construction, ESBWR will not have concrete block wall
13 construction. Essentially, what will be used in place
14 will be these metal, metallic blocks which are filled
15 with concrete to -- there's no porous concrete that
16 needs to be decontaminated and the outer surface of
17 these walls is steel which is easier, much easier for
18 decommissioning.

19 This essentially was -- an RAI was issued
20 prior to our issuance of our response to the RAI 12.7-
21 1. You can go ahead and read through it, but I
22 believe the only item here that we addressed on top of
23 that -- on top of what we had addressed in 12.7-1 was
24 the discussion of, as you can see in our response, the
25 underlying text which I had mentioned previously was

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1 the single liner of the spent fuel pool and its
2 associated leak detection system.

3 That's it. It was a lot quicker than I
4 thought it was.

5 So that's currently, I mean where we
6 stand. We look forward to gaining some lessons
7 learned and some insight through this workshop to be
8 able to take back with us and we'll enter our IDC as
9 we're still analyzing some processing and subsequent
10 revisions to come.

11 So I told you it was going to be short and
12 it was.

13 MEMBER CLARKE: Thank you, Eric.

14 MR. KIRSTEIN: I'll take any questions or
15 comments.

16 MEMBER CLARKE: Let's start with Eric
17 Darois and we'll follow the same plan. We'll take one
18 round of one question each and see where we go.

19 MR. DAROIS: In regards to the epoxy
20 coating on floors, some of the newer plants that are
21 in operation today, granted they're 20 years old now,
22 but they did the same thing and 20 years later they're
23 dealing with epoxy surfaces that have worn and I mean
24 they clearly require maintenance.

25 So the first comment is that maintenance

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1 program probably ought to be part of procedures of
2 programs somehow, specifically for those coatings, but
3 I guess the one that I'm curious about more is the
4 radwaste tunnels, given that those are epoxy coated
5 and those are areas that are likely to be
6 radiologically challenging to maintain, to do visual
7 inspections and certainly to recoat if they become
8 worn and what not.

9 How is that being addressed or is it, how
10 is that detail being addressed here?

11 MR. KIRSTEIN: Well, epoxy coating, we're
12 not completely married to the idea at present. I'm
13 not an expert by any means, but I've been told by some
14 of our engineers that there's also some sort of
15 additive that can be mixed with the concrete to
16 provide the same similar properties.

17 So we're not necessarily tied to epoxy at
18 the present, but I believe to address your concern I
19 think that would definitely at present would have to
20 be an operational inspection.

21 We are considering other -- we're not tied
22 to epoxy at the present. We're kind of looking at
23 other alternatives.

24 MEMBER CLARKE: Eric Abelquist?

25 MR. ABELQUIST: I was wondering if you

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1 could share a few additional details about the leak
2 detection system on the spent fuel pool?

3 How does that work?

4 MR. KIRSTEIN: I just can't tell you.
5 That's not my area.

6 I believe it's -- had I brought a copy of
7 the DCD with me, but I believe it's described in
8 another section of the DCD. I don't have anything
9 that I can tell you at the present. I apologize for
10 that.

11 MEMBER CLARKE: Thanks, Eric. Dr. Hinze?

12 MEMBER HINZE: Are there any radioactive
13 components that get into the epoxy and thus in the
14 decommissioning -- that the epoxy has to be removed?

15 MR. KIRSTEIN: In what terms?

16 MEMBER HINZE: Well, like you would
17 sandblast a concrete wall to remove any of the
18 radioactive materials that have gone into the concrete
19 or the concrete block? Do you have to do that with
20 epoxy?

21 MR. KIRSTEIN: I'm not aware of that. I'm
22 not sure.

23 MEMBER HINZE: Thank you.

24 MEMBER CLARKE: Allen?

25 VICE CHAIRMAN CROFF: In one of your first

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1 slides, you noted penetrations through the walls of
2 the building containing radiation sources are sealed
3 to prevent leaks.

4 You mean sealed permanently?

5 MR. KIRSTEIN: Where was that?

6 VICE CHAIRMAN CROFF: The previous one.
7 About halfway down.

8 MR. KIRSTEIN: I don't think we're that
9 far along in the process to determine -- I guess we
10 can determine, but we haven't thought through the
11 details of the characteristics, I guess, of the
12 sealant. If that's what you're asking?

13 VICE CHAIRMAN CROFF: No, my comment is if
14 you're going to seal penetrations permanently, why
15 have a penetration to start with?

16 MR. KIRSTEIN: This is just a basic design
17 feature of any piping or penetrations throughout the
18 walls. It's not anything, I believe, that's above and
19 beyond what currently exists.

20 VICE CHAIRMAN CROFF: They're not cutting
21 the pipe off and closing it, the sealing of the pipe
22 isn't past a certain wall?

23 MR. KIRSTEIN: This is a basic, we're
24 talking bare bones.

25 VICE CHAIRMAN CROFF: Caulking around the

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1 pipe --

2 MEMBER CLARKE: Mike?

3 CHAIRMAN RYAN: My question is probably
4 more general and don't feel like you have to answer
5 because it might be more for the roundtable, but I'll
6 let everyone think about it now. There's a lot of
7 common things that you said and we heard in the
8 previous presentation and it sounds like your efforts
9 on addressing 1406 are continuing to minimize the
10 production of radwaste by putting in systems that
11 avoid it. I think that's commonly involved.

12 Over the years, there's been a tremendous
13 effort to minimize what's produced in an outage and
14 crud management, water chemistry management and all
15 those things that ultimately have a payback on reduced
16 radwaste.

17 The second is some basic features of
18 design, layout, component selection, all which again
19 help minimize emanating something that otherwise
20 wouldn't be contaminated or minimized in the
21 production of waste.

22 So there's really those two areas. Am I
23 missing any major area where things could be done or
24 are being thought about differently?

25 Maybe the third is the environmental part,

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1 it's stuff outside the plant, paying attention more to
2 the environment. It's not, oh, it's within tech specs,
3 I'll let it go. Sometimes you can let it go and it's
4 fine. Sometimes you'll let it go and it's a big clean
5 up mess.

6 MR. KIRSTEIN: Currently, the approach
7 that we're taking is obviously to minimize or not
8 eliminate, but minimize it getting out in the first
9 place.

10 CHAIRMAN RYAN: Yes.

11 MR. KIRSTEIN: We're treating it
12 currently, the way it stands right in the DCD, we're
13 just trading it in DCD space and trying to minimize
14 the waste and minimize -- having features to reduce or
15 eliminate the --

16 CHAIRMAN RYAN: One specific question on
17 the BWR side. Are you doing anything different on the
18 off-gas treatment system?

19 MR. KIRSTEIN: No, it's pretty much the
20 same.

21 CHAIRMAN RYAN: It's held up to decay?

22 MR. KIRSTEIN: Yes.

23 CHAIRMAN RYAN: Okay, thanks.

24 MEMBER CLARKE: Thanks, Mike. Ruth?

25 MEMBER WEINER: Two really divergent

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1 questions. The first is -- oh, I only get one. Okay,
2 I'll take the most important one.

3 How would you decommission piping that is
4 embedded in concrete? I mean you have to cut up the
5 whole thing and haul it off? What's your plan for
6 that?

7 And the reason I ask the question is it
8 seems to me that at the decommissioning workshops that
9 we all went to a couple of years ago, this was
10 mentioned as one of the major barriers to efficient
11 decommissioning of a plant or any large facility that
12 has piping.

13 When you embed in something, with the
14 intent that it's virtually permanently embedded, what
15 do you do then?

16 MR. KIRSTEIN: Well, I mean, from our
17 standpoint we're obviously trying to minimize it, how
18 it's actually performed, I would assume it becomes
19 part of your waste and obviously to minimize that your
20 goal is to minimize that to obviously reduce the
21 amount of volume of waste that you have in the first
22 place.

23 How it's physically done I --

24 MEMBER WEINER: Do you have criteria for
25 what piping actually has to be embedded and minimize

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1 it that way? In other words, how do you go about
2 minimizing it?

3 MR. KIRSTEIN: At the present, I believe
4 that's going to be coming up in the detailed pipe
5 routing phase. We're not even at the point of
6 detailed pipe routing. But by establishing this
7 criterion and through reviews, we plan on keeping that
8 to a bare minimum.

9 MEMBER WEINER: Okay.

10 MEMBER CLARKE: Thank you, Ruth. Eric,
11 thanks very much. Appreciate it.

12 Let's do one more presentation and then
13 take a break.

14 Our next speaker is Ralph Andersen from
15 the Nuclear Energy Institute. Dr. Andersen has
16 spearheaded efforts at NEI and EPRI to contribute to
17 decommissioning lessons learned and to address these
18 lessons learned in the designs of new reactors.

19 He'll address the efforts of NEI and EPRI
20 to contribute to the development of Reg Guide 4012.

21 Ralph?

22 MR. ANDERSEN: Well, thank you very much.
23 I appreciate the opportunity to be here on a topic
24 that -- this is the microphone. Very good.

25 This particular requirement is always very

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1 interesting to me because although it was a part of
2 the license termination rulemaking, I think that it
3 really is a case of having laying dormant during the
4 front-end process of formulating the new regulatory
5 framework for licensing new plants.

6 And so I see us as very much on a learning
7 curve in figuring out what we really want to
8 accomplish with this requirement and how best to
9 implement it both from a regulatory point of view, a
10 designer's point of view and an operator's point of
11 view.

12 So my presentation really is going to
13 focus more on process and going forward than it is on
14 design details, although I appreciate the
15 presentations made by Westinghouse and General
16 Electric.

17 I think that we've also -- will see and
18 have seen from NRC immense focus on substance and
19 design detail as well, but I fear that we're not
20 paying enough attention to objectives to process. So
21 that's where I intend to go with this.

22 As a prologue, we've actually had a number
23 of public meetings with the NRC over time on 20.14-06,
24 actually extending all the way back to 2005, when we
25 began having interactions on radiation protection

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1 chapter of the FSAR up through the present. And more
2 recently, some of these meetings have been
3 specifically focused on 20.14-06.

4 We've had the opportunity previously to
5 address the ACNW and I would call to your attention
6 that, in fact, we have provided a considerable amount
7 of detailed information in the past, both to ACNW and
8 NRC staff.

9 You might recall that last year, we talked
10 about decommissioning lessons learned, tried to make
11 a fairly extensive presentation on lessons learned,
12 many of which apply to 20.14-06. We had an earlier
13 meeting this year with NRC staff on 20.14-06 in which
14 we included a presentation. And by the way, all of
15 these materials that occurs to me for your
16 convenience, I think I'll email these to Derek after
17 the meeting, even though they're in the PDR, it
18 wouldn't necessarily be easy to find.

19 We actually submitted a technical report
20 to NRC in which we captured the lessons learned out of
21 our groundwater protection initiative that
22 specifically go to the subject of design and
23 operational programs for new plants. And then in
24 parallel to this with the decommissioning lessons
25 learned project of NRC, we have and will continue to

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1 provide a substantial amount of information for not
2 only minimizing contamination in radwaste but also
3 more generally for facilitating decontamination.

4 Just for illustration, I included some of
5 the examples that have been in this previously
6 provided material. Many of these are things that you
7 heard in the previous two presentations and
8 undoubtedly we'll hear in the presentation by the NRC
9 staff.

10 In terms of thinking of facilitating
11 decommissioning, these are some examples of things
12 that come out of that. I will comment embedded piping
13 always seems to head the list. I confess that I'm
14 conflicted. My areas of work are health physics and
15 radwaste, so when I look at a pipe that is going to
16 carry radioactive fluids, I'm always looking at it two
17 ways. I'm looking at it immediately as something that
18 I want to see embedded. I don't want anybody getting
19 any exposure from it. I want it shielded. I want it
20 not accessible. And then on the other hand, I look at
21 it as a future radwaste problem at the time of
22 decommissioning.

23 So I would just mention in that for
24 simplicity that I think the key question is to come up
25 with criteria that strike the right balance. But it

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1 is a very challenging topic in a plant design where
2 you don't have an infinite amount of space. I do
3 recall one plant I worked at, just as an example, that
4 went out of its way to avoid embedded piping. And so
5 a lot of piping was put in overhead, so we had large
6 spaces in the floors.

7 What we ended up with were high radiation
8 areas in the overheads, and we actually because of NRC
9 requirements had to do postings. So when you were
10 walking through the building, you happen to glance up
11 and actually saw these horizontal access ropes with
12 high radiation area postings. It was very
13 disorienting in a way. Obviously, people didn't go up
14 into those areas routinely, but it does create
15 interesting challenges to balance this issue of
16 imbedded piping. I illustrated that example because
17 I honestly think that is true of a number of things
18 that come up when you look at them only narrowly
19 through the subject of 20.1406 and decommissioning.

20 So let me make a comment at this point.
21 We don't actually design nuclear power plants for the
22 purpose of decommissioning them. They actually serve
23 another function in our society. Just as we don't
24 design nuclear power plants for the purpose of seeing
25 how much radiation dose we can reduce. Those are

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1 things that we carry into the operation of those
2 plants. They're really there to make electricity
3 safely, economically, and efficiently.

4 So one comment that I would make about
5 20.1406, we need to be careful that we don't put this
6 out of proportion as to the overall set of
7 requirements and commitments and obligations that we
8 are trying to fulfill when we employ nuclear energy
9 for peaceful purposes.

10 I included in my presentation, I'm
11 certainly not going to read it for you, but just a
12 reminder of what the actual requirement says. There
13 are some key words in here that I will summarize in a
14 moment, but I also direct your attention to the
15 Federal Register notice for the final rule which also
16 offers a little bit of clarification. For instance,
17 minimizing generation of radioactive waste during
18 decontamination.

19 I take that to mean during
20 decommissioning. I don't see this as a requirement to
21 see if I can minimize radioactive waste during
22 operation, but in fact I would contend that NRC
23 regulations generally already have that implication in
24 them. But I don't see it as specific to this
25 particular requirement.

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1 Additionally, as a reminder, the intent
2 really was to take advantage of the fact that we need
3 to back this up earlier in the process at the concept
4 and design stage of plants and then through the
5 construction.

6 But the license renewal issue was
7 dispositioned as part of that final rule as well, why
8 we wouldn't be trying to backfit this type of
9 requirement into existing facilities. I know that
10 idea comes up once in a while. It will be an
11 interesting debate if the concept ever goes forward.

12 Some concepts that I personally derived
13 out of looking at both the rule and the background to
14 the rule is the emphasis on the early stage. It
15 really is trying to get things right upfront. That is
16 the correct approach to take. But let's not lose
17 sight that we're talking about minimizing to the
18 extent practical. We're not talking about
19 eliminating. It's a balance. And also what we're
20 trying to accomplish is to facilitate eventual
21 decommissioning. That's the focal point. It's not
22 minimize contamination for the sake of minimize
23 contamination. It's not minimize radioactive waste
24 for the sake of minimizing radioactive waste.

25 Ultimately, as I understand the basis for

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1 the rule coming forward, it represents an expression
2 of a concern that not controlling these things during
3 the operation of the plant might challenge the ability
4 and the options that are available at the time of
5 decommissioning -- a challenge to the resources in
6 terms of funding and in terms of options, not having
7 to go to restricted use options as opposed to
8 furnishing a green field site.

9 So that's a pretty big concern out there
10 and I worry sometimes that we're really getting down
11 in the grass and wondering how many radioactive atoms
12 of contamination we can eliminate if we do some
13 additional design features. So I think we just need
14 to keep the end in mind. The bottom line is I think
15 cost effectiveness somehow gets lost in some of the
16 discussions. I raise as an analog the requirement for
17 ALARA. We have been dealing with that for a long time
18 in regulatory space.

19 We've actually dealt with several
20 iterations of it, ranging from a regulatory good idea
21 to a regulatory requirement. So I think we have
22 lessons learned, if we were to look back. I'm not
23 sure we're taking advantage of those. But the
24 industry has gone through a long evolution as a
25 regulator in the ALARA topic.

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1 What I would contend is that the NRC took
2 a very enlightened approach in placing the
3 responsibility for solution development on the
4 licensee, setting broad guidelines and objectives in
5 regulation and then letting this rip. And if you look
6 at the results, as I've discussed previously with the
7 ACNW, I think they are profound in what can happen
8 when you avoid an overly prescriptive approach.

9 I've included some material from the Reg
10 Guide. It talks about meeting objectives. It talks
11 about what is necessary to provide reasonable
12 assurance for the regulator. It talks about
13 flexibility and basically I've summarized those in the
14 name of again applying lessons learned from a similar
15 process that we went through way back when. I
16 remember when ALAP first came out, as low as
17 practicable and as low as possible, depending on who
18 you talk to.

19 We all thought we knew what it meant, but
20 it was -- we spent a long time trying to reach a
21 common understanding.

22 I personally believe that where NRC's
23 guidance should focus is on the approach, not on a
24 prescriptive to do list. I think prescriptive to do
25 lists will tend to become formulaic, a cook book. I

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1 think it eliminates innovation. More importantly, I
2 think quite often it leads to unintended consequences.
3 And I think we saw that in the early days of the
4 ALARA, especially in the post-TMI environment, when we
5 were incurring a lot of those, putting in TMI
6 backfits.

7 Once we moved away from that, let the
8 human mind begin to work on these problems, we really
9 started attaining much better results.

10 I think it's necessary that the guide
11 provide considerable flexibility and especially, and
12 I think that's come up already, that it recognized
13 differences, not only between plant designs and
14 station operations, but we've also talked about site
15 characteristics.

16 I honestly thing that what NRC should be
17 looking for, encouraging and supporting is innovation,
18 not okay, here's one hundred things to do. What I
19 view that as is a formula is for an endless series of
20 RAIs that why didn't you do item number 17 and why
21 didn't you do item number 27? I don't really think
22 that that's going to be productive in the process and
23 I don't think it will reach the best possible end
24 result. One suggestion that we would offer is that we
25 shouldn't lose these ideas. I see many of the things

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1 I've seen in previous presentations is a list of
2 solutions. I think we ought to capture those. We
3 ought to have a really well-developed compendium. But
4 I don't see that as the guidance itself.

5 Some considerations and implementation, I
6 think we need to remember that this is the first time
7 implementation of this regulation, so we can't say
8 well, we do it just like we did before. I think it's
9 important that we understand where we are in time. We
10 already have certified designs. We have another
11 design in process and another one just about to enter
12 into the process. COLs are essentially already in the
13 final stages of development and will be submitted
14 shortly. By the time the guide comes out, some will
15 already have been docketed. We just need to be aware
16 of that. This Reg Guide is going to enter it right
17 into the middle of the process, at all various stages.

18 I think we need to be careful that we
19 don't end up with seven different levels of standards
20 for plants that have gone into operation.

21 One of the things we've looked at is in
22 terms of sending the Reg Guide out for review, we've
23 come to understand the actual immense scope of this
24 regulatory guide. It touches virtually every
25 discipline within an organization. And it covers all

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1 phases of design, construction, licensing, operation,
2 and decommissioning of the plant. So like ALARA, it's
3 an extremely broad scope.

4 And also, we ought to recognize that it's
5 still evolving, our understanding and knowledge of
6 smart things we can do. We don't have an answer to
7 embedded pipes yet. We don't have an answer to epoxy
8 coating versus other things yet. But solutions are
9 going to come if people are focused to that. We have
10 to leave room for that to happen. I'd hate to end up
11 with a prescriptive requirement to coat all surfaces
12 and then find out that additives in concrete is a much
13 better solution.

14 Our suggestions for this is certainly to
15 allow ample time for comment. I noted, however, in
16 NRC's presentation they're already suggesting 90 days.
17 I very much encourage and support that.

18 I think one consideration is once comments
19 are resolved as rather than issue a final Reg Guide,
20 do something that we've used with some of the other
21 guides in this new licensing framework. Issue it as
22 a draft for interim use and continue to receive
23 feedback. Understand that it's unlikely you're going
24 to get it right or even near right the first time.
25 Let some real humans go out and try to use it and give

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1 you some feedback on that.

2 I would also suggest that NRC consider
3 perhaps several years down the road then having a
4 workshop to try to accumulate the lessons learned that
5 have come out of application of this new requirement
6 and then look at finalizing the Reg. Guide. I think
7 all of those could lend much greater value to the
8 process, because it's not just getting through these
9 first three COLs. As with ALARA, what we're talking
10 about is setting into motion an evolutionary process
11 that should continue on through the life of our
12 industry. And I would contend that ALARA is not only
13 evolving, in some cases it's right back on a very
14 steep curve right now, as we've shifted our focus to
15 source term reduction.

16 Some structural suggestions with the
17 guide, I think personally that it should -- that the
18 emphasis really should be on performance objectives,
19 what needs to be accomplished and on a systematic
20 process. That's really what ALARA is, it is a
21 cultural process done systematically. It's integrated
22 into all aspects of design and operation. It's not a
23 list of things that if you do these things by
24 definition your plant is ALARA, never has been.

25 So I'd like to see a shift in what has

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1 been the previous focus away from sort of rote listing
2 of 100 smart things that you can do.

3 One suggestions is to take those things
4 and create a NUREG. I think of NUREG 0041 and Reg
5 Guide 8.15 for respiratory protection as an example.
6 I think the many numerous NUREGs in the ALARA area and
7 then the Reg Guides themselves really stand at a
8 higher level. So I think there's some good regulatory
9 examples of a way to display that information.

10 At the outset, I'll comment I'd be
11 disappointed if what we get is a 97 page Reg Guide for
12 review. And then finally, if you went that way, what
13 it does allow you to do with technical documents,
14 NUREGs are much easier to either update or issue a
15 series with periodic updates where we can continue to
16 capture experience and lessons learned again for the
17 lifetime of our industry.

18 So in summary, I view that what we're
19 talking about is implementing a process, not
20 completing a checklist. Many of us here, and I know
21 many of you, I've known you in regulatory contexts.
22 I've known you in operational context. You'll recall
23 that at one point in the ALARA process, we got hung up
24 on checklists. We just filled out checklists after
25 checklists for review of design or review of

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1 operations. Then we moved to something different from
2 that.

3 So we put in processes, processes that
4 involve people and processes that encouraged
5 innovation. So I suggest to you that that ought to be
6 the focus of where we're going with regulatory
7 guidance.

8 And then just as a final note, I'd like to
9 disavow those that have not been involved with the
10 notion that this is something new. Embedded in NRC
11 requirements and certainly throughout nuclear power
12 operations, the whole notion of reducing
13 contamination, reducing radioactive waste has been
14 with us since Day 1. The emphasis on dealing with it
15 at decommissioning is somewhat new. It certainly is
16 an enhanced focus, but I hope that we don't get caught
17 up in the idea that we're really starting with
18 something that we haven't been taking care of in the
19 past.

20 The fact is that we are decommissioning
21 plants within the funds that have been allotted to do.
22 The fact is that we are leaving sites that are not
23 restricted use sites and those have been under very
24 stressful conditions of plants that have shut down
25 early and haven't even yet fully appreciated

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1 decommissioning funds.

2 So we have dealt with issues like leakage
3 into groundwater, but if you consider the primary
4 nexus is health and safety, which I believe it is,
5 ultimately, we've made no challenges whatsoever across
6 any of those areas to public health and safety. In
7 fact, we've been at large margins between limits that
8 are considered adequate protection of health and
9 safety and actual performance and results either in
10 operation or decommissioning.

11 That concludes my comments and again, I
12 appreciate the time.

13 I'd be happy to take any questions.

14 MEMBER CLARKE: Let's do another round and
15 then we'll take a break.

16 Mike, do you want to start us?

17 CHAIRMAN RYAN: I appreciate your point
18 This has been going on a long time. I mean, there are
19 INPO measurables and there are lots of other metrics
20 out there that have been used for a long time to
21 improve practice. I can remember outages of many,
22 many months as opposed to many days. So there's been
23 a lot of change in the industry, so that's clearly
24 something that we should take away.

25 I'm intrigued by your comment about a

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1 longer Reg Guide. What form should you think guidance
2 in implementing 1406 should take? Should it just be
3 the principles of how you should do this? What --
4 could you expand on that a little bit more?

5 MR. ANDERSEN: Again, if you talk Reg
6 Guide 8.8, it's just an animal. You know, it suggests
7 structure, process, gives some fairly high level
8 examples, but it doesn't set out to be a complete
9 comprehensive detailed listing of each and every thing
10 that you should consider in either design or
11 operations. But even as such, I would comment that I
12 think it runs a bit long and also I noticed that it
13 hasn't been updated since the 1970s.

14 CHAIRMAN RYAN: Yes, I was just looking
15 actually at it. 1979 is when Rev 4 was published.
16 1979.

17 MR. ANDERSEN: So in my view, yes. What
18 I would see would be principles, a description of a
19 systematic approach. You know, explaining how this
20 should be integrated through all different aspects and
21 then a consideration of objectives that should be met.
22 I've given a simple example in groundwater protection
23 initiative, but obviously these objectives would need
24 to be adapted to this specific issue of facilitating
25 decommissioning.

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1 One objective in the Groundwater
2 Protection Initiative is to assure that monitoring is
3 capable of detecting tritium in groundwater, or
4 radionuclides in groundwater in time to be able to
5 take mitigative action to prevent migration of the
6 material off-site.

7 Easy to say and hard to do. I recognize
8 that, but it creates an objective for people to
9 fashion their monitoring program around. I was
10 intrigued by a question that Eric asked earlier. You
11 know, how much is enough? Well, my problem here is
12 there are no criteria. There are no objectives. I'm
13 very, very concerned that the Reg Guide could just go
14 on endlessly. So to me, principles, systematic
15 approach, objectives. And if there are key issues
16 from experience that specifically need to be
17 addressed, call those out in the Reg Guide. And I
18 believe there are some. The solutions should not be
19 a part of the Reg Guide.

20 CHAIRMAN RYAN: I think you're on the
21 right track, Ralph. It sounds very reasonable to me.
22 I think about, and I'm sure our other panel members
23 could help with examples. You know, if you had to
24 pick something that was sort of a sore thumb, we get
25 a lot of very large volumes of soil with a little bit

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1 of radioactivity in it. We've got to spend an awful
2 lot of time and resources to dispose of it one way or
3 another, or combinations of ways.

4 So what I would like to propose for the
5 round table, is there a top five list or a top ten
6 list of issues that have been time consuming,
7 expensive, and have really bogged down decommissioning
8 that if fixed through the mechanisms that we have
9 heard today and design and maybe through some improved
10 monitoring through the life of the plant and others
11 that we could recommend as the things that really
12 ought to float to the top of the 1046 list.

13 MEMBER CLARKE: That's a good suggestion.

14 CHAIRMAN RYAN: That would be a huge thing
15 for this collection of folks from both the design side
16 and the operating side and the decommissioning side to
17 put their heads together and say if you guys had just
18 run the pipes this way or that way or had done these
19 kinds of evaluations and the structure as built in the
20 geology or whatever it might be, that's really what I
21 think we're looking to extract out of that.

22 Are there any real sore thumbs out there
23 that say well, you know, if you address this you
24 really would have avoided, you know, this other
25 problem. It would be interesting to pull the

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1 experience together. Is that a fair kind of thing
2 maybe to set the stage for the round table?

3 MEMBER CLARKE: Let's take that as a
4 homework assignment for the round table. We'll give
5 it a little more time. If I could just make a comment
6 on that, Mike.

7 What I heard you say, Ralph, is don't give
8 me a check list of 100 things to do. Remember that
9 this is a risk-informed performance-based industry and
10 let's not lose that focus. So we've got design-
11 specific, site-specific factors. Maybe not one size
12 fits all, but you know, if we're going to get the
13 performance out of what we're proposing, what about
14 the probability, what about the consequences?
15 Is that a fair understanding?

16 MR. ANDERSEN: Amen.

17 MEMBER CLARKE: Fundamentally, it seems to
18 me, and I think it's because we're all exceedingly
19 good at what we do and that the people involved have
20 a lot of experience. I noticed that we jumped
21 immediately to solutions and it was very exciting for
22 the last six months, EPRI and NEI and INPO and the
23 vendors and the design centered working groups have
24 been generating solutions.

25 And then we end up with the question that

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1 Eric asks. By the way, how do you know when you're
2 done? And that type of question that's occurred in
3 some of our fora really woke us all up. His point is
4 we don't really know what we're aiming at, except in
5 very broad terms. So yes, exactly.

6 CHAIRMAN RYAN: If I may. One other point
7 on that, Ralph, that I mean I've seen you show curves
8 a few times over the years of, you know, improvements
9 in radiation worker, average exposure and total
10 exposure and other metrics of that sort of global type
11 that say the industry is doing better. You know, if
12 you've got solutions to me, what's the metric we
13 should attach to them and say let's do these three but
14 not those two? Maybe we can think about that
15 question, too. Is it a metric? Is it a
16 contamination, a voided metric, is it qualitative, is
17 it quantitative, and maybe we can think about that as
18 part of the question as well.

19 MR. ANDERSEN: But to pick up on that,
20 Mike, a bounding condition that the NRC has imposed on
21 itself as a policy is previously \$1000 and now \$2000
22 person-rem in their regulatory analysis. Now,
23 whatever you think of the value, at least there is a
24 number at which one could benchmark decision making.
25 Now, in fact the industry uses values far above that

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1 for its decision making. But that's our prerogative.
2 That's what we're willing to invest in workers'
3 safety.

4 But at least there's something there. As
5 you point out, at least there is a metric to have a
6 conversation about. In this area, there is no metric.
7 I'm not sure how I would measure success.

8 CHAIRMAN RYAN: That's what I'm reaching
9 for is what is the metric. Is it dollars of
10 decommissioning avoided? I don't know. Again, I just
11 pose it as a question. That's maybe where we ought to
12 spend some time talking.

13 MEMBER CLARKE: Okay, thanks. I'm going
14 to jump in a little bit and skip over to our panel.
15 I'm going to go to Eric.

16 Eric Abelquist?

17 MR. ABELQUIST: Excellent presentation.
18 it really resonated with me. The whole idea that I'm
19 struck with reviewing this draft Reg Guide is the fact
20 that the regulator for decommissioning sets a goal, 25
21 millirem per year, let's say. And it's not wide open
22 how it is achieved, but there is a lot of flexibility
23 in how it is achieved. To pick up on what Mike just
24 said, should the metric be dollars of decommissioning
25 costs avoided? If it is something like that, is it

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1 really the regulator that is concerned with how cost
2 effective the decommissioning is or is it more the
3 applicant who is going to a vendor to say how well did
4 you design this system, because I'm going to have to
5 bear the ultimate cost of decommissioning and I want
6 to make sure that is not going to leak often and when
7 it does, I want to make sure that it doesn't get into
8 the soil, because I know the costs are huge.

9 So what we really have I think is a
10 situation where yes, the NRC is interested in all of
11 this, but who is really going to pay for it if the
12 plant isn't made as well as could be, is going to be
13 the applicant, the COL, licensee. I think that a lot
14 of these good tips are items that the applicant is
15 more interested in than the NRC. So that sets up for
16 a very interesting regulatory position. How do you
17 fix that?

18 MEMBER CLARKE: Eric Darois.

19 MR. DAROIS: I related to a lot to what
20 you said, Ralph, because I came full circle on this
21 issue as well over time. You know, as you know, I was
22 involved in putting together the kind of the hit list
23 that EPRI provided of things we like to avoid. When
24 we first started, we thought we were going down the
25 path of developing the Reg Guide. My mindset was we

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1 can't get that specific in the Reg Guide. Well, we
2 slipped down that slope pretty fast and we went into
3 problem solving and talked about berm tanks and all
4 that kind of stuff.

5 I still don't -- I still struggle with how
6 do you write the Reg Guide to be broad enough to
7 capture all of the intent. And the metrics are
8 important too. Do you deal with dollars saved in
9 decommissioning, you got to look at dollars you spend
10 today to save those. I mean, it is truly cost
11 benefit. And what comes into it is kind of the
12 probability of occurrence of a particular event or a
13 particular condition. We don't want to make all of
14 these decisions a PRA study either.

15 I don't have anything firm to offer for a
16 solution, because as I've said I've been full circle
17 on that. We'll save it for the round table.

18 MEMBER CLARKE: Okay, thanks Eric.

19 Allen?

20 VICE CHAIRMAN CROFF: No, thanks.

21 MEMBER CLARKE: Ruth?

22 MEMBER HINZE: As I have said here --

23 MEMBER WEINER: Nothing.

24 MEMBER HINZE: Sorry. I'm sorry.

25 MEMBER WEINER: I just have something

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1 brief before the round table. I wanted to thank you,
2 Ralph, for making the point that the purpose of
3 building a plant is not to decommission it, but to
4 produce electricity with it. I think we run, we all
5 run a risk to not go into that tired old hammer and
6 nail analogy of missing the focus of where we should
7 be.

8 Decommissioning is something that will
9 occur, has occurred, and does occur. I think it is
10 important as Eric Abelquist has said, the applicant
11 becomes the one most concerned with cost
12 effectiveness. But I think we have to look at cost
13 effectiveness and general effectiveness also.

14 We have to set ourselves some kind of goal
15 for decommissioning that balances all of these things.
16 There was a view in the international meeting that I
17 was at recently that oh, costs shouldn't matter --
18 everything should be cleaned up to background or
19 wherever somebody wants it. That's not realistic.
20 Whatever we do with this Reg Guide and with its
21 implementation has got to be risk informed, and that's
22 all I have right now.

23 MEMBER CLARKE: Thank you.

24 Bill?

25 MEMBER HINZE: Well, I have heard all

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1 these great comments and they are very good. But I am
2 sitting here wondering from your presentation, Ralph,
3 if I've got the focus on nuclear power plants. I've
4 wondered if NEI has considered the decommissioning of
5 other nuclear facilities and how this fits into the
6 decommissioning problem?

7 MR. ANDERSEN: We have only in a broad
8 sense -- we work very actively with the Test and
9 Research Reactor folks as an example as well as the
10 fuel cycle facilities. That actually goes to one of
11 the comments that I was trying to make. It's not only
12 within the nuclear power plants that it crosses all
13 disciplines and phases. It really cuts across a
14 significant fraction of licensees who deal with
15 different kinds of issues and also have very different
16 expectations about where they are going to be at
17 decommissioning.

18 MR. ANDERSEN: That's why you need
19 flexibility?

20 CHAIRMAN RYAN: Right. Absolutely. You
21 know, I can state as a premise that ideally a nuclear
22 power facility is assuming that at the time of
23 decommissioning it will be able to achieve a green
24 field site status, whether in fact it is going to
25 continue to use the property for industrial purposes

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1 or not. I think that tempers our decision making.
2 There are other facilities that that's not really a
3 going-in assumption, and it's possible that no amount
4 of good intention and design will avoid that, at least
5 not at a cost that would make it worthwhile to even
6 operate the facility. So we've looked at it only to
7 that extent. I do think that's a community or set of
8 communities that you probably need to solicit some
9 additional information from, but certainly NRC.

10 I know NRC had a really excellent workshop
11 earlier this year and had a large number of people.
12 It was really on the subject of a potential rulemaking
13 in the future. There was a lot of that kind of
14 information that came out. I was struck then too by
15 the differences. So I don't have an answer to it, but
16 we've thought about it enough to say all the more
17 reason to stay at the 50,000-foot level in the Reg
18 Guide, rather than get buried down in the details.

19 MR. ANDERSEN: But it is another problem
20 and we've got to be able to face it and make certain
21 that it is incorporated.

22 CHAIRMAN RYAN: Absolutely.

23 MEMBER CLARKE: Mr. Chairman, I recommend
24 that we take a break and come back at 3:20, at which
25 time we will hear presentation on the Reg Guide and we

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1 will open it up to the round table.

2 CHAIRMAN RYAN: Sounds great. Thank you.

3 (Whereupon, the proceedings went off the
4 record at 3:01 p.m. and resumed at 3:18 p.m.)

5 MEMBER CLARKE: Okay. Our final speaker
6 is Ed O'Donnell from the NRC Office of Research. Ed
7 is the Project Manager heading up the development of
8 Reg Guide 4012, and he's here today to tell us all
9 about it. Thank you, Ed.

10 MR. O'DONNELL: Okay. Thank you very
11 much, Jim. I'd like to start by saying that I'm just
12 representing a whole group of people who have worked
13 on this. We want to, first of all, acknowledge the
14 ISL. ISL is a contractor to us, and Stuart Bland is
15 here in the room. Stuart helped out tremendously.
16 ISL reviewed existing Reg Guides to see which ones
17 would relate to 20.1406, and, in addition, they looked
18 at Lessons Learned, and they produced for us a letter
19 report, which is more or less in the form of what a
20 draft Guide might look like. We used that for the
21 first draft and everything else. We circulated it to
22 our licensing colleagues, and we got a tremendous
23 number of comments, and I'd like to acknowledge the
24 licensing comment, license people; Roger Pedersen,
25 Jean-Claude Dehmel, who's in the room, Charlie Hinson,

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1 who's in the room, Rafael Rodriguez, Jim Shepherd, who
2 is in the room, Bruce Watson, Steve Garry, who's in
3 the room, Jacob Philip, who's in the room, Tom
4 Nicholson. All these fellows participated in the
5 draft which is before the Committee.

6 Our objective today in appearing before
7 the Committee is, we'd like to release it for public
8 comment, and we're presenting it to the Committee to
9 see if it's worthy to be released for public comment.

10 Now with that, Bill Ott, who's one of my
11 co-authors, Bill would like to say a few words right
12 now.

13 MR. OTT: I just wanted to add a little
14 bit of perspective. If you'll note, this is Draft
15 Guide 4012. What that means it's a Division 4 Reg
16 Guide, not a Division 1 Reg Guide.

17 The focus today in almost all of our
18 discussions has been these new reactors that are
19 coming over the hill. But as a matter of cold hard
20 fact, 20.1406 applies to all new license applications,
21 which means all facilities.

22 When you look through the Guide, you'll
23 see a whole list of things, many of the things would
24 not even apply to a non-reactor licensee, so this
25 whole list of things is a list of things that might be

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1 considered in the application of this Guide, and we
2 tried to address that in our philosophy, as well.
3 With that, I'll just let Ed go forward.

4 MR. O'DONNELL: Yes. Okay. Thank you
5 very much, Bill.

6 The color pictures, there are about five
7 color pictures you see. Each one is of a reactor, and
8 we should be aware that it's just not reactors that we
9 should be talking about. Just happens to be it's a
10 lot easier to find a picture of a reactor than it is
11 some other nuclear facility.

12 Ralph has done us a favor. He's explained
13 to us the contents of 1406. And as we see on this
14 slide here, on the left side it says "Facilitate
15 decommissioning." On the right, "Minimize
16 contamination of the facility, contamination of the
17 environment, and generation of waste."

18 The draft Reg Guide, which the Committee
19 is considering, and I'm holding it up here, is divided
20 in four sections based on that, and we'll come to that
21 in a few minutes. Contamination of the facility, the
22 environment, et cetera, et cetera, et cetera. It's
23 structured accordingly.

24 The principles embodied in the Guidance
25 prevent, detect, correct - those words, I think I

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1 heard Ralph Andersen use a while back. I think that's
2 the first time I heard them, they came from Ralph.
3 And if you prevent, detect, correct; prevent
4 unintended release through design and operation;
5 detect, early detection, there's an unintended
6 release; correct unintended releases of radioactive
7 contamination by prompt and aggressive action. You've
8 gone a long way to meeting the requirements of the
9 regulation.

10 One of the questions we had from our
11 licensing colleagues was, how do I know that I've
12 implemented it and everything else, so we've added a
13 little -- towards the bottom of the first page, in the
14 paragraph down through there, we tried to address this
15 particular thing; that if you use good engineering,
16 good science, in combination with these Guidance
17 principles, you should go a long way towards meeting
18 the requirements. And the slide here, number 4,
19 illustrates this good engineering science, application
20 of Guiding principles, prevention, early detection,
21 prompt correction.

22 Now, as I said, the Reg Guide, it's
23 structured in four sections, and this would be the
24 first of the four sections; minimization of facility
25 contamination. And, again, we tried, at least for the

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1 discussion today is to pull the requirements into
2 prevention, detection, correction as much as we could.
3 Prevention - turns out there's both design things you
4 could do to prevent, and there are lots of inspection
5 maintenance things you can do.

6 So at the beginning of this section, and
7 I think this is what Ralph said, if you could set us
8 up kind of performance objectives, we have a little
9 introductory paragraph. And the introductory
10 paragraph, then the performance objectives, and then
11 a series of suggestions, an applicant could do this,
12 or should do this, such and such should be considered.

13 So in the Section 1 introduction there, minimize
14 contamination, you design to limit leakage, and
15 control spread of contamination, provide for early
16 detection of leaks, prepare follow-up corrective
17 measures.

18 Then you see a whole bunch of words here,
19 and at the tail end of those bunch of words you see
20 1.a. The one means it's in Section 1, and A is the
21 first of the things. I tried to paraphrase them but
22 it's awfully difficult, so these are kind of somewhat
23 shortened statements of what's in through there. And
24 in the upper right you see the word "prevention
25 design", so these are some of the design things you

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1 can do to prevent. And we just kind of, I don't know,
2 maybe - let's take a look at the bottom one there, the
3 fourth one. We already had seen that I think in the
4 AP 1000 slides, radioactive SSC, systems, structures,
5 and components should be designed for the lifetime of
6 the facility to avoid leakage and spread of
7 contamination.

8 I just want to mention, I think there are
9 61 of these little bullets, so I don't -- there's no
10 need to go through all 61. Plus, it's remarkable how
11 many of these were found in the AP 1000 and the ESBWR
12 presentations. They're already in there, and I think
13 part of the reason why that there's a similarity is
14 either we're all working similar good ideas, or we had
15 three public meetings with the industry. And in the
16 last of the three public meetings, Ralph presented us
17 the groundwork Guidance. There were 33 items in that.
18 I went through that, and I could only pull out about
19 10 of them we hadn't already covered. So, in other
20 words, we're already using similar thoughts, similar
21 ideas.

22 The bottom one, radioactive SSC should be
23 designed for the lifetime of the facility. Well, gee
24 whiz, if you keep changing things, there's more chance
25 for contamination, leakage, et cetera, et cetera, et

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1 cetera.

2 The next page, let's see. The second
3 item, potential spill areas, floors should be sloped
4 to drains that lead to the rad waste system. We
5 already heard that earlier in the day. The bottom of
6 the page there, seal surfaces to facilitate cleaning
7 and decontamination to reduce the generation of
8 radioactive waste. Heard that already, there's one.
9 Going to jump to the next page, for SSC that have a
10 high potential for leakage, floor liners and catch
11 basins should be used. Oh, another one, the drains
12 from locker rooms - we didn't hear that. I think
13 that's a different one. Steve Garry provided us that
14 one, and it's -- they should be routed to rad waste
15 processing facilities to prevent reconcentration of
16 radioactive materials in sewerage plants. Ventilation
17 systems should confine airborne radioactive materials
18 within processing areas.

19 The bottom one there, talk about sampling
20 stations should be designed to minimize the
21 possibility of sample fluid leaking to the ground, or
22 to the underlying pad surface. I don't think I'd
23 heard that today.

24 This one, if you look at the heading at
25 the top of the page, these are inspection and

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1 maintenance things you could do to minimize
2 contamination. The second one there, I see monitoring
3 sensors should be designed to allow instrument
4 replacement. The expected life cycle of the facility
5 design should include provisions to facilitate the
6 maintenance, inspection, removal of radioactive
7 components, so these are some of the inspection
8 maintenance things you could do.

9 The one there at the top of the page says
10 seals should be maintained over the life of the
11 facility, and their integrity should be routinely
12 inspected. Ventilation system should be periodically
13 checked. We'll jump on. Detection, a leak
14 identification program, et cetera, et cetera, et
15 cetera. A second one, provision should be made to
16 allow timely identification of leak locations, where
17 are the leaks?

18 The bottom one is a very important one
19 because the FSME staff are very much concerned with
20 residual radioactivity, particularly from the real
21 slow leaks that may go on for long periods of time.
22 And, if possible, leak detection systems should be
23 provided with the capability to detecting and
24 quantifying small leakage rates, if feasible.
25 Correction - radioactive lines and temporary mobile

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1 systems should have a means of promptly isolating
2 leaks. So these are some of the things - so,
3 basically, to minimize contamination, you promptly
4 correct things, that's part of the guiding principles.

5 Jumping on to the next section,
6 minimization of environment contamination, we see a
7 nice scenic picture of a nuclear facility somewhere in
8 a coastal area. We see mountains and everything else,
9 and we have to thank Tom Nicholson for this, about
10 getting across the idea of a conceptual site model.
11 We're talking about submittal of application, before
12 you do it, you should take a look at the overall site.
13 You're going to have nature, and you're going to have
14 a facility. The two are going to act together. You
15 should have an idea what the site is going to behave
16 like beforehand.

17 In this particular picture, looking at it
18 you can tell certainly the ground water is not going
19 to go this way, it's going to go this way. It will
20 give you an idea where to sample, where to look for
21 things. It should also, in this particular view, you
22 should have a rough idea from the picture where
23 contamination might happen, and where it's most likely
24 to happen. And this is the idea behind the conceptual
25 site model.

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1 Also, to minimize environmental
2 contamination, all those good things that you did to
3 minimize contamination inside the plant - well, this
4 applies outside to the environment. Keep the plant
5 clean, and good, and operate well, it's going to
6 protect the environment.

7 So the conceptual site model is based on
8 the site characteristics and the facility design, will
9 assist you to understand the site, and also, very
10 importantly, the plan of corrective actions needed,
11 things they should do, establish a background for the
12 CSM, identify potential release mechanisms, et cetera,
13 et cetera.

14 And, finally, the bottom one right through
15 there, Jake Philip, our geotechnical engineer, pointed
16 out, that it's very important to assess the site
17 changes due to construction. Certainly, you can
18 predict some of them before construction. You can
19 have a crude idea, roughly, what might happen, and
20 think about that.

21 Some of the things, this section for
22 environment, I think we have about 25 different of
23 these sub-items through there in there, some things
24 you can do in terms of design. The top one there,
25 systems containing radioactive material should have at

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1 least two impermeable boundaries to the environment,
2 capability of periodic testing and inspection. That's
3 an important one, because the situations with the
4 power plants, the leakage, the unintended leaks at
5 places like possibly Indian Point, Braidwood, and
6 everything else. As far as I can know, those were
7 single barrier failures. If there were a second
8 barrier then, conceivably, some of these things might
9 be avoided, so these are things to be considered.

10 The second one, tank catch basins should
11 be of solid construction. As I looked through this
12 last night, it sure sounded familiar, and I might have
13 gotten that one from Ralph Andersen from his
14 groundwater protection, the items that he had come up
15 with.

16 The third one down, exterior tank should
17 be located above bermed concrete pads. We heard that
18 earlier in the talk about the AP 1000. Systems
19 containing, transporting, and processing radioactive
20 liquids should not use buried piping or drains, but if
21 you do do it, think about ways to kind of do things a
22 little bit better. There are ways that might be
23 possible.

24 The next one on the top of the next page
25 says that if you do have underground piping, they

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1 should be enclosed within structured pipe chases,
2 provisions for periodic inspection or surveillance.
3 When pipe chases are not feasible, the use of double-
4 walled pipes, leak detection capability should be
5 considered, so there's possible things that a person
6 might consider to do if you have to go the route of
7 buried piping.

8 The next one, radioactive material,
9 handling, staging, storage, decontamination, should be
10 located inside buildings. We heard that earlier in
11 the AP 1000. The third one, we heard that, again, in
12 the AP 1000. This is about the penetrations. The
13 bottom one, this is just good engineering practice,
14 avoid bypasses or drains that would allow rad waste to
15 be inadvertently circumvent a rad waste treatment
16 system, where it would be released directly to the
17 environment.

18 The top one, this is, again, a good
19 engineering practice - drain systems for storm water
20 and sanitary sewerage should be separated from
21 contaminated waste drain systems. The next one down,
22 use of sills. We heard that one mentioned in the AP
23 1000, some kind of a sill at the entrance of
24 compartments that radioactive materials are in in case
25 there's leakage to contain it in the compartment.

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1 Third one down, that was the penetration
2 of the outer walls. Just jump on. Let's see. Oh,
3 top here. The design of excavation and selection of
4 backfill. This is one that our geotechnical engineer,
5 Jake Philip, pointed out to us, and this is one that
6 is overlooked. Like an engineered structure, if you
7 engineer your backfill, you can do all sorts - you can
8 direct the water where you want it to go. Give you an
9 example, if you were to use a silt or fine sandy loam,
10 you could actually wick away moisture, small leaks
11 could be wicked away, and you could direct it to a
12 drain in some direction where you want it to go. And
13 you could monitor it. The reason why I speak somewhat
14 knowledgeably about this is I did a lot of work on
15 research on covers, and we had something called a
16 conductive layer barrier, and it would wick water to
17 where you want it to go. This would be an application
18 of that principle, wicking it to some direction.

19 The second one, backfill should not
20 contain soil that contains concentrations of
21 radioactive material above the naturally occurring
22 levels. Again, that came from Jake, and he pointed
23 out that many -- if we're talking about new reactors,
24 they may be at existing sites, so be careful what kind
25 of material you do use for backfill, just in case

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1 there's on-site contamination.

2 Potential leakage from any existing
3 adjoining nuclear facility should be prevented from
4 migrating into the excavation and backfill of a new
5 nuclear facility.

6 Okay. This one here, we're still talking
7 about prevention, inspection and maintenance. Well,
8 the integrity of seals should be periodically
9 verified. Monitor backfill or structural fill for
10 evidence of clogging, migration of fines into it, and
11 blocking it. The design groundwater level should be
12 maintained below the foundation of the SSC. This is
13 a common thing at construction sites. We have a
14 reasonably high water table. We artificially maintain
15 the water table low by continual pumping. You can
16 keep it below the facility.

17 Let's see, the bottom one, the extraction
18 of groundwater or leaked liquid radioactive effluent
19 must consider potential impacts on the foundation. So
20 think about that, if you have to extract.

21 Detection - top one, if the systems
22 containing radioactive material do not have two
23 impermeable boundaries to the environment, applicant
24 should propose specific environmental monitoring.
25 Perhaps, for example, sampling groundwater in close

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1 proximity to potential sources, periodically verify
2 integrity of the system. And on and on it goes, let's
3 see. Going to just jump the next page.

4 If foundation drains are used as part of
5 the building design, capability of sampling and
6 processing, the effluent of those drains should also
7 be included. I'm going fast because I think that
8 probably nobody in the room really wants to do all too
9 much on these, just kind of get the big picture of
10 what it is, some details that you could use for
11 detection. Correction - if you do have sumps or
12 retention ponds, you should have a liner, capability
13 for isolation or routing to monitored release paths.

14 The bottom one - design and operation of
15 groundwater capture zone surrounding SSC may provide
16 effective means to isolate and collect liquid
17 radioactive contaminants escaping to the subsurface,
18 and prevent abnormal release to groundwater.

19 Jumping to the next section, facilitate
20 decommissioning. This is one that's -- this is the
21 introductory little paragraph, Section 3, the
22 introduction. This would begin at the design stage.
23 You consider the design with the thought hey, I'm
24 going to have to decommission this thing some time in
25 the future. The MagNOX facility, give you an example,

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1 they were clearly not designed for decommissioning.
2 It's a real difficult thing, because of the massive
3 structures of the MagNOX facilities.

4 The second bullet there says ensure
5 through the life of the facility that design and
6 operating procedures minimize the amount of residual
7 radioactivity, require remediation at the time of
8 decommissioning. And I heard from Ralph Andersen
9 talking before about the nuclear power plants are
10 pretty good about minimizing contamination, and
11 minimizing generation of waste. The latter one, of
12 course, is driven to a great degree by economics. And
13 properly designed and operated facilities will support
14 efficient decommissioning, as well as reducing the
15 generation of radioactive waste. So this would be
16 kind of the introductory lead-in to kind of the
17 performance objectives part of that section, and then
18 there would be a series of specific little items.
19 Here they are.

20 This first page, all four of those items,
21 turns out that they were information gathering. You
22 just look at the letters behind them, A, B, C, so that
23 our little laundry list was information. Then at the
24 second page here, we start getting down to minimize
25 the use of embedded pipes and facility walls

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1 consistent with ALARA. Temporary piping, second
2 bullet there, should be removed to avoid undocumented
3 random pipe in the field, which when covered will
4 raise questions about the extent of contamination
5 during decommissioning.

6 Number three, if you leave construction
7 debris all around the site, it's going to confuse your
8 ultimate decommissioning, so it's better to remove it,
9 if you can, as much as reasonable. SSC design should
10 facilitate removal of equipment. Well, we've heard
11 that one with regard to the AP 1000 and ESBWR.

12 Now this one is decommissioning of a
13 nuclear power plant somewhere in the Northeastern
14 United States, and, of course, you want to minimize
15 waste generation. You can do that through your
16 prevention, you could do it through design and
17 operations.

18 Here's the introductory paragraph.
19 Minimizing waste generation is both a design and
20 operational consideration. And this was where the
21 life cycle approach should be taken. Identify all the
22 components used in the facility and all waste that
23 will result from the systems, processing, and if
24 possible, try to think it through to final disposal.
25 Although, I recognize this may be very difficult if

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1 we're talking about some of the things that are being
2 disposed 30 years into the future.

3 The bottom one, let's see, systems design
4 should enable operators to perform decontamination
5 efficiently, while minimizing doses and production of
6 waste. Prevention through design - the first one
7 talks about volume reduction using ANSI standards.
8 The second one is about try not to mix waste streams
9 to get volume, mix the waste streams. And the bottom
10 one is - oh, yes - let's see - on-site decontamination
11 facilities, waste segregation facility should be
12 provided for the orderly management and segregation of
13 large quantities of radioactive material.

14 This one talks about the continuous
15 concrete pores. The bottom part of it really
16 mentioned that maybe modular design may allow you to
17 remove just separate layers of contaminated material,
18 thereby minimizing the volume of contaminated waste.
19 So this is prevent through design.

20 Prevention through operations, waste
21 should be shipped off-site when generated, legacy
22 waste should be avoided. And finally, the last one
23 there, this is a very important one to our FSME
24 colleagues, and this is about try to avoid the on-site
25 disposal of radioactive material. However, if you do

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1 go the route of using the 20.2002, on-site disposal
2 should not be located near a susceptible or surface
3 water groundwater intrusion, and must have proper
4 monitoring to detect potential radioactive
5 radionuclide migration. So that was very important to
6 our FSME colleagues. They're very much concerned
7 about legacy sites and residual radioactivity.

8 This is the last slide, and what we hope
9 to do is release the Regulatory Guide for public
10 comment in July of this year. We would like at least
11 a 90-day period because this is a new endeavor, it's
12 new, it's different, and we expect extensive comments.
13 And if all were to go well, we would expect the final
14 Guide possibly in January of 2008.

15 And with that, Bill.

16 MEMBER CLARKE: Ed, thank you very much.
17 Let me just ask you a quick question, and then we'll
18 --

19 MR. O'DONNELL: Sure, Jim.

20 MEMBER CLARKE: -- do a round. We heard
21 a discussion about maybe putting more emphasis on
22 performance, and less on the checklist. And I don't
23 mean to imply that this is a checklist, because I'm
24 not sure about the intent of that, and that's the
25 basis for my question. I thought it was encouraging,

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1 as you did, that all of the discussion has identified
2 things that are coming from all different directions.
3 What's coming from the reactor side are things that
4 have been identified, what you have identified, and
5 what the industry has identified, I mean, it's all
6 good stuff. And I'm wondering, is the intent to frame
7 it as these things should be done, or is the intent to
8 frame it as this is what the NRC thinks is good
9 engineering practice? There are going to be site-
10 specific and design-specific differences, and take it
11 from there. I just kind of throw that out. I'm
12 interested in your reaction.

13 MR. O'DONNELL: I'd like to throw that to
14 Bill, only because my mouth is dry.

15 MR. OTT: Good excuse, Ed.

16 MR. O'DONNELL: Yes.

17 MR. OTT: I think the observation that -
18 and the way we organize this, the focus on prevention,
19 detection, and correction, all these things are things
20 that could be considered for a particular individual
21 system, but a lot of them might not apply for a given
22 individual system. Essentially, what we're
23 suggesting, and I think the word was used earlier,
24 either by Westinghouse or GE, that when they go
25 through the design, they should systematically look at

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1 their system, figure out whether prevention is
2 relevant, whether early detection is relevant, if
3 they've got a containment failure, prevention doesn't
4 work, and then do we have to make some provision in
5 our plans for how we could clean it up quickly? And
6 I think timing is something that's underplayed in the
7 Guide.

8 We use the words "prompt detection, or
9 early detection and prompt clean-up", so the concepts
10 are there, but if you want to minimize contamination,
11 and minimize the spread of contamination, that time
12 factor is critically important. So where you put
13 detection instruments, and how you try and contain any
14 kind of a spill close to the facility, or close to the
15 location of the spill are critical items, but it's
16 really this approach of trying to use this philosophy
17 of prevention, detection, and correction, and using it
18 systematically whenever you've got one of these
19 boundaries that might cause you a problem with
20 contamination of the environment of the facility. I
21 think that's the key to the Guide.

22 MEMBER CLARKE: Thank you. I want to
23 continue starting out with our panel, so I'm going to
24 go to Eric Darois.

25 MR. DAROIS: Perfect, because I wanted to

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1 follow-up on your comment. I have just a little
2 heartburn with all the shoulds in here. I've heard it
3 said many a time that give me a good reason why you
4 didn't do it, and then we'll let you off the hook from
5 implementing the should. But you've got a couple of
6 things, and I'm not going to go through the whole
7 thing, but I'll give you a couple of examples, and
8 there are more that I struggle with. One is what you
9 had just mentioned, Ed, on the avoiding the 20.2002
10 on-site disposals. Well, there's been a number of
11 cases when the utility did that and made the right
12 decision. There's been a few cases when it's been --
13 very few cases I think where it's perhaps been the
14 wrong decision, but you know, consider very low-level
15 sludge from a discharge canal, and you go through the
16 process, and then you've got 100,000 cubic yards of
17 soil that you place on the property that would
18 ultimately meet the decommissioning criteria, as it is
19 today; that it's going to cost an arm and a leg to
20 get rid of otherwise. How do you get around that when
21 it says you shouldn't do that? It's a cost-benefit
22 analysis, so that's one example.

23 And the one that I read in the Reg Guide,
24 and I don't know how to interpret it, you didn't go
25 over it, but it's any backfill you use should contain

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1 soils that are not above natural radioactivity levels,
2 or something like that. Background, or backfill that
3 you use in construction. I don't know how to
4 implement that either, because I don't -- that means
5 if I have a bucket of soil, it's all got to be below
6 whatever I consider background, and that's a tough one
7 to get your arms around. That's just a couple of
8 examples of things that I don't know how I would
9 implement, and how do you get around the should?

10 MR. O'DONNELL: Well, going back to - I
11 just pulled up on the screen the 2002 one, so there's
12 an if - if you do it, you should try to avoid areas
13 susceptible, surface water, groundwater intrusion,
14 those are reasonable requirements, those two are
15 reasonable. And the next part, must have proper
16 monitoring - the question on that one is how long does
17 the monitoring continue? Does it continue as long as
18 you have a license? And if nothing is happening,
19 presumably then you can go through --

20 MR. DAROIS: But it's not tied to the
21 quantity or the concentration. If I'm putting
22 something in the ground that's .02 picocuries per
23 gram, I shouldn't have to do anything.

24 CHAIRMAN RYAN: The hard part of this,
25 Eric - I agree with Eric. I think this one is a deep

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1 hole with a blanket over the top. The reason I think
2 that is that I don't know how to demonstrate any of
3 that. Should not be located in areas susceptible to
4 surface water or groundwater intrusion. Well, that's
5 the Eastern United States. How far away is an area?
6 Is an area an acre, or 50 miles or what? You know, I
7 struggle with that. Groundwater intrusion, intrusion
8 into what? Intersecting the surface, 20 feet, 100
9 feet? It's very, very difficult to get that. And,
10 again, what you end up getting to is some kind of a
11 decommissioning dose criteria-driven analysis with a
12 prescribed method, and I think you either say 20.2002
13 can be done, or you say it can't be done. This says
14 well, maybe yes, maybe no. And we're not getting any
15 criteria --

16 MR. DAROIS: And we've already had
17 discussions in prior meetings where maybe an entry in
18 your 50.75(g) file would suffice for an on-site
19 storage, deal with it later at decommissioning. It
20 just gets into space that I don't think has been yet
21 well defined.

22 CHAIRMAN RYAN: The other dimension is
23 there is an effort underway for considering long-term
24 on-site storage. Now I know that's aimed at packaged
25 waste and other elements, but why couldn't this be a

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1 long-term on-site storage of 100,000 yards of soil?
2 Now I don't know how you deal with that, so I think
3 there's a caution on that one. And I agree with Eric,
4 I would think hard about maybe even having it in
5 there. The rules exist to take care of it, anyway.
6 You're adding something that could actually end up
7 being confusing, rather than helpful.

8 MR. O'DONNELL: That's a good point if the
9 rules -- yes, the rules do -- yes, good point on that
10 one.

11 CHAIRMAN RYAN: You know, waste should be
12 shipped off-site when generated, legacy waste should
13 be avoided. Yet, we're getting a rule for long-term
14 on-site storage. And, again, I would just comb
15 through it again. And I don't disagree with the idea
16 that it's best to send it to the disposal site earlier
17 rather than later, because there are things you do
18 avoid, but what's the return on that? I just wanted
19 to jump in here. It's going to be a cost management,
20 you ship a half a load, or a whole load, you pay the
21 same price, so you wait a while until you get a full
22 load, or something like that. So there's lots of
23 practical reasons to dive in there.

24 MEMBER CLARKE: Thank you both. Eric
25 Abelquist.

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1 MR. ABELQUIST: Couple of comments. It
2 seems to me that the regulatory areas that we already
3 have in place are dose limits, environment release
4 limits, ALARA, and all of these ideas that you just
5 presented, Ed, are terrific ideas. And if there were
6 no barriers to implementing all of them, the idea
7 should be go ahead and do all these things, and it's
8 going to keep dose limits down, it's going to minimize
9 releases to the environment, and we're going to be
10 following practicing ALARA in this process. So since
11 you already have those regulatory purchases already,
12 it seems very difficult to me to regulate on the
13 specific good practices. And I'll share with you an
14 analogy that came to mind as you were presenting.

15 About a decade ago, the issue of
16 characterization came up, and I remember the question
17 was, what should be the minimum that the licensees
18 should be doing, because they need to do more. Too
19 often, we would get into clean-up and final status
20 surveys, and a route cause for a really poor final
21 status survey was they didn't know what the extent of
22 contamination was. And so, I remember going round and
23 round, how do you regulate characterization? You
24 really need to regulate 25 millirem and the final
25 status survey needs to demonstrate that the clean-up

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1 was successful, and it was 25 millirem and ALARA, and
2 you need to do a good characterization and consider
3 all this, but the focus wasn't on let's regulate
4 characterization. It was, the end-point is clearly
5 license termination criterion, 25 millirem. And that
6 just seems to me that this is where we're at on this
7 particular subject, is that we already have the
8 regulatory purchases, and these are all good ideas.
9 I just don't know how you burden them with more.
10 We're going to check to see if you did every single
11 one of them, or however it ultimately is done.

12 MEMBER CLARKE: Okay. Thanks, Eric.
13 Ruth.

14 MEMBER WEINER: I share some of Eric
15 Darois' concern about the number of shoulds, and just
16 to give you an example, groundwater pathways and
17 surface water pathways can be altered by nearby
18 construction that has nothing to do with the facility
19 that you're talking to. And 30 years after the
20 facility is shutdown, and you get a condo development,
21 or whatever, an industrial park, you can change all
22 those paths, and there's no way that you can foresee
23 that, or forestall it, as far as I can see. That's
24 just an example of something that happened.

25 To what extent are the -- and this is kind

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1 of a general question, may have some examples. There
2 have been large decontamination and decommissioning
3 projects, Main Yankee, Big Rock Point, and, of course,
4 Rocky Flats, some of the Hanford reservation, and a
5 number of them. To what extent has this Reg Guide
6 incorporated the things that you've learned from those
7 decommissioning projects?

8 MR. O'DONNELL: Yes, I would say to a
9 great degree. And I think Ralph had made the point
10 that we're just not at the beginning. We've had a
11 tremendous amount of experience through the years, and
12 certainly with the DOE sites, and the U.S. commercial
13 sites. We've had a lot of experience with it, so a
14 lot of that was kind of factored into this.

15 MEMBER WEINER: When you did that, did you
16 factor in the cost of doing that, or the cost-benefit
17 ratio of doing that?

18 MR. O'DONNELL: No, I did not. I did not.

19 MEMBER WEINER: And the reason I make that
20 point is, some of these projects, particularly the DOE
21 ones were hugely expensive. And the question is,
22 again, getting back to the fact that you have a
23 standard, what did this huge amount of investment
24 actually buy you in terms of useable or preservable
25 environment? And I cannot help but think that that

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1 needs to be a consideration.

2 MR. O'DONNELL: Yes. It has caught our
3 thinking through the years, and it's been such a long
4 period. We've learned -- in the 1960s, we used to
5 dump rad waste off of the hillside. That was the case
6 of the sites up there in Pennsylvania, you know,
7 Shield Alloy dumped it right off the hillside. We
8 wouldn't even think of doing that today. We've
9 learned a lesson on that particular one, so I think
10 without giving any specifics, we've really learned to
11 -- let's go back -- piping is another example. The
12 single piping leaks, we've learned from that - well,
13 gee, if you have a single - no second barrier, you're
14 going to have some residual radioactivity, and you're
15 going to have to figure out how far it went, et
16 cetera, et cetera, et cetera. This leads us to a
17 thought that gee, maybe I should figure out some way
18 around that, and maybe the double-walled piping might
19 be a way, or a piping gallery might be a way around
20 that, or if I put the thing in the ground, have some
21 sort of a fine sandy loam, which I can monitor,
22 something of that sort. So these are things which are
23 driving us, and when I say "us", I mean people here
24 collectively in the room who are kind of doing this
25 sort of stuff. So going back to the DOE sites, they

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1 were very expensive, and, of course, they reflect
2 technology of the 50s and 60s.

3 MEMBER WEINER: That's true, but I just
4 wondered to what extent -- you've given some very good
5 examples of cleaning up and decommissioning, and
6 preventing contamination. Do you have any examples of
7 when more was done -- more needed to be done than you
8 really needed to do to protect the environment or
9 people? Are there any examples like that?

10 MR. O'DONNELL: I was hoping that somebody
11 -- Tim, will you come up to the microphone?

12 MEMBER WEINER: Sure.

13 MR. O'DONNELL: Tim Frey is coming up to
14 the microphone.

15 MEMBER WEINER: Okay. All right. Just
16 one or two. Do you have an example of where more was
17 done than you needed to do?

18 MR. O'DONNELL: Tim was standing up, and
19 I thought he was standing up to come to the
20 microphone.

21 MEMBER WEINER: Oh, okay. I'll hold the
22 question. Finally --

23 MR. O'DONNELL: Let me put it this way,
24 Ruth; the public would say not enough was ever --

25 MEMBER WEINER: Well, we know that, but

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1 the point is to get back to what Eric Abelquist said.
2 We have standards, and if you -- and we're looking at
3 the question, what do you need to do? How do you
4 balance the costs and benefits? That's the basic
5 question. You've talked about the benefits in terms
6 of decontamination and decommissioning. I'd like to
7 sort of look at the cost, because we're going to do a
8 lot more decommissioning than has been done to-date.
9 And this Reg Guide is going to guide it.

10 MR. O'DONNELL: Yes.

11 MR. OTT: Can I offer an observation here?

12 MEMBER CLARKE: Let's get through the
13 round, and then we'll get into --

14 MR. O'DONNELL: Bill Ott will --

15 MR. OTT: I just want to offer one
16 observation. The focus in 20.1406 is addressing
17 things at the design stage. If we were to ask
18 Westinghouse today how much it's going to cost them to
19 build AP 1000 as they're changing it to accommodate
20 1406 and compare that to what it would have been
21 before, we might have an estimate. If they started
22 from today and designed for 1406, I don't know how we
23 come up with a dollar value.

24 MEMBER WEINER: That's a good point.

25 Thank you.

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1 MR. OTT: Okay.

2 CHAIRMAN RYAN: In reading through the
3 document, Ed, I think about reactors all the way
4 through. I'm really worried about the licensees, I
5 heard 1406, of course, applies to everybody. What do
6 they do? Everybody being everybody from small
7 facilities to maybe even larger alternate fuel cycle
8 facilities like reprocessing at some point down the
9 line. I think that's something you don't have enough
10 language on in this Guide, because for a small
11 facility that may be, I don't know, producing radio
12 isotopes for medicine or something, that's a big deal.
13 There's a lot of onerous stuff that they're not used
14 to in this.

15 MR. O'DONNELL: Yes.

16 CHAIRMAN RYAN: But I don't think your
17 intent would be to apply every element that you've
18 laid out here, God forbid have a checklist that you've
19 gone through, 3A through F. If this is going to apply
20 to all facilities, of all types, I think you need to
21 do something either in the preamble or the
22 introduction to stratify that in some way so it
23 doesn't -- it's clear that you're not intending the
24 full suite of things to be critical for every type of
25 licensee.

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1 MR. O'DONNELL: I recognize the merit of
2 that comment, and that was the reason why at the very
3 beginning I even tried to make the point of used all
4 pictures of reactors, and really applies to all, and
5 I was aware that we're really skewed towards reactors.

6 CHAIRMAN RYAN: Well, without benefit of
7 hearing this conversation, it would be tough, it's
8 tough to see that in a document, so that's one
9 question. So I think the fact that it applies to
10 everybody needs a little bit more work to say what
11 exactly applies to me, because that's - when I'm a
12 licensee, I'm going to come in and say fabulous
13 document, what applies to me? I'll look at that more
14 carefully than what doesn't apply to me, so that's
15 one.

16 The second is, what's the benefit? What
17 does he mean by that? You know, in a lot of areas, if
18 a licensee performs well, there's a reward of some
19 kind, there's reduced inspection, there's lower
20 decommissioning trust fund costs, there's something,
21 and I don't see any treatment of that. I know I
22 raised that point before in these discussions on
23 decommissioning.

24 MEMBER CLARKE: That's a good point, Mike.
25 When we get everybody up, and get all their ideas,

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1 we'll have -- but that's certainly one I'd like to
2 raise again.

3 CHAIRMAN RYAN: Yes. I think that's
4 something to think about. I'm going to have to spend
5 a lot of money, no matter who I am, either in design,
6 or in facility management, or operation, or all the
7 above, of monitoring, and I'm wondering what the
8 benefit is.

9 MR. O'DONNELL: Yes. And, obviously, if
10 you do many of the things that are in here, you'll be
11 able to demonstrate to your regulator, gee, I did
12 these big items which are at the beginning paragraphs
13 of each of the sections.

14 CHAIRMAN RYAN: Right.

15 MR. O'DONNELL: You know, I prevented, I
16 corrected, or at least I have an early detection
17 program. I've worked very vigorously and tried to use
18 whatever the best techniques today. And, hopefully,
19 this will satisfy your regulator a little bit better.
20 That's kind of the most obvious reward, would still
21 save you a tremendous amount of money in legal fees,
22 and he's not going to tell you go out and do --

23 CHAIRMAN RYAN: Yes, I'm not spending a
24 lot of my management time on regulatory issues, but
25 then there's the other aspect. If I do make disposals

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1 today, and I don't store material on-site, my burden
2 on potential problems is lower, so maybe my
3 decommissioning requirement shouldn't be so high. I
4 just -- I really think at some point that this is an
5 ongoing, even said in the documents, life cycle
6 requirement. I'm looking for some ongoing life cycle
7 benefit. I don't think that's an unreasonable concept
8 to explore.

9 MR. OTT: I would like to make one brief
10 response to that, I guess. We licensed 103 or 107
11 nuclear power plants. We didn't design any of them to
12 leak, or give us problems with decommissioning. We
13 designed them to be the best that the industry and
14 science could design at the time. But yet, today, we
15 continually see problems. The greatest benefit that
16 I could see coming out of this, is learning from all
17 those problems, and having a generation of plants that
18 doesn't experience them.

19 CHAIRMAN RYAN: Don't disagree one iota.
20 I'm not talking about the power plants, I'm talking
21 about the thousands of agreement state licensees, NRC
22 licensees that are going to have to deal with this,
23 tens of thousands, not the hundred power plants.

24 MR. OTT: And I agree with you, both about
25 the fact that we haven't culled out the materials

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1 licensees enough.

2 CHAIRMAN RYAN: Right.

3 MR. OTT: As I admitted at the very
4 beginning, we had focused on reactors because that's
5 the thing we have to deal with this fall.

6 CHAIRMAN RYAN: And maybe this one should
7 be titled so that's clear, that another one will come
8 later.

9 MR. OTT: The problem is that, to the
10 extent that these other licensees have the same kinds
11 of facilities, the same kinds of concerns arise, so if
12 they've got a liquid rad waste treatment system, and
13 they've got liquids, and they want to use double-
14 walled pipes, and --

15 CHAIRMAN RYAN: My guess is that's a
16 handful, Bill.

17 MR. OTT: It could be. I don't know.

18 CHAIRMAN RYAN: It's a handful. Trust me.

19 MR. OTT: Okay.

20 CHAIRMAN RYAN: There's not a huge number
21 of folks that have these complex systems in their
22 facilities, because we don't do any reprocessing.
23 Even nuclear medicine is relatively modest, in terms
24 of --

25 MR. OTT: But if, as a result of being if

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1 we do have reprocessing facilities, then a tremendous
2 amount of this is going to apply to those reprocessing
3 facilities.

4 CHAIRMAN RYAN: When and if.

5 MR. OTT: When and -- agreed.

6 CHAIRMAN RYAN: Not going to let you off
7 the hook. The other thing --

8 MR. OTT: It's a matter of degree. I
9 mean, if you've got a small mom and pop operation with
10 a very small set of sources, they're going to close it
11 and not pay any attention to it.

12 CHAIRMAN RYAN: I'd like a small rebuttal
13 on the issue of 100 reactors designed to the best of
14 the day. Remember at that day and time, using
15 thousands of curies of Tritium to do TRACER studies in
16 groundwater was perfectly acceptable, so the whole
17 mindset was different, on what a proper design was.

18 MR. OTT: Yes. I mean, everything is --
19 we've advanced 40 years in our design knowledge, our
20 materials knowledge, everything else.

21 CHAIRMAN RYAN: And what's appropriate in
22 the environment and what's not, so I think that's,
23 certainly, something for additional conversation.
24 But, again, the two main points is, I think you need
25 to think about, not just the reactor audiences. And

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1 there's a third audience, which are all the agreement
2 state program folks that are going to have to
3 implement this. So they're going to need some
4 guidance on what proper implementation is, so you're
5 going to evaluate them through the impact program on
6 it. So that's one. I think we said enough about the
7 other ones. I'll leave it there. Thank you.

8 MR. OTT: Okay.

9 MEMBER CLARKE: Okay. Allen, this time I
10 mean it.

11 VICE CHAIRMAN CROFF: Easy for you to say.
12 I'm just going to endorse a lot of things Mike has
13 said in the past.

14 CHAIRMAN RYAN: Thank you.

15 MEMBER CLARKE: Is that it? Okay.

16 Bill.

17 MR. O'DONNELL: They're trying to pass so
18 they can get to the roundtable, Bill.

19 MEMBER HINZE: I think so. Well, I'm not
20 going to let them. Let me ask you a question here
21 regarding this paragraph that you inserted regarding
22 the demonstration of compliance, and you've praised
23 that in slide 4. I wonder if you ever gave any
24 thought to defense-in-depth as part of the
25 consideration?

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1 We understand that there are failures in
2 our engineering. We have limitations in our science.
3 There are failures, and one of the things that we do
4 in building nuclear plants is we have the defense-in-
5 depth. Why don't we have a defense-in-depth here in
6 terms of demonstration of compliance?

7 MR. O'DONNELL: Yes, we've got -- yes,
8 that's a good thought, because we have it buried
9 several other places, particularly when we talk about
10 anything leaked, should have double-barriers. But
11 yes, conceivably, it could be mentioned up through
12 here.

13 MEMBER HINZE: Yes. We seem to have
14 forgotten that whole concept in nuclear waste. We
15 have it at Yucca Mountain. We keep -- at least it's
16 in the back of our mind. We have engineer barriers,
17 we have geological barriers, and we don't rely on
18 either one entirely, or at least we feel we shouldn't.

19 Let me ask another question. There seems
20 to be a focus here, or at least some of your initial
21 comments focused on detection of leaks, both liquid
22 and gaseous. What's the state-of-the-art in terms of
23 the detection, the early detection, if you will? And
24 what is being done by the NRC to make certain that we
25 can do this, your prevention, early detection? Can we

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1 really do a good job at early detection?

2 MR. O'DONNELL: Well, it's a -- I realize
3 you're coming at it as a geophysicist, from a
4 geophysical thing, but it depends what you're talking
5 about. We've heard the discussion from AP 1000 about
6 the fuel pool. Gee, if the things is suspended up in
7 the ceiling, and you can get underneath it and look at
8 it, and visually you don't need any fancy geophysical
9 technique. Beyond that, I really can't provide you
10 too much more than what you already know, in terms of
11 detection techniques.

12 MEMBER HINZE: Well, if it's no more than
13 I know, then we have got a long way to go.

14 MR. O'DONNELL: Yes. Some of those
15 simple, easy things are very, very good. The very
16 simple, easy things. For example, you had a pipe, and
17 you put it in a fine, sandy loam, easy to pick up,
18 change the resistance. It's easy to do that. That
19 could be done.

20 MEMBER HINZE: Right.

21 MR. O'DONNELL: Sensor, these kinds of
22 things can be done.

23 MEMBER HINZE: This becomes difficult when
24 you get the very small quantities. And you can -- I
25 can dream up all kinds of scenarios in which your

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1 detection system would flunk the course, believe me.
2 What about soil gas? Is this a concern in terms of
3 contamination?

4 MR. O'DONNELL: Gee, I don't know. And,
5 again, I'm many years behind the times on soil gas
6 detection, because I worked for a company, we used to
7 do expiration using that technique. The technique is
8 there, you know.

9 MEMBER HINZE: Okay. Since I only want my
10 three, I recall when I was in the service, the mantra
11 was preventative maintenance. In other words, you
12 change the carburetor before it went, because when you
13 want to use the vehicle, you had to use it. Is there
14 any protocols for understanding when you will have
15 failures of mechanical systems, or electrical systems,
16 et cetera, so that you can replace or maintain before
17 it fails?

18 MR. O'DONNELL: Gee, obviously, it's going
19 to get very specific to whatever valve, pipe you're
20 talking about, plant.

21 MEMBER HINZE: Yes, but I think there
22 should be some general protocols on this. I don't
23 think one needs to be --

24 MR. O'DONNELL: On this one, I'd have to
25 defer to some of the power plant fellows in the room,

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1 and I don't see anybody putting his hand up, or
2 rushing up to the table. Maybe at the discussion,
3 they will run up and talk about it.

4 MR. DAROIS: I can share with you, and I'm
5 not an expert on this at all, but I just know the key
6 words and tricky phrases. But I know EPRI's NDE group
7 is working on - Non-Destructive Evaluation Group - is
8 working on trying to develop a guided way of
9 inspection methodology for something like buried
10 pipes, that will detect wall thinning and that sort of
11 stuff before it fails. I mean, that's a microcosm of
12 what you're asking, but that's one example I'm aware
13 of.

14 MEMBER HINZE: Sixty years ago I tried to
15 use that to destroyed airfields with an atomic weapon,
16 and it doesn't work. I mean, guided way is tough
17 going.

18 MR. DAROIS: Yes. They've perfected it in
19 the oil industry, apparently.

20 MEMBER CLARKE: Okay. Ed, thank you very
21 much.

22 MR. O'DONNELL: Okay. Thank you.

23 MEMBER CLARKE: What I'd like to do now is
24 stay where you are, and if we could ask the other
25 presenters to come to the front.

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1 (Off the record comments.)

2 MEMBER CLARKE: Other presenters who are
3 still here, hopefully, can you come to the front?

4 MR. O'DONNELL: Ralph is still here, Jim
5 is back there, and Bill Ott, why don't you come on up
6 here, too.

7 (Off the record comments.)

8 MEMBER CLARKE: Welcome back, everyone,
9 and we're officially into the roundtable, and there
10 are a number of ways we can do this. I suspect we'll
11 do them all. But Mike gave us some things to think
12 about, we could start there. And I thought those were
13 awfully good questions, and it would be good maybe
14 just to go down the line of the folks in front, and
15 see what your thoughts are. And as I recall the
16 questions, Mike, you asked for the top five that could
17 have the most impact.

18 CHAIRMAN RYAN: Yes.

19 MEMBER CLARKE: And what do you think
20 about decommissioning metrics. What are your thoughts
21 about that? How do you know when you're on the right
22 track, when you're done, when you're doing what you
23 should do, given all these other things that we've
24 been talking about? Is that a fair --

25 CHAIRMAN RYAN: Yes, I think the first one

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1 is pretty straightforward. From your experience,
2 whether it's design, operation, or both, what do you
3 get the biggest reduction in risk, I mean, from any
4 point of view you like, in the things that you've done
5 and designed, or you're going to do in operations and
6 so forth? I mentioned in talking to Ralph that I
7 think the MPO measurables, for example, go a long way
8 at looking at reducing worker dose, and water quality
9 has been a key issue, and that's resulted in a lot of
10 benefits in decommissioning, and clean-ups, and
11 outages, and lots of things have fallen out of that.
12 That's one.

13 And then the second one is not so much
14 what do you think of metrics, but more, if I'm going
15 to implement the guidance, and the regulation, it's my
16 favorite question to ask a regulator - how do I know
17 I'm done? When am I done? Tell me what you want,
18 I'll do it, but tell me when I'm done. That's it.

19 MEMBER CLARKE: Well, I guess in this case
20 you're done when you meet the standard.

21 CHAIRMAN RYAN: What is the standard?

22 MEMBER CLARKE: Yes.

23 CHAIRMAN RYAN: That's my point.

24 MEMBER CLARKE: If you want unrestricted
25 release, we know how -- but the question may be more,

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1 how do I position myself so that when I get to
2 decommissioning, I will be able to do that.

3 CHAIRMAN RYAN: Well, it's a little bit
4 more complicated than that, Jim, I think. And, again,
5 let me try and refine the question. For reactors, I
6 understood a lot of what was in the Reg Guide, and it
7 made a lot of sense to me how piping is designed, and
8 systems, and simplify them, and lots of those kinds of
9 things. But, again, I'm thinking from a broader
10 perspective of thousands and thousands of licensees in
11 agreement states, and non-agreement states that are
12 going to have to deal with this in some form or
13 fashion. Their goal is going to have to be, when am
14 I done? How much of this do I need to do? And what's
15 my finish line? When do I know I've accomplished my
16 goal under this regulation? Whether it's a reactor,
17 or whether it's a licensee that has 300 curies of XYZ,
18 that he uses in a chemical process to produce some
19 radionuclide for an application, or whether it's
20 sealed sources in a radiation facility. What do I need
21 to do to meet this requirement? I'm ready for
22 decommissioning. So it's a big question, but I think
23 it's an important one for the Guidance to somehow
24 address. And the top five list is what's really
25 worked. Not having underground pipes that you ignore

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1 for 20 or 30 years is probably a good example.

2 MR. DAROIS: I think we know better what
3 didn't work.

4 CHAIRMAN RYAN: Yes. And, therefore, you
5 can say what you would do to avoid it. I'll be quiet
6 and listen for a while.

7 MEMBER CLARKE: Eric and Ed, if you want
8 to jump in and give us your responses to this.
9 Obviously, keeping stuff out of the groundwater is a
10 big plus when you get to the end.

11 MR. DAROIS: Well, I was going to add to
12 the discussion some of the points you brought up,
13 Ruth. And that was, how much money do we spend in
14 these measures? I'll reiterate something that Jervan
15 Nordnan, who is the licensing manager Connecticut
16 Yankee presented at the last NEI groundwater meeting.
17 He, basically, said, and I think I've got the number
18 about right, that the groundwater and soil
19 contamination at that project cost \$75 million. So I
20 don't know if that's a lot or a little in terms of
21 design considerations. How much does it cost to line
22 a PAV with a half-inch stainless steel? I don't know,
23 is it 10 million, is it 30 million, 200 million? I
24 have no clue, but that's --

25 MEMBER CLARKE: It's not 75.

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1 MR. DAROIS: It's probably not 75. That's
2 not the only problem that would cause that amount of
3 money to be spent. And all that is is one data point,
4 too, so --

5 CHAIRMAN RYAN: But it's a principle. I
6 mean, to me, Eric, the principle is avoiding large
7 volume soil contaminations with material that doesn't
8 meet decommissioning requirements is number one in the
9 hit parade kind of issue for me. That's where a huge
10 amount of extra money gets spent on decommissioning
11 any facility, that's one.

12 MEMBER WEINER: And that's a good example.

13 MR. DAROIS: It is.

14 CHAIRMAN RYAN: You know --

15 MR. DAROIS: Be better off saying let's
16 not put these design considerations, and put the money
17 in the bank, and 60 years from now we'll have \$700
18 million to draw from, you know, because it's grown in
19 interest that much, and we're better off doing it.
20 It's the inverse of what we're talking about here, I
21 understand. There's still that cost-benefit.

22 CHAIRMAN RYAN: And I'm just looking to
23 see what some of the others were.

24 MR. ANDERSEN: Well, it seems to me that
25 a starting point, and this actually came out from the

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1 operating plants under the groundwater initiative, is
2 to understand where your risk is. And as a
3 consequence, one element of that initiative was for
4 people to review the systems in their plant in terms
5 of, not highly quantitative, but in a qualitative
6 sense of relative likelihood of failure that would
7 result in leakage into soil or groundwater, and then
8 what the consequence would be. What are the activity
9 levels that are in those systems? And we do that for
10 accidental analysis, so it would strike me that that
11 would be one of those top five, is to be able to lay
12 out such an evaluation, and then explain what actions
13 were taken in terms of design or proposed operational
14 programs to mitigate that. Because, again, that's
15 fundamental to what we do in the accident space.

16 CHAIRMAN RYAN: So if I may just kind of
17 restate it, I think you're -- and I hear you saying,
18 and I agree with you, that if I develop a plan that
19 recognizes that my facility sits on resources, which
20 are the soil and groundwater, and surface water system
21 that I'm on, and that's around me, and I have to
22 understand my plant's potential - I mean, plant
23 facility, licensee's activity, whatever, at whatever
24 level, I need to understand my potential impacts on
25 that system from my proposed operations. That's as

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1 important as, am I going to be safe in the laboratory,
2 or the reactor space, or wherever.

3 MR. ANDERSEN: Again, if you translate it
4 into ALARA space, you lower the doses. You don't run
5 off and spend 1,000 person-hours planning a job that's
6 going to have one person millirem of dose, so in the
7 initiative, whatever everyone did is, they went out
8 and they ranked their systems, and their
9 configurations, and said - simple things, like where
10 do I have a direct interface with soil, or the outside
11 world? And where I do have such a direct interface,
12 how much activity do I have in that system? As you
13 mentioned, the concentration level is already below
14 what you would have to mitigate, that wouldn't be a
15 very high priority, even if there was a high
16 likelihood of failure. But this goes back to
17 systematic approach. To me, that would be step one in
18 any design evaluation, preceding figuring out where I
19 would end on all these measures. And I really think
20 the designers either overtly, or implicitly probably
21 did that. Gee, spent fuel pools, it's not very
22 difficult to start with that, and say what's my
23 configuration for that, and fuel transfer canal,
24 that's where the radiation is, and sort of work from
25 there, primary system, secondary systems.

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1 MEMBER CLARKE: There's another piece to
2 this. Again, I wouldn't necessarily conclude is
3 something everybody should do in every instance, but
4 the chemical processing, and others have developed
5 ways of doing what's called a groundwater
6 vulnerability analysis, and now you're bringing in the
7 site-specific characterization, that you need to
8 determine if you do have a release, then where is it
9 going to go? How much time do I have to do something
10 about it? Where do I need to put detection systems?
11 How am I going to deal with it, if it happens? And
12 that's -- Ralph, I think that's another systematic way
13 of looking at some facilities in some locations.
14 Again, I don't think it's a general thing. It's
15 something for everybody, is your point. Right? If
16 you get beyond reactors and material sites, and you
17 have the other cases, but it strikes me from years and
18 years of working on superfund sites that boy, if you
19 get stuff in the deep soil, in the groundwater, you
20 are into it. You're just flat out into it. And that
21 ought to be right up there as something that needs to
22 be prevented. Surface soil, one thing.

23 MR. ANDERSEN: Is that the term of art of
24 groundwater vulnerability analysis?

25 MEMBER CLARKE: Probably.

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1 MR. ANDERSEN: Ask somebody about that,
2 what they recognize?

3 MEMBER CLARKE: I think so. Groundwater
4 vulnerability analysis.

5 MR. ANDERSEN: Part of an adjunct to that,
6 Mike, I would suggest going to the questions you
7 asked. Maybe something that needs to be in the Reg
8 Guide are really some front-end screening criteria,
9 figure out where you stand. You made that comment
10 about the other thousands of licensees. If you
11 recall, in the decommissioning area, after the rule
12 was finalized, that was really a first step, was to
13 try to come up with screening criteria where people
14 could simply be done, without having to go highly
15 elaborate analysis to show that they're okay. So
16 maybe conceptually putting something like that in the
17 Reg Guide, where somebody can get to a point where
18 they say I don't need to read the rest of this Reg
19 Guide.

20 CHAIRMAN RYAN: Well, I think that's a
21 real good way to get at it, Ralph. I mean, I can
22 envision licensees that I know, that would say I have
23 fairly substantial, but not fabulously big sealed
24 sources, and I have a certain activity, and I'm done.
25 Here's all my material right here, and I do surveys,

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1 and leak checks, and I'm done. That's it, the whole
2 package is right here in front of your very eyes right
3 now in the inspection, so I think -- and that may even
4 be an exempt category, or just failure to control
5 means failure to meet the new regulation, all the way
6 on up to reactors. And having a graded approach might
7 be a way to think it through.

8 Let's just talk about it two seconds more.
9 If I've got all sealed sources, I'm probably less
10 risky than if I've got sealed sources and solids. I'm
11 probably less risky than if I've got sealed sources,
12 solids, and liquids. And then if I have liquids and
13 processes, I mean, you can kind of think your way
14 through simple to complex, and come up with a half a
15 dozen tiers of potential for problems, or the kinds of
16 groundwater, or surface water issues come up, go up
17 the scale. But I really think it shouldn't be one
18 shoe fits everybody's foot here.

19 MEMBER CLARKE: Okay. Thanks. Other
20 thoughts?

21 MR. DEHMEL: Yes. Let me add something
22 with respect to - it seemed that the gist of the
23 discussion focused heavily on decommissioning, and
24 what happens at that time. Now what kind of design
25 features do you have into the facility to facilitate

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1 decommissioning, as well as, well, if you have some
2 contamination, depending what the levels are, it can
3 be handled later on at the time of decommissioning.
4 But as a technical reviewer looking at DCDs, design
5 certification, as well as COL application packages in
6 the near term, we're concerned about the immediate
7 consideration of protecting the environment,
8 minimizing releases of contamination of radioactivity
9 in the environment, and complying with Appendix I and
10 Part 20 requirements. So if I were to look at a DCD,
11 or at a COL application, and if this Reg Guide were
12 available to me as a tool, I would focus my review,
13 and use that as a point of reference to determine
14 whether or not the applicant has applied some minimum
15 consideration in making sure that some design features
16 incorporate some common sense engineering, and that
17 some operational considerations have been taken into
18 account, such that when the plant is operating, the
19 focus would be on minimizing spills and leaks, and
20 releases of radioactivity into the environment, both
21 through -- define a release pathway, and unmonitored,
22 uncontrolled release pathways.

23 Now somebody said well, is this too much
24 of a checklist? Well, the technical reviewer uses a
25 checklist, and march down literally Reg Guide, and say

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1 yes, you made this one, yes, you made this one, and
2 you're done. But I think that -- I don't think I
3 would use that as a checklist in that context. What
4 I would do is the following. I think what I will do
5 is the following, is focus on plant systems and
6 approaches in the design, either DCD or the COL stage,
7 where I know inherently those kind of systems and
8 operational features would lead to potential leaks,
9 much more than a sealed system, permanently installed
10 system. And my focus is really right now on mobile
11 and temporary system, because all the designs that are
12 coming forward are focusing heavily on mobile skid-
13 mounted portable system for treating waste, liquid
14 waste, as well as solid waste. So I would look at a
15 Reg Guide and say now, what are some of the design
16 features that are proposed, sound engineering
17 practices of these features that are proposed in the
18 Reg Guide, and how did the applicant consider them?

19 Now, obviously, you cannot take the Reg
20 Guide and start doing a sub-system by sub-system
21 analysis. First, there's not that kind of detail.
22 And, secondly, the Reg Guide is not enough of a
23 checklist, if you were to do this. So what you would
24 expect to do, what I would expect to see, the
25 applicant look at the Reg Guide, and, for example, in

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1 the introduction of Chapter 11.2, where the focus will
2 be, perhaps, on mobile liquid waste processing system,
3 I would expect to see discussion to see, because we're
4 going to be using liquid rad waste process system, we
5 have evaluated this Reg Guide, and based on that, we
6 have adopted the following engineering concepts, or
7 design features for the purpose of essentially making
8 sure that these portable systems once operating, once
9 connected, will minimize the leaks and spills, and
10 unmonitored, uncontrolled releases to the environment.

11 And these are the kinds of things I would
12 look, and essentially see how they've met that
13 requirement, by essentially saying these are the
14 design features that we're proposing. So it's not
15 really a checklist in the context of checking item by
16 item, but it's more kind of design philosophy
17 outlining example of engineer design features that if
18 you were to look at at a mobile liquid waste system,
19 and you could say well, how is this going to be put
20 into the plant? How is that going to be connected?
21 So the first thing you think about, for example, are
22 truck bays. That, essentially, by definition a truck
23 bay offers a ready-path to the environment, because
24 you have to be able to bring the thing in and out.

25 If it's mobile, that means it's going to

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1 be connected to permanently installed plant system,
2 that means you have to have some sort of connections.
3 What kind of connections are those going to be? Will
4 they be, for example, hard piping, self-sealing, quick
5 disconnect features? So these are the kinds of things
6 that would look as to the operational and the design
7 philosophy, that an applicant would propose, and say
8 they've considered the fact that there are going to be
9 a lot of connections made and broken to install the
10 system and change it, that in that consideration, the
11 following type of features were folded into the
12 design. And look at the Reg Guide in that context, as
13 opposed to using it as a true checklist, because then
14 the Reg Guide does not have that kind of detail to be
15 able to use it really as a checklist.

16 MR. KIRSTEIN: But doesn't the problem
17 still remain then, when are you done? I mean, it's
18 still open to interpretation of what design features
19 exist to minimize the possibility of contamination?
20 Being a vendor, we like checklists, because then we
21 know when --

22 MR. DEHMEL: Right.

23 MR. KIRSTEIN: And that's kind of where
24 I'm kind of struggling with that.

25 MR. DEHMEL: Well, look at the dilemma the

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1 staff has. For example, right now at the DCD stage,
2 a commitment is made to install or to ultimately
3 propose the use of a liquid rad waste processing
4 system. It's portable, it's mobile, but the DCD does
5 not provide any specific details, so if we were to use
6 a Reg Guide, we would look at this and say well, you
7 can't really apply the Reg Guide in the level of a
8 checklist, because the way the DCD describes the
9 system, it's very nebulous. So how would you then be
10 able to use a checklist even more detailed than a Reg
11 Guide, against a system that's being presented as a
12 black box? Here's a bay where this system will be
13 brought in place. We don't have the design detail
14 now. It's going to be the responsibility of the COL
15 applicant to provide the detail, so how does a
16 reviewer deal with that kind of situation at the DCD
17 stage?

18 The only thing we have, if we were to use
19 the Reg Guide, and look at these conceptual design
20 features and say well, yes, they described the fact
21 that if you're going to have these quick disconnect
22 system, these pipes and so on, they're going to be
23 self-sealing. Well, to me, that's a step in the right
24 direction.

25 CHAIRMAN RYAN: I think, Jean-Claude, I

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1 don't disagree with you. I mean, to me, I mean,
2 you're picking on an example I noticed a little bit
3 about, liquid rad waste systems. They're reviewed
4 under 50.59 reviews. Right? Like 50.59 review, how
5 do you do those? Well, you know, the potential is
6 there to spill X gallons with these activities, and
7 this is the clean-up thing, and this is what the
8 consequences would be, and we block the drain, and we
9 do all those -- I mean, and you're going to make a
10 judgment based on that. At the end of the day, we've
11 got to deal with the judgment somehow, but making an
12 analytical judgment is a little bit more helpful than
13 just saying I feel good about it. And it sounds like
14 you're heading in that direction.

15 MR. DEHMEL: Right. At the DCD stage, the
16 only thing we can say - all I can say as a reviewer,
17 is that since there's not enough technical detail
18 about how these interfaces will be made, then the only
19 thing I can hope to look for in the DCD application is
20 that these are the general design considerations we
21 will provide for the interface of these systems, and
22 there will be a few itemizing what those are. And
23 that's the only thing I can look for, and that's the
24 only thing I can hope for.

25 CHAIRMAN RYAN: But it's also fair to say

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1 that you're comfortable with, I think from what
2 you've said, the notion of liquid rad waste systems
3 that are mobile at this stage. That's not something
4 that's, oh, my God, why would you even think that.

5 MR. DEHMEL: No, absolutely not.

6 CHAIRMAN RYAN: So, I mean, there is --
7 you're over one hurdle here, the liquid rad waste
8 systems that are mobile, or temporary, will change out
9 over time is not a bad thing. That's okay, in
10 concept, and then the details will determine whether
11 at the licensing stage it's okay, based on the
12 specifics.

13 MR. DEHMEL: Then at COL stage, you would
14 expect to see a lot more technical detail, because now
15 at that point, the design is further down the line.
16 There may be more information about the type of mobile
17 rad waste system, maybe, maybe not. And so we would
18 expect a little bit more engineering detail, and
19 description. But the only thing I can tell you is,
20 the Reg Guide is not detailed enough to do this kind
21 of engineering checklist, the way it was envisioned
22 and discussed earlier. It's just not that kind of
23 technical detail to be able to say you're done, you're
24 done, because it's obvious that the Reg Guide is not
25 all comprehensive, to start with. Right? And then

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1 the question is, if we, the staff, were to review
2 against the Reg Guide and say this is the master
3 checklist, well, how can that be? So we could always
4 be countered by the applicant to say no, no, no. We
5 have a better idea, or your Reg Guide is wrong for th
6 is particular instance, or that particular feature
7 does not apply.

8 CHAIRMAN RYAN: And I appreciate the value
9 of checklists in the design setting, but in the
10 agreement state, or the non-reactor licensee setting
11 there will be thousands of NA, NA, not applicable. So
12 I'm not a big fan of the checklist approach, for that
13 reason, it applies to everybody. If it just applied
14 to reactors, so be it.

15 MEMBER CLARKE: I think what Jean-Claude
16 is saying, though, is that he does not want the
17 licensee to come away with that interpretation, that
18 it is, in fact, a checklist.

19 MR. DEHMEL: I could not use it as a
20 checklist.

21 MEMBER CLARKE: Yes.

22 MR. DEHMEL: I could not.

23 MEMBER CLARKE: Might not be all-
24 inclusive.

25 MR. DEHMEL: Yes. And I realize --

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1 MEMBER CLARKE: I don't know if the
2 language is in the Reg Guide or not, but I guess I
3 would suggest strongly that it become very clear to
4 the potential licensee that you do not want them to
5 interpret that as a checklist. You want them,
6 perhaps, and I don't mean to put words in your mouth,
7 but maybe these are things to think about, as you go
8 through your system, and you decide how you're going
9 to, in fact, minimize contamination. Is that fair?

10 MR. DEHMEL: Yes. Essentially, it's more
11 because -- it's more of a design philosophy, design
12 approach. Looking at the Reg Guide, identifying some
13 section of the Reg Guide that would apply, for
14 example, for liquid rad waste portable systems, that
15 would look at, for example, how do you design concrete
16 joints to make sure that there is no leakage between
17 floor joints, and so on; as opposed to using it as an
18 engineer - a detailed engineering checklist, because
19 it's not that. It cannot be that, versus not -- it
20 can't be all comprehensive. It's not.

21 MEMBER CLARKE: But do you think there's
22 a danger that it will be interpreted as a checklist?
23 Maybe I should ask the licensees.

24 MR. KIRSTEIN: No, I think I retract that
25 statement, and I think you're correct. The level of

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1 detail in the DCD would not be able to give the
2 reviewer an adequate feel for meeting certain
3 checklist requirements. I think there has to be a
4 happy medium in there somewhere. I agree.

5 MR. MENEELY: Well, but the level of
6 detail of what Ed presented has a lot of checklist-
7 type items in it, that someone could come back,
8 whether it's at COL stage, or DCD stage, or at an
9 audit later during operations, to say do your locker
10 room drains go to your rad waste system? That's a
11 pretty yes or no kind of question. That's a
12 checklist, so it may not be directly about the liquid
13 rad waste system, but it's about the plant. I guess
14 I don't know why you would include this kind of detail
15 in the Reg Guide, unless you were going to come back
16 and regulate against it some day, or at least ask
17 questions against it some day. As I say, maybe you
18 can ask them at the DCD stage, but at some point
19 you're going to ask them.

20 MR. ANDERSEN: Well, it would seem to me
21 that unless the purpose of Reg Guides has changed
22 substantially, that certainly, one primary purpose is
23 to provide an acceptable means for demonstrating
24 compliance with the regulation. And throughout FSARs
25 that have existed for a long time, and even the new

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1 ones, the commitment to a Reg Guide is usually
2 considered to be adequate, because you have committed
3 to a method that is acceptable to the staff to
4 demonstrate compliance. So what I would say is that,
5 either as the licensee, or as a reviewer, if you
6 believe the Reg Guide is missing information that
7 satisfies that need, however it's constructed, then
8 it's an inadequate Reg Guide. I want a Reg Guide that
9 tells me how to comply with 20.1406. We're not going
10 to get that, stop the train. I don't want a Reg Guide
11 that is interesting information, but does not provide
12 a method that is acceptable to the staff. So if I
13 were providing an application, which, of course, NEI
14 isn't going to build a reactor, I would expect that,
15 one, I would make a definitive commitment to the Reg
16 Guide, or take exceptions to it. And then, two, I
17 would provide you sufficient illustrative information
18 on all the things that you've talked about, that you
19 could determine from that, that, in fact, I've
20 complied with 20.1406. Because that's the conclusion
21 we need to reach, is that I complied with that
22 requirement.

23 MR. DEHMEL: But the industry does that
24 already. If you look at the DCDs, the first section
25 of all the system design-basis, it looks at the Reg

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1 Guide, it looks at a regulation, and it provides
2 essentially a discussion as to well, this design -
3 this system is designed as follows. It's in
4 compliance with the following design-basis to Reg
5 Guide, and so on, and it goes on and provides the text
6 to support those statements. So what is so different
7 now about Reg Guide, this Reg Guide 20.1406? Why are
8 we stumbling on that? I don't think we should. It's
9 no different than any other Reg Guide.

10 MR. ANDERSEN: Except that it doesn't
11 exist. But said differently, and I would think -
12 let's just pretend I'm not a reactor licensee, just to
13 satisfy the broader need. If I made an application,
14 and you challenged me that it was incomplete under
15 20.1406, and if there is a Reg Guide that provides a
16 method acceptable to the staff for complying with
17 20.1406, then if I felt that I had developed the
18 application consistent with that Reg Guide, my
19 challenge to you would be well, show me how I didn't
20 meet the Reg Guide. Where did I not meet the method
21 that was acceptable to the staff? So the Reg Guide
22 should be sufficient for that, because all the other
23 Reg Guides are.

24 Charlie weighs against 8.8. He doesn't
25 just make things up that aren't in 8.8, and say well,

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1 you should also have this.

2 CHAIRMAN RYAN: Let's take a second and
3 read the regulation. I think that -- I just did that,
4 and it was real interesting to do that after these
5 couple of hours. "Applicants for licensees and
6 renewals after August 20th, 1997 shall describe in the
7 application how the facility design and procedures for
8 operation will minimize, to the extent practicable,
9 contamination of the facility and the environment, and
10 facilitate eventual decommissioning, and minimize, to
11 the extent practicable, the generation of radioactive
12 waste." That's a mouthful.

13 MR. ANDERSEN: For instance, the standard
14 is not prevent unmonitored, and uncontrolled releases.

15 CHAIRMAN RYAN: Right.

16 MR. ANDERSEN: It is not that.

17 CHAIRMAN RYAN: Right.

18 MR. ANDERSEN: There is no such
19 requirement.

20 CHAIRMAN RYAN: So, again, I kind of cycle
21 back to, there's a whole range of facilities. It
22 might be helpful to have a little bit more in the
23 preamble information on what are the range of
24 facilities, and how does all this apply to me? If
25 I've got 20 sealed sources and three vials of

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1 standards, it's pretty easy. And I think if this is
2 going to apply to everybody, we really need to think,
3 not just in terms of the harder ones, and the more
4 complicated ones, but really get across the whole
5 spectrum of licensees with some graded approach, shall
6 I use that whole term.

7 (Off the record comments.)

8 MR. OTT: I want to offer one additional
9 observation about that, and I'm glad you actually read
10 the regulation out, because it focuses on new
11 facilities, other than renewals?

12 CHAIRMAN RYAN: Right.

13 MR. OTT: I think that's going to relieve
14 a lot of the burden on materials licensees. It's only
15 new facilities that have to comply with this
16 regulation at this time. On the other hand, I do
17 agree that we need to put some introductory material
18 in the Guide to point out that even those new
19 facilities need to look at this with a special eye
20 towards what applies to them, what's relevant to them.

21 CHAIRMAN RYAN: You need to tell them what
22 that special eye is. They don't need to figure it out
23 on their own. That's my point.

24 MR. OTT: Right.

25 CHAIRMAN RYAN: I mean, if I was an

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1 applicant and I said all these things apply, and I'm
2 looking for relatively small activity, it's going to
3 drive me crazy to go through that.

4 MR. OTT: Well, we might be able to do it
5 by, as you said before, sealed sources, sealed sources
6 and solids.

7 CHAIRMAN RYAN: Yes, I guess in
8 petitioning -- yes, that would be helpful, too.

9 MR. OTT: If we did that by cases of
10 licensees, then we might be able to do something.

11 CHAIRMAN RYAN: Classes or something. I
12 think that's -- and maybe there's even over X thousand
13 curies, or under this, or some kind of --

14 MR. OTT: But in terms of the total
15 burden, it shouldn't be as much of a shock as we were
16 thinking earlier, because I had totally lost track of
17 the fact that we are dealing only with new facilities
18 here.

19 CHAIRMAN RYAN: Well, we're dealing with
20 a decade of new facilities, at least, plus whatever
21 comes now. I mean, that's ten years old.

22 MR. OTT: Right. Well, yes.

23 CHAIRMAN RYAN: That's not exactly
24 yesterday.

25 MR. OTT: Good point.

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1 MEMBER CLARKE: We're coming down the home
2 stretch. We've got 15 minutes left. Let me ask the
3 panel and the Committee if they have any questions
4 that they've been holding. I think discussion has
5 been very helpful. Any more responses to what we've
6 been talking about from you folks? I do want to give
7 our panel and our Committee another shot.

8 MR. ANDERSEN: Something we haven't talked
9 about, and I'm not sure that even in 15 minutes we
10 could get started, but it's an idea that we're going
11 to take back, and that's this idea of a metric. I
12 think that's essential. The measure of when you've
13 done enough shouldn't be the number of things you've
14 done, or the amount of words you put in an
15 application, or the level of detail. It should be
16 that you've met a standard that can be objectively
17 weighed. And even though you may not be able to get
18 to that quantitatively, we ought to, at least, be able
19 to ultimately have a qualitative metric that we're
20 aiming at. Because I think the question we had
21 earlier about what's the end-point, what are you
22 really trying to accomplish here? I mean, we all know
23 we're trying to make the world a better place. I
24 understand that element of the regulation. I just
25 don't know beyond that, what it is we're actually

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1 trying to accomplish, until there's been some
2 discussion of that, and that shows up in a Reg Guide
3 to help understand it. But I just offer that thought.
4 I think that's a very fruitful area for further
5 thought.

6 MEMBER CLARKE: Eric, and Eric, and Eric.
7 Three Erics.

8 MR. DAROIS: Well, I had a few things from
9 earlier. I guess we're going to change topics a
10 little bit. And this is kind of a little bit all over
11 the map, so I've just got a few items. One is, on the
12 1406 Reg Guide, there's a small paragraph in there
13 that deals with 10 CFR 50.75(g), and I would assume
14 30(g), as well. But just a commentary on 75(g), that
15 the interpretation of what you need to put in your
16 75(g) file is still not particularly clear across the
17 industry, and I'll give you two examples. One is,
18 where one utility records everything, every
19 contamination area that's set up in the radiological
20 control area of the plant, which I don't think that's
21 the intent of 50.75(g), especially if it doesn't
22 impact decommissioning costs. And then there's
23 examples on the other end of the spectrum. I don't
24 know if we need to consider expanding that a little
25 bit, and providing some additional guidance somewhere

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1 on what 50.75(g) events get recorded. I know my
2 answer, but I'll leave it at that.

3 With regards to one thing that was said a
4 couple of times today, that certain systems should
5 have double containments, which, again, sounds like a
6 great idea all over the place, but think about spent
7 fuel pools when that statement is made, and I don't
8 know if that's double containment or not, because
9 there's fuel cladding in place, and then there's a
10 liner. But if that's the interpretation, then also
11 realize that we've had spent fuel pool leaks with that
12 configuration for a variety of reasons.

13 That's probably my most significant stuff,
14 so I'll give other folks a chance to talk.

15 MR. ABELQUIST: Well, my big issue has
16 been addressed several times. That's having
17 performance-based objectives or criteria for
18 implementing 20.1406. The only other point I'd throw
19 out that I thought about when I initially went through
20 this, when I think about decommissioning, I first
21 think about the real work, actually digging soil,
22 knocking down buildings, pulling out rubble, debris.
23 But another important, sometimes very costly part of
24 decommissioning is the final status survey. I know
25 when we did it for Fort St. Vrain, that turned out to

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1 be a humongous aspect of the overall cost, and so in
2 that context, if we think about what drives up the
3 final status survey costs, one of the big issues is,
4 for any type of facility, if there are alpha
5 contaminants that have very low DCGLs, which they do
6 based on the screening model we typically end up
7 using, that adds up to be just a terrifically
8 expensive part of the overall final status survey,
9 which is the final part of decommissioning. And so,
10 anything that we could add to help out in the overall
11 D&D facilitation that addresses the final status
12 survey aspect would be probably helpful.

13 MEMBER CLARKE: Anyone else on the
14 Committee? Anyone else?

15 CHAIRMAN RYAN: We had a couple of
16 comments here. You need to come up to the microphone
17 and tell us who you are.

18 MR. BLAND: I'm Stewart Bland with
19 Chesapeake Nuclear Services. Mike, I wanted to point
20 out, is that in the non-reactor licensee, in the NMSS
21 consolidated guidance, quite a few of those, there are
22 specific words in there that do address 1406,
23 basically saying is that if you do your design and
24 evaluation programs as laid out in the consolidated
25 guidance, that is sufficient for addressing 1406. So

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1 I think in terms of the Regulatory Guide going
2 forward, looking back at that NMSS consolidated
3 guidance, and linking to that in some fashion, I think
4 it's going to answer a lot of the questions you have.

5 CHAIRMAN RYAN: Maybe that's the hook, is
6 if it can be linked back to that. I didn't realize
7 that was in there. I haven't looked at that guidance.
8 Thanks. That's great.

9 MEMBER CLARKE: Thank you. Bobby?

10 MR. EID: This is Bobby Eid from Division
11 of Waste Management. I think you asked lots of good
12 questions, and the solutions to most of those
13 questions actually in NUREG-1757, categories of the
14 sites, classifications for the sites. I believe it
15 would be good to use this kind of classification in
16 the current guidance, so it can be some kind of
17 guidance when to do all of this list, or checklist, so
18 to speak, and when not, because for sealed sources,
19 you do not need to do all of this kind of checklist
20 that we're talking about, because it will be confusing
21 for the audience, will be confusing for the agreement
22 states if they think that everything is to be
23 applicable, so I agree with your comments.

24 CHAIRMAN RYAN: That's great. Thank you.

25 MEMBER CLARKE: Anyone else? Any other

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1 comments, questions? Anything you folks would like to
2 say in the few minutes we have left? If not, let me
3 thank you all very much.

4 CHAIRMAN RYAN: Come on up, Bobby.

5 MR. EID: One issue was raised that Eric
6 Abelquist mentioned about using the decommissioning
7 criteria, which is 25 millirem. It is good idea;
8 however, you will know exactly what is the status of
9 decommissioning and the scenario to be used. So the
10 25 millirems when it comes translate to actual
11 concentration could be different depending on the
12 scenario. So if you assume green field and
13 residential apartment, of course, concentration would
14 be different; whereas, if you assume some kind of
15 restrictions for the site, or other kind of scenario,
16 like industrial scenario, so the concentration could
17 be different completely.

18 In addition, also, the groundwater
19 protection required by EPA needs to be taken into
20 consideration, because some licensees in the states,
21 they try to comply with EPA groundwater protection.
22 That's another issue, too, to be taken into
23 consideration. Therefore, when you consider about the
24 decommissioning criteria to comply with, you need to
25 think about the flexibility for what is the site at

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1 the end is going to be used for. Otherwise, you try
2 to clean up to the atom, so you don't want to spend
3 the cost in advance specifically when you assess
4 decommissioning cost early in the process. Thank you.

5 MEMBER CLARKE: Those are good points,
6 Bobby. Thank you.

7 Okay. Well, let me thank you all very
8 much. This has been very helpful, very interesting to
9 us. Let me thank Derek Widmayer for pulling all this
10 together, Eric Darois, Eric Abelquist.

11 Mr. Chairman, back to you.

12 CHAIRMAN RYAN: Let me add my thanks to
13 all the panel members, and staff, and guests. We
14 really appreciate it. This has been a very fruitful
15 afternoon discussion, and I'm going to guess just for
16 everybody's benefit, we'll probably put together a
17 letter on this, specifically, and communicate that
18 forward, as we normally do. So I appreciate
19 everybody's input, and with that, we will adjourn
20 today's meeting, and adjourn the session. Thank you
21 all very much.

22 (Whereupon, the proceedings went off the
23 record at 4:54 p.m.)

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