

ACNWT-0182

Official Transcript of Proceedings

NUCLEAR REGULATORY COMMISSION

Title: Advisory Committee on Nuclear Waste
162nd Meeting

Docket Number: (not applicable)

PROCESS USING ADAMS
TEMPLATE: ACRS/ACNW-005

Location: Rockville, Maryland

Date: Thursday, August 4, 2005

SISP REVIEW COMPLETED

Work Order No.: NRC-542

Pages 1-88

ORIGINAL

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

T208

**ACNW OFFICE COPY - RETAIN FOR
THE LIFE OF THE COMMITTEE**

DISCLAIMER

UNITED STATES NUCLEAR REGULATORY COMMISSION'S
ADVISORY COMMITTEE ON NUCLEAR WASTE

August 4, 2005

The contents of this transcript of the proceeding of the United States Nuclear Regulatory Commission Advisory Committee on Nuclear Waste, taken on August 4, 2005, as reported herein, is a record of the discussions recorded at the meeting held on the above date.

This transcript has not been reviewed, corrected and edited and it may contain inaccuracies.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

+ + + + +

ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

+ + + + +

162nd MEETING

+ + + + +

THURSDAY,

AUGUST 4, 2005

+ + + + +

ROCKVILLE, MARYLAND

+ + + + +

The committee met at the Nuclear
Regulatory Commission, Two White Flint North,
Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Michael
T. Ryan, Chairman, presiding.

COMMITTEE MEMBERS:

MICHAEL T. RYAN, Chairman

ALLEN G. CROFF, Vice Chairman

JAMES H. CLARKE, Member

WILLIAM J. HINZE, Member

RUTH F. WEINER, Member

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

1 ACRS/ACNW STAFF:

2 LATIF S. HAMDAN, ACNW Staff

3 MICHAEL L. SCOTT, ACNW Staff

4

5 NRC STAFF:

6 THOMAS NICHOLSON, Office of Research, NRC

7 JACOB PHILIP, Office of Research, NRC

8

9

10 PRESENTERS:

11 LES DOLE, Oak Ridge National Laboratory

12 EDWARD GARBOCZI, NIST

13 DAVID KOCHER, SENES, ACNW Consultant

14 ANNE SMITH, Charles River Associates

15 International

16 VERNON ICHIMURA, Chem-Nuclear Systems

17 CRAIG BENSON, University of Wisconsin

18 RANDY POSTON, WDP & Associates

19

20

21

22

23

24

25

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

12:49 p.m.

1
2
3 CHAIRMAN RYAN: All right, it is the
4 appointed hour, and we'll come into order, please, and
5 we're on the record. We're scheduled for a briefing,
6 and I'm informed that even though the calendar says
7 12:45 to 3:45, we probably won't use that entire block
8 of time, but we'll certainly have plenty of time to
9 discuss with staff the status of repository design
10 issues. And I believe Tim Kobetz is leading us off.
11 Welcome Tim and colleagues, and we appreciate you
12 being with us today. Thank you very much.

13 MR. KOBETZ: Thanks Mike. Yes, I'm Tim
14 Kobetz. I'm the Senior Project Manager in the Office
15 of High Level Waste Repository Safety. It's
16 responsible for all the pre-closure activities, and
17 that includes making sure that the staff's prepared in
18 the event that a potential LA would be submitted for
19 our review.

20 CHAIRMAN RYAN: Tim, I'm sorry, just one
21 minor comment before we start. If I could ask the
22 folks on the other end of the videoconference, if you
23 could create a sign-in sheet, please, and provide that
24 either by fax or something to Mike Lee, that would be
25 helpful for our complete record. Thank you very much.

NEAL R. GROSS

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

1 Sorry Tim.

2 MR. KOBETZ: Okay. But what, you know, I
3 appreciate you inviting us here today. What we want
4 to do is provide to you an overview of what we're
5 doing to prepare in the event that the LA does come in
6 and we need to review it. So we're going to go
7 through basically the regulations, all the way through
8 some of the independent evaluations we're doing.

9 Before we go on I want to go ahead and
10 introduce Mike Waters. Mike's our Senior Systems
11 Performance Analyst that's responsible for pulling the
12 whole pre-closure safety analysis together, our review
13 of it. And Mahendra Shah, who's our Senior Structural
14 Engineer. And Mahendra is responsible for ensuring
15 that our review of all the surface facilities is
16 adequate to support Mike's review of the PCSA. As you
17 know, we do have some people on videoconference.
18 That's staff in the Center who's very integral to our
19 pre-closure teams.

20 We're not going to discuss a lot of
21 technical issues in detail. Certainly if there's
22 something that you find interesting and you want more
23 detail on, we can set up a future meeting when we're
24 prepared and we have enough information that we can
25 make it meaningful for both sides. So like I said,

NEAL R. GROSS

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

1 we're going to go through the regulatory framework of
2 Part 63, specifically how it applies to making the
3 decision for 63.31, which would be of grant a
4 construction authorization if we were to receive the
5 license application. We're not going to focus on the
6 parts of the decision that deal with, you know,
7 physical protections. We're focusing on making the
8 safety decision here today.

9 We're going to talk about staff challenges
10 associated with performing this review, because as
11 you know this is really the first performance-based,
12 risk-informed review that the staff's done, and it's
13 very different than doing a deterministic review. And
14 in reviewing some of the information in your April
15 meeting I guess with Department of Energy, I think you
16 find yourselves kind of going into the deterministic
17 mode in looking, well, what's the general design
18 criteria, or what are the design-basis accidents. And
19 we don't have that kind of thing here. So there's a
20 certain amount of challenges involved with that.

21 We're going to talk about how we are
22 preparing the staff, the teamwork that we'll pulling
23 together to make sure that everyone's ready. We're
24 going to talk about the pre-closure topics that we're
25 pulling together, the things that we think we should

NEAL R. GROSS

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

1 focus our attention on until the time that DOE would
2 submit an LA, if they do submit it. We're going to
3 talk about some independent staff evaluations that are
4 being performed both here and at the Center to prepare
5 us, because there's a certain amount of confirmatory
6 analysis that we would do with any license
7 application. We're going to talk about some of the
8 stuff that we're doing with that.

9 We're going to talk about some of the past
10 interactions we've had with DOE, some of the technical
11 exchanges, what we've tried to get out of that, and
12 where we're going forward with those. And then we're
13 going to talk a little bit about the essential
14 elements of design. And when we say that, we mean
15 those elements of the design that are going to be
16 required to support DOE in performing a pre-closure
17 safety analysis that would demonstrate compliance with
18 the dose objectives of Part 63.

19 Okay. I'm going to start out with Part
20 63. I'm going to talk briefly about two regulatory
21 decisions we would have to make, the first one having
22 to do with whether or not to grant a construction
23 authorization, and then the second one in the event
24 that we did grant a construction authorization, the
25 decision whether or not to grant a license to receive

NEAL R. GROSS

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

1 and possess high-level waste.

2 The first one, 63.31 really focuses on the
3 design of the facility. You know, will the design --
4 or can DOE demonstrate that the design is sufficient
5 to either prevent or mitigate the event sequences that
6 they've identified as items important to safety, and
7 then can demonstrate that the regulatory requirements,
8 the dose objectives can be met. We expect all of the
9 design that we would need for them to demonstrate that
10 in the license application when it first comes in. We
11 would not expect to have to be receiving other design
12 information after we've made a decision whether or not
13 to grant a construction authorization. If a
14 construction authorization was granted, that's when we
15 start performing inspections, and follow-ups, and
16 things like that. Are they taking what they stated in
17 the safety analysis report, and we documented in SER,
18 and are they adequately transferring that design into
19 the facility? Are they building in accordance the way
20 they said they would? Are they procuring material the
21 way they said they did? Are they fabricating waste
22 packages the way they said they did? And then there's
23 a point at the end where they would have to prove
24 operations through pre-operational testing which is
25 required.

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 So, with that, 63.31, and the part I'm
2 going to focus on today like I say is safety. It's
3 not going to get into some of the other, the quality
4 assurance and things like that. But it requires that
5 DOE describe the proposed geologic repository in
6 accordance with 63.21. And that you take the design
7 as it's described, and that you demonstrate through a
8 pre-closure safety analysis that you've identified the
9 appropriate hazards, that you've identified initiating
10 events, that you've identified the event sequences
11 that your design can prevent or mitigate those event
12 sequences such that you still meet the dose
13 requirements of 63.11 for Category I or Category II
14 events, and that then can be used to identify those
15 items that are important to safety.

16 Now, one of the things that I think people
17 get caught up on is you'll read in 63.21 that the
18 safety analysis report must include a description and
19 discussion of the design of various components of the
20 geologic repository operations area and engineered
21 barrier systems, including dimensions, material
22 properties, specifications, and analytical design
23 methods, and it goes on and on. And we had a lot of
24 discussions as I'll talk about near the end with DOE
25 on what that means, and what we're looking for there,

NEAL R. GROSS

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

1 and what the regulation is requiring more
2 specifically. Because just to say we need dimensions,
3 we need materials, that doesn't help a lot. We have
4 to tie it into performance. Again, this isn't
5 deterministic where we can just say design it in
6 accordance with this general design criteria and we'll
7 review it, you know, our engineers will review it and
8 perform these accident analyses based on design-basis
9 accidents. No, they have to demonstrate compliance
10 with the regulatory dose requirements.

11 So what does that mean? That kicks them
12 in, then, from 63.21 into performing the PCSA. What
13 we're going to need is sufficient design for them to
14 perform an analysis in accordance with 63.112(e). The
15 analysis has to demonstrate the ability of the
16 structure systems and components to perform their
17 intended functions, assuming the occurrence of event
18 sequences. We're going to need that at the time of LA
19 to perform our review. We don't intend to look at
20 information, design information after construction
21 begins, unless it changes for some reason which we
22 understand in any construction process designs can
23 change for a number of reasons, or new technology
24 might come out that is better intended for the
25 function that they want to provide. But we're not

NEAL R. GROSS

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

1 intending to look at, you know, confirmatory analysis
2 in that. Everything that they need to confirm that
3 that design is going to operate the way it's intended
4 to needs to be provided in the LA up front.

5 So what kind of challenges does that bring
6 up to us? Well, like we say, this is a first of a
7 kind activity for a couple of reasons. One, it's the
8 first risk-informed performance-based regulation, and
9 we've already talked about that as far as
10 deterministic. So we have to get our minds set in
11 that. And then also there are new facilities, or
12 things that we haven't licensed before, such as some
13 of these subsurface systems. You know, the
14 transporter, the locomotive that would move the
15 transporter down into the tunnel, the emplacement
16 gantry. So there's things that we have to look at
17 from that standpoint. There's some things that, you
18 know, we've moved fuel, or we've licensed the
19 movements of fuel for a number of years. There's
20 certain other challenges still there with the risk-
21 informed, but some of that we've done before. DOE's
22 design is evolving. From the time that I've been here
23 a couple of years we've seen different things. The
24 HVAC system going from important to safety, to not
25 important to safety, to important to safety for

NEAL R. GROSS

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

1 various design reasons, whether they're finding new
2 methodologies, or better methodologies, or whatever.
3 But that certainly presents a challenge for us in that
4 if we review something early on, it may change, and we
5 have to go back and rethink, well, are we really still
6 looking at the most important stuff now.

7 And then the integration of information
8 between staff. And this is extremely important. This
9 is where we really need a team. Again with
10 deterministic, you know we have a team of engineers,
11 but you have engineers that might review certain
12 structures, certain systems, certain components. But
13 here we have to integrate information. We have to
14 integrate information about the site characterization
15 to build the hazards. We have to integrate
16 information dealing with the design to identify
17 internal hazards. We have to take that and be able to
18 integrate that with the safety evaluations that
19 they're performing, with the event trees. We have to
20 take that and integrate it with the design, and then
21 make sure that the consequence analysis are reflecting
22 all that, and that we're identifying the right things
23 that are important to safety. We also have post-
24 closure and pre-closure. There's certain things that
25 are going to be done in the post-closure world that

NEAL R. GROSS

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

1 are going to affect post-closure, such as with the
2 waste package and that. So we have to integrate
3 information that way. That's a new challenge. And
4 then we also have the integration of information with
5 the Center. And that's important because that's where
6 a lot of our technical expertise is. And we've all
7 worked with contractors, but I don't think ever on
8 such a large scale with such a long distance. Yes?

9 CHAIRMAN RYAN: Quick clarifying question
10 there. I agree with you, I think that integration
11 question is probably where the committee's focused a
12 good bit, and it seems -- and I'm just going to say
13 what I think here talking about is that you sure want
14 to avoid stove-piping there, you know, the HVAC folks
15 versus the electrical folks versus the mechanical
16 folks. And that's where you identify maybe more
17 subsystem and system questions that could be --
18 interactions and, you know, other kinds of perhaps
19 failure modes, or fault trees, or you know, other
20 kinds of things. And that is probably -- I mean,
21 you're saying that's your biggest challenge, I think
22 we would agree. Are we understanding that right?

23 MR. KOBETZ: Yes, you are.

24 CHAIRMAN RYAN: Okay.

25 MR. KOBETZ: Yes, you are. Yes. This is,

1 you know, I've worked on a lot of licensing projects
2 and that, but this is the one that I've had to focus
3 the most team-building.

4 CHAIRMAN RYAN: Sure.

5 MR. KOBETZ: You know, trying. Because we
6 have a large number of people from a variety of places
7 and that.

8 CHAIRMAN RYAN: Yes, and conversely
9 somebody may be a knowledge -- or an engineer in a
10 particular discipline and think something's very
11 important, and it may or may not be important to
12 safety. So it's kind of a two-way question I think,
13 and I guess my view of it anyway is the unifying kind
14 of principle is it's a system. I mean, it's got to
15 work as a system. Fair enough? Okay.

16 MR. KOBETZ: Yes. You're absolutely
17 right. Okay, so what have we done for this team-
18 building and that? Well, we've established some
19 different teams within the pre-closure team, and the
20 pre-closure team's over-arching, but we have a
21 performance assessment team which Mike leads up. We
22 have an engineering team which Mahendra's involved in.
23 We have site characterization team which overlaps with
24 post-closure, and then we have a health physics team.
25 Now, we have a lot of team meetings, you know, which

NEAL R. GROSS

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

1 really aren't technical in nature to make sure we all
2 understand everyone's expectations. We've had a
3 couple of things, actually three of them, I guess,
4 that we call mega-meetings, where we get together with
5 the Center, and we sit down for three days, and we
6 just talk about what are those challenges, some
7 technical, but others just in communication, setting
8 up databases, making sure that we control an SER when
9 we're writing it, and there's just one version of the
10 SER, and people aren't emailing things back and forth
11 and like that. And then the real technical work gets
12 done by the team leads, and you know, underneath
13 engineering we have sub-team leads where you have
14 things for the surface -- one for the surface
15 facilities, one for the sub-surface facilities. Then
16 -- well, and I already talked about the integration of
17 the teams with both NRC and the Center, and the
18 challenges there. So far it's been working real well,
19 but you know it's something you have to keep pushing
20 at.

21 So what are we doing now that we've got
22 these teams integrated and we're meeting and that?
23 Well, we're trying to develop what are those things
24 that are risk-significant that we should focus our
25 attention on between now and LA. You know, what is it

1 that we need to find out the most information on, or
2 that our resources are best spent on looking at? So
3 we've used our backgrounds. You know, we've got a lot
4 of operational experience, licensing experience,
5 engineering experience. A lot of that is
6 deterministic, but we also have performance assessment
7 experience that we're pulling in. We've incorporated
8 what design information and that we have been able to
9 understand from DOE, or you know at least as the
10 baseline, or as it changes. And then we've performed
11 some visits to relevant facilities, and that's kind of
12 an integral process. As we identify things, we
13 identify maybe another facility to look at, which then
14 identifies something else that we want to continue to,
15 you know, something else we pull into the picture.

16 Since we have limited time we're obviously
17 focusing on the hazards and event sequences that seem
18 to be the most significant, you know, a higher
19 probability, or higher consequences associated with
20 them, and that provide probably the greatest
21 prevention or mitigation of event sequences, such as
22 shielding walls for the hot cells, you know. I mean,
23 they're pretty important for seismic and for aircraft
24 hazards. And uncertainties, and that may not be the
25 way that you think of uncertainties, but it's what is

NEAL R. GROSS

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

1 it that we don't know about this type of facility that
2 we should focus on, you know, from industry experience
3 and that.

4 So with that we developed -- we started
5 out and we developed about 28 - 30 different topics
6 that we wanted to look at. Now, that's a lot, and we
7 wanted to be able to better focus, you know, what do
8 these areas really mean so that we don't have -- we're
9 not redundant, we're not repeating ourselves in some
10 areas, and we can converse easily with stakeholders
11 and with DOE on, you know, where we think need to
12 focus our attentions, and what we think appears to be
13 some of the more risk-significant issues. So I'm
14 going to talk briefly about these, and if there's
15 anything here that you may want to discuss like I say
16 in the future, as we go on, we'll talk about the
17 technical exchanges we're doing, our path forward,
18 then we can talk about it at the end of the meeting or
19 whatever, and highlight that. But the aircraft crash
20 hazard and event sequences, this is something we've
21 had quite a bit of dialogue with DOE on. We started
22 I think even before September 2003 when I sat in on a
23 technical exchange. At that time it appeared to DOE
24 they could probably look at the probability, and it
25 was beyond a Category II event sequence, and they

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 wouldn't have to perform any sort of design analysis.
2 That's changed over the last year and a half or so,
3 and now they're using a certain amount of probability,
4 and a certain amount of taking credit for system
5 structures and components with the robustness to
6 withstand impacts and that. So this isn't just a
7 probability issue, it's also an engineering issue that
8 we're working with them on.

9 And the same goes with site
10 characterization and event sequences. What we're
11 focusing on here are the seismic events and the ground
12 characterization and that, but also the structural
13 integrity of the walls and things that would be
14 required to prevent or mitigate event sequences.
15 Spent fuel source terms under normal and accident
16 conditions. We're looking just what are they using
17 for their spent fuel source terms, and are they taking
18 into account things like oxidation which you may have
19 heard about is, you know, handling the fuel in air.
20 Is that an issue? Is that something that we should
21 focus more attention on? How is DOE handling that?

22 Performance of surface facility mechanical
23 systems. And I'm going to talk about surface facility
24 and sub-surface facility, and just kind of tell you
25 our views on how we look at these systems, and what

NEAL R. GROSS

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

1 we're trying to glean. You know, we sort of break
2 them down into three categories. And this isn't, you
3 know, in the Yucca Mountain Review Plan or anything,
4 but it's a way for us to understand when we can take
5 credit for certain codes or standards, and when we
6 need to look at something more deeply, and the way
7 they're using and applying codes and standards. First
8 you could have a crane. You know, cranes have been
9 used in the nuclear industry and other industries for
10 a long time. There's a lot of data out there on how
11 it performs and that. So if they are going to design
12 it in accordance with certain codes and standards, and
13 they show that data, that may be sufficient for our
14 review. Then there's other system structures and
15 components, such as HVAC systems that are built out of
16 components, which all have certain reliability
17 figures, have all been used in the industry, but in
18 different configurations. That we might have to look
19 at a little closer, make sure that that system is
20 going to perform the intended function that it needs
21 to. And then we have the things that we call unique,
22 or DOE refers to as non-standard equipment, you know,
23 an emplacement gantry. You know, there's none out
24 there right now, but they're going to have to design
25 it, or at least portions of it to perform its intended

NEAL R. GROSS

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

1 function during an event sequence, whether it's a
2 runaway, or whether it's preventing a drop, whatever
3 it is. Now, are we going to have to review the design
4 of the whole emplacement gantry? No. We're going to
5 focus on those things that are important to safety,
6 that are used to prevent and mitigate the event
7 sequences, things such as if it is a runaway, and this
8 could apply to the train or to the transporter, what
9 codes and standards are they using to demonstrate the
10 reliability of braking systems, of coupling systems.
11 You know, how are they using that to demonstrate
12 reliability. Because when you're performing an event
13 tree, you know there's something that's either going
14 to prevent it, or there's some probability that it's
15 still going to fail. We know that through all of
16 engineering, that there's always some probability that
17 something's going to fail. So we have to understand
18 what are those reliability values.

19 CHAIRMAN RYAN: Just to push that a step
20 further, you could even think about as you described
21 it, there's probably a pretty fair knowledge that such
22 a transporter could be designed to bear a certain
23 weight and load. That's pretty straightforward, and
24 so that aspect of it could be a fairly routine part,
25 versus the runaway and then anything that might

NEAL R. GROSS

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

1 involve the package and the fuel thereafter would be
2 the unique part. So I guess what I'm asking is I kind
3 of suspect that in any one of these things where
4 you're seeing something unique, it's probably made up
5 of a hybrid of parts that aren't so unique, but maybe
6 used in a unique way, or part of a unique system. So
7 you're really starting from scratch, and are you
8 challenging those more routine aspects now that it's
9 in a new environment and so forth? Is that also on
10 the table?

11 MR. KOBETZ: I'm not sure what you mean by
12 "more routine." We are challenging the use of certain
13 codes and standards, you know, in ways -- or if
14 they're being applied in ways that maybe aren't the
15 way they've been applied in the past.

16 CHAIRMAN RYAN: Fair enough. You've
17 answered the question.

18 MR. KOBETZ: Okay.

19 CHAIRMAN RYAN: So you are starting with
20 a clean sheet of paper. As you look at something, it
21 may have some standard components and some new uses.

22 MR. KOBETZ: Absolutely.

23 CHAIRMAN RYAN: And you're challenging all
24 of it in that setting.

25 MR. KOBETZ: Absolutely.

1 CHAIRMAN RYAN: Okay, all right, thanks.

2 MR. KOBETZ: Okay, so that's the
3 mechanical SSCs. Criticality event sequences is
4 something that we want to make sure we understand
5 well. Aging facility performance. You know, you
6 probably saw our October 8 letter, and we'll talk
7 about that a little bit, but we need them to supply a
8 sufficient amount of design information so they can
9 show, or they can demonstrate that if they do have an
10 aging facility, and it is integral, and it needs to be
11 used, that it can withstand whatever event sequences.
12 You know, we would need that much information.

13 Pre-closure safety analysis, and that's
14 kind of looking at the methodology. You know, do we
15 agree with how they're identifying hazards, how they
16 screen them in or out. Do we agree with their event
17 sequences, you know, do we think that there's any
18 other hazards about their event sequences that can go
19 on. How are they taking that information in
20 performing their dose calculations and that. And then
21 the licensing process, that's really focusing on
22 things like if we were to grant a construction
23 authorization, what would it look like, you know, what
24 kinds of conditions and standards -- conditions, I
25 guess, in the construction authorization -- would we

NEAL R. GROSS

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

1 expect to see in there, or do we think we should put
2 in there. And then we take it a step further. In the
3 event that we were going to grant a license to receive
4 and possess, what would that license look like.
5 Because as you were saying, this is kind of a hybrid
6 of several types of facilities. So we want to try to
7 get an understanding. And we want to get an
8 understanding of that early because that does -- as
9 we're doing our review, we want to make sure we're
10 identifying those things that should go into potential
11 tech specs.

12 MR. THADANI: Mike, may I?

13 CHAIRMAN RYAN: Please.

14 MR. THADANI: Tim, how did you develop
15 this topics list?

16 MR. KOBETZ: Through -- like I said,
17 through experience. Basically through our pre-closure
18 team meetings, through experience looking at, okay,
19 what are those things that appear to, you know, either
20 have the highest consequence, or the greatest
21 probability. And aircraft crash hazards, you know,
22 may be low probability, but it could be a high
23 consequence. The same with site characterization, or
24 like we were saying, for seismic events. Source term.
25 You know, there's kind of an unknown still that we

NEAL R. GROSS

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

1 want to make -- that could affect the consequence
2 analysis or the dose calculations to a great extent.
3 So we wanted to make sure we understood those. So
4 that's the kind of thought process.

5 MR. THADANI: So this is your best shot up
6 front?

7 MR. KOBETZ: This is our best shot up
8 front.

9 MR. THADANI: If you find something --

10 MR. KOBETZ: And it's from information
11 from DOE also, you know. We don't always agree with
12 what they have, and you know we're going to challenge
13 them this way. Why isn't this --

14 MR. THADANI: Sure.

15 MR. KOBETZ: And we'll talk about that
16 even in a little bit.

17 MR. THADANI: Another question. In terms
18 of -- are you talking about establishing some sort of
19 reliability goals for structure systems and
20 components? I wasn't sure when you said trying to
21 make sure the reliability's maintained and so on,
22 whether that means you -- a la maintenance rule for
23 reactors. Are you thinking along those lines?

24 MR. KOBETZ: I'm not sure I'm thinking
25 along the lines of the maintenance rule. Again, I

NEAL R. GROSS

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

1 haven't been involved in that in a long time. But --
2 go ahead.

3 MR. WATERS: DOE has established
4 reliability goals for several systems to meet the
5 performance objectives. The first step of the pre-
6 closure assessment is categorizing the chance of
7 event. I mean, if you see on first principle levels
8 there's many systems instructors where they assume a
9 certain reliability or design to do so. So that's in
10 part what we're reviewing as well.

11 MR. THADANI: May I add to that? The
12 reliability goals are dependent on what the initiating
13 event or the hazard is. If you -- you have to have a
14 process event sequence 1 in 10,000 during a pre-
15 closure period. So it's related to that.

16 MEMBER HINZE: Following up on Ashok's
17 question, I understand you're in the process of
18 developing performance assessment codes for analyzing
19 the safety analysis. Part of coming up with the pre-
20 closure topics of course is to hopefully use
21 performance assessment to identify those things which
22 are most important. And this is an iterative
23 procedure of course. And I'm wondering what's the
24 status of your performance assessment? Have you used
25 performance assessment to really look critically at

NEAL R. GROSS

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

1 these topics or additional topics that might be of
2 concern.

3 MR. KOBETZ: Mike's going to talk about
4 that in about four or five more slides.

5 MEMBER HINZE: Sorry.

6 MR. KOBETZ: No, it's fine.

7 MEMBER HINZE: Okay. Okay.

8 MR. LEE: Can I -- I have one question.
9 Tim, this is kind of a follow-up to Dr. Thadani's
10 comment or question. You said you started about with
11 28 to 30 topics, and then you distilled these into
12 these subject areas that you have here, and you
13 reinforced the notion that you're trying to better
14 understand what DOE's approach might be in a potential
15 license application to document approaches, and
16 assumptions, and design bases, and things like that.
17 A similar approach was used in post-closure, and that
18 led to a number of agreements to make sure that
19 sufficient information would be available on the
20 license application. Just, I'm not trying to steal
21 your thunder, but does that information exist in your
22 judgment, or is this just what you say it is, just to
23 better understand where that information's going to
24 be? Or to reach shared expectation that the
25 information would be in the license application?

NEAL R. GROSS

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

1 MR. KOBETZ: I guess I'm not quite sure of
2 your question. Let me -- can I couch that one also to
3 the end?

4 MR. LEE: Sure.

5 MR. KOBETZ: Because I'm going to talk
6 about our path forward, and our interactions with DOE.

7 MR. LEE: Okay.

8 MR. KOBETZ: And I think that might answer
9 your question.

10 MR. LEE: Well, let me just state it a
11 little differently. The understanding is that the
12 application is written, and subject to the, you know,
13 some budget issues and a few other things that DOE's
14 on the verge of submitting it. Now, maybe I'd better
15 wait and see what you have to say towards the end.

16 MR. KOBETZ: Okay. Okay. I think that
17 covers the topics. Site visits. I think all
18 engineers are touchy-feely people. They like to go
19 out and see the types of things that have been
20 designed in the past and that, and I'm definitely like
21 that. So we've tried to get staff out to as many of
22 these places and different things, and I think you're
23 going to see it's kind of a broad range of things that
24 we've been looking at. And coming back, and again
25 trying to figure out how that works in the review, and

NEAL R. GROSS

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

1 I'll talk about that a little bit. And I believe even
2 in your letter, gosh, was it in 2003 maybe? You
3 mentioned that yes, you should get out and see more
4 facilities and that too. So you know, it's kind of
5 like I say an iterative process. We've taken our
6 topics and looked at what kind of facilities match
7 that. Then we come back from these visits and say,
8 well how does that figure into our topics.

9 So I'm going to talk first about our visit
10 out to INEEL. And the reason we went out there is
11 because the hot cell at the Test Area North facility
12 is supposedly what the fuel handling facility, the
13 first facility to be built at Yucca Mountain was based
14 on. So we wanted to see, this is a, you know, a one
15 throughput. And we want to look at, you know, the
16 types of radiological controls, the types, the walls,
17 look at the windows, you know, all that kind of thing
18 to try to look at well what are the -- you know, are
19 there any structural weak points here that we don't,
20 you know, we've never licensed before, or we haven't
21 thought about. Looked at fuel movements. Looked at
22 the way the interlocks, and how you move the spent
23 fuel in, and the transportation cask, and that kind of
24 thing. So that was a real eye-opener for -- I
25 shouldn't say a real eye-opener, but it was a good

NEAL R. GROSS

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

1 experience for us, and to just understand the size of
2 these facilities, the types of facilities, and what we
3 would potentially be granting construction
4 authorization for. Looked at, you know, HVAC systems,
5 and that kind of thing.

6 While we were out there we also visited --
7 actually let me go back and talk about this. One of
8 the things I didn't -- you know, we did ask them about
9 operating experience out there. Had they ever dropped
10 an assembly. And I guess in the, what, 50 years it's
11 been operating they couldn't recall, anyway nobody
12 there could recall. I don't think they did a record
13 search, but you know they didn't know of any fuel
14 drops. We also looked at the welding and NDE
15 processes out there for the waste package. That's
16 where they're developing those things. And that's
17 important because we had some questions, and I think
18 we still have some questions on the types of
19 volumetric inspections that they can perform on those
20 waste packages when they weld them up before they put
21 them into the mountain.

22 We also looked at the Idaho spent fuel
23 facility, or got an overview of it. We couldn't look
24 at it yet because it hasn't been constructed. That's
25 a Part 72 facility, but what was important there is

NEAL R. GROSS

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

1 that's where they're taking peach bottom 1 fuel that
2 is stored out there now. They're going to repackage
3 it into canisters that we'll talk about the drop
4 testing on in a minute, that they would then ship to
5 Yucca Mountain. They would take those out, and never
6 open up the fuel again, and put those cylinders into
7 a waste package, and then put that into the mountain.
8 So we would see -- we had a firsthand look at the
9 types of cylinders that they would be actually moving
10 this fuel in.

11 We went out to the TMI fuel storage, and
12 the reason we did that is because if they do have an
13 aging facility there's two types of casks that they
14 can use out there. They could use a horizontal type
15 cask, such as the new Holmes that is used for TMI-2,
16 or they could use a vertical one. So we wanted to
17 just get a physical -- let people look at, see what it
18 was, and talk about some of the experiences that they
19 had with loading and things like that.

20 Hanford. We went out to the Hanford
21 facility, and there we looked and we saw the K-basin.
22 We saw the fuel that's in the K-basin, you know, some
23 of the old N reactor fuel, some of the -- the
24 condition it was in. Some of the reason that they
25 just want to put into a cash one time out there and

NEAL R. GROSS

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

1 ship it to the mountain, not have to open it up and
2 deal with it. There's some corrosion products on
3 there that they can't get rid of and things, so they
4 just want to be able to seal it up once. So we saw
5 the types of casks that they're going to be putting
6 that in, talked to them a little bit about drop tests,
7 and things like that. I'll talk about that in a
8 minute. Talked about the welding processes. And we
9 talked about some of the cranes that they used to move
10 the fuel around, to use the canisters around. They're
11 different types than would probably be at Yucca
12 Mountain, but we talked about interlocks, and you
13 know, how you prevent collisions, and things like
14 that. And that gave the staff, especially the
15 performance assessment staff, a good idea of the
16 reliability of those types of things.

17 We went to the Columbia Generating
18 Station. The reason we went there was they have an
19 ISFSI that uses Holtec Hi-Storm casks. We wanted to
20 see the vertical casks, understanding any potential
21 problems or differences that they might present for
22 storage because that's something else that if they did
23 have an aging facility, and they did use certified
24 casks, and they can show that they bounded the types
25 of conditions that would be at Yucca Mountain through

NEAL R. GROSS

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

1 Part 63 and through the performance assessment,
2 there's certain loading operations that they would
3 have to perform out there. We wanted to get an
4 understanding of that and the types of fuel moves.

5 You know, obviously Yucca Mountain, I put
6 that on the list because that -- every time you go out
7 to Yucca Mountain, I think you know, I think ACNW
8 probably goes out there every year. I know when I was
9 on the staff I went out there a couple of times. But
10 you get a good perspective, okay, here's the plain,
11 here's where the facility's going to be, you know, and
12 just getting a description. You know, going into the
13 mountain, just getting an understanding so that we can
14 open up a dialogue as to what we think might be
15 important to safety, and what we should look at
16 closer.

17 The Joseph Oat Corporation. The NRC does
18 observations of DOE audits, just to make sure -- and
19 these are really quality assurance type functions.
20 But in doing so we'll send some of our technical
21 people out there. And in this case we sent some to
22 Joseph Oat Corporation out in New Jersey, and they're
23 fabricating one of the first prototype waste packages.
24 So we wanted to see the challenges that they might
25 have, and you know, working with the stainless steel

NEAL R. GROSS

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

1 for the inner package, and then the alloy 22 for the
2 outer package. And you know, how is it to roll, how
3 is to weld, and that. So we got some firsthand
4 experience on that.

5 MEMBER HINZE: Were you involved with any
6 of the testing of that, or observing the testing of
7 the canister?

8 MR. KOBETZ: What type of testing do you
9 mean?

10 MEMBER HINZE: Well, I understand the
11 Joseph Oat Corporation is doing some testing on the
12 characteristics of their canisters, and I'm wondering
13 if --

14 MR. KOBETZ: Can I defer that to one of
15 our staff? Al, you were out there.

16 MR. CSONTOS: Al Csontos. Yes, I've been
17 out there twice. The testing, is that what you're
18 asking? They're just basically fabricating the
19 prototype waste package 21 PWR UCF uncanistered fuel
20 waste package right now. The testing they're doing,
21 they're really not doing any testing other than NDE of
22 welds at the present time.

23 MEMBER HINZE: Thank you.

24 MR. KOBETZ: And then we've also gone out
25 to Sandia National Laboratory to watch some drop

1 testing of the MCO, these multi-canister overpacks
2 that they would be storing. I talked about the peach
3 bottom 1 fuel that they would be moving into basically
4 their 2-foot round, 14-foot long cylinders. We
5 watched drop tests of that, and also of the -- I'm
6 sorry, I got that backwards, I believe. The MCOs are
7 at Hanford, and they're using the N fuel reactor.
8 Then there's another very similar type canister that
9 they're going to be using at INEEL to put the peach
10 bottom fuel in. But we saw the drop testing of that
11 to give us at least some understanding of the types of
12 tests that they did, and if the application came in
13 and they take certain credit for the robustness of
14 those, and we looked at the drop test results and
15 that, we at least also have seen it firsthand. And
16 from what I understand in those dropt tests they
17 compared very favorably to the finite element analysis
18 that they would run before they would do the drop
19 test. Any questions on U.S. facilities? Okay.

20 And we also sent a small group out to
21 COGEMA La Hague because COGEMA La Hague has done some
22 design work for DOE with the dry transfer facility and
23 the different moving equipment and that. So we wanted
24 to get a firsthand look on what we could there. And
25 what you see in the picture there is on the left the

NEAL R. GROSS

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

1 transportation cask being put in place, a collar being
2 fit up to it, and then if you go to the top right you
3 can see we're looking down at the canister now.
4 That's where they're removing the spent fuel. And
5 then there's the facility to the bottom there where
6 they would then transfer it into -- in their case,
7 they transferred it into a, basically a 9 x 9 storage
8 rack that they would go store in a spent fuel pool
9 until they needed it. And I'll talk about that in a
10 second. But I want to talk more specifically about
11 some of the things we learned there, because it was
12 interesting. At the COGEMA facility they do prefer
13 dry movements over wet, and it had to do with a couple
14 of things. One, the dose is less because it takes
15 less people. There's less radioactive waste. And
16 also there is less heavy lifts that they would have to
17 perform. Now, they can't do all of their unloading
18 dry, and I'll talk about that in a second.

19 They really haven't had any major events
20 since the newest facility anyway, and that's the one
21 we were focused on, went online in 1986. They have
22 had a couple of fuel drops. They didn't consider them
23 major events because they didn't really see any
24 radioactivity where it shouldn't have been, any
25 radioactive material. But what we did that was kind

1 of interesting out of those, when you think about fuel
2 drops and that, you think about crane failures. Well,
3 one they talked about they had trouble getting
4 information from the fuel vendor on the fit-up at the
5 top of the assembly, so when they had to make their
6 gripper, they didn't make it properly, and obviously
7 I guess didn't test it properly. But that's something
8 that, you know, just it really doesn't -- you don't
9 think about right away, but now that's something that
10 we're going to have to think about and look at.

11 The other one had to do with a software
12 modification that was made in 1997, and didn't pose a
13 problem until the year 2004, you know, because there
14 was some testing that was missed. It might have posed
15 itself earlier but with experienced operators they
16 would understand how to work around the problem. And
17 when somebody would actually, in this case, you know,
18 had the problem and kept following the procedure,
19 that's when they got into trouble. You know, I
20 thought that was kind of interesting. They lived with
21 a workaround for awhile.

22 They unload about 12 different
23 transportation casks, and this is why we say they have
24 to have some wet unloading, also for some damaged
25 fuel, because as we pointed out in the previous slide,

NEAL R. GROSS

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

1 the fit-up collar, they don't have fit-up collars for
2 all the transportation casks that come in. That's
3 something that we would have to consider when they're
4 talking at Yucca Mountain about the types of
5 transportation casks that would come in, and we'd have
6 to look at, you know, gee, can they accept all this
7 fuel. Can all those casks be used at the facility.

8 CHAIRMAN RYAN: Tim one -- just a question
9 while you're talking, and it's come to mind based on
10 several of the points you've made where there's lots
11 of variables, and lots of new stuff. How does the
12 human reliability assessment come into all of this?

13 MR. KOBETZ: That's a good question.
14 That's one we posed to them on our last technical
15 exchange, and we need to follow up with them.

16 CHAIRMAN RYAN: Okay.

17 MR. KOBETZ: I mean, that's been
18 specifically put into I think the pre-closure safety
19 analysis technical exchange.

20 MR. WATERS: Yes, and just to add, the
21 regulations require human induced hazards to be
22 considered, and we did pose that question, how they
23 considered inter -- and human interactions. And DOE
24 has committed to get back to us on that in a future
25 meeting. This is something we'll look at, and of

NEAL R. GROSS

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

1 course the reliability as well.

2 CHAIRMAN RYAN: The second part of that of
3 course is, you know, you're going to have some
4 assessment of that going in, and then as experience
5 and, you know, training and experience develops, and
6 people begin to get, you know, real experience under
7 their belt, is there going to be a process where you
8 reevaluate that? I mean, how is that going to be
9 incorporated into the institutional wisdom?

10 The reason I'm raising that, you might say
11 well that's after we grant an operating license,
12 that's going to be something down the line, but now's
13 the time to think about that. For example, if you
14 design and construct yourself into a corner, I can
15 tell you several examples where there's not enough
16 head room to do the lifts on the new casks in the new
17 liners where there used to be in the old days, things
18 of that sort. So how do you develop that thinking
19 about margin, and variability, and all that? Have you
20 thought about that? I mean, that's a step that I'd
21 add to my list. How are systems, and processes, and
22 components going to evolve over time perhaps as
23 experience builds. And can you make a change? Are
24 you locked in to designs? That's just something to
25 think about. I'm sure you don't have an answer to all

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that, but that would be kind of -- I mean, how do you
2 make this kind of a circular process rather than a
3 straight line.

4 MR. THADANI: This would tie in with the
5 use of digital technology also. You talked about some
6 software problems. The man-machine interface issues
7 should probably be considered up front.

8 MR. KOBETZ: And I would agree with you on
9 that, and that's something we haven't focused on a lot
10 yet, but that's something that we have discussed to
11 some extent.

12 CHAIRMAN RYAN: Yes, and thinking about
13 your nine or so bullets, maybe these two are
14 additional bullets to at least have on everybody's
15 radar screens and thinking about these things.

16 MR. WATERS: I think that's a point very
17 well taken. We have actually quite an expertise on
18 our staff to deal with these issues. And we have
19 posed a question to DOE. I think on first principle
20 issues, DOE will have to define and design operations
21 and categorize events based on that design operations
22 to -- start authorization. Ours, we grant that, and
23 that will be captured by a license conditions, but
24 also be part of the SAR. And there is change
25 authority where they can update the SAR to perhaps

NEAL R. GROSS

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

1 incorporate that, either on their own, or come back in
2 for a request. So that is a very good question, how
3 do we carefully capture that and make sure DOE's
4 addressed it correctly to demonstrate compliance with
5 objectives.

6 CHAIRMAN RYAN: Sure. And of course the
7 regulatory infrastructure is there to make the
8 changes, but the real question is, is the engineered
9 facility as it stands capable of accepting updates and
10 change, you know, from kind of a physical engineering
11 and systems point of view.

12 MR. CAMPBELL: Let me add a couple of
13 things there. This is Andy Campbell. I'm Chief of
14 the Performance Assessment Section. One of the areas
15 we have identified in terms of staff capability that
16 we needed some help with was human reliability
17 analysis. We do have a member of the PA staff who has
18 some background in HRA. We also have developed a
19 user-need memo to the Office of Research to provide
20 some assistance in this area. So we are aware of it.
21 We are pursuing it in terms of having our own
22 capability, and utilizing the capability within the
23 agency to help out, especially given that we're
24 dealing with an operational facility, and the agency
25 has many, many decades experience with operational

1 facilities, and HRA is an important part of that.

2 CHAIRMAN RYAN: Just thinking ahead a bit,
3 not so much for a question from this presentation, but
4 maybe a future one, if we could draw on our colleagues
5 at the ACRS. And of course we've got Ashok and John
6 Flack on this staff. Maybe that's a subject for a
7 more detailed review down the line, and as
8 appropriate. I mean, there's no reason to aim at a
9 particular schedule. But it seems to me that the
10 expertise is real clear when it comes to the
11 individual disciplines, but then when you ingrate it
12 up, these other issues of human reliability, and
13 systems interactions, and all that kind of comes to
14 the top.

15 MR. KOBETZ: Yes, we'll take that away
16 with us and follow up. Pool storage for between
17 14,000 and 16,000 NTU of spent nuclear fuel. Well, we
18 thought that was interesting because, like I was
19 saying, they take it out and they put it in these 9 x
20 9 racks, and then they stage it, and they stage it for
21 a period of time until they need it to blend with
22 other fuels to get the right composition when they're,
23 you know, when they're reprocessing and they're going
24 to send something out, which is, you know, their
25 version of -- well, it's not an aging, but it's a

NEAL R. GROSS

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

1 staging type place. So you know, there's some
2 applicability out there. You know, that type of
3 facility's, you know, been used like an aging
4 facility.

5 CHAIRMAN RYAN: What's the criteria
6 they're aiming at? Is it some blend of percent
7 enriched uranium plus a MOX characteristic? What are
8 they aiming at when they blend?

9 MR. KOBETZ: You know, basically all they
10 told me is that they'll get an order from a customer
11 for whatever the type of fuel and that, and that's
12 when they pick and match. That was about as far as --

13 CHAIRMAN RYAN: The reason I ask, because
14 I'm guessing that it's probably a different kind of
15 criteria than what would be the blending for placement
16 in the mountain.

17 MR. KOBETZ: Oh, absolutely. It's not
18 thermal. Basically it's chemical. You're right.

19 CHAIRMAN RYAN: Okay. Yes, all right.

20 MR. KOBETZ: But it's an analogy that at
21 least there is some --

22 CHAIRMAN RYAN: There's staging, and
23 there's holdup, and there's residence time, and all
24 those kinds of parameters.

25 MR. KOBETZ: Yes. It's not just a one

1 true process, I guess. It comes in, you cut it up,
2 and out it goes.

3 CHAIRMAN RYAN: I'm with you.

4 MR. KOBETZ: Damaged fuel. All the
5 damaged fuel that's been sent to COGEMA La Hague has
6 been bottled and unloaded in the wet facility.
7 They've never opened up a cask and found damaged fuel
8 that they didn't expect. Now, one of the things I
9 think that assists them there, and I thought was
10 interesting, was that COGEMA has a representative at
11 each facility that's going to be loading a cask to
12 ship to them, to look at records, to you know, to
13 watch the sniff tests, or however they're looking for
14 damaged fuel. So there's always somebody there so
15 they know what's coming to them firsthand.

16 Hot cell cooling systems are required to
17 maintain SSCs within operability limits. The reason
18 we thought this was interesting is because from the
19 designs that we've seen with DOE, the HVAC system when
20 it is considered important to safety was for
21 radiological purposes, to you know, for a drop or
22 something to make sure that you don't have a release.
23 Now, we always wondered, you know, you have concrete
24 temperatures, you have the resident neutron absorbers
25 for the transportation casks. They have to be

NEAL R. GROSS

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

1 maintained at a certain temperature. And equipment,
2 you know. So this is just something that flags you,
3 and you want to ask more questions maybe as we go on,
4 is there more of an important safety feature in the
5 HVAC system that -- a repository similar to at COGEMA.

6 We've got a couple of future trips coming
7 up here in I guess the next month or two. One's going
8 to be to Fort Calhoun to watch inspections of damaged
9 fuel, to see how well they can detect pinholes, and
10 hairline cracks, and does that play into the possible
11 oxidation of spent fuel, you know, to give them a
12 better understanding of what would be received at the
13 facility. And also we're going to have some staff
14 going out to INEEL. Apparently there's an inserting
15 facility where they actually move spent fuel in an
16 inert environment. And that's about all I know on
17 that, but we're going to have somebody look into that
18 in case that's a possible solution for DOE.

19 CHAIRMAN RYAN: Do you have any other
20 international trips planned?

21 MR. KOBETZ: Not at this time.

22 CHAIRMAN RYAN: You know, the Japanese
23 facility is kind of starting up, the reprocessing
24 facility. They do have fuel that they've received
25 now. I don't know how far along they are from just

NEAL R. GROSS

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

1 having it, and now having it in the pool. We did in
2 May see that activity. I think Neil Coleman can share
3 with you what we've learned there.

4 MR. KOBETZ: Okay.

5 CHAIRMAN RYAN: And any other interest in
6 Sweden, or anywhere else that's had a lot of fuel in
7 pools?

8 MR. KOBETZ: At this time we don't have
9 any other international trips, but I'll take that, you
10 know, if you want to put that in a letter as a
11 recommendation.

12 (Laughter)

13 MR. THADANI: The Hungarians have a lot of
14 damaged fuel, but I wouldn't advise you go there. You
15 know, the Paks problem.

16 CHAIRMAN RYAN: The other interesting
17 question is, you know, it's probably easy to figure
18 out how to handle fuel that's not damaged. That's
19 pretty clear. When fuel is identified as damaged,
20 that's probably easy as well. What about in the
21 middle, when it shows up and you don't know it's
22 damaged? I know that's an accident sequence, but you
23 know. And the other thought that struck me as you
24 were mentioning that is that I recall from our last
25 briefing there's a very wide array of, you know, first

NEAL R. GROSS

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

1 of all waste containers, second of all types and
2 details of fuel, and hookups, and there's got to be a
3 tremendous amount of lifting gear of one sort or
4 another all through this. And that's, you know, that
5 again is an engineering component, and a human
6 factors, and training, and experience, and all that
7 kind of stuff. So that would seem to me to be an area
8 of real special focus. It's just the whole notion of
9 how, and what, and you know, what are the details of
10 all the variety of lifts that you're going to make.
11 It's not like we've got PWR and BWR fuel and that's
12 it, two types. It's a broad spectrum of questions.

13 MR. KOBETZ: And that is -- the human
14 reliability, like I say, that's interesting, and we
15 are going to follow up on that. Some of what you
16 mentioned, and I don't want to just be specific on
17 rigging and things like that, but are when we talk
18 about the pre-operational testing, and training, and
19 that. That's the types of things that we would look
20 at then, too.

21 CHAIRMAN RYAN: But the real specific
22 question is a lot of the fuel is beyond what NRC has
23 licensed. Is that correct? I mean, you haven't
24 licensed, for example, you know some fuels that are at
25 Hanford and other things that might end up in Yucca Mountain?

NEAL R. GROSS

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

1 MR. KOBETZ: You're right, we haven't.

2 CHAIRMAN RYAN: So, I mean, and I guess I
3 would offer the thought that, you know, anything
4 you've licensed you obviously have real experienced
5 folks that know a lot about it. But what about the
6 parts that you might not be so familiar with, that
7 might be 30 or 40 years old, and so on.

8 MR. KOBETZ: For DOE, and Naval fuel, and
9 -- well, DOE and Naval fuel, they won't be handling
10 that as far as we know right now out at Yucca
11 Mountain. Because as I was saying, at the Idaho
12 facility and at Hanford they will be putting these
13 into these MCOs, and they will be putting them into
14 their own special canisters, and they won't be taking
15 them out. Now, but an important point is we have to
16 understand that if they drop that cask what happens to
17 it, because that gets to your point, you know, we're
18 not sure, you know, what the source terms and things
19 like that would be in there. So they're going to have
20 to show us some reliability that those casks would
21 not.

22 CHAIRMAN RYAN: Maybe the French example's
23 a good one. Have somebody there watching it. You
24 know, that's just an interesting dimension of what you
25 know and what you don't know at this point. Thanks.

NEAL R. GROSS

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

1 MR. KOBETZ: Any other questions? Did you
2 have something to add?

3 CHAIRMAN RYAN: No.

4 MR. KOBETZ: Are there any other questions
5 on COGEMA La Hague? I'll take your note back about
6 other international experience.

7 MR. CAMPBELL: Tim? This is Andy Campbell
8 again. We did have, one of the members of the team
9 that went to La Hague went on to Germany at the
10 Karlsruhe facility there, and was interacting with the
11 people in Germany on their fuel, and a variety of
12 issues involving their fuel.

13 CHAIRMAN RYAN: I was thinking of
14 Sellafield too. I mean, they're certainly handling a
15 lot of fuel.

16 MR. KOBETZ: Yes. With that I'm going to
17 turn over to Mike, who's going to go through just some
18 of the independent evaluations that we're performing
19 to get ready, and how we're working with the staff on
20 that.

21 MR. WATERS: Yes, thanks Tim. We want to
22 highlight a few examples of evaluations that we intend
23 to perform in preparation of upcoming LA. In general,
24 we think these activities will help us to understand
25 views, approach, in addressing pre-closure hazards and

NEAL R. GROSS

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

1 potential technical issues. I think to reiterate what
2 Tim kind of alluded to earlier, what we focus on in
3 pre-licensing and what we review during licensing will
4 be driven greatly by the performance-based approach
5 that DOE takes to the industry compliance with
6 objectives, and these activities are based in part on
7 the current approach DOE has taken as we understand
8 it.

9 First, PCSA exercise, performance closure
10 safety assessment exercise. We intend -- we've
11 started a limited exercise looking at the fuel housing
12 facility that DOE has described. We're using the PCSA
13 tool to assist us in putting together that evaluation.
14 Basically we're looking, stepping through
15 systematically, looking through design and operations,
16 identifying potential hazards, looking at a subset of
17 event sequences from those hazards, examining
18 potential consequences, and examining potential
19 systems important to safety.

20 One key point to make, and it goes back to
21 evolving design information. We're trying to base
22 this assessment on publicly available information at
23 DOE at this time. In some cases, we have to make
24 assumptions on design operations continued assessment
25 for, but we'll illuminate, that is, on the gaps in

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 data, or uncertainties as well. Key objective
2 activity is obviously to further improve the
3 assessment team understanding of DOE's approach,
4 understanding the importance of systems. Second,
5 flesh out the role of the PCSA tool in assisting our
6 review for an actual LA. Third, develop any potential
7 risk insights on fuel handling operations, and also as
8 I said, illuminating potential gaps in design
9 operation information, including any uncertainties.

10 And to answer Dr. Hinze's I guess
11 question, we're not doing a full blown performance
12 assessment of the entire pre-closure design. There's
13 many reasons. I think a primary reason is as Tim
14 said, evolving information, and the fact that design
15 does change. And I think on first principle levels,
16 we have looked at the basic conceptual design DOE's
17 taken, and the hazards they've identified on a general
18 level, and that's where our pre-closure topics have
19 derived from, from -- to a great degree. So that's
20 where we're at right now. And I think this limited
21 exercise goal is on a discrete limited facility and
22 will kind of highlight this point as well.

23 MEMBER HINZE: So you have no problem of
24 an interface between your performance assessment and
25 the post-closure performance assessment?

NEAL R. GROSS

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

1 MR. WATERS: I'm not sure if I understand.

2 MEMBER HINZE: Well, if there is a pre-
3 closure performance assessment, we have the post-
4 closure performance assessment. What I'm asking about
5 is the interface between those, and the integration of
6 them. In other words, let's take seismic. Seismic is
7 of course very important in the post-closure, but it's
8 very important to you too, I'm sure. And so how is
9 that integrated? How do you thread all that together?

10 MR. WATERS: I think we and obviously DOE
11 would have to inherently consider hazards that apply
12 to both the pre-closure operations and post-closure.
13 And part of the process is identifying all those
14 hazards systematically, which is something we would
15 assure DOE does. I'm not -- however, I'm not sure
16 what more you mean between interface between pre- and
17 post-closure. We do -- Rob, do you want to add?

18 MR. JOHNSON: Yes. This is Robert Johnson
19 with the staff. Real quickly, right now there are no
20 problems with integration between the PCSA tool and
21 the staff's performance assessment tool. We do have
22 staff that are involved both in performance assessment
23 and in pre-closure. We right now are doing limited
24 analyses using our tool, and our expertise in publicly
25 available design information with respect to pre-

1 closure facilities. So there's not a problem with
2 integration that we see, and we are working on -- I
3 mean, there are staff members that have both hats on -
4 -

5 MEMBER HINZE: Across the field.

6 MR. JOHNSON: Correct.

7 MEMBER HINZE: Okay. And in that manner
8 you can get the integration that you need.

9 MR. JOHNSON: Yes, sir.

10 MR. WATERS: Thank you, Robert. Let me go
11 to Slide Number 1 and talk about consequent system
12 study. That's still some broader area as well. The
13 NRC staff intend to perform consequences to city
14 studies related to potential conditions and release
15 scenarios at the Yucca Mountain site. A team will use
16 and work a public dose consequence module of the tool
17 to determine release exposures, and perhaps use MCMP
18 to calculate direct radiation exposures. Some
19 objectives of this activity are to test the
20 sensitivity of worker-induced results to key
21 parameters in the consequence models, identify and
22 quantify potential uncertainties in exposure
23 estimates, and again develop consequence insights for
24 the generic types of hazards identified by DOE thus
25 far.

1 Now more specifically spent nuclear fuel
2 oxidation analysis which Tim's touched upon. DOE has
3 identified the potential oxidation of damaged fuel as
4 a higher priority technical issue that they are
5 currently considering in their evolving pre-closure
6 design. The pre-closure team is preparing to review
7 any potential oxidation hazards by extensively
8 reviewing oxidation phenomenon, and release fraction
9 mechanics. In addition, we are looking at the Center
10 to develop some preliminary thermal models of bare
11 fuel in a direct transfer environment so we can better
12 understand the thermal behavior. This is obviously
13 important because oxidation rates are temperature-
14 dependent to some degree. That's where we are with
15 that.

16 Finally, aircraft crash analyses. The
17 pre-closure team has spent a significant amount of
18 time in the past years working on aircraft hazards.
19 And we recently addressed that in the KTI letter. I
20 think Tim mentioned, the DOE's current approach is
21 essentially to show that the chance of release from an
22 aircraft crash is beyond Category II, or less than 1
23 in 10,000 chance during pre-closure operations.
24 They're doing this, as Tim said, in two ways. One,
25 looking at the overall crash frequency at the site,

NEAL R. GROSS

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

1 but also taking credit for the structural walls of the
2 facility, and some barriers to withstand the force of
3 impacts.

4 CHAIRMAN RYAN: Just a question on the
5 probability. These are aircraft crashes from
6 inadvertent routine air travel that intersect the
7 facility in some way, as opposed to something
8 intentional, is that right?

9 MR. KOBETZ: Correct.

10 CHAIRMAN RYAN: And the intentional
11 aircraft question, that's I'm sure being dealt with
12 separately?

13 MR. THADANI: It's being addressed
14 separately.

15 CHAIRMAN RYAN: Okay. I guess what I'm
16 trying to get at is those kinds of questions are
17 typically, you know, off of the routine plate, but on
18 somebody else's plate.

19 MR. WATERS: Yes, that would be in the
20 safeguard security region, I believe.

21 CHAIRMAN RYAN: Okay. Thanks.

22 MR. THADANI: One comment I would make is
23 that it'd be useful for you to have some understanding
24 of the analysis and the work that they have done. You
25 might benefit from that in terms of what you're doing.

NEAL R. GROSS

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

1 MR. WATERS: Yes, and actually we have an
2 expert here --

3 MR. THADANI: I am familiar.

4 MR. WATERS: Mr. Shah. To finish up with
5 what we're doing here, our hazard and frequency
6 experts have been examining military and commercial
7 flight characteristics of the Nevada test site, and
8 are looking at applicable crash data. In addition, we
9 are working with the Center to develop some
10 preliminary instruction models of LS-DYNA so we do
11 understand the structural response to severe impacts.
12 And that's something we just started as well.

13 With that, I just want to reiterate, these
14 are a few examples, as Tim mentioned earlier, with
15 pre-closure topics, depending how the design evolves,
16 and the approach DOE takes. Those may lead to
17 additional analyses as well. If you don't have any
18 questions I'll turn it back over to Tim.

19 CHAIRMAN RYAN: Just a quick question.
20 Again, I'm interested in your process to stop and
21 think about should we add new topics, or do we have
22 the right list, are all of the sub-topics covered.
23 And you know, what process are you going to use to
24 self-evaluate, are we on track as this process --
25 particularly as it begins, and as the early phase of

1 the review occurs. Is there a step in there to think
2 through and do that, or no?

3 MR. KOBETZ: It sounds like you're looking
4 for is there a real formal process. Not other than as
5 we meet weekly to discuss the different technical
6 issues, to discuss them amongst ourselves, and as we
7 set these topics. You know, we send it around, okay,
8 what else needs to be put on the plate here, and then
9 we discuss it. So it's somewhat formal, somewhat
10 informal. But I think we address your question. I
11 think that we are asking ourselves a question what
12 needs to come and go. Was that?

13 CHAIRMAN RYAN: I guess the devil's in the
14 details. It, you know, a small group, or a subgroup
15 saying yes, we've got it covered, is probably not
16 good, but if it's a bigger, larger group, and has
17 management review, or independent review, and you know
18 you've come to that conclusion, obviously that's more
19 like an expert elicitation have we covered it, asking
20 somebody else. That's a broader thing. I'm just
21 wondering where, you know, what your process kind of
22 vision is for how you're going to do it, recognizing
23 we're much on the front end, and it will evolve.

24 MR. KOBETZ: No, that's a perfect lead-in
25 as we're going to go into how we're going to interact

NEAL R. GROSS

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

1 with DOE, because we are preparing I think what you're
2 going to. So if there's no other questions.

3 MEMBER HINZE: I really think this gets to
4 a specific example of your question, Mike.
5 Characterization has gone on for a number of decades
6 at Yucca Mountain, and a great deal of data have been
7 collected, and analyzed. Most of that data, or
8 essentially all of it has been focused on post-closure
9 analysis. And I'm wondering, as you look at your work
10 here, whether you're seeing any pre-closure
11 characterization that needs to be done, and how you
12 are getting that information in a timely manner from
13 DOE, and what provision is being made for
14 communication of those kinds of needs, and can you
15 give us examples of those.

16 MR. KOBETZ: Yes. Let me go into the next
17 slide, because that pretty much comes right into the
18 next slide.

19 MR. KOBETZ: Past interactions with DOE,
20 and this is going to include some future that I think
21 is going to address both of your questions. Pre-
22 closure obviously is behind post-closure, and the
23 characterization of what the work that DOE has done.
24 Obviously they've done a lot over the last 20 years
25 for post-closure. So starting back, what we talked

NEAL R. GROSS

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

1 about in September of 2003 we had our first aircraft
2 crash, but we really started getting more specific on,
3 hey what's going to be in the LA as far as design and
4 performance assessment and that. Can you give us a
5 flavor, because we're looking at some documents here,
6 and we don't see, you know, a lot that we would think
7 that would support it. So let's talk about it. You
8 know, it doesn't mean it's not there. It just doesn't
9 mean that, you know, we've seen the paper trail yet.

10 So in February 2004 we had a technical
11 exchange with Department of Energy. And do you
12 understand the technical exchange, and the meanings of
13 them? Okay. And what we're trying to accomplish?
14 Okay. To go over the outline of the LA, you know, how
15 is it going to be laid out, is it going to be in
16 conformance with the Yucca Mountain Review Plan, are
17 they going to be deviations, which they're allowed to
18 do but we just kind of would like to understand going
19 in so we can maybe plan you review better. And the
20 Department of Energy, without being specific, laid out
21 a pretty good detailed what's going to be, you know,
22 what kind of design information will be there, and
23 what kind of analysis. But as we would look at some
24 documents and that, we wouldn't see the detail that
25 they're describing. We're wondering, you know, what's

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 the delta here, and I think that's maybe what you're
2 getting at. Why are we seeing this delta. So we
3 continued to have some technical exchanges. When we
4 were talking about -- in February we identified the
5 items important to safety. You know, they would talk
6 about the transporter, sometimes it would be important
7 to safety, sometimes it wouldn't be important to
8 safety. What does that mean? You know, well if it's
9 transporting, you know, an empty cask just to be
10 loaded and that, it's not important to safety. Well,
11 there's still those system structures and components
12 on there. If they're important to safety, they're
13 important to safety all the time. They still have to
14 follow the same rule all the time. You know, they
15 have to have the same maintenance. They have to be
16 designed to the same codes and all that kind of thing.

17 That's the kind of thing that we discussed
18 during that technical exchange. You know, HVAC
19 systems. If you're going to have -- if it's going to
20 have to shut remotely to prevent, you know, a release,
21 well, it's not just that damper, it's whatever that
22 sensor was to close that damper, whatever, you know,
23 the motors, the electrical supply, anything like that.
24 So we went through some iterative process with them on
25 that because we weren't seeing how that types of

NEAL R. GROSS

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

1 information was actually going to make it into an LA.

2 Then in September of 2004 we wanted to
3 have, okay, you know, your design's really evolved.
4 We're going to go through it, and let's talk about the
5 details. Again, and that's what prompted the October
6 8 letter. We didn't see a lot of information on the
7 types of casks and that that would be used at a
8 potential aging facility. Doesn't mean it didn't
9 exist, we just didn't see, you know, how it was
10 tracing back to anything. We didn't understand how
11 the electrical system, how they were taking credit for
12 it being important to safety. Were they taking credit
13 for it. You know, what was all the function there.
14 We didn't see where they had made a lot of progress on
15 the aircraft crash at that point. So we're still,
16 we're missing that delta, and I think that's what
17 you're getting at. That's how we're trying to
18 interact. That's why we decided after the September
19 technical exchange, we really need to highlight this
20 to them, and that's how we're communicating. We sent
21 them a letter and said, you know, these are the things
22 that we're missing here.

23 Then at the June 2005 technical exchange
24 we went back and we had more specific discussions on
25 aircraft crash hazard. And this time, and Mahendra's

NEAL R. GROSS

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

1 going to talk about it after this, about the types of
2 things we would have expected to see as far as design
3 to support a pre-closure safety analysis that we
4 weren't seeing. Again, it doesn't mean it's not
5 there, it's just from the documents we've looked at we
6 don't understand how you're coming to your
7 conclusions. And we just -- and I've got copies of
8 it. We just sent them a letter, I guess it went out
9 on Tuesday, basically saying here's still the things
10 that we see a delta on that, you know, it doesn't
11 appear that it's supporting with a pre-closure safety
12 analysis. Doesn't mean it's there, we're just not
13 seeing it fully yet.

14 Then, also in July we had one on, you
15 know, just what is the essential information. Are we
16 miscommunicating here somehow, the stuff that we're
17 looking for. Maybe you've got it and we're just
18 asking for the wrong stuff. So we went through
19 basically the beginning of the presentation that you
20 had today here. We went through it with Department of
21 Energy, saying here's the regulations. You know, when
22 it says in 63.21 they have to provide dimensions and
23 that, well it's to support the PCSA, it's to support
24 the analysis that shows that the system structure or
25 component is going to prevent or mitigate, you know,

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 that particular event sequence. Right now we're
2 discussing whether to write a letter on that one.

3 And now let's talk about the path forward,
4 because we're trying -- you know, we're starting to
5 get to the point that we understand, you know, I think
6 as they've discussed it's going to be delayed until
7 March. So we've got some time that maybe we can have
8 more interactions. And we've talked to Department of
9 Energy, and we discussed this at our July meeting,
10 that hey, we've conveyed our, you know, nine, ten
11 items to you. We've had discussions about objectives.
12 Let's document these. Let's get this down, let's
13 document what's the objective for each of these
14 meetings going forward, a technical exchange on these
15 types of topics, and then at the end of the meeting we
16 go through the objectives, and we say hey, did we have
17 success? If not, we send you a letter, and we're
18 going to tell you where the delta that we still see.
19 Maybe you've got the information but you're still not
20 conveying it right to us.

21 CHAIRMAN RYAN: Tim, as you talk I think
22 about the idea of a Level 1, Level 2, or a Level 3 in
23 a PRA kind of way. I mean, where would you say we
24 are? Are we starting on Level 1, are we between Level
25 1 and Level 2, or somewhere in between?

1 MR. KOBETZ: We're at Level 1.

2 CHAIRMAN RYAN: And the reason I ask that
3 question, as you proceed through your process, you're
4 going to gain more and more information, and more and
5 more connectivity. But out of all that of course
6 comes the second and third and fourth and fifth round
7 of questions and details. And I guess I just see that
8 ramping up in terms of planning, and staff, and you
9 know hours, and all that sort of aspect of it. And
10 have you thought through that, how that's going to
11 ramp up over time?

12 MR. KOBETZ: How our resource --

13 CHAIRMAN RYAN: Yes.

14 MR. KOBETZ: -- requirements are going to
15 ramp up?

16 CHAIRMAN RYAN: Yes.

17 MR. KOBETZ: We certainly have our
18 resource plans in place. We certainly, you know,
19 haven't hired all the staff I think that we need to
20 going into it. I know they keep promising to give me
21 a backup, and I haven't seen one yet. So we still are
22 in the process of getting more people onboard. But I
23 mean, you know, we've gone through and assessed what
24 our needs are, and we've enveloped staffing plans.

25 CHAIRMAN RYAN: Okay.

NEAL R. GROSS

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

1 MR. CAMPBELL: Let me add something there,
2 Mike. This is Andy Campbell, NRC. When I started in
3 the Performance Assessment Section about two and a
4 half years ago when I left the staff scientist
5 position here at the committee, I had one-half of
6 Robert Johnson here next to me working on pre-closure.
7 At this point in time, I have four PA staff working
8 almost all their time on pre-closure issues, PCSA
9 issues, including Robert, and Mike, and Chris Ryder
10 back here, and Albert Wong who's out. I also have
11 other people who've come onboard since then that have
12 some responsibilities in pre-closure area, for example
13 HRA. So we've gone from a PA section that focused
14 substantially on post-closure. We still do have a big
15 post-closure focus. But I have a substantial fraction
16 of my team looking at pre-closure issues. And I think
17 you could probably say the same thing for the
18 engineering section. A substantial amount of the
19 engineering effort, in fact probably more of the
20 engineering effort is focused on pre-closure than
21 post-closure. In addition, we have a very large staff
22 down at the Center who are working a lot of issues in
23 the pre-closure area. Some of them are also working
24 post-closure area. So we have substantially ramped up
25 our effort in this area. We certainly have --

NEAL R. GROSS

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

(202) 234-4433

www.nealrgross.com

1 maintaining and continuing our base in the post-
2 closure area, but we are anticipating a little more
3 growth, but I think we're pretty close to being there
4 in terms of the resources we need, we think we need,
5 to prepare for and then conduct a review.

6 CHAIRMAN RYAN: Okay, thanks.

7 MEMBER HINZE: Andy, are you at a position
8 where you feel comfortable with where you are so you
9 aren't going back to DOE with asking for another rock?
10 Asking for further information? In other words, let's
11 take the seismic area. Have you defined those
12 critical elements that the DOE needs to fill in?

13 MR. CAMPBELL: We are in that process. I
14 would not characterize -- let me make sure I
15 understand, but I would not characterize what we're
16 doing and what Tim's talking about as a bringing
17 another rock type of situation. We are looking at
18 information on documents, and trying to understand
19 what information that we currently see in documents,
20 and it's an evolving process. Their design is still
21 evolving, you know, frankly. And what we're looking
22 at, and what Tim's talking about is are we seeing the
23 type of information we would need to see in a license
24 application to be able to review it. And at this
25 stage we continue to ask the questions, and we

NEAL R. GROSS

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

1 certainly plan on future interactions in that area.

2 In terms of seismic, I think John
3 Stamatikos down at the Center is working with us in
4 terms of seismic issues, a lot of experience with the
5 PFS licensing process. So we're drawing on those
6 resources to make sure we understand it. But be aware
7 that to a certain degree, the design is evolving, and
8 it is not a static thing that has been set at this
9 point in time.

10 CHAIRMAN RYAN: Thank you.

11 MR. JOHNSON: Just one other point to add
12 to that. Specifically in the areas of aircraft crash
13 hazards and operations, some of the work that we've
14 been doing here has informed questions that we're
15 asking DOE. I mean, even in the July technical
16 exchange we gave them a list of questions and
17 expectations with respect to the regulations, and were
18 able to ask them specific questions. Where's the
19 technical basis for this. How are you including this.
20 Where is this considered. So some of the things I
21 think you're asking we are doing that. And as time
22 goes on, and we do more of our independent analyses,
23 we will obviously be able to incorporate those
24 questions at the appropriate time.

25 MR. KOBETZ: Thank you. And I think

NEAL R. GROSS

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

1 that's going to be a good lead-in in just a minute for
2 Mahendra's discussion on essential design
3 requirements. But let me just in closing this
4 portion, does that answer your question about our path
5 forward? We want to document, we want to make public
6 those issues, those objectives for technical
7 exchanges, you know, at least come up with a very good
8 schedule, understanding that things may change, but
9 when we can hold these technical exchanges, and have
10 it really pinned down. And right now we're discussing
11 that with Department of Energy, you know, let's do
12 this, let's get it out there, let's move forward, and
13 then they understand that if there is a delta -- I
14 mean, we're not going to say do it this way, or do it
15 that way, because we're not consultants. We're going
16 to say, just like Rob was saying, we don't understand
17 this assumption, or you know, we still don't see how
18 you're making this statement. Why is it valid.
19 That's the kind of thing.

20 CHAIRMAN RYAN: Sure. No, I understand.

21 MR. THADANI: May I just -- Tim, if I go
22 back to your chart on pre-closure topics. You have
23 event sequences and aging as separately identified
24 topic. Aging would impact fragilities of structure
25 systems and so on. Is that factored in when you

1 evaluate these scenarios?

2 MR. KOBETZ: Actually, I think you're
3 thinking of a different kind of aging. You're
4 thinking like reactor licensing. Aging of a facility.

5 MR. THADANI: Right.

6 MR. KOBETZ: Okay. This is an aging
7 facility, which is something that is proposed by
8 Department of Energy in which they may have --

9 MR. THADANI: Oh.

10 MR. KOBETZ: -- certain thermal loads they
11 might put them out in this facility.

12 MR. THADANI: I understand. But now I
13 have raised this, do you fold in some aging
14 considerations when you look at these scenarios,
15 particularly from fragility point of view? Talking
16 about post-closure. The somewhat interaction issue.
17 Pre-closure, post-closure. Aging of equipment, if you
18 will.

19 MR. KOBETZ: You're talking about the same
20 kind of thing with license renewal, and the things
21 that we would look at as the components there as far
22 as their lifespan?

23 MR. THADANI: Yes, but -- you can use that
24 as an example, but I'm thinking more in terms of since
25 you're using performance assessment type of thinking

1 here, which is somewhat different I think, and you're
2 trying to draw some conclusions up front, how do you
3 account for the effects of aging in terms of potential
4 consequences from certain scenarios that you're
5 evaluating. You could even use seismic as an
6 initiator.

7 MR. SHAH: Aging in fact has to be
8 considered in determining the probability of failure
9 of the equipment.

10 MR. THADANI: Right. And that's what I
11 mean when I say fragility.

12 MR. SHAH: That will be factored into
13 event sequence.

14 MR. THADANI: So you would factor it in.

15 MR. SHAH: Yes, as part of reliability
16 evaluation.

17 MR. THADANI: Okay. Thank you.

18 MEMBER WEINER: I had a question for Tim.
19 From the very beginning of your talk, you mentioned
20 that you focus on high probability and high
21 consequence hazards. I would think you'd focus on
22 high risk, without disaggregating so to speak.

23 MR. KOBETZ: And you're right. It's just
24 a -- I guess that was my way of saying it, that we are
25 looking at high risk, but there's going to be

1 different components, where there's going to be the
2 consequence, or there's going to be the probability.

3 MEMBER WEINER: Or both of them are
4 intermediate. In other words, you're looking at a
5 risk spectrum. I just wanted to --

6 MR. KOBETZ: Absolutely.

7 MEMBER WEINER: -- to clarify that. And
8 the other question, it may be more detailed than you
9 want to answer at this point, but I'd be very
10 interested to know how you model the momentum transfer
11 in your aircraft crashes.

12 MR. KOBETZ: Actually, that's going to
13 take into his slide too.

14 MEMBER WEINER: Oh, okay. Okay, thank
15 you.

16 MR. LEE: Tim, thanks for that. Slide 19
17 clarified my earlier question, as well as the follow-
18 up from Robert Johnson. Thank you for that. Just one
19 question. You've had five technical exchanges, and
20 written one letter to DOE. What's their spin on all
21 this? What's the path forward? Just more meetings?
22 Are there any commitments? What's DOE's overall
23 reaction? Could you characterize that for the
24 committee?

25 MR. KOBETZ: I'm not sure how -- you would

NEAL R. GROSS

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

1 have to ask DOE as far as their spin, but they --

2 MR. LEE: Are they sensitive to the
3 concerns that the staff has?

4 CHAIRMAN RYAN: I think we can get DOE to
5 answer that, Mike.

6 MR. LEE: Okay.

7 CHAIRMAN RYAN: I don't think that's a
8 fair question, to put Tim on the spot trying to
9 answer.

10 MR. LEE: Okay, fine.

11 MR. KOBETZ: Let's see. Okay, so we've
12 got our path forward. And with that we're going to
13 kind of go into I think something that's going to
14 address Mr. Hinze's and Ruth's questions as far as are
15 we asking for another rock, and what about these type
16 of technical issues. And we're going to talk about
17 aircraft crash hazard.

18 MR. SHAH: Okay. What I'm going to
19 present is based on the DOE's approach for addressing
20 the aircraft crash hazard on pre-closure facility as
21 we understand it from the technical exchanges we had,
22 the last two of them. They're identified based on the
23 aircraft -- Based on the aircraft probability studies,
24 DOE has identified these two types of structures as
25 important to safety. These structures are, one, all

NEAL R. GROSS

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

1 the exterior walls of the buildings. There are four
2 buildings involved here. And secondly is the barriers
3 which surround the aging pads. The aging pads are
4 basically interim storage pads, not for aging effects.

5 But anyway, to give you perspective on the
6 aircraft crash probability on this building, the
7 buildings vary from -- this is a canister handling
8 facility, dry transport facility, transportation casks
9 receipt and return facility, and a fuel handling
10 facility building. They vary in size from 150 feet by
11 200 feet to about 500 feet by 500 feet. So these are
12 large buildings. And the heights, for three buildings
13 the height is about 100 feet. And the one building,
14 this transportation receipt and return facility is
15 about 80 feet. So you can see the probabilities and
16 have a perspective on that.

17 Now, based on the fact that these are
18 important to safety walls, what that means is that
19 they have to be able to withstand the aircraft crash
20 impact on those walls, whatever various aircrafts.
21 They use F-16, F-15, A-10. Those are potential
22 crashes could occur on the walls. Now, if it had been
23 a deterministic type of regulation, we would have just
24 determined what is the maximum speed, or some
25 probability associated with it that we would select,

NEAL R. GROSS

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

1 and then do the analysis, and show that it meets the
2 codes and standards. But in addition to that
3 evaluation, where you have to select the initiating
4 events and go through the process of determining what
5 the demands and all that would be, because this is a
6 performance-based regulation, you also have to
7 determine what is the probability of failure, to make
8 sure that the event sequence starting from the
9 initiating event which is directly impacting the
10 building, and also that could be a fire, how that
11 event sequence leads to compliance that it has to be
12 a 1 in 10,000 during the pre-closure period, or -- if
13 you assume 100 year pre-closure period, our standard
14 is to 2^{-6} per year. So normal deterministic type
15 analysis would stop at just going to the standard, but
16 here you've got to go a step further and demonstrate
17 that the event sequence has a probability of 10^{-6} per
18 year. This allows DOE an option to select whatever
19 initiating event probability of occurrence. However,
20 it puts an additional burden on the DOE to demonstrate
21 this. So that's a thing for you to keep in mind.

22 Now, what DOE has done now -- or DOE plans
23 to do. We pointed out that you have to address -- in
24 our technical exchange meeting we pointed out these
25 two aspects that they need to address. Now, they were

NEAL R. GROSS

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

1 thinking of just stopping at first point, that as long
2 as they selected the aircraft crash which is likely,
3 and then just stop at codes and standards. So that's
4 one of the points we made it clear.

5 Now, what kind of information they need to
6 provide is also we discussed in our technical
7 exchange. First, they need to provide design as to
8 what the wall dimension thicknesses are, what the
9 reinforcing steel is. We do not need to know all the
10 details of corner reinforcement, or fabrication and
11 construction procedures, but we need to know essential
12 elements of design, which are to be relied on for the
13 safety. So that design has to be detailed enough so
14 we can understand the capacities.

15 Second thing they need to include is what
16 are the initiating events, like what aircraft crash
17 could occur, what is the probability of that event,
18 and what kind of analysis you have done to determine
19 what the loads would be, like how the moment of
20 transfer will take place, energy and transfer will
21 take place, and what will be the force time history.
22 So you could use different methods, but they have to
23 describe what methods they used to determine these
24 forces. And then what analysis matters they use to
25 determine what the demands on these different parts of

NEAL R. GROSS

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

1 these structures would be, like forces, movements,
2 displacements. And once you have those demands, then
3 you've got to determine what's the capacities of these
4 structures based on codes and standards they could
5 use, and then show the -- determine the margins of
6 safety involved. And then that's part of the first
7 structural integrity evaluation.

8 Then they'll go to performance
9 reliability, which is what I talked just recently, is
10 the demonstration that the probability of failure when
11 you use these codes and standards will result in an
12 event sequence of 10^{-6} per year. So that's where the
13 main difference between DOE and us was when we talked
14 about this. So I hope they'll address that issue
15 clearly.

16 MEMBER HINZE: Mahendra, it wasn't clear.
17 Your goal is 10^{-6} , so you sum up a bunch of sequences
18 and show that the sum total is less than 10^{-6} .

19 MR. SHAH: 10^{-6} per year.

20 MEMBER HINZE: Which would then allow for
21 a potential for an initiating event having a frequency
22 of 10^{-6} ?

23 MR. SHAH: Okay, that's not what I was
24 saying. I was also going to mention that if you
25 choose a 10^{-6} per year as an initiating event, then

NEAL R. GROSS

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

1 you don't need to go further because once you use
2 codes and standards you can stop there, because you
3 have a probability of that event sequence less than
4 10^{-6} , so that's an option DOE has.

5 MEMBER HINZE: But they have to consider
6 initiating events with a frequency that could be as
7 low.

8 MR. SHAH: It depends on them. If they
9 can show that the design, the probability of failure.
10 Let's say they chose the probability of initiating
11 event is 10^{-4} for the aircraft impact speed. You can
12 determine what that speed and all that is. And if
13 they can show that probability of failure of this
14 structure is 10^{-2} or less, then they will still
15 satisfy.

16 MEMBER HINZE: So for aircraft crash, each
17 sequence by itself --

18 MR. SHAH: By itself.

19 MEMBER HINZE: By itself. And so if I am
20 smart enough, I can break down to a thousand
21 sequences.

22 MR. SHAH: No, there will be -- not a
23 thousand, but there will be multiple sequences.

24 MEMBER HINZE: There will be many. So
25 they are -- but they do have to consider, from what

1 you're saying, initiating event that may have a
2 frequency of, say, 10^{-5} as long as the conditional
3 probability --

4 MR. SHAH: Is 10^{-1} or less.

5 MEMBER HINZE: So they have to maintain
6 those scenarios.

7 MR. SHAH: Yes, exactly.

8 MEMBER HINZE: Thank you.

9 MR. WATERS: Can I just for the record
10 slightly clarify. The regulation is less than 1 in
11 10,000 chance during pre-closure operations. In that
12 case you have to consider a pre-closure operation
13 length of time, and actually for aircraft right now
14 DOE's assuming that aboveground emplacement operations
15 will be for 50 years.

16 MR. SHAH: Fifty years, yes.

17 MR. WATERS: And that event calculate 2^{-6}
18 as our cutoff. So I just wanted to clarify that for
19 everybody.

20 MEMBER HINZE: As long as we agree with
21 that.

22 MR. WATERS: Right.

23 MR. SHAH: That ends my presentation.

24 MEMBER WEINER: Can I ask a couple of
25 questions?

1 MR. SHAH: Yes.

2 MEMBER WEINER: Are you in the position of
3 approving -- do you approve the way they model the
4 crash sequence? In other words, do you tell them, no,
5 you shouldn't use this model, you should use some
6 other, or do you just approve the --

7 MR. SHAH: No, we do not influence what
8 they do. We just review.

9 MEMBER WEINER: You just review to what?

10 MR. SHAH: To see if it complies with the
11 regulations.

12 MEMBER WEINER: So it is immaterial -- so
13 the regulations don't specify how they have to be --

14 MR. SHAH: Exactly. It's up to them to
15 choose what initiating events to analyze for, as long
16 as the demonstrated event sequence is less than 1 in
17 10,000 during the pre-closure period or post-closure
18 period.

19 MR. THADANI: But I would think you would
20 review and approve the model they use to come to that
21 conclusion.

22 MR. SHAH: Yes, we would review.

23 MEMBER WEINER: Yes, that was my question.

24 MR. SHAH: Oh yes, we will review details
25 of what they do.

1 MEMBER WEINER: I'm just curious. Do they
2 model the mass of -- the momentum transfer from the
3 mass of the fuel, that you'd have a loaded aircraft
4 and that's --

5 MR. SHAH: As far as I know, based on our
6 recent technical exchange they have not done that. So
7 far.

8 MEMBER WEINER: So far.

9 MR. SHAH: They may do in future, but.

10 MR. THADANI: Ruth, just for your
11 information, lots and lots of analyses have been done
12 with fairly contemporary computer models. And in
13 these analyses, you do include fuel. You do consider
14 under accident conditions where the fuel would go, and
15 how it might burn, and the potential impact.

16 MR. SHAH: Right.

17 MEMBER WEINER: Thank you.

18 CHAIRMAN RYAN: Any other questions? Jim,
19 any questions?

20 MEMBER CLARKE: Yes, I had kind of a
21 general question, and it admittedly reflects my
22 limited understanding of the review process. But a
23 couple of times today the statement was made that the
24 design is still evolving. I guess at some point at
25 least portions of the design will have to stop

NEAL R. GROSS

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

1 evolving. Is that -- was that the content of the last
2 technical exchange meeting, which elements are
3 essential?

4 MR. KOBETZ: I guess -- I want to make
5 sure I understand this right. The last technical
6 exchange was we tried to focus in on what the
7 regulations say to make a decision. If we get the
8 application, whether or not to grant a construction
9 authorization. The Department of Energy has to have
10 sufficient design that they can demonstrate that
11 through the PCSA that any structure, systems, and
12 components relied on to prevent or mitigate the event
13 sequence would do so. As far as us putting a stop on
14 them where they finish their analysis, I mean that's
15 up to them. How they do it. And what we try to point
16 out is areas, as Mahendra just said, that we don't see
17 information. They may have it, you know, it may not
18 have been presented well, maybe we didn't understand
19 the way they presented it, but we don't understand how
20 they're getting through that analysis portion. Is
21 that?

22 MEMBER CLARKE: Yes, I think I understand
23 that. And then, the follow-up I guess would be if the
24 facility is going to operate for, say, 50 years, it's
25 conceivable that sometime in that period a better way

NEAL R. GROSS

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

1 of doing something might come along. It may be a
2 minor change, or it may be a major change. Do you
3 have in your process a way to?

4 MR. KOBETZ: Yes. What that is I believe
5 it's 63.24, where they have to update the LA sometime
6 during construction but just prior to requesting a
7 license to receive and possess, or if we were to
8 grant, I guess a license to receive and possess. With
9 things that may have changed during the facility,
10 whether it's new technology, whether it's you know,
11 design because they ran into rock we weren't
12 expecting, or you know, whatever, if there was some
13 sort of design. We don't expect design work to be
14 continuing that should have supported, you know, the
15 PCSA in the first place. Does that answer?

16 MEMBER CLARKE: Sure.

17 MR. KOBETZ: Okay.

18 MEMBER CLARKE: And before they could make
19 that change they would need your approval? Or how
20 would that work?

21 MR. WATERS: Let me add, DOE has -- the
22 regulation does give them change authority, which is
23 similar to 50.59, about the same or similar. So they
24 follow process to make changes. If they cannot meet
25 the criteria for the change authority, then obviously

1 a NMT may be what we would have to do, I believe, to
2 make such a change.

3 MR. KOBETZ: Yes. There's also, in the
4 construction authorization there's 63.32, I believe,
5 that -- and that's what talks about what should be in
6 a construction authorization. And one of the things
7 that we have to look at, NRC, is what are those
8 structures, systems and components that we feel are so
9 important that they have to notify us. And there's
10 different reporting requirements on there. What do
11 they have to notify us that, hey, we had to change
12 this. You know, some things they don't make changes
13 to they won't have to notify us. Some things they'll
14 have to give us and that's like, you know, 60 days or
15 whatever.

16 MEMBER CLARKE: It's spelled out in the
17 regulations.

18 MR. KOBETZ: So that's covered, and we
19 have to cover that in the construction authorization
20 if one was granted.

21 MEMBER CLARKE: Okay.

22 MR. KOBETZ: All right. Well, let me try
23 to wrap it up then here. You know, like we were
24 saying, Part 63, there's one license application. The
25 first decision that the NRC would be requested to make

1 is whether or not to grant a construction
2 authorization. This is really focusing on the design.
3 Can DOE demonstrate through a pre-closure safety
4 analysis that its design will function during event
5 sequences as it's intended to to prevent or mitigate -
6 - well, to prevent or mitigate the event sequences,
7 and thus ensure that the regulatory limits, the dose
8 limits are maintained in accordance with 63.11. The
9 second decision if we were to grant a construction
10 authorization somewhere down the road would be did
11 they build a design and fabricate the waste package
12 and that as they demonstrated in the SAR, and as we,
13 you know, if we did approve it in the SER.

14 The staff in preparing for this review, we
15 are using a structured, integrated, and risk-informed
16 approach to prepare for the LA. And Ruth, I did want
17 to get back to one of your comments, because we do
18 talk -- you know, you were talking about -- where was
19 it, whatever that slide was with the risk information.

20 MEMBER WEINER: High probability and --

21 MR. KOBETZ: Yes. That is, if you look
22 the slide, that's the development of risk-significant
23 technical topics. And you know, the two things that
24 you're going to look at are going to be probability
25 and consequences. And that's -- we are looking at it

NEAL R. GROSS

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

1 that way. We are thinking risk.

2 We're performing independent evaluations.
3 We want to make sure that when the LA comes in we're
4 prepared to perform certain independent confirmatory
5 calculations to show that, okay, yes we agree with the
6 statements they made in their SAR, or no we don't.
7 You know, and they either have to answer an RAI or it
8 gets rejected. And then the staff, we're going to
9 continue to interact with DOE. We hope to come up
10 with a more formalized structured approach so that we
11 could have the technical exchanges, understand whether
12 those objectives were met for the technical exchanges,
13 and if we think there's a delta write a letter and
14 say, you know, here's a delta. Like Ruth said, it's
15 not to say this is the way you should do it, and
16 you're not doing it this way, it's to, you know, we
17 don't understand why you're doing it this way and you
18 haven't provided sufficient justification.

19 So that really wraps up my comments. I
20 appreciate everybody from the NRC staff that showed up
21 here, and provided response, and helped us prepare for
22 this presentation.

23 CHAIRMAN RYAN: Thanks Tim, that's been
24 great and we appreciate the exchange and the Q&A as we
25 go along. That has been real helpful too. Just a

NEAL R. GROSS

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

1 question, looking down the line a bit, when do you
2 think we ought to hear from you again on this? You
3 know, I don't want to just exercise you on one or two
4 more letters, but is it before the LA comes in, or
5 kind of whenever that date seems a little firmer, and
6 maybe we can hear how your process and your
7 preparations have evolved?

8 MR. KOBETZ: Certainly.

9 CHAIRMAN RYAN: I don't know if that's
10 March, April, May, June in '06, but somewhere in that
11 six to nine months timeframe?

12 MR. KOBETZ: Are you talking would you
13 like an update for this?

14 CHAIRMAN RYAN: Yes, an update of where
15 you're at, and what new insights you've gained, and
16 how your process has maybe gone from this sort of
17 starting vision to how it's evolved over time. The
18 reason I suggest that is it's very helpful because
19 you're thinking about things in detail, interacting
20 with DOE, and you know, that's one avenue for us to
21 get insights as well, as well as directly from them on
22 how they're design's evolving. We did have a design
23 briefing from DOE, I believe it was what, two months
24 ago? Or last month? I forget. Two months ago,
25 thanks Mike. And we did see what you alluded to, was

NEAL R. GROSS

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

1 that they had, you know, it's evolved quite a bit from
2 the previous briefing. So I think, you know, from
3 both, it gives us better insight to hear from you as
4 well.

5 MR. KOBETZ: Let me suggest this. Once we
6 get our interactions established, and the objectives
7 set, and we have a path forward, I'll share that with
8 the staff. It'll be public anyway.

9 CHAIRMAN RYAN: Sure.

10 MR. KOBETZ: And I'll talk with the pre-
11 closure team and see where we think an appropriate
12 place would be to interact with you. And also, you
13 know, we'll look for feedback from you if there's
14 something else, or specific topics that you want to
15 hear on.

16 CHAIRMAN RYAN: Okay.

17 MR. KOBETZ: So as soon as that gets
18 established, which I hope you know happens in the near
19 future, we'll pass that on to you.

20 CHAIRMAN RYAN: And again, I think just
21 before the LA is coming in, and as that -- at that
22 point before it comes in would be a time when we'd
23 want to hear from you, at least at some -- maybe once
24 or twice, I don't know, it just depends on the
25 schedule. But we'll see how it goes.

NEAL R. GROSS

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

1 Any other questions?

2 MEMBER HINZE: It would be helpful if we
3 were kept informed as to the technical exchanges in
4 case we would like to sit in on one of the more
5 technical aspects of it.

6 CHAIRMAN RYAN: Yes, that's a good point.
7 If we can kind of keep up with your calendar, and
8 maybe we have a staff person, or a member, to you
9 know, just participate or observe if that's possible.

10 MR. KOBETZ: Certainly.

11 CHAIRMAN RYAN: Okay.

12 MR. KOBETZ: I think your staff attends
13 most of our Yucca Mountain team meetings, and I know
14 they're coming up, but we'll make sure that at least
15 there's one contact point here that's added to the
16 meeting distributions here, the meeting notice
17 distributions.

18 CHAIRMAN RYAN: All right. Any other
19 questions, Bill?

20 MEMBER HINZE: That's it, thank you.

21 CHAIRMAN RYAN: Al? Ruth?

22 MEMBER WEINER: I'd just like to add, I
23 think that would be a very good idea, because a lot of
24 the questions that have sort of arisen during this
25 discussion are really more technical and detailed than

1 you want to discuss in this venue. But thank you.

2 CHAIRMAN RYAN: Jim; any other questions?
3 You're sure? Anybody? Gentlemen, thanks very much
4 for a great briefing. I'm sorry, excuse me.

5 MR. CAMPBELL: I just wanted to say that
6 if the committee is thinking about something on HRA,
7 we would certainly be interested in participating in
8 that, whether it be a working group or whatever you
9 guys are thinking about, we would be interested in
10 participating in that.

11 CHAIRMAN RYAN: Okay.

12 MR. CAMPBELL: I also wanted to take the
13 chance to thank all of the NRC staff, and all of the
14 Center staff, both here and down in San Antonio for
15 the tremendous amount of work that they've put into
16 this, and a variety of activities we've had ongoing in
17 the last few months. We've been very, very busy with
18 interacting with DOE, and you know, what you see here
19 today is kind of a culmination of a lot of staff
20 activity to support that.

21 CHAIRMAN RYAN: Sure. No, I think the
22 committee recognizes that. We visited the Center a
23 few times in the past, and particularly maybe even
24 over a year ago, and a year and a half ago, maybe saw
25 kind of the beginnings of the PCSA tool, and how that

1 was evolving. So we do recognize and appreciate all
2 the hard work of the folks in San Antonio. So thanks
3 for bringing that up.

4 MR. CAMPBELL: Thank you.

5 CHAIRMAN RYAN: Thank you all in San
6 Antonio, and thanks for being with us today. Anything
7 else? Thanks very much. Appreciate it. San Antonio,
8 you're welcome to continue to sit in, or we can end --
9 we're going to discuss a few business matters and
10 other items, but I believe that is our last briefing
11 for the day, but you're welcome to sit in. Okay,
12 thanks very much.

13 Okay, we're scheduled for a short break.
14 Why don't we come back -- it's 2:30 -- at 2:45. We'll
15 reconvene. And I believe that will end our need for
16 the record today. Are you sure? Because we're not
17 taking any new information. Okay, that'll end our
18 formal transcript for the day, and we'll reconvene at
19 2:45. Thank you very much.

20 (Whereupon, the foregoing matter was
21 concluded at 2:30 p.m.).

22

23

24

25

CERTIFICATE

This is to certify that the attached proceedings before the United States Nuclear Regulatory Commission in the matter of:

Name of Proceeding: Advisory Committee on

Nuclear Waste

162nd Meeting

Docket Number: n/a

Location: Rockville, MD

were held as herein appears, and that this is the original transcript thereof for the file of the United States Nuclear Regulatory Commission taken by me and, thereafter reduced to typewriting by me or under the direction of the court reporting company, and that the transcript is a true and accurate record of the foregoing proceedings.



Eric Hendrixson
Official Reporter
Neal R. Gross & Co., Inc.

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

(202) 234-4433

www.nealrgross.com



Status of Yucca Mountain Preclosure Review Preparations

Tim Kobetz

Mike Waters

Mahendra Shah

August 4, 2005

Meeting Overview

- 10 CFR Part 63 regulatory framework
- Staff challenges
- Pre-licensing staff preparations
- Preclosure topics
- Staff independent evaluations
- Past interactions with DOE
- Essential elements of design

10 CFR Part 63 Regulatory Framework

- Licensing Approach of 10 CFR Part 63
 - One license application (LA) for Part 63 with two regulatory decisions
 - 10 CFR 63.31 - Whether to grant a Construction Authorization based on the LA
 - 10 CFR 63.41 - Whether to grant a license to receive and possess source, special nuclear, or byproduct material, based, in part, on the substantial construction completion in conformity with the LA as amended, and updated LA for additional data obtained during construction

August 4, 2005

10 CFR Part 63 Regulatory Framework (cont.)

- Construction Authorization - 10 CFR 63.31
- In reaching findings related to safety, the staff will consider, in part:
 - The DOE has described the proposed geologic repository as specified at § 63.21
 - The site and design comply with the performance objectives and requirements contained in subpart E (*Technical Criteria*) of this part

August 4, 2005

10 CFR Part 63 Regulatory Framework (cont.)

- 10 CFR 63.21
 - (c) The Safety Analysis Report must include:
 - (3) A description and discussion of the design of the various components of the geologic repository operations area and engineered barrier system including:
 - (i) Dimensions, material properties, specifications, analytical and design methods used along with applicable codes and standards;
 - (ii) Design criteria used and their relationships to the preclosure and postclosure performance objectives specified at § 63.111(b), § 63.113(b), and § 63.113(c); and
 - (iii) The design bases and their relation to the design criteria.
 - (5) A preclosure safety analysis...to ensure compliance with § 63.111(a), as required by § 63.111(c).

10 CFR Part 63 Regulatory Framework (cont.)

Preclosure Safety Analysis (PCSA)

- 10 CFR 63.112 (in subpart E)
 - (e) An analysis of the performance of structures, systems, and components to identify those that are important to safety...The analysis required in this paragraph must include...
 - (8) Ability of structures, systems, and components to perform their intended safety functions, assuming the occurrence of event sequences.
 - (f)(1) The relationship between design criteria and the requirements specified at § 63.111(a) and (b); and
 - (f)(2) The design bases and their relation to the design criteria.

Pre-licensing Staff Challenges

- First of a kind licensing activity
- Evolving design information from DOE
- Integration of information between staff

Staff Preparations

- Established review teams
 - Performance Assessment
 - Engineering
 - Site Characterization
 - Health Physics
- Coordination with CNWRA

Staff Preparations

- Developing risk-significant technical topics
 - Consider operational, licensing, and engineering staff experience
 - Incorporated available design and analytical information
 - Visited relevant facilities

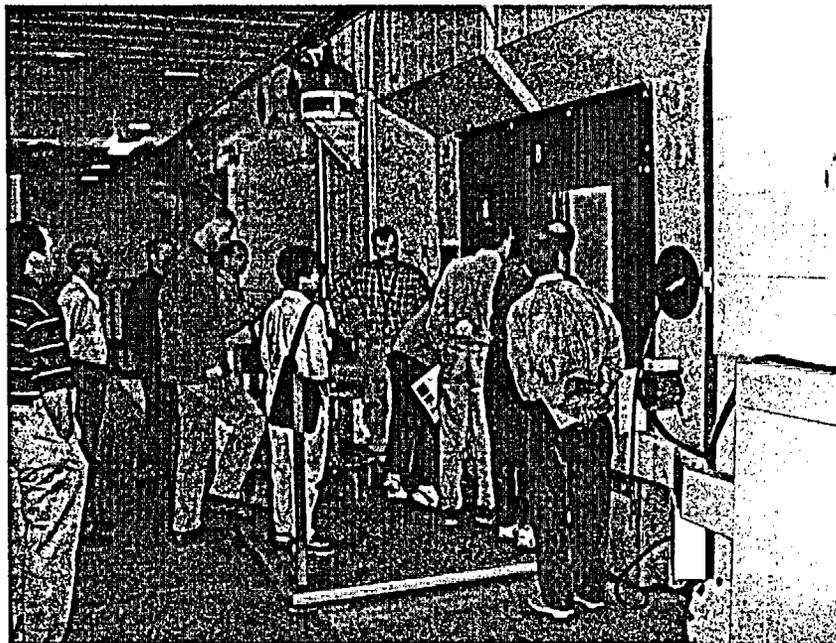
Development of Risk-Significant Technical Topics (cont.)

- Staff Focus
 - Hazards and event sequences that may be significant (high probability or consequences)
 - SSCs that provide the greatest prevention and mitigation of event sequences

Preclosure Topics

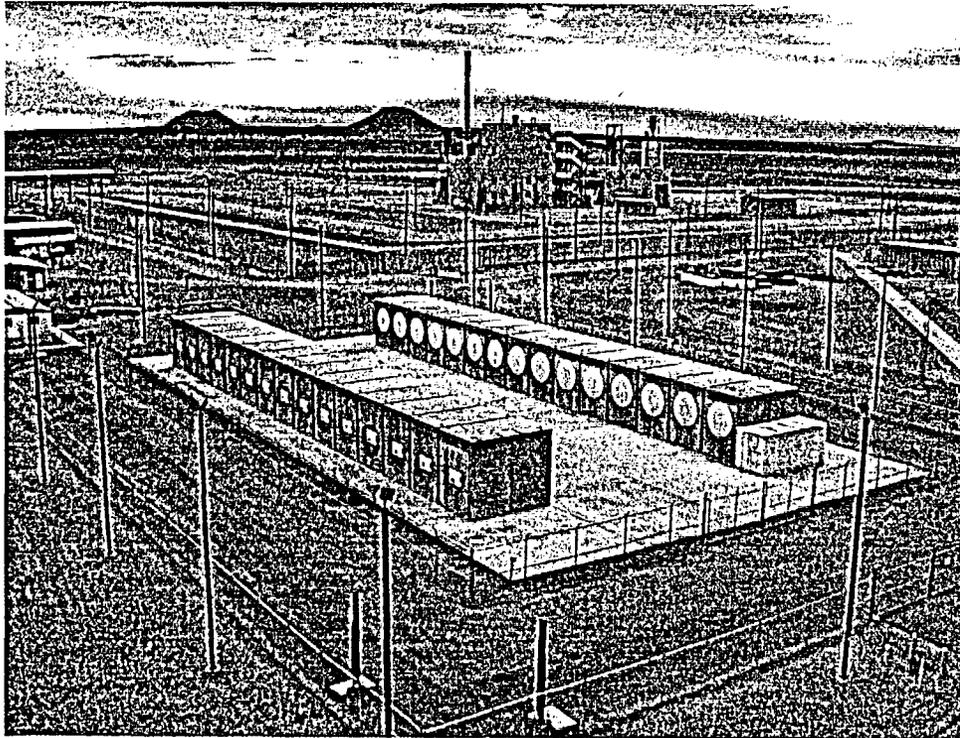
- Aircraft crash hazard and event sequences
- Seismic and site characterization and event sequences
- Spent fuel source terms under normal and accident conditions
- Performance of surface facilities mechanical SSCs
- Performance of subsurface facilities mechanical SSCs
- Criticality event sequences
- Aging facility performance
- Preclosure Safety Analysis
- Licensing process

INEEL Test Area North Hot Cell



- Transportation casks
- INEEL TAN hot cell confinement
- Operating experience
- Welding and NDE processes
- Crain stops and interlocks
- Quality assurance oversight
- Complications of dual regulation
- Idaho Spent Fuel Facility overview

TMI-2 Fuel Storage

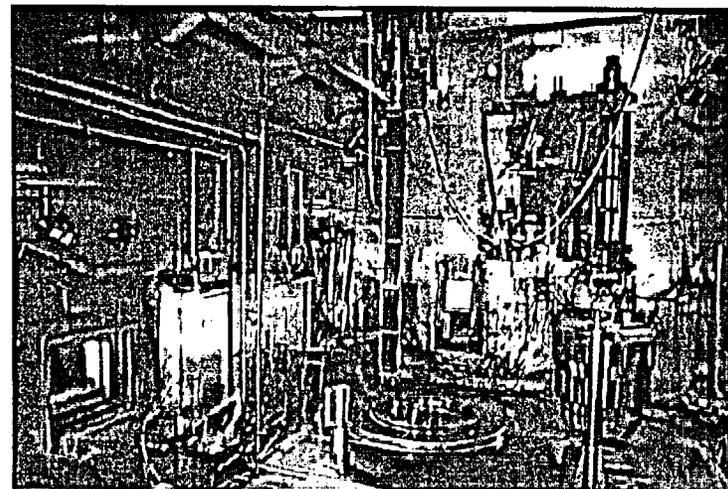
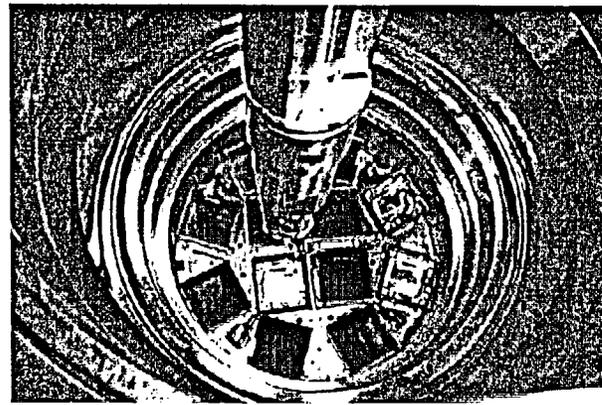
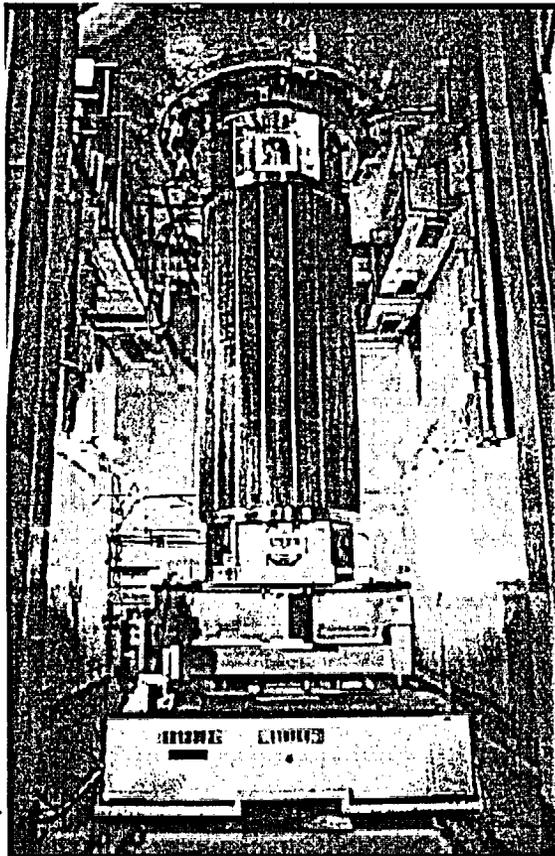


- Horizontal storage casks
- Physical security
- Quality assurance

Other US Facilities Visited

- Hanford
- Columbia Generating Station ISFSI
- Yucca Mountain
- Joseph Oat Corporation, Inc.
- Sandia National Laboratory

COGEMA-La Hague Fuel Handling



COGEMA-La Hague Fuel Handling

- Dry fuel unloading is preferred over wet
- No major events since newest facility commissioned in 1986
- Unload 12 different transportation cask (some must use wet unloading)
- Pool storage for between 14,000-16,000 MTU SNF assemblies
- All damaged fuel sent to COGEMA-La Hague is bottled and unloaded in the wet facility
- Hot cell cooling systems are required to maintain SSCs within operability limits

Staff Independent Evaluations

- Limited PCSA Exercise - Fuel Handling Facility
- Aircraft Crash Analyses
- Spent Nuclear Fuel Oxidation Analyses
- Consequence Sensitivity Studies

Past Interactions with DOE

- February 2004 Technical Exchange
- May 2004 Technical Exchange
- September 2004 Technical Exchange
- October 8, 2004 Letter from NRC to DOE
- June 2005 Technical Exchange
- July 2005 Technical Exchange

Past Interactions with DOE

- February 2004 Technical Exchange
 - Outline of Potential LA
- May 2004 Technical Exchange
 - Identification of Items Important to Safety
- September 2004 Technical Exchange
 - Level of Design Information
- October 8, 2004 Letter from NRC to DOE
- June 2005 Technical Exchange
 - Aircraft Crash Hazard
- July 2005 Technical Exchange
 - Essential Elements of Design

Summary

- 10 CFR Part 63 is a one license application (LA) with two regulatory decisions:
- Staff is using a structured, integrated, and risk-informed approach to prepare for LA review
- Staff is performing independent engineering and risk assessments
- Staff will continue interact with DOE, as appropriate, to understand its preclosure work