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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON NUCLEAR WASTE

(ACNW)

159<sup>TH</sup> MEETING

+ + + + +

TUESDAY,

APRIL 19, 2005

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ROCKVILLE, MARYLAND

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The Advisory Committee met at 8:30 a.m. in Room T-2B3 of the Nuclear Regulatory Commission, Two White Flint North, 11545 Rockville Pike, Dr. 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

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1 ACNW STAFF PRESENT:

2 NEIL M. COLEMAN

3 JOHN FLACK

4 LATIF HAMDAN

5 JOHN T. LARKINS

6 MICHAEL LEE

7 RICHARD K. MAJOR

8 RICHARD SAVIO

9 MICHAEL L. SCOTT

10 SHARON STEELE

11

12 NRC STAFF PRESENT:

13 MERRI HORN

14 ASHOK THADANI

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OTHERS PRESENT:

TERRY DEVINE, CRCPD, via teleconference

BRUCE HINKLEY, DOE

JOHN KESSLER, EPRI

J. GARY LANTHRUM, DOE

ENGELBRECHT VON TIESENHAUSEN, Clark County,

Nevada

GARY LANTHRUM, DOE

MARTIN MALSCH, State of Nevada

C-O-N-T-E-N-T-S

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

(8:30 a.m.)

1  
2  
3 CHAIRMAN RYAN: If the meeting would come  
4 to order please. This is the second day of the 159th  
5 meeting of the Advisory Committee on Nuclear Waste.  
6 My name is Michael Ryan, Chairman of the ACNW. The  
7 other members of the committee present are Allen  
8 Croff, Vice Chair, and Ruth Weinberg, Jim Clarke and  
9 Bill Hinze. During today's meeting, the Committee  
10 will be briefed and hold discussions with  
11 representatives from the Office of Nuclear Material  
12 Safety and Safeguards on the National Source Tracking  
13 System, welcome. We will be briefed by the  
14 representatives from Department of Energy on the  
15 Status of Repository Design.

16 We will be briefed and hold discussions  
17 with representatives from the DOE, the Department of  
18 Energy, regarding the updates of the transportation  
19 aspects of the Yucca Mountain Environmental Impact  
20 Statement and we'll be briefed by representatives from  
21 the Electric Power Research Institute on their topical  
22 report on Future System States. We will prepare for  
23 the May 14th to 21st trip to the nuclear facilities  
24 and regulators on Japan. A subcommittee will be  
25 attending those activities and we'll continue

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1 preparation and review for potential ACNW letter  
2 reports.

3 In addition, after our transportation  
4 presentation, Engelbrecht von Tiesenhausen from the  
5 State of Nevada will be offering some insights --

6 MR. von TIESENHAUSEN: Clark County.

7 CHAIRMAN RYAN: I'm sorry, Clark County,  
8 my mistake. Forgive me. Thank you for correcting me,  
9 Engelbrecht. Clark County, Nevada to offer some  
10 insights on our thinking about transportation from  
11 questions that he often gets from members of the  
12 public. So we thought it would be beneficial for us  
13 to get that on record so we could reply to them and  
14 carry them forward on our thinking and deliberations,  
15 and thank you for offering to provide us that insight.  
16 And again, I apologize for the error in location of  
17 the organization. My mistake.

18 Latif Hamdan is the designated federal  
19 official for today's initial session. The meeting is  
20 being conducted in accordance with the provisions of  
21 the Federal Advisory Committee Act. We have received  
22 no written comments or additional requests from the  
23 one I mentioned for time to make oral statements from  
24 members of the public regarding today's sessions.  
25 Should anyone wish to address the Committee, please

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1 make your wishes known to one of the Committee staff.  
2 It is requested that the speakers use one of the  
3 microphones, identify themselves and speak with  
4 sufficient clarity and volume so they can be readily  
5 heard.

6 It's also requested that if you have cell  
7 phones or pagers, kindly turn them off or place them  
8 in the mute mode. Thank you very much. There are a  
9 couple of just very brief scheduling items I want to  
10 bring to the -- mainly the Committee's attention.  
11 First, there's -- we have been copied the two ICRP  
12 Foundation documents that support their draft  
13 recommendations as they are being revised. Those will  
14 be distributed to members today and I'm going to begin  
15 just looking at them and noting any comments and as  
16 you have comments over the next few weeks if you want  
17 to send them to me, I'll assemble them and our plan is  
18 to formally present those to NRC staff, namely, Dr.  
19 Don Cool at our June meeting. So that's where that  
20 one will be formally presented in that forum. So just  
21 a word ahead.

22 A couple of meetings of interest, Dr.  
23 Hinze and Dr. Marsh will be attending on behalf of the  
24 Committee the PVHA workshop, August 31st in Las Vegas.  
25 This is an ongoing series of meetings that Dr. Hinze

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1 and Dr. Marsh have been tracking on behalf of the  
2 Committee. Sharon, you had mentioned that there now  
3 a date for Calvert Cliffs.

4 MS. STEELE: Yes, June 7th.

5 CHAIRMAN RYAN: Tentatively scheduled for  
6 June 7th so members can take note of that scheduling.

7 MS. STEELE: We're also looking at the  
8 potential for the -- to join ACRS on the Browns Ferry  
9 trip.

10 CHAIRMAN RYAN: Okay, so we'll update on  
11 that. The -- a couple other meetings of note.  
12 There's an RES working group meeting on Determination  
13 of Dispersal Characteristics of Spent Fuel in  
14 Cadarache, France on May 15th. The NMSS folks will be  
15 visiting COGEMA Spent Nuclear Fuel Handling Facility  
16 in La Hague May 23rd to 25th. And Dr. Weiner will  
17 chair a session on RADTRAN Estimating Risk on  
18 Transporting of Radioactive Materials at the ANS June  
19 5th to 9th meeting in San Diego, California.

20 The Bell Fourth International Conference  
21 on Hormesis Implications for Toxicology, Medicine and  
22 Risk Assessment is being conducted at the University  
23 of Massachusetts in June 6th to 8th at Amherst,  
24 Massachusetts. This is a topic that is of interest  
25 and related to the Committee's charge from the

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1 Commission so I think we need to figure out how that  
2 meeting will be covered, whether it will be members or  
3 staff or both and I just want folks to be thinking  
4 about that and looking at their calendars so we could  
5 figure out how to get that done. I'd be especially  
6 interested if Dr. Cool or Houlihan or others will be  
7 attending that meeting and how we'll gather  
8 information from it, because I think that's a fairly  
9 important conference that we need to have some  
10 coverage on.

11 With that in mind, that takes care of our  
12 action items, so thank you. Without further ado, I'll  
13 turn our meeting over for the National Source Tracking  
14 presentation and discussion to our cognizant member,  
15 Allen Croff.

16 VICE CHAIRMAN CROFF: Thank you, Mike.  
17 This section is going to examine the new regulation  
18 that will require licensees to report transactions  
19 involving the manufacture, transfer or receipt and  
20 disposal of high risk sealed sources. We have in the  
21 room to address the topic Merri Horn from the Division  
22 of Industrial and Medical Nuclear Safety in NMSS and  
23 I hope we have on a speaker phone Terry Devine from  
24 the Conference of Radiation Control Directors. Do we?

25 MR. DEVINE: Yes, sir, I'm here.

1 VICE CHAIRMAN CROFF: Great. With that,  
2 I'll turn it over to Merri.

3 MS. HORN: Good morning. My name is Merri  
4 Horn. I am currently the Project -- NRC Project  
5 Manager for the National Source Tracking System. I am  
6 both the Project manager for the overall project and  
7 also for the rulemaking and today we're actually here  
8 to talk about the rulemaking and I do appreciate this  
9 opportunity to discuss the source tracking project.  
10 It's actually very important, a lot of interest in  
11 this particular project.

12 In the limited time we have today, I plan  
13 to share some background -- hold on here. Thank you,  
14 sorry about that. We want to provide to you some  
15 background in the source tracking system, the  
16 organizational structure for the development of the  
17 National Source Tracking System, some of the details  
18 on the proposed rule and some scheduling information  
19 on the project. I do first want to emphasize that the  
20 Source Tracking System is only one piece of NRC's  
21 efforts to enhance the control of sources.

22 There are several other efforts that are  
23 currently underway. Some of them in place, some of  
24 them still in the developmental stages. These efforts  
25 are integrated and they are hopefully complimentary to

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1 each other. A couple of other examples are some of  
2 the orders that we have issued to the irradiator  
3 licensees, the manufacturers and distributors and it's  
4 limited maybe to some of the other reactor licensees.

5           These orders basically enhance security on  
6 the materials at those facilities. We also have  
7 orders that are in the developmental stage for  
8 transportation of radioactive material at these  
9 levels. Those -- we're hoping they'll be going up to  
10 the Commission later this spring. And we also have an  
11 import/export rulemaking that's actually -- the final  
12 rule is currently before the Commission and we expect  
13 that that will actually be published later this  
14 summer.

15           Also included in these are the GLTS  
16 system, the General Licensee Tracking System which I  
17 believe you may have been briefed on in the past, I'm  
18 not sure and also the Orphan Source Offsite Recovery  
19 Program, which I'm aware that you have been briefed on  
20 I believe in December most recently. In June of 2002  
21 the Secretary of Energy and the Chairman of the NRC  
22 met to discuss the adequate protection of inventories  
23 of nuclear materials that could be used in an RDD.  
24 They actually -- the outcome of that meeting was an  
25 actual interagency working group on RDD. This working

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1 group, over the course of a year or so took a hard  
2 look at this topic and they actually entered a joint  
3 NRC/DOE report in May of 2003 entitled "Radiological  
4 Dispersal Device, an initial study to identify  
5 radioactive materials of greatest concern and  
6 approaches to the tracking, tagging and disposition".  
7 One of the recommendations from this report was that  
8 there should be a national source tracking system  
9 developed to better understand and monitor the  
10 location and movement and sources of interest.

11 And within that report, there was a list  
12 of isotopes that were developed and thresholds which  
13 they thought that we should include in the source  
14 tracking system and these were the isotopes that  
15 warranted maybe an additional look from a security  
16 standpoint. During that same time period, the NRC was  
17 also supporting the U.S. Government efforts to  
18 establish international guidance for the safety and  
19 security of the radioactive materials of concern. NRC  
20 participated in an effort for a major revision to the  
21 IAEA Code of Conduct on the safety and security of  
22 radioactive sources. This revised Code was approved  
23 by the IAEA Board of Governors in September 2003 and  
24 it contains a recommendation that every state in this  
25 case it means country, should establish a national

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1 register of radioactive materials. And that  
2 recommendation was limited to certain isotopes and  
3 thresholds that were identified in the Code of  
4 Conduct.

5 And the U.S. has actually made a non-  
6 legally binding commitment to the Code of Conduct, so  
7 we are definitely embracing those and the  
8 import/export rulemaking that I mentioned earlier is  
9 the first rulemaking to implement some of the  
10 recommendations from the Code that this will be the  
11 second.

12 We have also made a commitment to Congress  
13 that we would develop a national source tracking  
14 system and that commitment was made in August 2003.  
15 As you probably are aware, the NRC does not regulate  
16 all materials licensees. We actually have agreement  
17 states. In this case, there are 33 agreement states  
18 that issue licenses for the medical, industrial and  
19 academic uses of nuclear material. Current  
20 regulations do not require tracking of sources. Most  
21 of the licenses that are issued actually list  
22 possession limit, a maximum possession limit that a  
23 licensee can possess. So we didn't actually have  
24 information on what licensees truly had.

25 So to address that issue, starting in the

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1 fall of 2003, we started developing and interim  
2 inventory survey and we basically went out with the  
3 cooperation of the Agreement States, we went out to  
4 approximately 2600 licensees that could potentially  
5 possess sources of the Category 1 or Category 2 level  
6 from the Code of Conduct. This was a voluntary  
7 survey. It was considered a snapshot in time, so it  
8 was basically what you had at that time. And we plan  
9 to continue this survey on an annual basis until we  
10 actually have the National Source Tracking System up  
11 and operational.

12 I will point out, we actually had very  
13 positive results. We had very -- involved a lot of  
14 phone calling with some of the licensees, but we  
15 actually had a very good response rate on that and  
16 about half of the licensees that we contacted actually  
17 had Category 1 or Category 2 sources.

18 But we actually set up a muti-tier structure to  
19 address the National Source Tracking System. We have  
20 an interagency coordinating committee. We invited  
21 representatives from other federal agencies to  
22 participate on this committee and the idea was to  
23 address from an interagency perspective National  
24 Source Tracking, you know, what concerns do you have?  
25 We wanted to -- instead of different agencies going

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1 out and contacting licensees, we wanted it to be one.  
2 NRC would contact, and so we were trying to get all of  
3 their needs into one place. So they met, they  
4 identified from a high level standpoint what they felt  
5 a source tracking system should include and then we  
6 included that as we were developing the requirements.

7 We had actually 11 other agencies that  
8 participated on this committee and DOE, the agreement  
9 states, participated, State, Transportation, Commerce,  
10 EPA, FBI, Defense, Homeland Security, -- three  
11 different offices in Homeland Security. So there was  
12 a very wide scope participation. We also had formed  
13 a steering committee. The idea of the steering  
14 committee was to provide guidance on the critical  
15 issues that were related to the development of  
16 coordination and implementation of the system, and we  
17 had members from DOE and agreement states plus several  
18 various NRC offices.

19 And all of these helped guide the work of  
20 the actual National Source Tracking Working Group.  
21 The working group was actually chartered to develop  
22 the system, to coordinate it and actually implement it  
23 down the road. As I mentioned before, I'm the actual  
24 -- I'm the Co-chair for this working group. The other  
25 Co-chair is Clayton Brandt from the State of New York.

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1 Again, we had working group members from both DOE and  
2 the agreement states and several different NRC  
3 offices. And this group, over the course of several  
4 months, developed the actual requirements for the  
5 system, putting in the language that both from an IT's  
6 perspective and a rulemaking perspective that we could  
7 then use to forward with the two projects.

8 Today we're really here to talk about the  
9 proposed rule. So we actually formed another working  
10 group to actually develop the rule language and I will  
11 say that many of the members were the same on both  
12 groups. The idea of the Source Tracking System is it  
13 would provide a life cycle account of nationally  
14 tracked sources. It will improve the source  
15 accountability, it will give better information to  
16 decision makers, because, as I indicated before, we  
17 don't know what licensees actually possess because  
18 they're not required to report that information to us.

19 So this is an opportunity that -- to get  
20 the information. As mentioned before, it is  
21 transaction based, so it's not real time tracking. It  
22 does not include the actual transportation of the  
23 sources. The information will be considered official  
24 use only, so it will be a need to know to have access  
25 to it. We do plan it to be a primarily web based

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1 system, to make it easy for the licensees to report.  
2 They would be assigned an account, a password. They  
3 would go on line, log in and easily type in the  
4 information that they want to report. And they would  
5 only have access to their site information.

6 The sources that they were interested in  
7 -- the thresholds are from the IA Code of Conduct  
8 Categories 1 and 2 is what we're including. The  
9 Commission decided to add seven additional isotopes to  
10 that list. That was primarily because of DOE  
11 participation in this effort and DOE has more of these  
12 types of sources than NRC licensees.

13 CHAIRMAN RYAN: Merri, can I just ask a  
14 quick question on the previous slide?

15 MS. HORN: Yes. Sure.

16 CHAIRMAN RYAN: You said that, and I may  
17 already know the answer but I thought I'd ask anyway.  
18 The data base will be such that the licensees can  
19 implement, for example, if they buy a new source and  
20 so forth.

21 MS. HORN: Yes.

22 CHAIRMAN RYAN: How is that cross-checked  
23 by the Inspection Programs, either NRC or Agreement  
24 States or is there -- how do you envision that will be  
25 verified?

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1 MS. HORN: We do anticipate that the  
2 inspections for the source tracking system will become  
3 part of the routine inspection program. So that when  
4 an inspector is going out to do a radiation protection  
5 safety, they can take a look at what's in the system,  
6 take that information with them and actually check  
7 their records and see, yes, have you been reporting as  
8 you're supposed to.

9 CHAIRMAN RYAN: Okay, thanks. I just  
10 wanted to make it clear that there is a plan to close  
11 the loop from the inspection standpoint.

12 MS. HORN: Yes.

13 CHAIRMAN RYAN: Thank you.

14 MS. HORN: It's still an open issue on  
15 exactly how for the Agreement State licensees. I  
16 don't know how familiar you are with the 274(I)  
17 agreements but because this rulemaking is being done  
18 under common defense and security, technically, they  
19 don't have the authority to inspect and enforce. And  
20 so they have to enter into 274(I) agreements to be  
21 able to do that. We don't know if all the states will  
22 do that or not and they've had mixed results in some  
23 of the other areas, so that's something that we'll  
24 have to kind of wait and see. We may have to come up  
25 with some creative methods because it's a lot of

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1 resources, obviously.

2 MEMBER HINZE: May I follow that up,  
3 please?

4 CHAIRMAN RYAN: Yes, sir.

5 MEMBER HINZE: There must be a finite  
6 number of suppliers of these radioactive materials.  
7 Is there any effort made to determine from them who  
8 they are selling to or --

9 MS. HORN: Actually, that will be one of  
10 the requirements of the rule, that when they  
11 manufacture a new source, they're going to have to  
12 report that to the source tracking system. Then when  
13 they transfer that source, they will have to report  
14 that transaction also. So we will have that  
15 information.

16 MEMBER HINZE: Will there be any effort  
17 made to try to determine what type of transportation  
18 is being used to send them from the supplier to the  
19 user?

20 MS. HORN: Not as part of this rulemaking.  
21 There are other -- as I said, this is one of an  
22 integrated many items that the NRC is looking at from  
23 a security standpoint. And we have issued orders and  
24 will be issuing additional orders to various licensees  
25 that cover some of those aspects. Unfortunately those

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1 are safeguards right now so I can't go into what those  
2 details are but it is considered uncovered.

3 MEMBER HINZE: I understand. Are the  
4 Agreement States involved in this as well or --

5 MS. HORN: They have working group members  
6 on the working group and the steering committee that  
7 are developing this.

8 MEMBER HINZE: Thank you.

9 MS. HORN: As I mentioned, the current  
10 rule will include the Categories 1 and 2 from the Code  
11 of Conduct and the Commission currently is adding  
12 seven additional isotopes to the list. The most  
13 common isotopes that are in use are cobalt-60, cesium-  
14 137, iridium-192 and americium. Basically, these are  
15 the irradiators, some of the medical uses and  
16 radiographer and well-logging are the primary uses for  
17 this material.

18 Now, the IA Code of Conduct actually did  
19 write the sources in terms of potential risk. I  
20 understand that that's an interest that you have. In  
21 terms of potential risk associated with the non-  
22 violent use and it considered the normal quantities  
23 used in the various applications. And that considered  
24 both a radiological dispersal device and a  
25 radiological exposure device. So they basically

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1 came up with five categories in the Code of Conduct  
2 and they're recommending that for the source registry  
3 you include the first two categories because those are  
4 the ones viewed most likely to be used in these types  
5 of devices.

6 One of the isotopes that they have  
7 included in their recommendation was radium-226 and  
8 since NRC does not regulate that isotope, obviously,  
9 we're not going to include it in a rulemaking. The  
10 system itself, once it's developed, we would accept  
11 that if other states would want to impose requirements  
12 on the licensees that they have, but it will be --  
13 from our standpoint, obviously, it would be a  
14 voluntary effort.

15 I mentioned briefly in response to your  
16 question but the basic elements of the rulemaking,  
17 we're going to require a licensee to report any time  
18 they manufacture a new source, they transfer to  
19 another licen -- or to another facility because it may  
20 not be a licensee. It could be say DOE that they're  
21 transferring it to. Any time they receive a new  
22 source and any time they dispose of sources. The rule  
23 currently would require that they report by the close  
24 of the next business day. We want to get this  
25 information fairly quickly from a securities

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1 standpoint in case there's problems, we would be able  
2 to react.

3 CHAIRMAN RYAN: Just another quick detail  
4 there; you know, the Army has a large NRC license and  
5 they transfer material among facilities under that one  
6 license. Would those kind of transfers from facility  
7 to facility be covered as well?

8 MS. HORN: They should be covered as well,  
9 yes.

10 CHAIRMAN RYAN: Okay, thank you.

11 MEMBER HINZE: And that's also true of  
12 well-logging organizations. They will move a source  
13 from one area to the other.

14 MS. HORN: The well-logging is a little  
15 bit different because it remains under control of the  
16 licensee. We view -- even though under the Master  
17 Materials License says it's one license, we're viewing  
18 them kind of like an Agreement State so that they're  
19 permittees. And so if they transferred it from one  
20 permittee, if you will, to another, it would have to  
21 be reported but because with a well-logging or a  
22 radiographer, it's under the control of the same  
23 licensee, they would not be required to report that.

24 Now, if they transferred it, say they have  
25 a license in Oklahoma and they have a license in Texas

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1 and they're now moving to another state, so they're  
2 operating under a new license, they would have to  
3 report that. But as long as they're operating within  
4 -- under that same license they would not need to  
5 report the temporary locations.

6 I will point out that the sources that we  
7 would be tracking do not include the fuel assemblies  
8 rods or pellets so it doesn't include any of the fuel  
9 aspects. Basically, from a transaction standpoint,  
10 the information that we're going to be asking the  
11 licensees to provide is basically the company  
12 identification number which is, you know, company  
13 name, the license number, your address, the basic  
14 identifying information. And we're also going to ask  
15 them to -- yes.

16 CHAIRMAN RYAN: I'm sorry, I'm just going  
17 to ask a question that got away from the previous  
18 slide you have. Manufacture, transfer, receipt and  
19 disposal, how about loss?

20 MS. HORN: No, there are already current  
21 requirements that require a licensee to report the  
22 loss of a source or a material in general, and instead  
23 of requiring a dual reporting, we're going to have --  
24 we will just monitor the events or the NMED data and  
25 pull that information ourselves.

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1 CHAIRMAN RYAN: So it will be NRC's  
2 responsibility to take it out of the system.

3 MS. HORN: Yes.

4 CHAIRMAN RYAN: Okay.

5 MS. HORN: So, as I mentioned, the basic  
6 company identification information. We're going to  
7 want to know the actual radioactive material in the  
8 source. We want to know the initial source strength  
9 at the time the source was manufactured, obviously the  
10 manufacturer or make is usually the term we use, the  
11 model number, the serial number and then obviously, as  
12 I said, the manufacture date. This is just the basic  
13 source identification information.

14 For transfer and receipt, again, the basic  
15 company identification information, only in this case  
16 we're going to want it on the company that's actually  
17 shipping the material and the company that's receiving  
18 it. So if Company A is sending to Company B, we want  
19 them to tell us they're sending it to Company B and  
20 provide that license number so that we can actually,  
21 again, figure out the transaction.

22 We'd also ask for the shipping date and  
23 the estimated arrival date, so that at the other end  
24 if the licensee, who is supposed to provide the  
25 receipt date when they report, they haven't reported

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1 to the system, we'd have an alarm and we could  
2 investigate. We'd call a licensee and say, "Hey, have  
3 you received this yet, did you forget to enter the  
4 information", or they didn't receive it and there's a  
5 problem, and so maybe now you actually need to go out  
6 and investigate. So it will provide some useful  
7 data.

8           There are some sources that are involved  
9 in a waste shipment, if it's going to a waste broker  
10 or if it's going to a disposal facility. In those  
11 cases, they would have -- the licensee would have to  
12 provide the waste manifest number and the container  
13 identification. And the idea on that is that's the  
14 information that the receiver is doing to have.  
15 They're not going to have the detailed information.  
16 So when the disposal facility reports theirs, they  
17 won't have to provide that basic source information  
18 because we're not asking them to verify that they  
19 receive a source. We don't want them to open up that  
20 shipment and dig out and say, "Yes, this source is in  
21 the container".

22           So what they would have to do is provide  
23 the -- again, the company identification number, the  
24 manifest number, and the container identification, and  
25 so the fact that they receive that container and put

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1 the container and dispose of it is all that we're  
2 looking for and then, obviously, the date and the  
3 method.

4 CHAIRMAN RYAN: Again, just another detail  
5 question, Part 35 licensees have, you know, for  
6 example, moly generators. I'm just wondering if that  
7 rises up to Category 1 or 2 or how much of the Part 35  
8 world is effected.

9 MS. HORN: Some of the Part 35 world will  
10 be captured. Molybdenum is not one of the isotopes  
11 that we're tracking so that would not be but certainly  
12 any of the -- some of the brachytherapy, some of the  
13 other dose therapy type issues, blood irradiators  
14 certainly would be covered, so we will be capturing  
15 some materials that they use.

16 CHAIRMAN RYAN: The reason I ask is that  
17 some of the Part 35 transportation is more general  
18 commerce, common carrier kind of situation where  
19 perhaps some of the others are more of the sole use  
20 kinds of carriers, so there's a little bit of a  
21 difference of the transportation control aspect of it.

22 MS. HORN: And again, this rulemaking does  
23 not impose any requirements on the transportation  
24 aspect. That's actually something separate.

25 CHAIRMAN RYAN: Gotcha. Thank you.

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1 MS. HORN: And I will say here that some  
2 of the orders that have been issued require  
3 coordination for timely receipt, so that's one way in  
4 which the disposal facility is actually going to show  
5 what they're receiving and other facilities also.

6 CHAIRMAN RYAN: That's not terribly  
7 different than what goes on now for most shipments.

8 MS. HORN: No, it's not, no, it's not.  
9 We're actually allowing a licensee a variety of  
10 methods to submit this information. Again, as I said,  
11 it's close of the next business day after the  
12 transaction so that if they receive something on  
13 Monday, by the close of business on Tuesday, they  
14 would have had to have reported that information.

15 We allow them to report on line which is  
16 what we hope most licensees will take advantage of  
17 because this is going to be the easiest quickest,  
18 actually the most accurate method electronically.  
19 They can basically do a batch load. They can upload  
20 the information from their own system, send us an  
21 electronic file and we would just download it into the  
22 system. So between those two methods, we're hoping  
23 that the majority of the licensees will actually use  
24 these two.

25 We also obviously, are going to require or

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1 allow them to submit by mail. They can fill out a  
2 paper form, they can mail it to us or they can fax it  
3 to us, either way. And we'll also allow telephone  
4 with a follow-up by facsimile or mail. We kind of  
5 view that as something that a licensee might use in an  
6 emergency. They've forgotten, the last minute, oh,  
7 we've got to get this in. So we don't expect that a  
8 lot of licensees will use that.

9 But the advantage of the on-line,  
10 basically once the source information has been  
11 entered, you log in your information, which is  
12 associated with your password and everything, your  
13 company identification information is all there. All  
14 the sources that you possess are there so you can  
15 basically go on line. You can click on this source  
16 saying, "I want to transfer it to another company",  
17 and then you just have to type in the company name.  
18 So it makes it a lot easier for licensees and it's  
19 less error because when they send in just a paper  
20 copy, then someone has to type that information into  
21 the system, there's another human error factor there.

22 Basically, we require licensees to report  
23 their initial inventory two different times, for  
24 Category 1 sources, by the end of year 2006 and for  
25 Category 2 sources, March 31st, 2007. For those

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1 licensees that have responded to the inventory survey  
2 that we did, we will actually take that information  
3 and load that into the National Source Tracking  
4 System, provide it to them and just ask them to  
5 update, so it would reduce the burden of them for  
6 reporting that initial inventory because basically  
7 this will be our baseline for the source tracking  
8 system.

9           And it's the same type of information, the  
10 manufacturer, make, model, serial number, the date of  
11 the activity. To maintain the system's accuracy and  
12 reliability of the information, we are going to  
13 require licensees to go in once a year and verify that  
14 the information is correct. Basically, if there is  
15 any discrepancies, they'll have to complete the  
16 appropriate report. If they receive a source and they  
17 forgot to report it, they would have to file the  
18 transaction report for that receipt. If during the  
19 initial inventory they missed a source, they would  
20 just report that, "We had this source in our  
21 inventory". So basically we're asking them to verify  
22 that the information in the source tracking system is  
23 correct against what their own inventory says that  
24 they have a the site.

25           And we'll require this during the month of

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1 June of each year, so it will be an annual  
2 verification. We're also requiring that if they  
3 discover an error, why they submitted their  
4 transaction report and they put the wrong model number  
5 on it or they got the serial number off a little bit,  
6 once they discover that, they're supposed to correct  
7 that information within give days, five business days.  
8 So it's a two phase, if they discover an error,  
9 correct it, basically immediately and if you haven't  
10 caught it during your annual reconciliation,  
11 hopefully, they will be caught.

12 CHAIRMAN RYAN: As it goes down the line  
13 a bit, say in the 2007 time frame when you have both  
14 Category 1 and 2 sources in, do you have an idea of  
15 the number of licensees that will be in the system?

16 MS. HORN: I think that there will be  
17 about 1350 is the number that we're using. There were  
18 about half of -- there were about 1320 or so that  
19 actually reported under the NMED inventory and so we  
20 figured there will be a few more that maybe we've  
21 missed. There's a couple of reactor sites that may  
22 still have a source that -- because we didn't go out  
23 to the reactors for the inventory but we're guessing  
24 about 1350.

25 CHAIRMAN RYAN: Just a thought, you might

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1 want to stagger by quarter who has to report on an  
2 annual basis.

3 MS. HORN: We thought about that. That  
4 makes it very difficult for -- to do it. We were  
5 originally going to do it when they do their physical  
6 inventory, but some licensees are required to do a  
7 physical inventory quarterly, some semi-annually, some  
8 annually, so you had -- you don't want them doing it  
9 more than the one time. We just decided it was easier  
10 if we had everyone do it basically at one time.

11 CHAIRMAN RYAN: It will make for a busy  
12 June though.

13 MS. HORN: Yes, it will make a busy June,  
14 yes.

15 MEMBER HINZE: This goes to access to the  
16 inventory. Will the licensees have access to the  
17 entire inventory or only their portion of it?

18 MS. HORN: No, licensees will only have  
19 access to the information on their own facility.

20 MEMBER HINZE: On their own.

21 MS. HORN: Yes.

22 MEMBER HINZE: And who else will have  
23 access to the inventory system?

24 MS. HORN: The only people that will have  
25 access to everything that's in the system is NRC staff

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1 and even that would be somewhat limited. It won't be  
2 everyone that would have information to that.

3 MEMBER HINZE: The firewalls are there to  
4 make certain?

5 MS. HORN: The firewalls will be there.  
6 They're not there yet. The system doesn't exist.

7 MEMBER HINZE: Okay. To make certain,  
8 they only can get into their own.

9 MS. HORN: Yes, this will be role-driven  
10 permission type system. There's a lot of security  
11 that will be associated with it. The procurement that  
12 we're working on now, it's not complete yet, has a  
13 long list of security related reg guide types, federal  
14 guidance, different statutes that they will have to  
15 meet.

16 MEMBER HINZE: Thank you.

17 CHAIRMAN RYAN: Agreement States will have  
18 access to their state?

19 MS. HORN: Agreement States will have  
20 access to the information on their own licensees.

21 CHAIRMAN RYAN: Okay.

22 MS. HORN: There is one exception to that.  
23 The information on loss and stolen sources which is  
24 public anyway because it's in the NMED system and in  
25 the event reports, there will be a broader range of

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1 accessibility to that. Basically any Agreement State,  
2 any NRC staff, DOE and a few other federal agencies  
3 would have that direct access to just that list.

4 MEMBER WEINER: You mentioned your web  
5 security, firewalls and so on. Have you considered a  
6 closed network that only handles this particular  
7 aspect, only handles the national source tracking, you  
8 can still limit access from certain people but it  
9 would be more secure than firewalls and so on.

10 MS. HORN: I don't believe that that has  
11 been considered. I don't recall that being in any of  
12 our discussions. But basically we want the licensees  
13 to have access to it so it has to be over Internet and  
14 the -- if we were just dealing with I'll say the more  
15 sophisticated licensees, that might be easier to do  
16 but dealing with a general, more general type of  
17 licensee that don't have as many interactions with the  
18 NRC, I think that would be a lot more difficult.

19 Another aspect that the rule is going to  
20 require is that the manufacturers who create these  
21 sources need to assign a unique serial number to each  
22 source. The sources within the system will be  
23 tracking by the combination of the make, model and  
24 serial number. Now, we actually believe that most of  
25 the manufacturers already do this but since this is

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1 what the system is going to be based on, we want to  
2 make sure that manufacturers are, so we're actually  
3 including that in the rulemaking.

4 The schedule for the rulemaking, the  
5 proposed rule is due at the Commission early next  
6 month, so hopefully we will actually be seeing this  
7 published in the Federal Register for public comment  
8 some time this summer. We plan on having at least two  
9 public meetings during the public comment period. We  
10 may have more. We haven't made the final decision on  
11 the number yet. We hope to have the final rule in  
12 place by July of 2006. That allows for a short  
13 implementation period before the final -- the initial  
14 loading of the source tracking system in December.

15 And during that time the final rule is  
16 published and the time they have to report in  
17 December, we plan on having a series of stakeholder  
18 workshops during the fall and basically these  
19 workshops would provide a demonstration of the system  
20 and to give them information -- allow them to actually  
21 play with it, you know, to have a little demo they can  
22 do some hands-on work if they wanted to, give them  
23 information on how they can actually set up an account  
24 for the system. Right now we'll probably hold at  
25 least one meeting in each region for the stakeholders.

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1 We also plan to have one for the OAS at the OAS  
2 meeting for Agreement State personnel to teach them,  
3 and I suspect there will be several other meetings but  
4 we do plan on that to try to get out to two of the  
5 licensees who are actually going to be using the  
6 systems and teach them how.

7 And with that I thank you and if you have  
8 any questions.

9 VICE CHAIRMAN CROFF: Okay, questions?  
10 Jim?

11 MEMBER CLARKE: Yeah, a couple questions  
12 and I think they're related, but the people in the NRC  
13 that will be monitoring this, that will have access to  
14 all the information, what are you really looking for?  
15 I mean, what are -- what kinds of problems do you  
16 anticipate and what are the consequences? Are there  
17 penalties associated with this rulemaking?

18 MS. HORN: As with any regulation, there  
19 is -- if licensees violate it and we go out and  
20 inspect, there is a possibility of civil penalties.  
21 That would depend on the level of the violation, you  
22 know. If someone violates it once, obviously, we're  
23 not going to issue them a civil penalty. But if they  
24 are repeatedly not doing reporting, I suspect that we  
25 would escalate that and we maybe would go with that

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1 approach.

2           Initially, I don't think that we will be  
3 issuing violations. We'll be working with the  
4 licensees, helping them to become familiar with the  
5 system. We're actually going to be establishing a  
6 help desk as part of this system so that if licensees  
7 are having trouble getting their information, they can  
8 actually call and we'll -- it won't be actually  
9 contract set but we'll walk them through how you  
10 actually report and what you need to do, so we're  
11 trying to be as user friendly as we can for the  
12 licensees.

13           From the NRC staff standpoint, I don't  
14 think all those decisions have been made yet as far as  
15 implementation. The system will have lots of bells and  
16 whistles with it so that if you have transactions that  
17 aren't matched, you know, it will send a message to  
18 someone on the NRC staff to say, "Hey, here's an  
19 issue", and they can decide whether they think it's  
20 serious enough that they want to actually do an  
21 investigation or maybe they'll just call up a licensee  
22 and say, "Hey, this doesn't match, could you two  
23 parties please work it out and get the correct  
24 information into the system".

25           So it really depends. Now, obviously, if

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1 it was a very large transaction that involved large  
2 quantities of materials, obviously that would warrant  
3 a little more attention than if it was a single source  
4 that the mismatched transaction is on. So in part, I  
5 don't know yet. As we go through and get it in place,  
6 we'll start working out those type of implementation  
7 details.

8 MEMBER CLARKE: Thank you.

9 MEMBER WEINER: Aren't most of your  
10 Category 1 sources transported in Type B containers?

11 MS. HORN: I think so, but I'm not 100  
12 percent sure.

13 MEMBER WEINER: Because I've been wracking  
14 my brain trying to figure out how you could make an  
15 RDD out of cobalt-60 in a safe keg.

16 MS. HORN: That's not my area but those  
17 are the levels that everyone has expressed concern at.

18 MEMBER WEINER: Okay. Yeah, that's it.  
19 I already asked about web security.

20 VICE CHAIRMAN CROFF: You done?

21 MEMBER WEINER: Yeah, I'm done.

22 VICE CHAIRMAN CROFF: Okay, Mike.

23 CHAIRMAN RYAN: Maybe I can try and get  
24 Terry Devine to join us. Terry, tell us about from  
25 the perspective of the CRCPD and Agreement States

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1 about the role-out and what issues you see and how  
2 this is going from your perspective.

3 MR. DEVINE: I've heard very little from  
4 the radiation control people in the states. About  
5 this. I know they're interested. They're following  
6 the issues. I suspect that some of these  
7 considerations are spreading over into other issues.  
8 That has come to my attention in the matter of surety  
9 and bonding, they have a table of values of nuclides  
10 that seem to me to be somehow related to the table  
11 you're talking about. Of greatest concern, I know  
12 that over the years I've heard a great deal more  
13 concern about the hazard of material disbursed through  
14 buildings and grounds and being ingested and all.

15 I'm thinking particularly about the  
16 concerns for radium and plutonium, which on occasion  
17 have -- the source casks have ruptured and great  
18 concern to check the people out and decontaminate at  
19 great expense down to very low levels. And what I've  
20 heard on the other hand about your tables of nuclides  
21 of the greatest concern seems to be instead for acute  
22 lethal external radiation hazard. That's about all  
23 that I've heard of discussed and mentioned. I'm sure  
24 there will be a lot more, probably at the conference  
25 this week in Kansas City.

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1 MS. HORN: Actually, I'm scheduled to make  
2 a presentation at the CRCPD meeting.

3 MR. DEVINE: Good. I'm sorry I'm going to  
4 miss that.

5 CHAIRMAN RYAN: Well, I think, you know,  
6 as other programs, you know, I think of Part 35 and  
7 it's roll-out to states that their involvement will be  
8 important and of course, I know NRC was well aware of  
9 that relationship. How many of the sources are --  
10 what's the split between an Agreement State license  
11 fraction and an NRC direct license fraction for these  
12 sources?

13 MS. HORN: I have those numbers but I  
14 don't know them off the top of my head. I can say  
15 that about a third -- about a fourth of the licensees  
16 are NRC licensees and --

17 CHAIRMAN RYAN: So roughly three-quarters  
18 of the action is in the agreement states. So that's  
19 an important aspect.

20 MS. HORN: It doesn't mean that the number  
21 of sources are the same split.

22 CHAIRMAN RYAN: No, no, no, I understand  
23 but just the licensees, that's helpful because, you  
24 know, I'm sure they're across the Unites States and,  
25 you know, there's a lot to do.

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1 Another question that came to mind, we  
2 heard from Paul Lohaus and the Agreement States  
3 program and the IMPEP program. Will this be picked up  
4 as part of that ongoing Agreement State program  
5 review?

6 MS. HORN: That's an unknown, because this  
7 rulemaking, as I mentioned, is being done under common  
8 defense and security provisions, which means that it's  
9 reserved to the NRC.

10 CHAIRMAN RYAN: I see.

11 MS. HORN: There -- we don't know yet  
12 exactly how the states will, from an enforcement, some  
13 of them may choose to enter the 274(I) agreements and  
14 do the inspection and enforcement aspects for us.  
15 Some states may not which means that we would have to  
16 inspect them. We're also looking at maybe some other  
17 options, something outside the box that we could use  
18 to do that, and that's across all the security  
19 initiatives because much of this is being done under  
20 common defense and security versus public health and  
21 safety.

22 CHAIRMAN RYAN: Right.

23 MS. HORN: It is a big issue and we're  
24 aware of it.

25 CHAIRMAN RYAN: Yeah, I mean, that seems

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1 to me to be the potential area where good thinking,  
2 good work would help because if three-quarters of the  
3 action is under the Agreement States' control, and  
4 yet, you know, that role isn't flowing smoothly to the  
5 Agreement States program, that, as you've pointed out,  
6 that could be an area to make some good headway.

7 MS. HORN: We did have members on both the  
8 working group steering committee and the interagency  
9 committee from the Agreement States, so they have had  
10 involvement and they are aware at least in a limited  
11 extent. They obviously received the rule for comment.  
12 Actually, we didn't get a lot. I was rather  
13 surprised. We briefed OAS at the OAS annual meeting  
14 last year and I suspect that the one that they had the  
15 is fall we will be doing another briefing on this  
16 topic. So we are trying to get them involved.

17 CHAIRMAN RYAN: Okay. Thanks.

18 MEMBER HINZE: Briefly, I assume that the  
19 code audit does the matching, the correlation, the  
20 tracking automatically; is that correct?

21 MS. HORN: I'm not quite sure I understood  
22 your --

23 MEMBER HINZE: Well, in other words, do  
24 you find errors by manually viewing the --

25 MS. HORN: Oh, no, it would be a computer.

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1 MEMBER HINZE: Computer?

2 MS. HORN: Yes.

3 MEMBER HINZE: And how is the verification  
4 of that code coming along?

5 MS. HORN: Actually, we don't -- we  
6 haven't started that. The procurement for that system  
7 has not hit the streets yet. We're hoping that this  
8 summer that the request for procurement will be issued  
9 and we'll have a contractor on board in the fall that  
10 they'll start the development of work.

11 MEMBER HINZE: I see, okay. But plans are  
12 underway to have a strict --

13 MS. HORN: Yes, plans are underway. IT  
14 procurement is slow, we've discovered.

15 MEMBER HINZE: Second question; this  
16 preceded my tenure on the committee but I understand  
17 that this committee suggested something about GPS  
18 tracking of the sources. Is anything being done about  
19 that? What's the status of that?

20 MS. HORN: I can't tell you the status of  
21 that. For the source tracking system we're not  
22 considering that because we're actually tracking the  
23 sources. And to be honest, without redesigning some  
24 of the sources, you wouldn't be able to accommodate  
25 that because if you add a tracking bar, it's not going

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1 to fit into the device that it's designed to go into.

2 MEMBER HINZE: Sure.

3 MS. HORN: You certainly could put a GPS,  
4 I suppose, on the shipping containers that they're  
5 used. But then you're actually tracking the shipping  
6 container and not the source. Someone could  
7 technically take the source out and then you're  
8 tracking an empty container. But the security aspects  
9 from transportation and the other things are  
10 considered in a different part. This is literally  
11 just the tracking.

12 MEMBER HINZE: Thank you very much.

13 CHAIRMAN RYAN: And, Bill, just as a  
14 matter, that letter that we did write, I think it's  
15 clear that the regulation addresses the other comments  
16 we made and the tracking system is really in the  
17 discussion that went on at that meeting, we talked  
18 about the very largest of the sources and really kind  
19 of thought about it as a transportation type issue.  
20 You know, once it's under the control of the licensee,  
21 there is an obligation there but it really was a  
22 transportation related question for the very largest  
23 of the material sources.

24 MS. HORN: And we are working on some  
25 transportation security related orders. Like I said,

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1 they're supposed to go up to the Commission some time  
2 this -- actually, I think maybe in the next couple of  
3 weeks.

4 CHAIRMAN RYAN: That's a separate step  
5 from what we're talking about today.

6 MS. HORN: Yes, yes.

7 MEMBER HINZE: Thank you.

8 VICE CHAIRMAN CROFF: How does the  
9 Department of Energy fit into all this tracking? Are  
10 they trying to do something similar by the -- for  
11 their sources and how do they fit in as a manufacturer  
12 of sources?

13 MS. HORN: They would fit in just like any  
14 other manufacturer. I'll step back. DOE has  
15 participated on both the working group, the steering  
16 committee and the inter-agency committee meeting, so  
17 they are supportive of the system. It addresses  
18 requirements that they have identified. There's a few  
19 things in there that they specifically wanted. Their  
20 actual participation and reporting to the system is  
21 still an unknown. They are going to participate at  
22 some frequency. It may not be the same frequency that  
23 we're requiring our licensees.

24 That's an answer -- that's a policy  
25 decision that they still have to make but they have

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1       been involved in the system and hopefully they're  
2       going to be reporting on the same frequency. The  
3       commitment that we currently have is that a couple of  
4       times a year they would provide basically their source  
5       registry, the sources that they have at their sites,  
6       but they may not be willing to make the transaction  
7       reporting. That's still an open issue.

8                   VICE CHAIRMAN CROFF: Okay, and in their  
9       manufacturing activities, they will put the serial  
10      numbers and whatever on these to conform to --

11                   MS. HORN: Ideally, yes, but that's  
12      something that they would have -- we can't control  
13      them because they're not a licensee. Hopefully,  
14      they're going to make the same requirements on their  
15      facilities as we're making on our licensees, but as I  
16      said, that's a policy decision that they're not --  
17      they haven't actually made yet. But I think that they  
18      will. I think they'll be going along with this.

19                   VICE CHAIRMAN CROFF: Okay, is there any  
20      mechanism you can foresee to get the radium sources  
21      into the system? I mean, I recognize the legal issues  
22      but --

23                   MS. HORN: Yeah. We've actually suggested  
24      legislation that would give NRC authority over  
25      discrete sources of radium. I haven't heard recently

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1 what the status of that is. I don't know if that will  
2 go forward or not. If it doesn't legally, we can't do  
3 anything because we wouldn't have the authority. If  
4 it were to go forward, it would be a simple matter for  
5 us to add another isotope to the system. We would  
6 just have to do -- actually, it would be a very simple  
7 rulemaking for just the source tracking system.

8 States could adopt their own regulations  
9 or they could issue orders to their licensees that  
10 would require them to report to the system because  
11 basically what we will allow is voluntarily reporting.  
12 We do recognize that means the data won't be very  
13 reliable but we figure a little bit of information in  
14 this case was better than nothing at all. So it's  
15 really -- at this point, it's up to Congress and the  
16 states and what they want to do.

17 VICE CHAIRMAN CROFF: Okay, now back to  
18 the list of radionuclides that have the source and I  
19 guess a couple reports that you mentioned, can you  
20 give a general summary of the qualities or criteria  
21 that makes a radionuclide high risk as opposed to not  
22 high risk if you will? I sort of -- I look at the  
23 list and I see some -- you know, some obvious suspects  
24 and I see some fairly obscure radionuclides and I'm  
25 sort of perplexed how they can end up all on the same

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1 list.

2 MS. HORN: Well, I wasn't involved in that  
3 so I can't give you a whole lot of information. The  
4 IAEA document uses the categorization of sources from  
5 Tec Doc 1344 which provides some background for it and  
6 they basically had some dose criteria that they used  
7 and they looked at the isotopes that are out there in  
8 common use, applied the criteria to them and this was  
9 the list that they came up with.

10 VICE CHAIRMAN CROFF: So the list doesn't  
11 necessarily imply that material exists in those  
12 categories in any significant quantities or at all.

13 MS. HORN: That would be correct, at least  
14 from the domestic. Internationally they may but from  
15 a domestic standpoint, they may not.

16 VICE CHAIRMAN CROFF: Okay. Ruth, did you  
17 have a follow-up?

18 MEMBER WEINER: I did have one follow-up  
19 to Bill Hinze's question. For the Category 1 sources,  
20 for shipping, since this does become a transportation  
21 issue, have you considered hooking into the TRANSCOM  
22 system that now tracks the shipments of the waste  
23 isolation pilot plan?

24 MS. HORN: No, we haven't. The concern --  
25 the NRC hasn't decided exactly where we're going to go

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1 yet with the requirements for transportation. It also  
2 involved the Department of Transportation, obviously,  
3 which actually regulates domestic transportation.  
4 Once those decisions are made, we would probably  
5 implement whatever is decided in a future rule-making.  
6 This system down the road could accommodate that type  
7 of information. It would just require another release  
8 of the software. So, yes, ultimately some of those  
9 things may be considered but until those final  
10 decisions are made. We also have a little bit of  
11 concern that when you start getting some of the route  
12 information, the information becomes safeguards which  
13 we wouldn't be able to put it in this system or you  
14 would have to isolate it from other parts.

15 MEMBER WEINER: Thank you. Thanks.

16 VICE CHAIRMAN CROFF: We have one over  
17 here.

18 MR. SCOTT: Thanks, Mike Scott, ACNW  
19 staff. I'd like to follow up on Ruth's question a  
20 little bit. The very existence of this type of a  
21 system clearly poses a risk/benefit trade-off, the  
22 risk being that the bad guys get ahold of the list and  
23 then they have sort of a road map to find the sources.  
24 I understand from your presentation that Congress has  
25 directed the development of the data base and I

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1 presume --

2 MS. HORN: No, we've committed to  
3 Congress. They have not directed us to.

4 MR. SCOTT: Okay. All right, thank you.  
5 And so you don't have guidance from above on how the  
6 -- what the electronic format or -- in other words,  
7 the vehicle, like the web based or whatever, where  
8 that would come from, correct?

9 MS. HORN: No.

10 MR. SCOTT: Have you done a detailed let's  
11 say risk analysis posed by the choice of a web-based  
12 system? I understand the reasons why you chose it but  
13 of course, every day in the press you read about how  
14 this or that web system has been hacked and the  
15 information has been obtained. I'd just be curious as  
16 to your perspective on how important risk or let's say  
17 security considerations have been in the selection of  
18 the electronic format that you've used.

19 MS. HORN: I won't say -- we're certainly  
20 very aware of the security aspects and the need to  
21 take and secure the information. But from a pure  
22 workability standpoint, this is the easiest way to  
23 have the system. Otherwise the burden on both the  
24 licensees and the NRC staff is going to be humongous.  
25 We have a NMSMS, which is a Nuclear Material

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1 Safeguards Management System for basically special  
2 nuclear material, and licensees provide that and they  
3 download, they transcript all the -- it's a very labor  
4 intensive system and it costs a lot more, obviously.  
5 So what we -- while we haven't done an actual risk  
6 analysis, we have certainly weighed those values, I  
7 guess qualitatively and we think we can come up with  
8 a system that provides adequate security and still is  
9 workable.

10 VICE CHAIRMAN CROFF: Thank you. Latif?

11 MR. HAMDAN: Merri, my question pertains  
12 to the lost and stolen sources and the question is, do  
13 you have sufficient provisions or what kind of  
14 provisions do you have in the rule pertaining to the  
15 lost and stolen sources? Do you go and investigate,  
16 find them and reveal them or you don't go that far and  
17 if not, why not?

18 MS. HORN: No, we don't. The source  
19 tracking system certainly does not. This is just --  
20 the rule just establishes provisions for them to  
21 report, licensees to report transactions for the  
22 sources. You're getting more into the Off-site Source  
23 Recovery Program that we have with DOE which is  
24 totally separate type of program. If a licensee has  
25 a source that they would like to get rid of,

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1 obviously, and it met our criteria, the fact that they  
2 have that source would be in the system. We do  
3 envision down the road that there would be maybe a way  
4 for the licensees to designate a particular source  
5 that they would like to get rid of and they can't find  
6 a home and so maybe through CRCPD there could be some  
7 matching or to the offsite source recovery program you  
8 put that on the list and eventually DOE would  
9 hopefully come and pick that up.

10 MR. HAMDAN: The concern I have is it has  
11 to be one of the main purposes of the tracking system  
12 is to make sure that sources don't get into the wrong  
13 hands, they're not stolen or lost and fall into the  
14 wrong hands, and is there another mechanism another  
15 process that would follow up and take it from there or  
16 because if there is not, then it seems to me that the  
17 rule should include provisions for that.

18 MS. HORN: I don't know exactly how you  
19 provide a provision for that. NRC certainly can't the  
20 possession of courses. We have worked with licensees,  
21 as I said, through CRCPD and through the offsite  
22 source recovery for those sources to be picked up  
23 either by another licensee or by DOE. But the  
24 tracking system is primarily so we know who has what,  
25 so that we know what material is out there. That's

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1 really the primary purpose of that, so that we  
2 actually know that when you know, there's a security  
3 level alert, that we know in a particular region, you  
4 know, which licensees to go out and send security  
5 advisories to. That we just have a better feel for  
6 where this material is at because currently we don't  
7 have that type of information.

8 CHAIRMAN RYAN: It's an interesting  
9 question, Latif, and let's recall, too, that -- and  
10 correct me if I'm wrong Merri, but you're talking  
11 today about sources that licensees have and want and  
12 use.

13 MS. HORN: Yeah.

14 CHAIRMAN RYAN: That's a little different  
15 question than sources that, let's take for example, a  
16 downhole logging source that gets lots, and I mean,  
17 lost down a bore hole, it's 3,000 feet down, it's not  
18 coming back up. So that's -- and there are reporting  
19 mechanisms if a licensee has a source and loses it  
20 beyond recovery, you know, and that has to be looked  
21 at from an Agreement State perspective and NRC and  
22 there's a process to do that.

23 MS. HORN: And that information would  
24 actually be in the system because we would take those  
25 reports. The system will actually record the end

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1 point of a source. That end point could be that it's  
2 been exported to another country, that it's been lost.  
3 Obviously, that's a reversible end point, that's  
4 decayed below the threshold values, that it's been  
5 abandoned in a well logging hole or what have you.  
6 Those types of end points would be captured by the  
7 system but there would be nothing to recover. There  
8 would be no intent to recover that source.

9 CHAIRMAN RYAN: Yeah, there's a return to  
10 vendor provision. I think some sources get  
11 remanufactured and things like that, but --

12 MS. HORN: Yes, that's correct.

13 CHAIRMAN RYAN: -- so I guess from you  
14 know the states tend to deal with a lot of those loops  
15 and then the separate question and again, I'm  
16 interpreting you know, what you're saying, but the  
17 separate question is an orphan source is a different  
18 matter all together. That's a source that for  
19 whatever reason disappeared for awhile and now it's  
20 back on the radar screen. But I think if I recall,  
21 Terry Devine and was it Joe Clinger from Illinois,  
22 gave us a pretty thorough report on that program for  
23 orphan source recovery and management as well as DOE's  
24 presentation a few months ago. So I don't think it's  
25 -- I think it's being looked at but I don't know that

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1 it's necessarily appropriate or part of this aspect of  
2 this rule. That's my own view.

3 MS. HORN: Now on some of the -- typically  
4 an orphan source is a source viewed that you found  
5 somewhere and it really doesn't have a home, so it  
6 probably wouldn't even be in the system. Now, if it  
7 was a source possessed by a licensee that they're  
8 wanting to get rid of, then yes, that source would  
9 probably be recorded in the system. And when DOE or  
10 whoever picked it up, then you would record the  
11 transfer just like you would if it was going to a  
12 licensee.

13 MR. HAMDAN: If I may, it wouldn't hurt  
14 for you to consider since you're making this rule, to  
15 really put some meat onto the stolen source or the  
16 sources that you -- that may be of concern, that may  
17 be Category 1 and then that was maybe stored or  
18 something. So maybe the rule is maybe an opportunity  
19 to I think put something there, you know, that would  
20 help some at least.

21 MS. HORN: I don't quite know what  
22 provision you could put in a reporting system.

23 MR. HAMDAN: Investigation, for example,  
24 for safety and types of storing sources.

25 MS. HORN: That's more getting into the

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1 possession of a source versus recording the  
2 transaction, so that would actually be more a licensee  
3 who has sources that -- you're questioning the storage  
4 of them, that would be part of the routine inspection  
5 program.

6 CHAIRMAN RYAN: Latif, again, I emphasize  
7 that I'm putting on my old licensee hat, there is a  
8 very clear obligation to have a source, if it's lost  
9 or stolen you must report it already.

10 MS. HORN: Yes.

11 CHAIRMAN RYAN: That requirement is on the  
12 books.

13 MR. HAMDAN: The only concern I have is  
14 this tracking system is to see to it that sources  
15 don't get into the wrong hands. Is that not true?

16 MS. HORN: No, no.

17 CHAIRMAN RYAN: Well, wait a minute. A  
18 licensee has an obligation to have a source. And  
19 again, I can -- I'm visualizing the log book of  
20 sources I used to keep up to date. And I just kept a  
21 log book and it was routinely inspected against our  
22 inventory. Now, that's being formalized and  
23 centralized, but my obligation as the owner of that  
24 source is if it's missing, the minute I find it  
25 missing, I report it.

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1 MS. HORN: You're supposed to report it.

2 CHAIRMAN RYAN: That obligation has been  
3 in place forever.

4 MS. HORN: 2201.

5 CHAIRMAN RYAN: Yeah. So that part of the  
6 obligation is clear. I think what's being formalized  
7 here is the tracking and recording aspect. So you're  
8 right, but what I'm trying to get across is that that  
9 strict obligation to identify it's stolen immediately  
10 or recognizing a loss or whatever the case might be  
11 exists already. Is that helpful?

12 MR. HAMDAN: Thank you very much.

13 MS. HORN: Yeah, 2201 requires licensees  
14 upon the discovery -- immediately upon discovery to  
15 report lost material that meet the criteria and all  
16 the Category 1 and Category 2 sources would meet the  
17 criteria.

18 MR. HAMDAN: Thank you.

19 CHAIRMAN RYAN: I guess I think the key  
20 here is and maybe it's in the draft language of the  
21 rules, that linkage ought to be pretty clearly  
22 established that, you know, it does link with that.  
23 I mean, in reference to --

24 MS. HORN: I think there is discussion in  
25 the Statement of Considerations about lost and stolen

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1 sources.

2 CHAIRMAN RYAN: Okay.

3 VICE CHAIRMAN CROFF: Okay, John?

4 MR. FLACK: Yeah, just back on the risk  
5 question, is the enforcement side of the rule going to  
6 be risk-informed or is it going to be more compliance?

7 MS. HORN: It enforcement policy is  
8 something we typically address at the final rule stage  
9 versus the proposed rule stage, so I don't know.  
10 Right now, I don't actually envision any changes in  
11 the enforcement policy. We've taken a quick look at  
12 it and at most, we might provide an extra example or  
13 two but I suspect that it would be probably risk-  
14 informed.

15 MR. FLACK: It will be risk-informed.

16 MS. HORN: I would suspect so.

17 MR. FLACK: Okay, but in elaborating a  
18 little bit on that, how do you go about risk informing  
19 it?

20 MS. HORN: Well, I think you can take a  
21 look at the -- say maybe pay more attention to the  
22 Category 1 sources versus the Category 2, you know,  
23 the quantity that they're not reporting properly.  
24 Also maybe the frequency which gets maybe into a  
25 little bit of compliance but if someone is routinely

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1 not reporting their transactions, obviously, we would  
2 take a harder look at that than someone who misses one  
3 every now and again.

4 MR. FLACK: With some frequency.

5 MS. HORN: Yeah.

6 MR. FLACK: Okay.

7 MS. HORN: Obviously, Category 1  
8 transactions are a little bit more important than the  
9 Category 2.

10 CHAIRMAN RYAN: And Merri, that gets me  
11 back to this 274(i) aspect that if it was in the IMPEP  
12 program, you got kind of that built in already, that  
13 sort of graded approach to ramp it up as those  
14 performance indicators go negative.

15 MS. HORN: Right.

16 DR. LARKINS: Yeah, there may -- John  
17 Larkins, there may be some difference, though because  
18 Agreement States differ in their approach to  
19 enforcement as opposed to the NRC.

20 MS. HORN: And my understanding -- I could  
21 be wrong but my understanding is that the Agreement  
22 States can't actually take enforcement. They can go  
23 out and inspect and I think they can -- and they a  
24 have to report. We actually have to take the  
25 enforcement for anything that's under 274(i)

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1 agreement.

2 VICE CHAIRMAN CROFF: Rich?

3 MR. MAJOR: Merri, do you know how the  
4 rest of the world is doing on source tracking? Is NRC  
5 leading the pack or --

6 MS. HORN: I would say that we're probably  
7 leading the pack. I know there are states that are  
8 beginning to take a look at that, countries. Some of  
9 them actually are requiring when they issue a license  
10 or whatever, their equivalent is that they actually  
11 state the sources that a licensee is authorized to  
12 possess so they actually have source information in  
13 the license which we don't do. I know that Canada is  
14 starting to take -- is looking at this and they are  
15 also looking at the import/export. They're looking if  
16 I remember correctly early next year to start. So I  
17 think that we are probably on the forefront, but other  
18 countries are looking at this also. We've met with  
19 regulators from Brazil, Ukraine, Canada, Mexico,  
20 several other countries.

21 VICE CHAIRMAN CROFF: Thanks, any more  
22 questions?

23 MS. STEELE: Yes. Sharon Steele. Have  
24 licensees from academia or medicine or other  
25 industries been involved in the working groups and if

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1 so --

2 MS. HORN: No.

3 MS. STEELE: Okay, and the meetings that  
4 you have for the summer and the fall, where would they  
5 be?

6 MS. HORN: Location still to be  
7 determined. At least one of the meetings will be here  
8 at headquarters. The other one, if we just have one  
9 other one, it will be somewhere in the Midwest to West  
10 because that's where most of the radiographer type  
11 licensees are and that's kind of where the patch is.  
12 If we end up having more, we may have one in each  
13 region, but resource issue, we haven't decided that  
14 yet.

15 MS. STEELE: So then that would be the  
16 first time that they would know about the --

17 MS. HORN: I won't say that it would be  
18 the first time because we have gone out with the  
19 interim inventory surveys which went out last year and  
20 we're doing those updates and those letters, the NMSS  
21 newsletter we've mentioned that National Source  
22 Tracking is coming. While they haven't been directly  
23 involved, they have been informed. Some of the  
24 security meetings that they've been having with  
25 licensees, I believe that they've mentioned it in some

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1 of those meetings also.

2 VICE CHAIRMAN CROFF: Any other questions?  
3 Okay, seeing none, we'll take up the issue of whether  
4 this is right for a letter or not later this afternoon  
5 in the session for that purpose. So thank you very  
6 much for a very interesting presentation. We're going  
7 to take a short break here, despite it not being shown  
8 on the agenda till ten o'clock.

9 (Whereupon, the proceedings went off the  
10 record at 9:37 a.m. and resumed at 9:55 a.m.)

11 VICE CHAIRMAN CROFF: Okay. Let's come to  
12 order here and we'll move on to the next presentation  
13 on pre-closure and repository design update. We're  
14 going to hear from Bruce Hinkley from the Shaw/Stone  
15 & Webster organization.

16 And before turning the floor over, I  
17 understand that additional copies of the presentation  
18 are being made. I think we ran out here. And those  
19 should be available shortly.

20 With that, Bruce?

21 MR. HINKLEY: Good morning.

22 Thank you for the opportunity to give you  
23 an update. My understanding is that the Committee has  
24 not had a design update for a little over two years,  
25 so I'd like to think we've made some progress. And,

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1 hopefully, after two years we certainly have.

2 Before I get started, just quickly, my  
3 background. Again, Shaw/Stone & Webster. And I work  
4 in the Management Technical Support Group as a direct  
5 support to the Department of Energy and the  
6 engineering and project management areas. My  
7 background is all commercial nuclear power plants.

8 What I'd like to talk about this morning  
9 is the overall design status. Talk a little bit about  
10 the surface facility changes, subsurface facility  
11 layouts, the recent specific areas of focus from  
12 recent NRC interactions. Talk a little about the  
13 integrated waste stream management, thermal design  
14 requirements, the emplacement drift ground support and  
15 then wrap up with \*R path forward.

16 Now moving to the surface facilities, what  
17 I mean by recent design changes is they're recent  
18 since two years ago when you were last updated. There  
19 have been changes in the North Portal or the  
20 emplacement portal layout. And the layout and  
21 orientation of facilities changed to optimize  
22 operational aspects and to support the phased  
23 construction, which I'll talk about a little later.  
24 Integration of the Transportation Cask Receipt  
25 Facility with the Warehouse Non-Nuclear Receipt

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1 Facility. Addition of the Fuel Handling Facility and  
2 addition of the Central Control Center. And the  
3 addition of the second closure cell to the Canister  
4 Handling Facility. And a change in the aging system  
5 capacity from 40,000 to 21,000 metric tons of heavy  
6 metal.

7 Now, it's easier to see up on the screen  
8 and, hopefully, your eyesight is a little better than  
9 me if you're looking at your handout.

10 This area right here is the Fuel Handling  
11 Facility. This is the Central Command Center, Central  
12 Control Center Facility. And this here is the Waste  
13 Receipt and Cask Facility. We'll talk about the other  
14 facilities, but quickly this is the North Portal or  
15 the emplacement portal, and then the Canister Handling  
16 Facility and then the Dry Transfer Facility.

17 Now, the Transportation Cash and Receipt  
18 Facility, we can walk through the cask operations.  
19 And if you can follow the numbers through, we receive  
20 the transportation cask, and we do a receipt  
21 inspection and survey. And then the cask is  
22 transferred to the Site Rail Transfer system. And the  
23 transfer of the site rail transfer system from the  
24 Receipt building to one of the processing facilities.

25 Now, on the non-nuclear side of the

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1 facility we have site specific or aging cask  
2 operations. And if you look at number four you'll see  
3 where the aging cask receipt and inspection takes  
4 place. And then we transfer the aging cask and skid to  
5 the staging pad. And then, again, transfer the aging  
6 cask to the site rail transfer casks. And then we'd  
7 be transferring the aging cask to one of the separate  
8 process buildings.

9 And when they talk about waste package  
10 operations, again, in the non-nuclear receipt facility  
11 this is a storage area and a receipt facility for  
12 waste packages, the waste package lids. They'll  
13 install the trunnion collar. It is basically, for  
14 lack of a better term, a spare parts and parts that  
15 come on and off the cask and containers are stored in  
16 this area.

17 Now the Fuel Handling Facility I'll  
18 discuss next. But what I'd like to do is just briefly,  
19 the design process for a licensed nuclear facility  
20 takes into account numerous items with numerous  
21 independent reviews and analyses. For example, there  
22 are environmental issues; everything from tornado  
23 winds to maximum rainfall to flooding, to the seismic  
24 events. We take into account volcanic ash deposition  
25 on the ventilation systems.

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1           Besides that we have fire hazards,  
2 personnel protection concerns. On heavy lifts we have  
3 draw pipe. We have secure load paths and, for  
4 example, not only what you can or cannot carry a heavy  
5 load over, but you clear that load path from any sharp  
6 objects that could, say, endanger the package on the  
7 case of a drop or bump.

8           And then the subsurface then we have the  
9 issue or during the mining operations of rockfall  
10 concerns.

11           Now, the mission of the Fuel Handling  
12 Facility is to receive and package commercial and DOE  
13 spent nuclear fuel and Department of Energy high-level  
14 waste for emplacement. It's a multi-level steel  
15 reenforced concrete structure. And for a size idea,  
16 it's a little over 30,000 square feet with the  
17 vestibule area, which is shown in just framework.

18           Now what I'd like to do is walk through a  
19 basic operation or disguise -- not disguise. Describe  
20 some of the major activities that happen in the Fuel  
21 Handling Facility.

22           Right here is the vestibule. And this is  
23 where the transporter and the cask is brought in. Now,  
24 an interesting thing is it is backed up. The  
25 transporter backs the shipment in. And then you close

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1 this access door. Well, let me -- this door is closed  
2 when you bring the package in. Once the transporter  
3 backs in, then they will go ahead and back the truck  
4 or the rail locomotive back out, and we will close  
5 this door. That is for environmental protection from  
6 basically the outside weather. And this is in the  
7 vestibule area here.

8           The major equipment in the vestibule area  
9 is a 200 ton Gantry crane. So we'll take the package,  
10 the cask coming in here. And then we'll take it into  
11 this area, again, another set of doors. And what we  
12 do is we have staged ventilation areas. And right  
13 over here is the highest contamination areas where we  
14 do the fuel operations. So that would be the lowest  
15 pressure. And then as you move out through the other  
16 areas of the building, that way we always have the  
17 contamination restricted by the airflow of the lowest  
18 pressure where the highest contamination is.

19           When we bring the containers into here,  
20 this is the preparation area. Here we'll do the gas  
21 sample on the cask. In it, we'll remove the inner lid  
22 bolts and we'll put the lifting fixtures and start.

23           Now they come in horizontally. We bring  
24 it in here. And this is where we'll go ahead and stand  
25 it up in the package, put it on a different pedestal

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1 and trolley and start moving it into the three  
2 transfer bays.

3 Now for purposes of this discussion, we'll  
4 say Transfer Bay 1 will have a waste package. Transfer  
5 Bay 2 is the aging cask. And Transfer Bay 3 -- I'm  
6 sorry. Transfer Bay 2 is the shipment. And Transfer  
7 Bay 3 is the aging cask.

8 Now once we bring the waste package in,  
9 there is a docking ring and the elevation above these  
10 transfer bays, transfers cells, is all controlled by  
11 remote manipulators where we will go ahead and move  
12 the spent fuel between the packages for thermal  
13 management concerns as well as optimization of the  
14 waste package. When we have taken the waste package  
15 and it is moved over to this area, which is the  
16 closure weld cell where it's all remotely sealed and  
17 welded, then the closed waste package comes back out,  
18 goes through the turntable, moved into the right  
19 direction. Take it out, lay it down, bring it back  
20 up. The transporter will pick it back up and take it  
21 to the emplacement portal.

22 If it goes to the aging cask where we have  
23 moved some of the fuel from the waste package and put  
24 it into an aging cask, when the aging cask is ready to  
25 be moved it, again, comes out to the turntable and

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1 brings it out here. Lays it down or we can leave it  
2 vertical, bring it out and take it out to the aging  
3 pad.

4 Now the Fuel Handling Facility was modeled  
5 after the Test Area North Facility at Idaho. Again,  
6 it's designed to handle the uncanistered spent nuclear  
7 fuel in the fuel transfer cells. It's capable of  
8 handling canistered waste forms, and that's in -- we  
9 just take it and handle it in the large main transfer  
10 bay before it goes into the fuel transfer cells. And,  
11 again, we mentioned there was the one closure cell for  
12 waste package welding.

13 Now, the Canister Handling Facility, it  
14 provides limited throughput for handling only sealed  
15 defense high level of waste, defense spent nuclear  
16 fuel, I mean DOE spent nuclear fuel and high level  
17 waste, Naval canister and vertical, dual purpose  
18 canisters. It is about 120,000 square feet. And,  
19 again, multi-level concrete and steel. And I believe  
20 the canister handling facility and those operations  
21 were discussed last time you were briefed.

22 This sketch shows the material flow path  
23 through the building. The one thing I would like to  
24 talk about here is you have three transfer pits. And  
25 some of the issues and the safety requirements on the

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1 pits are, of course, the drop height and between the  
2 pits right now the current design has a crush pad so  
3 that if there was a slap-down or a tip, that would  
4 help in that analysis.

5 Now, one of the interesting things on --  
6 and the typical canister arrangement just is that we  
7 would put one DOE high level waste canister in the  
8 center of a waste package and then surround it with  
9 spent nuclear fuel. And that's really to optimize the  
10 loading of the waste package.

11 MEMBER HINZE: Where is that being done?  
12 Where is that physically being done?

13 MR. HINKLEY: I'm sorry. Right here are  
14 the pits and the waste package operations are, if you  
15 can look on your drawing, we bring the waste package  
16 in through here. And then depending what the  
17 canisters, we transfer the waste package onto a  
18 trolley. And here it gets surveyed and assessed. And  
19 then we transfer to the waste package pallet right in  
20 here. And so the waste package operations are done  
21 right here in these two cells.

22 And then once we consolidate the waste  
23 package, we go ahead and do the laydown, put it on the  
24 transporter and send it to emplacement.

25 So right here is where we can have the

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1 canisters and move it to the necessary waste package,  
2 and then bring it in here to do the sealing, and then  
3 bring it out.

4 MEMBER CLARKE: Excuse me, Bruce?

5 MR. HINKLEY: Yes.

6 MEMBER CLARKE: When you say "waste  
7 package," are you using that as a generic term, are  
8 you talking about a canister or the three that are --

9 MR. HINKLEY: Well, the waste package is  
10 the transportation cask. When I say a "waste  
11 package," it's whatever we put in. In the Canister  
12 Handling Facility it would be canisterized waste, if  
13 you would, the high level waste and the spent nuclear  
14 fuel. And then once it's put into the, let's call it  
15 the emplacement container or the emplacement assembly,  
16 then that would be considered a waste package. So,  
17 yes, it's a generic term.

18 MEMBER WEINER: Is the fuel, the  
19 commercial spent fuel also going to be in packages  
20 surrounded by glass logs?

21 MR. HINKLEY: No. The commercial spent  
22 nuclear fuel, it can come in as bare spent nuclear  
23 fuel in its own transportation cask. And so it would  
24 be picked up. It will not be encased in glass  
25 packages.

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1                   MEMBER WEINER: Okay. Will it just be put  
2 into the waste package?

3                   MR. HINKLEY: Yes. Yes. And that would be  
4 in the Fuel Handling Facility where we have the three  
5 cells, and then we would use thermal management  
6 techniques and analysis to make sure the thermal  
7 concerns in those packages.

8                   MEMBER WEINER: Thank you.

9                   CHAIRMAN RYAN: Just another quick follow-  
10 up, and I'm just trying to think of this from the  
11 health physics and housekeeping perspective. In this  
12 building, if I understood your process right, you're  
13 really viewing this to be in essence a relatively  
14 clean operation from a contamination control  
15 standpoint because you're dealing with the sealed  
16 packages?

17                   MR. HINKLEY: This is the sealed  
18 containers, yes.

19                   CHAIRMAN RYAN: So it's external radiation  
20 concerns and heat and so forth, as you've mentioned?

21                   MR. HINKLEY: Right. More so than the Fuel  
22 Handling Facility where we actually --

23                   CHAIRMAN RYAN: Where things are open and  
24 so forth?

25                   MR. HINKLEY: Yes.

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1 CHAIRMAN RYAN: Okay. And, of course,  
2 that excludes your accident analysis and dealing with  
3 questions of rupture and so forth in this facility as  
4 well.

5 If I could ask maybe just quickly go back  
6 to the other slide. It struck me that your first  
7 survey that you do, you do that inside?

8 MR. HINKLEY: Actually, here is where the  
9 container comes into the site and they'll do a quick  
10 surface survey here. Just to accept the package to  
11 bring it onto the site.

12 CHAIRMAN RYAN: Right.

13 MR. HINKLEY: However, when we bring it  
14 into the Waste Transport and Receipt Building, that's  
15 where the clean packages go. Now right in the  
16 vestibule of FHF, that is where we do the detailed  
17 swipe survey and analysis.

18 CHAIRMAN RYAN: So you're really doing a  
19 DOT arrival survey sort of approach right at the gate,  
20 so to speak?

21 MR. HINKLEY: I would assume so. I don't  
22 know the DOT rules. Right.

23 CHAIRMAN RYAN: Well, I mean it's a first  
24 check that it arrived intact before you actually get  
25 inside the building?

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1 MR. HINKLEY: And it's to verify the bill  
2 of lading and --

3 CHAIRMAN RYAN: All that stuff?

4 MR. HINKLEY: -- that it's the right  
5 shipment and that kind of thing.

6 CHAIRMAN RYAN: Okay.

7 MR. HINKLEY: But more detailed analysis  
8 inside the building.

9 CHAIRMAN RYAN: Gotcha. Thank you.

10 MR. HINKLEY: Now the Dry Transfer  
11 Facility is about two and half to three times the  
12 size of the Canister Handling Facility. It is a very,  
13 very large facility. And the mission is to receive  
14 and package the commercial spent nuclear fuel. DOE  
15 spent nuclear fuel, high level waste and the Naval  
16 spent nuclear fuel for emplacement in a repository  
17 Again, multilevel structure of concrete and steel.

18 Now, the Dry Transfer Facility basically  
19 has all the capabilities of the Fuel Handling Facility  
20 as well as the ability to handle some of the  
21 canisters. It is focused more on throughput and  
22 productivity, whereas the Fuel Handling Facility is  
23 more of a first-of-a-kind design for demonstration,  
24 and as such would have less of a throughput. This  
25 would be considered the larger production facility.

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1                   Now, if I could. And so this drawing, you  
2 can see here. Here's an example of a horizontal  
3 shipment. And here is the cask standing up.

4                   This area here, this bank of what looks  
5 like rows and rows of scuba tanks is the blending and  
6 staging area. And that's where we do the initial  
7 thermal management effort.

8                   And what we do is the transportation cask  
9 could bring in one to over 80 fuel assemblies. A waste  
10 package more or less holds between 12 to 40 or 45. So  
11 as such, you need the ability to, if you would, mix  
12 and match to optimize both for your thermal management  
13 issues and optimization of your waste packages. But  
14 it also allows us to sort and not categorize, but to  
15 handle the differences between the different boiling  
16 water reactor and pressurized water reactor fuel  
17 assemblies or packages.

18                   Now, here are the closure cells similar to  
19 what we talked about in the Fuel Handling Facility.

20                   Now when we talk about the aging pad, as  
21 I mentioned it was reduced to 21,000 metric tons. And  
22 the initial capacity necessary for a fuel handling  
23 facility operation is 1,000 metric tons. And by having  
24 an aging pad it allows for the uncoupling of the  
25 receipt and emplacement operations. It gives us the

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1 flexibility to use a thermal management program.

2 It also allows for accelerated emplacement  
3 of the hot spent nuclear fuel with cooler spent  
4 nuclear fuel. Again, to optimize the packages as they  
5 come in.

6 Now the aging pad system, if you would, it  
7 provides the aging casks, the aging pads and the cask  
8 transporters for the commercial spent nuclear fuel and  
9 staging the Department of Energy spent nuclear fuel  
10 and high level waste.

11 Now I mentioned earlier that we have opted  
12 at this point to go to a phased construction schedule.  
13 And that's both for budgetary concerns as well as  
14 optimization of the workforce and the sequence of the  
15 structures.

16 This diagram is color coded and if you  
17 look at the light blue, that is the necessary  
18 facilities and support infrastructure for Fuel  
19 Handling Facility initial operating capability. That  
20 would then be followed by the Canister Handling  
21 Facility in the red. And then the Dry Transfer  
22 Facility is the large green building. And then there  
23 are also plans for a Dry Transfer Facility Number Two,  
24 which at this time is basically a cookie cutter of Dry  
25 Transfer Facility 1.

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1           If you look in the upper left-hand corner,  
2           that is 20,000 metric tons of aging. And the 1,000  
3           that you need for Fuel Handling Facility initial  
4           operating capacity is right here. And then the 20,000  
5           up here.

6           MEMBER HINZE: Excuse me. Looking at our  
7           figure, it looks like the Storage Facility is on a  
8           pretty steep topographic gradient. Is that all going  
9           to be cut down to the lowest grade or how is that  
10          going to be handled?

11          MR. HINKLEY: Well, there are a couple of  
12          challenges with the footprint. They are still doing  
13          analyses on the final footprint of the buildings. But  
14          there is going to be some grading and there are still  
15          some studies going on to put the final determination  
16          of the footprint.

17          MEMBER HINZE: What is the present  
18          location of the various facilities predicated on?

19          MR. HINKLEY: Well, part of it is  
20          predicated on the ground conditions and the seismic  
21          spectrum in that local area. What we learned from the  
22          WTP project that a general seismic mapping or a ground  
23          mapping may not provide the best answer for the  
24          individual footprints of the building. So it's that,  
25          as well as the shortest transportation routes and

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1 where we can get the roads and the transporters and  
2 the locomotive and the rail to get between the  
3 different activities.

4 MEMBER HINZE: But these are not set in  
5 concrete yet?

6 MR. HINKLEY: No, they are not. Again,  
7 well it says "preliminary and not intended for  
8 construction." This is our best layout right now.  
9 But for example where the Fuel Handling Facility is  
10 located right now, it happens to be covered by a very  
11 large much pile where we excavated the tunnels. For  
12 example, that would have to be removed and then we  
13 would have to basically excavate and backfill with the  
14 appropriate aggregate before we could even build the  
15 building in that location.

16 MEMBER HINZE: While I'm interrupting you,  
17 what are the storage casks? Are they vertical, are  
18 they --

19 MR. HINKLEY: The aging casks?

20 MEMBER HINZE: The aging casks?

21 MR. HINKLEY: The aging pad is designed to  
22 handle both horizontal and vertical. Most of them  
23 will be vertical, but there is a small area set aside  
24 for the horizontal casks as well.

25 MEMBER HINZE: And this is because some of

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1 the casks, why will some of the --

2 MR. HINKLEY: Some of the cask systems,  
3 the transportation, that we receive is horizontal.  
4 There is an allowance, if you would, or plans to allow  
5 for the horizontal storage as well.

6 MEMBER HINZE: Thank you.

7 MR. HINKLEY: Right.

8 And I'd like to move on to the subsurface  
9 facilities.

10 Again, recent as since you were briefed  
11 two years ago, but there have been revised panel  
12 layouts in the ventilation system, revision to the  
13 ground support system, we returned to the rail system  
14 for the waste package transporter. I believe a couple  
15 of years ago it was multiwheeled crawler. Now we've  
16 decided to go to the rail system.

17 We've increased the radius of the  
18 emplacement drift turnouts and moved ventilation  
19 control doors to the outer end of the turnouts.

20 Now this represents the proposed  
21 emplacement sequence. It also talks about initial  
22 development which would be necessary to support FHF  
23 operations.

24 Basically we're going to develop three  
25 emplacement drift, one of them will be used for

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1 performance confirmation. What I mean by that is we  
2 will have waste packages in that emplacement drift,  
3 but it will be heavily monitored and instrumented as  
4 performance conformation.

5 Now we will also have one monitoring drift  
6 is what we have planned right now. And that is  
7 actually burrowed under or will be burrowed under the  
8 performance conformation drift with bore holes, if you  
9 would, that will go up so we will be able to monitor  
10 temperature, humidity and etcetera through the rock up  
11 under the performance confirmation drift. And so  
12 we'll have additional instrumentation. The monitoring  
13 drift is not intended for any emplacement.

14 And then we would subsequently move on to  
15 complete the remaining drifts consistent with the  
16 construction schedules and the capacities necessary.

17 MEMBER HINZE: Were is the monitoring  
18 drift in --

19 MR. HINKLEY: The monitoring drift is not  
20 shown on there. It is not constructed yet. It will be  
21 bored under the three emplacement drifts.

22 On this drawing, to be honest, I'm not  
23 sure exactly where it would be.

24 MEMBER HINZE: Is it designed for any  
25 particular lithologic unit?

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1 MR. HINKLEY: That is not my area of  
2 expertise, but I would go on the assumption yes it is.

3 MEMBER HINZE: Yes. I would hope so.  
4 Right.

5 MR. HINKLEY: So that we get the full  
6 mapping of the instrumentation and monitoring of the  
7 drift.

8 I was actually out in the tunnel last  
9 Thursday, and for the members of the Committee who  
10 haven't been out there, they walk through all the  
11 different phases and went through all the testing and  
12 monitoring program. And now is the time to go because  
13 the weather is good. It's a lot better now than it  
14 will be in August.

15 And, again, emplacement length available  
16 is approximately 40 miles.

17 Here is, to give you an idea of the  
18 emplacement drift, a physical feel; the diameter is  
19 about 18 feet across. As you can see, that we have  
20 the rail system and it's on transverse support beams  
21 and longitudinal support beams to keep it off -- it is  
22 just not rail sitting on the bottom of the emplacement  
23 drift.

24 Now, these are waste packages of different  
25 types and lengths. If you've heard discussion of the

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1 drip shield, this is the drip shield. This, and we'll  
2 talk about it later, is what we will put in as a  
3 Bernold sheet, but this is the ground support system  
4 and these are the rock bolts, the stainless steel rock  
5 bolts that will go in.

6 MEMBER HINZE: All of those support  
7 systems are alloy, steels --

8 MR. HINKLEY: The rock bolts are stainless  
9 steel and the sheet will be stainless steel as well.  
10 And we'll talk about that a little bit at the end.

11 MEMBER HINZE: Sorry.

12 MR. HINKLEY: Oh, that's okay.

13 Now, the next slide is a picture of -- a  
14 little different picture of the entrance to the  
15 emplacement drift. Again, here's where it talks about  
16 the perforated steel sheets and the rock bolts, the  
17 waste package.

18 This is the emplacement gantry. And we'll  
19 talk about that in a little bit. I have a better  
20 picture of that.

21 This is the locomotive power system. It  
22 is -- well, I grew up outside of Boston, so it reminds  
23 me of the old trolley cars in Boston. So you have a  
24 connection and the wire cable power in the ceiling.

25 Now, the interesting thing and we'll talk

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1 about it, but when you get to the doorway you  
2 obviously can't run wires through it and close the  
3 doors for any kind of confinement. So we'll talk about  
4 that as we go on.

5 Now if you see, the transporter will come  
6 in with the waste package, and then allows the gantry  
7 to come out over this, for lack of a better term,  
8 loading dock, pick up the pallet and then move it into  
9 the emplacement drift.

10 As I said before, my background is  
11 commercial nuclear plant operations. So all this  
12 subsurface and rail cars and everything gets to be  
13 real interesting.

14 One of the things to discuss is, you know,  
15 when you bring the cask in and then you do your  
16 operations of the waste package, you back it in and  
17 then you pull it out, well if you went in that way  
18 then the waste package is behind the cab and the  
19 locomotive. Well, when you have a 1,000 to maybe 1500  
20 R, when you put those waste packages in the  
21 emplacement drift, you really don't want the  
22 locomotive to go in head first. So we had to design a  
23 rail system so that you can go up, swing back and then  
24 always be able to back it in to provide the necessary  
25 shielding. And, of course, the cab to the locomotive

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1 is shielded.

2 Now the waste package transporter, it  
3 transports the individual waste packages on pallets.  
4 The waste package itself is never picked up by the  
5 gantry. It is picked up on a pallet. It comes around  
6 with fingers and picks up the pallet so that you're  
7 not handling the waste package itself.

8 And it has manual and remote control, and  
9 all digitally monitored and controlled from the  
10 Central Control Facility.

11 MEMBER CLARKE: Bruce?

12 MR. HINKLEY: Yes.

13 MEMBER CLARKE: How does the waste package  
14 get on the invert? Is it transported in that way or  
15 is it placed on it?

16 MR. HINKLEY: How does it get in the  
17 emplacement drift?

18 MEMBER CLARKE: Yes.

19 MR. HINKLEY: Okay. Next slide. Thank you  
20 very much.

21 MEMBER CLARKE: Okay. I'm sorry.

22 MR. HINKLEY: No, that's okay. Thanks.

23 Now, again, the waste package transporter  
24 brings it in. What I didn't mention is the waste  
25 package transporter has an extended bed with the

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1 pallet on it. So when you slide the pallet on to the  
2 extended bed, it goes in -- let me go back. This  
3 right here is a shielded area on the transporter. So  
4 this is the extended bed. And then that waste package  
5 will slide in under there so there's shielding as you  
6 move it to emplacement. Okay.

7 Now the emplacement gantry, which we saw  
8 in the previous picture, it moves in and places the  
9 waste packages on pallets within the emplacement  
10 drift. So it takes it, picks it up off the  
11 transporter and then carries it along. And it's  
12 controlled to a precise exact location to then go  
13 ahead, lower it into the emplacement drift. The pallet  
14 goes in and just stays there. So you put the waste  
15 package and the pallet in the emplacement drift.

16 MEMBER CLARKE: So what you're calling  
17 "pallet," I'm calling invert is that --

18 MR. HINKLEY: Well, the pallet is  
19 basically like a forklift in a warehouse.

20 MEMBER CLARKE: Yes.

21 MR. HINKLEY: So when you pick up the wood  
22 pallet, but this is the pallet used to support the  
23 waste package. Are you talking invest as --

24 MEMBER CLARKE: Just the final resting  
25 place for the --

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1 MR. HINKLEY: Yes. Yes, invert -- and I'm  
2 not a mining person, but when they talk to me to about  
3 inverts in the mines and where the rail is, those are  
4 basically very large concrete support grounded  
5 structures. No, the pallet is separate --

6 MEMBER CLARKE: Right.

7 MR. HINKLEY: -- than the invert.

8 MEMBER CLARKE: Okay. And so --

9 MR. HINKLEY: Because the invert, and the  
10 way I understand it, is under the rail system. It's  
11 a support for the rail system. The pallet is simply  
12 a support pallet for the waste package.

13 MEMBER CLARKE: Okay. I understand.

14 MR. HINKLEY: Okay. Okay.

15 And again, when we put limits and  
16 operating heights and that, that's due to controlling  
17 the energy in case there is any kind of drop of off-  
18 normal condition. And, again, it's remotely  
19 controlled. We do not send anybody in with the waste  
20 package into the emplacement drift.

21 Now, this is a little more recent. On  
22 October 8th we received a letter from the Nuclear  
23 Regulation Commission which basically identified areas  
24 where additional design information and specifics  
25 would be helpful to be able to support the license

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1 application review. And I'll talk about a few of  
2 those just to kind of move us into a little more  
3 current state of where the design is.

4 It has to the aging cask design analysis,  
5 the electrical distribution system. And I'll talk a  
6 little bit about target reliability data and what that  
7 means.

8 The Department of Energy and Bechtel SAIC  
9 identified potential surface facility enhancements as  
10 well. And they were based upon the design at the  
11 time. And we have defined the work scope for the  
12 design enhancements, and those are on schedule.

13 Now, the basis and objectives for these  
14 enhancements are to continue development of the design  
15 for the operations approach. We need to make sure  
16 that we don't design for design's sack and that we can  
17 actually make sure there is some efficiency and  
18 optimization of the operations.

19 It was to increase to conservatism in the  
20 Pre-Closure Safety Analysis. For example, use of  
21 bounding values verses mean values. And we have also  
22 made efforts to enhance the design solution, and these  
23 are voluntary enhancements, not necessarily NRC  
24 regulated actions. And we've also improved the  
25 documentation of how the design satisfies the design

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1 basis. And I'll talk a little bit about that on a  
2 diagram of how we handle reliability when we have  
3 decisions or design decisions based on reliability,  
4 what we're going to do to make sure there's the  
5 necessary information.

6 CHAIRMAN RYAN: Maybe this isn't the right  
7 point, but the use of bounding analysis you always  
8 have to be careful because you may be masking a risk.

9 MR. HINKLEY: Yes.

10 CHAIRMAN RYAN: So are you going to talk  
11 a little bit more about that?

12 MR. HINKLEY: I wasn't intending to, but  
13 I know Carol's here. If more detail on the Pre-  
14 Closure Safety Analysis or any of that would be  
15 helpful.

16 CHAIRMAN RYAN: And maybe the best thing  
17 is to think about that for a more detailed  
18 presentation at a later time.

19 MR. HINKLEY: Sure.

20 CHAIRMAN RYAN: But I think that's a  
21 subject we'd be interested in. You know, as you know  
22 the Committee's had an ongoing interest in more of a  
23 risk-informed approach. While bounding analyses  
24 perhaps have a place, you always have a risk that  
25 you're satisfying yourself when there may be other

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1 things that need to be understood as well.

2 MR. HINKLEY: Agreed.

3 CHAIRMAN RYAN: Okay.

4 MR. HINKLEY: Carol, do you have that?

5 Thank you.

6 A couple of examples or three examples of  
7 the enhancement development are expanding the design  
8 details for the aging system, defining the system  
9 boundaries for the important-to-safety electrical  
10 system and then advancing the design of nonstandard  
11 equipment to confirm Pre-Closure Safety Analysis  
12 reliability.

13 Now with the aging system, which we talked  
14 about earlier, where evaluating dry storage system  
15 designs already certified under Part 72 for compliance  
16 with Part 63. And, again, what we want to do is take  
17 advantage of any licensing and analysis precedents.

18 And the design is supported by the  
19 calculations in NUREG-1567 and 1536, which is the  
20 standard review plan for spent fuel storage facilities  
21 and for dry cask storage facilities.

22 The advantage, there's been discussions in  
23 the press and other issues on spent fuel pools versus  
24 dry cask storage and susceptibility to attack and  
25 things like that. But the two advantages of storing

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1 spent fuel in dry cask storage is: (1) it's a passive  
2 system and it only depends on air circulation for  
3 cooling, and it divides the inventory of spent fuel  
4 into smaller discrete packages.

5 Now, in the electrical system, portions of  
6 the electrical system where necessary to support the  
7 analysis will be designated important to safety, which  
8 brings with it increased requirements for maintenance  
9 testing, manufacturer traceability, etcetera.

10 The grid reliability is also modeled, not  
11 just inside the fence, if you would, but the grid  
12 reliability is modeled as part of the whole fault tree  
13 analysis. What we found is a loss of grid power  
14 concurrent with a Category 1 is classified as a  
15 Category 2 event sequence.

16 The diesel generators provided defense-in-  
17 depth, but at the present time the current analysis  
18 shows that they are a belt and suspenders, not  
19 necessarily required for providing the important-to-  
20 safety reliability features.

21 And the grid, the onsite distribution and  
22 component reliability will be monitored to ensure that  
23 their performance is within the reliability values  
24 used in the analysis.

25 Now I talked about how would we handle

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1 reliability based information in our license  
2 application, if you would. The real focus on this  
3 slide is the standard equipment and nonstandard  
4 equipment. Where we are relying on what we would call  
5 standard equipment, which is familiar in the industry  
6 and has been analyzed and potentially licensed before,  
7 then we will have a report, we'll have available to  
8 support the LA, the report demonstrating the  
9 capability to meet the credited safety function.

10 Now, on nonstandard equipment, which  
11 would have limited licensing precedence or more of a  
12 first of a kind, then where we may not have the  
13 completed report demonstrating the capability, what we  
14 will have is the design development plan which will  
15 describe what we are doing and the plan and the  
16 schedule where we will be able to verify the equipment  
17 meets the accredited safety function when installed.

18 CHAIRMAN RYAN: I'm sorry. Just what  
19 split do you see between the one of a kind versus the  
20 industry standard equipment so far?

21 MR. HINKLEY: Well, for example cranes and  
22 heavy lifting devices. A lot of that could be  
23 standard equipment. Anything having to do with the  
24 locomotives and the specially designed trolleys and  
25 turntables, and things like that, although they have

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1 standards, they have not been in licensing proceedings  
2 before. So we would expect where we're doing, if you  
3 would, first of a kind design, that we'd have the  
4 design development.

5 I don't have a ratio as to --

6 CHAIRMAN RYAN: In my mind, tell me if I'm  
7 wrong, I think about things inside the drifts as being  
8 relatively unique and new and maybe combinations of  
9 things that we know a little bit about, but Fuel  
10 Handling Facility and other things of that sort are a  
11 little bit more in the arena of standard?

12 MR. HINKLEY: That's true.

13 CHAIRMAN RYAN: Is that fair enough?

14 MR. HINKLEY: That is true Yes.

15 CHAIRMAN RYAN: Okay.

16 MR. HINKLEY: Now I'd like to talk a  
17 little bit about integrated waste stream management,  
18 which is basically the program philosophy of  
19 operations, if you would.

20 Now, waste stream management starts at the  
21 utility and the DOE sites and we use the waste  
22 generator records to derive thermal output. Now, in  
23 waste stream management it continues throughout the  
24 repository pre-closure period, so it's a cradle-to-  
25 grave program.

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1           Now the commercial spent nuclear fuel heat  
2 load is the key variable. We will age the young or the  
3 most recent fuel to meet the thermal criteria. And,  
4 again, as we talked about in the different facilities  
5 and in the waste packages, we'll blend the commercial  
6 spent nuclear fuel to meet the thermal criteria.

7           Now the primary tool for planning is the  
8 DOE Design Basis Waste Stream report. And what we  
9 talk about the youngest fuel first and minimum age out  
10 of the reactor, you know, five or ten years.

11           Right now the average waste stream for the  
12 youngest fuel first ten years, the commercial spent  
13 nuclear fuel is about 17 years out of the reactor and  
14 4 percent enrichment.

15           And, again, we use the records and the  
16 information at the generator site, if you would. And  
17 if it's different than expected, we continue to be  
18 committed to operate within our analyzed safety basis,  
19 so we would just prevent it from shipment until we  
20 would be able to be designed to accept and take that  
21 fuel.

22           Now, the waste package emplacement follows  
23 an nominal pattern where we intersperse the commercial  
24 spent nuclear fuel with the cooler DOE spent nuclear  
25 fuel and high level waste. And, again, the actual

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1        emplacement pattern may vary, but the thermal criteria  
2        and the design basis of the thermal criteria has to be  
3        met.  And so as it follows, it will require  
4        alternating placement of hotter and cooler waste  
5        packages.

6                Some of the waste stream management tools,  
7        we have the Total System Model which evaluates the  
8        entire Office of Civilian Radioactive Waste  
9        Management, the system including throughput.  And the  
10       throughput modeling evaluates facilities and  
11       emplacement operations.  And it includes the waste  
12       receipt, spent nuclear fuel assembly management, aging  
13       needs and the waste package loading and emplacement.

14               Now a little bit about thermal design  
15       requirements and criteria.  So when we talk about the  
16       commercial spent nuclear fuel, the key or the critical  
17       criteria is to maintain the cladding below the  
18       allowable temperature limits.  And during surface  
19       operations 400 degrees C.  And when your surface  
20       operation is off normal limits, which would be an  
21       operational impact, those operations and what we would  
22       do in an off normal condition are under development.  
23       And as we get ready and closer to operation, we'll  
24       have our own standard set of procedures and tech  
25       specs, and that kind of thing.

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1           Subsurface operations and post-closure,  
2           the cladding is limited to 350 degrees C.

3           Now, for the DOE spent nuclear fuel and  
4           high level waste, we maintain the canisters below the  
5           allowable temperature limits. And in both surface and  
6           subsurface operations, you know, depending in what's  
7           in the package and what kind of spent nuclear fuel,  
8           there will be different canister temperatures. And  
9           it'll all be monitored.

10           Now besides the cladding and the specific  
11           fuel types, then we have natural and engineered  
12           barriers as part of the repository. And what we'll be  
13           monitoring is emplacement drift wall post-closure  
14           temperature and pre-closure temperatures, the  
15           emplacement drift rock pillar, the center portion  
16           stays below 96 degrees C, waste package surface  
17           temperature of 300 degrees C. And then the last two  
18           items are really the design basis thermal load, if you  
19           would. The waste package thermal power of 11.8  
20           kilowatts, which is the limit we blend to prior to  
21           emplacement to put in the package. That is our  
22           blending value, if you would. And then the initial  
23           maximum average thermal line mode of 1.45 kilowatts  
24           per meter.

25           Now when we move to repository closure,

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1 the design requirements are that the thermal pulse  
2 after closure doesn't exceed the emplacement drift  
3 wall specified temperature, waste package surface  
4 temperatures, the spent nuclear fuel cladding and the  
5 associated temperature for high level waste.

6 Now the thermal condition is important for  
7 closure. The repository temperature at closure, the  
8 repository thermal power at closure and the thermal  
9 power rate of change when we get to closure. And,  
10 again, we have the performance confirmation to confirm  
11 our thermal calculations.

12 Now, this slide shows the different sizes  
13 and shapes of the different transportation casks and  
14 canisters, and waste packages. And what you can see  
15 is that they range or vary significantly in  
16 dimensions. And if you remember the picture of the  
17 transporter or when we had the emplacement drift, it  
18 showed the different size of waste packages both  
19 lengths and diameter and how it would have to  
20 emplacement them and space them as part of the thermal  
21 management plan.

22 Some of the design features to help with  
23 the thermal management is, again: The basic design and  
24 structure of the transportation casks; the waste  
25 package, use of the aging system for thermal

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1 management and the ability in the surface waste  
2 processing facilities to go ahead and load the  
3 different waste packages and/or aging casks; the HVAC  
4 heating, ventilation and air conditioning systems in  
5 the facilities, and; then the design of the subsurface  
6 facility itself and its naturally engineered barriers  
7 and the subsurface ventilation system.

8 Now the concept of operations for the  
9 surface facilities is, again, generator records are  
10 evaluated prior to waste shipment to determine, you  
11 know so if you would a heads up in a plan so you have  
12 preplanned what the waste disposition upon arrival at  
13 the repository. It can go into the waste packages for  
14 emplacement or into the aging casks for the aging pad.  
15 And we're designed to take a wide range of waste  
16 characteristics depending on the inventory of the  
17 waste shipper.

18 The waste could be processed through the  
19 Waste Transfer Facility. Any commercial spent nuclear  
20 fuel that exceed the emplacement thermal criteria will  
21 be sent to the aging pad. And the buffer areas in the  
22 aging pads support limited segregation of the waste  
23 forms. What I mean by that is it's, for lack of a  
24 better term, a campaigning effort where it allows us  
25 to thermally manage and mix and optimize the waste

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1 package loading.

2 The facilities and systems are designed to  
3 maintain the specified thermal units. The Dry  
4 Transfer Facility includes, you know, staging for the  
5 48 pressurized water reactor and 72 boiling water  
6 reactor spent nuclear fuel assemblies and 10  
7 Department of Energy spent nuclear fuel or high level  
8 waste canister.

9 The Canister Handling Facility has its own  
10 staging area. And the Fuel Handling Facility has the  
11 cell for the aging cask in lieu of a staging area so  
12 that we have that aging cask as we move the fuel and  
13 mix it or manage it the thermal management process.

14 Thermal analysis for the bounding waste  
15 form heat loads. And then we have the thermal  
16 analysis for our normal conditions, for example, the  
17 loss of ventilation.

18 Now for the aging pads, again, the aging  
19 casks allow the assemblies to cool until the  
20 commercial spent nuclear fuel meets the thermal  
21 emplacement criteria. We mentioned the capacity  
22 earlier. It potentially utilizes various types of  
23 casks to accommodate various types of commercial spent  
24 nuclear fuel. And it potentially includes the  
25 capability for aging existing dual purpose canisters.

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1           Now, as far as thermal management as it  
2 relates to individual waste packages. The waste  
3 package loading controls are still being developed.  
4 They address thermal criticality and shielding  
5 concerns. Will probably be or most likely be similar  
6 to controls on loading the existing dry casks.

7           Primary commercial spent nuclear fuel  
8 waste package have the capacities as stated: 21  
9 pressurized water reactor or 44 boiling water reactor.

10           Now the waste package, the 12 pressurized  
11 water reactor waste package is available for the  
12 longer spent nuclear fuel, but can also be used for  
13 particular hot spent nuclear fuel assemblies to  
14 maintain the overall thermal output limit. But this  
15 would result in a larger waste package inventory and  
16 inefficient use of the drift links.

17           Again, and then 21 and 44 waste packages  
18 should be short loaded to meet thermal units, but then  
19 again, you would be in an inefficient use of the waste  
20 packages and the drifts.

21           MEMBER HINZE: So this means you're  
22 varying the distance between the casks in the drift?

23           MR. HINKLEY: Well, there is limits  
24 between the casks, but more so it's what you put in  
25 the waste package.

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1 MEMBER HINZE: I understand.

2 MR. HINKLEY: And then that by itself, it  
3 won't change the difference if you would between the  
4 casks as much as just the total length of what you're  
5 going to put in the emplacement drift, because some  
6 are shorter and some are longer.

7 MEMBER HINZE: So what is the distance  
8 between the casks?

9 MR. HINKLEY: I do not know, but I can  
10 find out and let you know.

11 MEMBER HINZE: Well, you have said that  
12 you blend to reach an average thermal generation. But  
13 you also have alternating hot and cold casks?

14 MR. HINKLEY: Well, two things are  
15 blending, if I would, and I apologize if I've confused  
16 everyone.

17 You blend to reach the thermal limit  
18 inside the individual waste package.

19 MEMBER HINZE: Okay.

20 MR. HINKLEY: Then you also have a design  
21 requirement for the average thermal load, a longer  
22 distance. So you have, if you would, two thermal  
23 management activities. You don't really blend in the  
24 emplacement drift, but you can sequence.

25 Now that's another reason why you want

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1 the flexibility of the aging pad because you don't  
2 want to move them around once you get them in there.  
3 So, I mean, that's why the preplanning. It's really a  
4 pretty comprehensive plan as to say, okay, this is  
5 what's coming in and this how we're going to put it in  
6 in what sequence to be able to meet those limits.

7 MEMBER HINZE: Thank you.

8 MR. HINKLEY: You're welcome.

9 Now in the subsurface, again, designed to  
10 meet the thermal units, duration and flow rates for  
11 ventilation are established. After final emplacement  
12 it's basically planned to have 50 years of pre-closure  
13 ventilation.

14 The waste package and cladding can  
15 withstand extended interruption in ventilation based  
16 on the current analysis. And once again, the original  
17 post-closure must be met, you know, prior to closure.

18 Now, to give you physical feel, this is a  
19 typical aging facility. This is at a commercial  
20 nuclear station. And since there's trees and green  
21 grass, you're obviously not out at Yucca Mountain, but  
22 it just gives you an idea if you take a look at that  
23 truck what the size and robustness of these aging  
24 casks are.

25 Some of the ongoing evaluations and

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1 thermal management: Still taking a look at the  
2 throughput capability of the waste handling  
3 facilities; trying to optimize system operations; the  
4 safety and operational evaluations continue. As,  
5 again, we are in the early design phases and so a lot  
6 of the conditions for operator dose, minimization of  
7 handling of the waste forms are still under  
8 development. Taking a look at waste package and aging  
9 cast loading. And, again, how we sequence in the  
10 emplacement drift. And continue all our thermal  
11 evaluations.

12 As we mentioned before, the Total System  
13 Model, some of the ongoing evaluation. The effects of  
14 varying the waste stream on the facility operations,  
15 the duration of facility operations and, once again,  
16 trying to optimize how we operate the facility.

17 The Total System Performance Analysis,  
18 which evaluates post-closure performance.

19 And then the Pre-Closure Safety Analysis  
20 which is, you know, evaluates the effects of thermal  
21 management on compliance with pre-closure performance  
22 objectives.

23 To summarize in thermal management. The  
24 thermal emplacement limits require some aging. The  
25 aging systems will be similar to the existing Dry

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1 Storage Facilities. The ventilation is required to  
2 meet thermal limits in both surface and subsurface  
3 facilities during operation. And the thermal goals  
4 must be satisfied before repository closure.

5 Now I'd like to talk quickly, I believe  
6 there was a question about the emplacement drift  
7 ground support that the Committee wanted to have a  
8 quick conversation on.

9 The drift ground support is Bernold  
10 stainless steel plates secured with the stainless  
11 steel rock bolts, if you can remember from the  
12 artist's picture, if you would. These allow for  
13 airflow to eliminate any moisture traps between the  
14 plate and the rock wall. They're not classified as  
15 important to waste isolation.

16 They're used for the confinement of the  
17 rock surface, which is really just to prevent the  
18 unraveling of the small rock particles during pre-  
19 closure. And they're designed for no planned  
20 maintenance. We may have inspection, but that's when  
21 we went to stainless steel so there would be no  
22 requirement for plain maintenance on the ground  
23 support.

24 This gives you an idea of what a Bernold  
25 plate looks like. It's another example which shows

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1 the overlap at the joint.

2 And to conclude, I hope after I've talked  
3 this long that you think we've made significant  
4 progress on the design, at least since you were  
5 briefed over two years ago. And that our current  
6 project focus is on readiness for the license  
7 application and then the continued readiness for  
8 support of the NRC information needs post-submittal or  
9 during and post-submittal of the license to handle the  
10 outstanding technical issues.

11 And that's all I have.

12 VICE CHAIRMAN CROFF: Thank you. Do we  
13 have additional questions?

14 Thank you.

15 This Bernold stainless steel plates, this  
16 is only for the pre-closure period then?

17 MR. HINKLEY: These are permanently  
18 installed and they stay installed.

19 VICE CHAIRMAN CROFF: Right. But they are  
20 not important to isolation and they're strictly for  
21 the confinement of the rock surface during pre-  
22 closure, is that right, or do I understand this?

23 MR. HINKLEY: Right. They are not  
24 required to prevent -- analysis shows that they're not  
25 required to prevent a rockfall or any rockfall of

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1 significant size that would damage the waste package.

2 VICE CHAIRMAN CROFF: Okay. The size of  
3 the aging pad, you mentioned that that had been cut in  
4 half, approximately from what was heard a couple of  
5 years ago?

6 MR. HINKLEY: Correct.

7 VICE CHAIRMAN CROFF: Could you give us  
8 some clue as to why that has happened?

9 MR. HINKLEY: I think the original design  
10 was 40,000 metric tons. Now before I say the wrong  
11 thing, we did respond to the NWTRB and I brought that  
12 letter. I think I want to make sure we tell the same  
13 story to both groups.

14 VICE CHAIRMAN CROFF: Okay. Right or  
15 wrong, it will be consistent, right?

16 MR. HINKLEY: I do not want to misspeak.  
17 Now that I said that, I probably left it back there.

18 What I can tell you is that the latest  
19 analysis showed that the 21,000 was sufficient to  
20 support -- and I'll read. This is a letter from the  
21 U.S. Department of Energy to the NWTRB. And I'll just  
22 read you part of it.

23 Is that the preliminary throughput  
24 analysis support an operational need from 15,000 to  
25 17,000. And what we did was we added 4,000 for margin.

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1 And then the current estimates show that the 21,000  
2 will be sufficient to address all the necessary aging  
3 and staging requirements.

4 My supposition is that potentially on the  
5 earlier studies, the 40,000 just included additional  
6 margin. But based on current analysis, the 21,000  
7 already includes 4,000 for margin. So where the  
8 original number came from, I'm sorry, I don't know.

9 VICE CHAIRMAN CROFF: Okay. The blending  
10 is done in a couple of different ways here. What  
11 about in terms of the input to the repository,  
12 facility from the generators and for DOE? In other  
13 words, how much of the blending is going to be from  
14 the nuclear power plants and what they're sending you  
15 and what DOE is sending you? Is there any information  
16 on that?

17 MR. HINKLEY: It's not my area of  
18 expertise, but my understanding is that the plants,  
19 they will put and load their spent nuclear fuel as  
20 necessary to meet the transportation or storage  
21 requirements that are within their license. And I  
22 don't believe there is a requirement for them to do  
23 any blending that would facilitate any reduction in  
24 blending for us.

25 VICE CHAIRMAN CROFF: I see.

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1 MR. HINKLEY: I mean, because we have the  
2 facilities to move between different shipments,  
3 different types, different plants, that kind of thing.

4 VICE CHAIRMAN CROFF: While we're on the  
5 aging area, your slide 15, I believe, shows a dashed  
6 zone to the east of the repository which it looks like  
7 a possible repository. Is that a possible additional  
8 or is that a possible substitute?

9 MR. HINKLEY: For the aging pad?

10 VICE CHAIRMAN CROFF: Yes.

11 MR. HINKLEY: Yes, as I recall, that's an  
12 older drawing that I wasn't smart enough to figure out  
13 to take that piece off.

14 VICE CHAIRMAN CROFF: Okay.

15 MR. HINKLEY: But however, what it was is  
16 if you look at the original drawings that may have  
17 been briefed and submitted, that would have been the--  
18 if they wanted to go to 40,000, that's probably where  
19 the expanded aging pad would be. But right now there  
20 are no plans to do that.

21 VICE CHAIRMAN CROFF: Okay. And that's  
22 not a substitute then?

23 MR. HINKLEY: No, no, no.

24 VICE CHAIRMAN CROFF: Okay. A final  
25 question. Are all these canisters Alloy 22 at this

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1 time?

2 MR. HINKLEY: I can't -- I really don't  
3 know. I know that --

4 VICE CHAIRMAN CROFF: In the inverts, I  
5 think that Dr. Clarke asked the question. The inverts  
6 are concrete or are they Alloy 22 or --

7 MR. HINKLEY: The inverts in the tunnel  
8 under the rail system were concrete, because that's  
9 what I saw. I'm not the right subsurface person.

10 VICE CHAIRMAN CROFF: Okay. Thank you.

11 MR. HINKLEY: But we can get back to you.

12 VICE CHAIRMAN CROFF: Okay. Thank you.

13 MR. LEE: I think the inverts are  
14 concrete. The existing plan, I believe, is to  
15 continue with the use of concrete.

16 CHAIRMAN RYAN: Thanks. It is clear that  
17 you've changed in the last two years, so you met your  
18 goal.

19 When I take a look at some of the sketch  
20 drawings, say, 20 and 21 and so forth, I come into  
21 question how far along in design are you? I mean, are  
22 we at a detailed design step or are these still  
23 preliminary or conceptual, are you down to the nuts  
24 and the bolts?

25 MR. HINKLEY: Well, depending on the

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1 facility and the discipline, that varies. With all  
2 the regulators here in the room, we certainly want to  
3 be at a sufficient level of design to put our license  
4 application in. Now, that will vary.

5 Now, as you might imagine, much of the  
6 civil structural and certainly the concrete and the  
7 ground work is more advanced than the detailed design  
8 and instrumentation and controls. But the major focus  
9 on the design effort for Bechtel, I say I see right  
10 now is to provide sufficient detail for the license  
11 applications. It's still -- we have a ways to go  
12 before in detail design.

13 CHAIRMAN RYAN: But it sounds like  
14 different from, say, two years. You really made some  
15 commitment steps that we're going to go this way?

16 MR. HINKLEY: Yes.

17 CHAIRMAN RYAN: And we're not considering  
18 options or alternatives or, you know, you've made some  
19 commitments to do for example, your rail system and  
20 the drifts and emplacement approach, that sounds like  
21 it's pretty firm at this point.

22 MR. HINKLEY: It appears that the  
23 subsurface approach is pretty solid right now. Again,  
24 we continue to look at the surface facilities to be  
25 able to optimize operation and minimize handling

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1 operations.

2 CHAIRMAN RYAN: I noted on 35 your slide  
3 showing the canisters and casks and so forth. It just  
4 struck me that you're going to have an awful lot of  
5 grappling equipment around to handle all these  
6 different packages and types and so forth.

7 MR. HINKLEY: Yes.

8 CHAIRMAN RYAN: And that's an interesting  
9 aspect of design because not only, of course with  
10 canister the radiation questions, but heavy lifting I  
11 imagine will be a real issue for you, and it leads me  
12 to this question. How have you thought about  
13 occupational and industrial safety kinds of questions  
14 which are, you know, heavy lifting specific rather  
15 than radioactive material specific? Has that been  
16 integrated into your design and have you done that?

17 MR. HINKLEY: It has been integrated into  
18 the design. And the backup -- for example, a couple of  
19 backup documents, if you would, to the safety analysis  
20 report would be the facility design description and  
21 the system design descriptions which would take and,  
22 if you would, crosswalk you from the design  
23 requirements to how they're being implemented.

24 Another thing when you talk about the  
25 manipulators and the different heavy lifting handling

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1 equipment, the buildings are designed that much of  
2 that equipment that can be moved to a maintenance area  
3 so they are not having to be maintained in a rad field  
4 or a high contaminated area.

5 CHAIRMAN RYAN: Again, with nine different  
6 final casks, is there's a lot of movement of material  
7 that's unrelated to actually handling a package, I  
8 would imagine.

9 MR. HINKLEY: A tremendous amount of  
10 fixtures and different rings and lifting rigs, which  
11 again when we talk about the Waste Receipt and  
12 Transfer Facility, a lot of that is just storage of  
13 different lifting and handling equipment.

14 CHAIRMAN RYAN: Sure. Okay. Thank you.

15 MEMBER WEINER: What happens to your flow  
16 of materials into the repository if there's an  
17 accident of some sort of the cask is dropped, or  
18 something like that that requires a stop in  
19 operations?

20 MR. HINKLEY: Let me answer from my  
21 background at a commercial nuclear plant, and I will  
22 have to go on the assumption that our operational tech  
23 specs and response would be similar.

24 When you find yourself in an off normal  
25 condition, then the philosophy is to basically stop

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1 all operation, go to a safe condition and then perform  
2 the evaluation and then take the necessary off normal  
3 action steps.

4 I don't think -- well, we are not far  
5 enough long that we had developed those operational  
6 procedural.

7 The design requirements in, for example,  
8 the locomotive, the entry crane, the requirements are  
9 that it will stop in a safe condition. Because the  
10 answer may not be to stop right away. It may be to  
11 put the package back down on a pallet, for example, to  
12 continue the operation rather than stop and leave it  
13 hanging it up. So those are in the design.

14 MEMBER WEINER: But my question is more  
15 what happens to trucks or rail cars then back up at  
16 the entrance and what happens to the flow that you  
17 theoretically have, or do you have alternate entry  
18 ports where the transporters can go in?

19 MR. HINKLEY: My understanding is that,  
20 again, we will have whatever the bounds are on the  
21 safe operating envelop for our license. And if  
22 anything is outside of that, then we would just  
23 basically -- you know, ideally you'd like to stop the  
24 shipment before it leaves the generator.

25 That's a great question. I don't know. I'm

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1 not one of the emergency planning people. But I assume  
2 -- well, I'm not going to assume because I really  
3 don't the answer. But we'll get back to you.

4 MEMBER WEINER: Okay. Okay. Thank you.

5 Could you go back to your slide 18 for a  
6 moment, please?

7 MR. HINKLEY: They told me we have old  
8 fashioned slides. We have to go all the way back by  
9 this.

10 MEMBER WEINER: That's fine. Yes.

11 Are you filling those drifts back to front  
12 or something? I'm not sure from your drawing? I  
13 gather you're filling Panel 1 first. But what's the  
14 sequence, or do you know?

15 MR. HINKLEY: I'm not the subsurface. My  
16 area is not in the subsurface construction. But I  
17 know that we will be able to continue development of  
18 the emplacement drifts while we are in operation with  
19 Panel 1. That I know we will be able to do  
20 concurrently. That's the way it's designed.

21 MEMBER WEINER: What happens if you find  
22 a cask that has some kind of a corrosion pit or a leak  
23 or something and it's already back and there are  
24 things that are placed in front of it? How do you  
25 handle that?

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1 MR. HINKLEY: Well, the system is designed  
2 for emplacement and retrieval. So we can actually put  
3 the emplacement gantry back in and we may have to move  
4 them back out and then put them in different shielded  
5 areas and relocate to get to the exact package. But  
6 it is designed to do that.

7 MEMBER WEINER: It is designed for  
8 retrieval?

9 MR. HINKLEY: Yes, ma'am.

10 MEMBER WEINER: Okay. The final thing is  
11 on your slide 35, the one with all the different kind  
12 of casks on it. You have to go forward.

13 MR. HINKLEY: Oh, yes. Luckily, they told  
14 me I'd be stumped.

15 MEMBER WEINER: Okay. How close are these  
16 to existing casks? Do you have existing casks that  
17 can be used for any of these designs? Are there casks  
18 that are now commercially exist that you can buy?

19 MR. HINKLEY: Remember, the utilities  
20 have, many of the power plants have dry fuel storage  
21 capabilities, so they have their own aging casks. So  
22 what we want to do is take advantage of the aging  
23 casks.

24 Now, when you talk about the canisters and  
25 containers to move the fuel, we're in prototype

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1 development and that kind of thing.

2 MEMBER WEINER: And the waste packages  
3 that are going to be emplaced, I imagine you don't  
4 have --

5 MR. HINKLEY: Still are under development.

6 MEMBER WEINER: Okay. Thank you.

7 MR. HINKLEY: Thanks.

8 VICE CHAIRMAN CROFF: Jim?

9 MEMBER CLARKE: Just a couple of quick  
10 ones. I guess all the welding for the LI 22 will be  
11 done in surface facilities, all the final sealing of  
12 the waste packages?

13 MR. HINKLEY: Yes.

14 MEMBER CLARKE: And I was wondering about  
15 the number of transfers that a material might undergo.  
16 Am I correct in assuming that everything will undergo  
17 at least one transfer and maybe two?

18 MR. HINKLEY: Well, yes. If we are going  
19 to move spent nuclear fuel to be able to stay in the  
20 thermal management program, yes then we will be moving  
21 it. You know, you may have the ability to take it out  
22 of the transportation cask and if the world is good,  
23 move it right into a waste package and it's the right  
24 kind and the right aging, and that.

25 MEMBER CLARKE: Right.

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1 MR. HINKLEY: And be able to put it in  
2 one. Go ahead and take the waste package over to be  
3 welded, sealed and then sent to emplacement.

4 MEMBER CLARKE: Right, that's the best  
5 case.

6 MR. HINKLEY: That's the best case.

7 MEMBER CLARKE: Okay.

8 MR. HINKLEY: So it could require, you  
9 know for example in one of those cells, for example  
10 let's talk about FHF. You'd have an aging cask right  
11 there as well. So, you know, you may take part of an  
12 incoming shipment, put part of it in the aging cask.  
13 And so then you might have to be able to wait for the  
14 next one and move them until, you know, you could get  
15 your right thermal mixing.

16 MEMBER CLARKE: Yes. And then out of the  
17 aging cask and into the waste package?

18 MR. HINKLEY: Right. And back and forth.  
19 Because, you know, really that's kind of the staging  
20 area, if you recall. In FHF it's really just that  
21 cell.

22 MEMBER CLARKE: Do you have pretty good  
23 information to manage all that? I mean --

24 MR. HINKLEY: Yes. The requirements for  
25 the generator, in fact, are very detailed. So we

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1 would have the best information available on those  
2 fuel records.

3 Remember, some of the fuel has -- some of  
4 it as been the pools for a very long time. So I think  
5 it will still be a challenge on handling fuel that  
6 hasn't been handled in a very long time.

7 MEMBER CLARKE: Thank you.

8 CHAIRMAN RYAN: I guess I'm not sure what  
9 the plans might in the generator end, Bruce, but I  
10 would think too that there's an opportunity for fuel  
11 that's in pools now to at least have some kind of an  
12 inspection and view of it as it goes into  
13 transportation or aging at a power plant.

14 We did hear a presentation, what? About  
15 a year ago? On some examination of some spent fuel  
16 that had been in dry storage for a while, and that was  
17 an interesting presentation that there wasn't any real  
18 evidence of degradation over I think it was 15 years  
19 or so. So I think there's an additional opportunity  
20 to get more information as fuel starts to move on the  
21 generator end.

22 MR. HINKLEY: Right.

23 VICE CHAIRMAN CROFF: Regarding the  
24 packages, is it still the plan to have a fill gas  
25 inside the package, like helium?

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1 MR. HINKLEY: When the packages are  
2 received?

3 VICE CHAIRMAN CROFF: No, before they're  
4 emplacement in the waste packages?

5 MR. HINKLEY: That's the current plan,  
6 yes.

7 VICE CHAIRMAN CROFF: And how does that  
8 get in? I assume it means somehow pumping the air  
9 out, putting the helium in. But are there valves on  
10 this? And at what stage does this all get done?

11 MR. HINKLEY: I'd prefer to get back to  
12 before we get into that specific design. But it would  
13 be done over in that waste closure cell, you know  
14 prior to the final welding and that kind of thing.  
15 Because there are ports -- remember when it comes in  
16 we take a gas sample as it comes in.

17 VICE CHAIRMAN CROFF: Yes.

18 MR. HINKLEY: So I would assume there'll  
19 be an ability to have the port and put the gas in the  
20 waste closure cell. But I'm not the right one to  
21 answer that question, but we can get back to you.

22 VICE CHAIRMAN CROFF: Okay. At closure,  
23 is it still the plan to backfill the emplacement  
24 drifts?

25 MR. HINKLEY: I'm going to have to defer

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1 that one, too. I'm not the post-closure person.

2 VICE CHAIRMAN CROFF: Okay.

3 MR. HINKLEY: Sorry.

4 VICE CHAIRMAN CROFF: At what point in the  
5 emplacement sequence do the drip shields get put in?  
6 Is it late, close to closure or soon on or --

7 MR. HINKLEY: Yes. My understanding is  
8 they'll be put in much later in the process. You  
9 know, basically once your emplacement drift is full,  
10 yo know, then you have the option to put the drip  
11 shields in there.

12 VICE CHAIRMAN CROFF: So there will be  
13 some kind of a device that will somehow go down the  
14 line--

15 MR. HINKLEY: It's all done remotely, yes.  
16 By a special device.

17 VICE CHAIRMAN CROFF: Okay. And how does  
18 management of low-level waste generated at the site,  
19 do you generate any liquid waste? Is there a waste  
20 processing facility of some kind?

21 MR. HINKLEY: My understanding -- well, of  
22 course we will have some low-level waste. And I don't  
23 know what the details of the waste processing facility  
24 are. But for example, we have additional monitoring  
25 on the drains in the rooms and that kind of thing.

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1 The design requirements says hey keep monitor away  
2 from the fuel. But we will have both storm drains and  
3 floor drains and things like that that we'll be  
4 monitoring and I assume process.

5 I don't know what the design of the low-  
6 level waste processing system is.

7 VICE CHAIRMAN CROFF: Okay. Thanks.

8 Mike?

9 MR. LEE: Mike Lee.

10 Nice presentation, Bruce.

11 MR. HINKLEY: Okay.

12 MR. LEE: One for Dr. Hinze. The last  
13 design we saw for the aging pad was a cut and fill  
14 design that was in reference to an earlier question.

15 MEMBER HINZE: Well, as I understand it,  
16 there are 80 meters from top to bottom. And whether  
17 that's 40 and 40, 40 cut and 40 fill makes a  
18 difference from the seismic response.

19 MR. LEE: Right.

20 Just a couple of quick questions. Last  
21 time the Committee was briefed there was a talk of  
22 doing some prototype development work up at the Atlas  
23 facility or some off-site location. Can you talk to  
24 the Committee about what DOE plans are for proof of  
25 system, if you will, for some of the unique features

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1 of the repository?

2 MR. HINKLEY: Well, I mean there's  
3 prototype development for the waste packages that is  
4 ongoing. As far as there are -- as part of the  
5 overall plan and schedule there are prototypes for any  
6 of the specialized lifting and handling equipment.  
7 And all I can tell you is I know they're on the  
8 schedule, because I get to look at the schedule.

9 Exactly where they're being done, I don't  
10 know.

11 MR. LEE: This came up in an earlier  
12 presentation because I think the thinking from the DOE  
13 representatives was at some point the prototypes would  
14 be perfected and there was a need to begin to work  
15 through some procedures and tests, and get some  
16 operational experience but do so in an environment  
17 that was outside the test site area.

18 MR. HINKLEY: I know those discussions are  
19 still ongoing. And there is prototype development in  
20 the integrated schedule.

21 MR. LEE: Okay. Is there any prep work  
22 going on at the site right now in advance of the  
23 construction authorization application, like utility  
24 work or things like that?

25 MR. HINKLEY: No.

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1           MR. LEE: Okay. And just as a data point  
2 for the members, we have in the queue a request for  
3 presentation on the staff's October 8th letter, that's  
4 in June where the staff will get into some of the  
5 issues that they raised concerning the level of detail  
6 in the design, as well as the pre-closure safety  
7 analysis perspective from the NRC's perspective.

8           MR. SCOTT: Mike Scott.

9           Over the years there has been a  
10 considerable amount of discussion about whether the  
11 transfer system should have liquid pools or entirely  
12 dry. The way I understand from your presentation, the  
13 new one or the one you have now is entirely dry. Is  
14 that correct?

15          MR. HINKLEY: Yes, sir.

16          MR. SCOTT: Okay. That presents  
17 interesting questions about recovery from casualties  
18 of moving equipment because of the radiation fields  
19 associated with that. I would be interested to hear  
20 how your design is addressing recoverability from  
21 moving equipment type casualties and to what extent  
22 you've used operating experience information in the  
23 design for those type of considerations?

24          MR. HINKLEY: What I'd like to do, Mike,  
25 is get back to you on that. I am, again, on any of

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1 the off normal operations, we have off normal  
2 considerations. I'm not prepared to discuss that.  
3 That wasn't part of what I was ready to brief. But we  
4 can follow-up with either a letter or some  
5 information.

6 What I do know is that the design of the  
7 remote handling equipment and manipulators, there are  
8 designed into the building features that allow us to  
9 do both remote maintenance with a separate set of  
10 manipulators as well as to remove some of the  
11 equipment.

12 Now, there are still conversations going  
13 on. Ideally, of course, you don't ever want to go  
14 into the transfer cells. But that's still under  
15 consideration what we would have to do and what  
16 requirements would be necessary to ever to go into  
17 those cells.

18 CHAIRMAN RYAN: Maybe that's a subject  
19 that we could take up at a briefing. You know, I  
20 don't know that a long letter would be as helpful as  
21 maybe an interactive briefing that could think that  
22 off normal condition recovery question and other  
23 design detail questions for a briefing down the line.  
24 So is that fair enough?

25 MR. HINKLEY: That's fair.

1 MR. SCOTT: Can I just follow-up on the  
2 second part of the question was operating experience.  
3 Do you have a formal operating experience program to  
4 incorporate lessons learned, especially dry fuel  
5 handling facilities into your design?

6 MR. HINKLEY: Again, the specific  
7 methodology of the design and operating experience  
8 would be on the Bechtel SAIC side.

9 I know that, for example, Cogema is part  
10 of the design development team. And that they have  
11 also utilized some other fuel fabrication facilities  
12 and some utility operating experience, but not on dry  
13 fuel operations. And they've dealt with some of the  
14 national labs. But I don't know how formal that  
15 program is.

16 MR. SCOTT: Thank you.

17 VICE CHAIRMAN CROFF: John Flack?

18 MR. FLACK: Just from a risk perspective,  
19 and again commercial reactors, is the risk being  
20 driven -- I would think it would be driven by load  
21 drops, dropped casks somewhere in the process or have  
22 you looked at that as --

23 MR. HINKLEY: No, no, no. That's one of  
24 the major contributors, yes.

25 MR. FLACK: Yes. Okay. And that's

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1 usually driven by human error. So when you do your  
2 reliability analysis, do you look at that from that  
3 perspective? You know, since you're still in the  
4 design phase, especially with the I&C and that sort of  
5 thing, that you've looked at what kinds of errors  
6 could occur that could cause these sort of accidents  
7 to take place and try to design them out at this stage  
8 when you have a chance?

9 MR. HINKLEY: Well, I know that's part of  
10 the design process, again, from BSC and that's in  
11 their fault tree analysis and their reliability  
12 modeling.

13 Again, the process exists. We're very  
14 early in the design phase. Let's say that process and  
15 that methodology is in place, but right now we're  
16 pretty preliminary on most of the design and control  
17 systems.

18 VICE CHAIRMAN CROFF: Ashok?

19 MR. THADANI: Let me first follow-up on  
20 John's question, and then I have another point that I  
21 know you will appreciate.

22 Do you have in the design any  
23 consideration of where you cut off things to consider,  
24 accidents to consider or eliminate? Is there such a  
25 thing as a cut off frequency, that this is really not

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1 credible; and you can quantify that, if you will?

2 MR. HINKLEY: Well, because it's in, if  
3 you would, because in Part 63 then it is really a  
4 reliability based accident analysis and fault tree. So  
5 by definition since it's driven by probability, you  
6 know there are combinations of accident scenarios that  
7 would be eliminated as part of that analysis.

8 MR. THADANI: So then going to what I  
9 think Ruth was trying to understand, you know do you  
10 have a real backdown design basis and then beyond  
11 design basis? I'm using reactor language because I'm  
12 a reactor person, like you. I mean, is there such a  
13 thing as accident management strategies that you think  
14 of as you go forward?

15 MR. HINKLEY: Let me try and answer it in  
16 two parts.

17 I know that we have design criteria and  
18 the safety analysis report, of course, would be based  
19 on if you would, the design basis and the design  
20 criteria. So that clearly exists.

21 What the accident management strategy is,  
22 I'm not in the licensing area. I'm probably not the  
23 right person to answer that question. I don't know  
24 what all the accidents are that have been analyzed in  
25 the pre-closure safety analysis.

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1 MR. THADANI: Maybe as Mike indicated  
2 earlier, when you talked about making bounding  
3 assumptions versus mean values, if you will, there is  
4 a relationship here in terms of the issues.

5 MR. HINKLEY: Yes.

6 MR. THADANI: I'm a reactor person, like  
7 you, and you might recall that same sort of thinking  
8 went into earlier designs and even recent designs of  
9 nuclear power plants. The philosophy of often times  
10 making bounding assumptions.

11 MR. HINKLEY: Yes.

12 MR. THADANI: And I'm reminded an event.  
13 And the analysis for overpressure protection of  
14 reactor coolant pressure boundary, you want to assume  
15 that the power operated relief valves didn't exist.  
16 And we know from the experience at Three Mile Island  
17 that was not a very good way to address the issue of  
18 overpressure protection.

19 What that tells me is it seems to me that  
20 you would first want to make sure, I'd say regardless  
21 of licensing requirements, what would be doing some  
22 realistic analysis, what would be the expected  
23 response, expected response and then depending, I  
24 suppose, some other requirements establish what  
25 margins you're heading on.

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1 MR. HINKLEY: Yes.

2 MR. THADANI: And so it sort of ties in  
3 with this issue of bounding assumptions can mask  
4 potentially important safety matters. So it always  
5 helps to do a realistic analysis. And this is an  
6 issue, it seems to me, it would be very useful to  
7 understand.

8 MR. HINKLEY: No, I understand your point.  
9 Again if in a follow-up briefing you'd like a more  
10 detailed discussion on the pre-closure safety analysis  
11 and the accident management strategy, then we'd be  
12 pleased to do that.

13 CHAIRMAN RYAN: And I think your  
14 presentation today, Bruce, has really helped us shape  
15 these ideas a little bit. So don't feel like we don't  
16 recognize the progress you've made. It always leads to  
17 good questions.

18 MR. HINKLEY: Thank you.

19 VICE CHAIRMAN CROFF: John, did you have  
20 a question.

21 DR. LARKINS: I just had a quick question.  
22 You mentioned the ventilation system that's required  
23 to meet the thermal limits in both the surface and  
24 subsurface. How far along are you in the design of  
25 the--

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1 MR. HINKLEY: I added during operation.

2 DR. LARKINS: During operation?

3 MR. HINKLEY: During operation. Well, for  
4 example, the modeling, the HVAC modeling and the  
5 design requirements has been established. But as far  
6 as detailed design and the fan sizes, motor force and  
7 that kind of thing is still very preliminary.

8 VICE CHAIRMAN CROFF: Latif?

9 MR. HAMDAN: Yes. Bruce, this definitely  
10 was an example -- you make it sound as if it's easy  
11 for those who are not into the design.

12 My question to you then is from your  
13 standpoint are there some challenges in design? Are  
14 there some design issues that you consider to be more  
15 challenging than others and what are these, if you  
16 care to share that with us?

17 MR. HINKLEY: Well, anytime you have these  
18 kind of radiation contamination challenges and a lot  
19 of first of a kind engineering, having to use  
20 locomotives and going underground and a lot of lifting  
21 and turntable and trolleys. So there's a lot of  
22 mechanical engineering challenging.

23 Realistically speaking this is not an  
24 operating plant. There is not a lot of high pressure  
25 systems. There's not a lot of instrumentation and

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1 controls relatively speaking. So most of the  
2 challenges are in the development of the waste  
3 packages which then involves, you know, rolling of  
4 very steel and some challenges in the welding and  
5 final closure. But the manipulation of such heavy  
6 loads so frequently, that all has to be done remotely  
7 is one of the significant challenges.

8 Now, interestingly, if you take -- you  
9 have a challenging design and then you move it out  
10 into Yucca Mountain, which has its own challenges  
11 being just because of the remote location and the  
12 environment. There are a lot of human factors that  
13 are involved, whether it was a standard facility or a  
14 nuclear facility, you know to get the design done.

15 So those are the major challenges now.  
16 I'd like to think we're still on schedule to have  
17 sufficient design to submit the license application at  
18 year end. So then let's say we'll still have the  
19 design concepts, but the final calculations and the  
20 material section that, we still have a ways to go.

21 VICE CHAIRMAN CROFF: Okay. Thanks. I  
22 think we're about out of questions and out of time for  
23 this.

24 Thank you very much for an interesting  
25 presentation. And we thank you. Look forward to

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1 hearing from you again in a year or two.

2 With that, I think there's one final item.

3 CHAIRMAN RYAN: Yes. We've had an  
4 additional request for somebody to speak to the  
5 Committee. And it's Martin Malsch. And we slotted  
6 this few minutes here to hear what Mr. Malsch has to  
7 say.

8 MR. MALSCH: Should I move to the front?

9 CHAIRMAN RYAN: Please, so I can get it on  
10 the record.

11 MR. MALSCH: Okay. Thank you. I just  
12 wanted to make a few brief remarks on behalf of the  
13 State of Nevada.

14 My remarks are in three categories.  
15 First, a few brief comments on the presentation here  
16 this morning. Second, some more slightly lengthier  
17 comments about something that the NRC staff said  
18 yesterday about following up on the ongoing  
19 investigations of the USGS. And then something about  
20 the presentations this afternoon, and in particular  
21 the nature of a petition for rulemaking, which Nevada  
22 filed a few weeks ago.

23 First let me address briefly the remarks  
24 this morning. First, it struck me that as the speaker  
25 said, there's a ways to go before the final design is

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1 developed. I understood the Commission in part  
2 contemplated that the LA would include a level of  
3 detail equivalent to what we would now see in a final  
4 safety analysis report. And it struck me that the DOE  
5 is a long ways away from that. And quite away away  
6 from meeting a schedule of filing an LA or submitting  
7 an LA in 2004.

8 Among other things, I didn't hear anything  
9 at all in the presentation about airplane crashes. Now  
10 that, of course, goes to overall site suitability.  
11 But as we know also from the experience in the Private  
12 Fuel Storage Facility proceeding there's a possible  
13 spillover into the facility design as to whether  
14 certain features of facilities are designed or  
15 hardened against airplane crashes. And I heard no  
16 presentation about that.

17 Then there's this question about the aging  
18 facility, which always fascinates the State of Nevada.  
19 Apparently the purpose of the facility is to enable  
20 the site to accept spent fuel that doesn't meet  
21 emplacement thermal criteria. There's even a  
22 reference someplace in the slides here to accepting  
23 the youngest fuel first, which I thought was contrary  
24 to the overall design philosophy of accepting the  
25 oldest fuel first. This combined with what we still

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1 think is a rather large aging facility leads Nevada to  
2 be curious about whether this is really nothing other  
3 than a monitored retrievable storage facility in  
4 disguise, which of course is something which is  
5 prohibited by the Nuclear Waste Policy Act.

6           The third comment I would have about this  
7 morning's presentation is that I notice that the  
8 emplacement drift ground support materials are not  
9 classified as important to waste isolation, and I  
10 don't know whether or not that's true. I suppose that  
11 depends upon how they factor into the total systems  
12 performance assessment. But somewhere along the lines  
13 here DOE seems to have forgotten about the concept of  
14 retrievable. And I'm wondering whether they are  
15 consciously building into the design a retrievability  
16 option, which is of course as required by Part 63.  
17 And I saw that missing from the presentation.

18           Let me now go over into the remarks which  
19 the NRC offered yesterday about how they're following  
20 up on the allegations concerning USGS.

21           I just wanted to emphasize that the  
22 problem goes far beyond USGS. These allegations only  
23 came to light after DOE was forced to review some so-  
24 called archival emails as a result of Nevada's  
25 challenge to the original LSN certification. We had

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1       been reviewing the old emails and, of course, we can't  
2       predict what the review of the new emails might still  
3       produce in terms of surprises for us. But we have  
4       looked at some of the old emails. And I'd like to  
5       have you just consider what they tell us about the  
6       project so far.

7               They show current project management  
8       Bechtel SAIC directing its quality assurance personnel  
9       not to the use "violated" in their reports. A less  
10      disturbing term, non-complaint was preferred.

11             They showed project personnel adopting the  
12      position that the NRC should only be given the minimum  
13      information on the KTIs.

14             Project personnel afraid to call whole  
15      programs deficient because fixing them would be too  
16      expensive.

17             Secret communications. The question of  
18      whether of critical representations to the NRC about  
19      safety priorities are correct.

20             Efforts to keep some people in blissful  
21      ignorance about technical problems.

22             An assumption that the proof that will get  
23      through the so called regulatory hoops need not be  
24      rigorous from a scientific point.

25             A program that carefully manipulates

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1 statistics to assure that the results are always in  
2 the right place.

3 A program where scientific instruments are  
4 documented as properly calibrated before they're even  
5 received, much less calibrated.

6 And a project where discord and distrust  
7 are so rampant that senior officials are called  
8 "swindlers, certifiable jerks" and worse.

9 And the management to the principal  
10 contractor is called "craven and ignorant."

11 They evidence a project where dramatic and  
12 unexpected information in an email entitled "Water,  
13 water everywhere" apparently gives DOE ulcers but not  
14 enough discomfort to delay a scientific report to the  
15 Congress.

16 Let me just focus on two emails in  
17 particular which I think the Committee might find  
18 interesting.

19 There's an email in the year 2002 speaking  
20 about the whole effort to prioritize the KTIs. In  
21 part, we see an email which says: "I already saw a  
22 note, though secretly sent to his favorite DOE folks,  
23 arguing that prioritization based on any kind of TSPA  
24 results is not to be trusted." I've already said,  
25 it's directly contrary to representations which DOE

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1 made to you people and to the NRC about how one could  
2 base a prioritization on the KTIs on the TSPA.

3 Then there's another email that dates back  
4 to 1998 which says, in part, as follows: "In the  
5 absence of statistics they have relied on expert  
6 opinion alone, but mostly internal experts like Bruce.  
7 I would not characterize this as emphasizing elicited  
8 information." And then here's the important part.  
9 "Who's kidding who? These guys are going to assign  
10 probability distributions that keep the expected  
11 values in the right place."

12 But there are some good people in the  
13 project. There is another email which says, as  
14 follows: "I don't know how to fight lies and  
15 misinformation. And no one seems to care about the  
16 truth or even making sure the right people are doing  
17 the right stuff." Apparently the email drafter here  
18 was concerned about the truth and doing the right  
19 stuff.

20 All these emails are attached to the State  
21 of Nevada's testimony a short time ago before the  
22 House Subcommittee of Federal Workforce and Agency  
23 Organization. If the Committee's interested, I'm  
24 happy to leave a copy of the emails with you if you'd  
25 like to look at them.

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1           And then thirdly and very briefly, let me  
2 address some of this afternoon's remarks in which  
3 there will be some discussion about DOE's plans for  
4 its NEPA review of transportation issues.

5           In the oral argument before the Court of  
6 Appeals the NRC staff represented with respect to NEPA  
7 that it would not adopt the DOE Environmental Impact  
8 Statement unless it satisfied the requirements of  
9 NEPA, the NRC's regulations and the regulations of the  
10 Council on Environmental Quality. And that meant, of  
11 course, that it would be open to any participant or  
12 party in the licensing proceeding who opposed the  
13 adoption of an DOE Environmental Impact Statement to  
14 raise any issue within the scope of NEPA, the Council  
15 on Environmental Quality's regulations and the NRC's  
16 regulations. As opposed to, for example, being  
17 confined to raise issues only dealing with new  
18 information or new changes developed since the  
19 Environmental Impact Statement.

20           Our petition for rulemaking that we filed  
21 a few weeks ago asked the NRC essentially to codify  
22 that representation to the Court of Appeals into the  
23 regulations, so there should be no question about  
24 this. That's the thrust of our petition for  
25 rulemaking. But I thought that it was important for

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1 you to know that because it influences the scope of  
2 the Commission's review of the DOE EIS and then it  
3 also, perhaps, conceivably the scope of this  
4 Committee's role with respect to the DOE EIS.

5 And with that, let me conclude and say  
6 thank you for allowing me to address you this morning.

7 CHAIRMAN RYAN: Thank you, Mr. Malsch. We  
8 did have your petition documentation. It came to the  
9 Committee's attention, and that's been distributed.

10 And if you'd like to make your written  
11 material as part of your presentation, we'd be happy  
12 to have that copy as well.

13 MR. MALSCH: Sure. Thank you very much.

14 CHAIRMAN RYAN: Thank you.

15 With that, we're scheduled for finishing  
16 this morning. Mr. von Tiesenhausen will be up after  
17 the following presentation after lunch.

18 Thank you all very much.

19 We'll reconvene sharply at 1:00.

20 (Whereupon, the Committee was adjourned at  
21 11:42 a.m., to reconvene this same day at 1:00 p.m.)

22 CHAIRMAN RYAN: On the record. Okay.  
23 We'll come to order please. I would like to remind  
24 everybody to please put your cell phones in off or  
25 mute. That would be helpful. Thanks very much. And

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1 this portion of the meeting on Transportation Aspects  
2 of the Yucca Mountain Environmental Impact Statement  
3 (EIS) Update will be led by Dr. Weinberg. Ruth.

4 MEMBER WEINER: Thank you and I would like  
5 to welcome Gary Lanthrum, Director of the Office of  
6 National Transportation and to clarify that this is  
7 not an update on the EIS but an update on Department  
8 of Energy transportation plans. Is that correct,  
9 Gary?

10 MR. LANTHRUM: That is correct. Is it all  
11 mine now?

12 MEMBER WEINER: It's all yours. Take it  
13 away.

14 MR. LANTHRUM: Thank you very much. I see  
15 a number of familiar faces out here and for the  
16 familiar faces, there'll be a number of slides you've  
17 seen before. Unfortunately, the Transportation  
18 Program has not been charging ahead at a rapid pace,  
19 partly because of funding and other issues, but we'll  
20 get into that as we go along and hopefully for some of  
21 you, all of the slides will be new.

22 As a bit of background, the Office of  
23 National Transportation (ONT) within the Office of  
24 Civilian Radioactive Waste Management, we have office  
25 within offices and directors reporting to directors

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1 reporting to directors. It's a confusing  
2 organizational chart. But the Office of National  
3 Transportation was formed in 2003. I came on board in  
4 August of that year and it was about time the  
5 Transportation Program got some new legs again after  
6 the site recommendation which was made in 2002.

7           Following that, funding increased for  
8 Transportation in 2003 in the genesis of a program to  
9 focus on what it would take to ship spent nuclear fuel  
10 and high level waste to a repository began in earnest  
11 and I was lucky enough, I still think, to get the job  
12 and pull that together. I've organized the Office of  
13 National Transportation into two divisions and you'll  
14 understand a little bit more later as I go through it.  
15 But there's an Infrastructure Development Division and  
16 Operations Development Division.

17           All of the work since we're trying to  
18 build the capability to do operations and we're trying  
19 to build the capability to make shipments, all of the  
20 work is project ties right now. Although at some  
21 point, those projects are going to transition into  
22 actual operations. But the bulk of the projects are  
23 to buy things. We're going to be a very contract-  
24 intensive organization. We have to buy casks. We  
25 have to buy rail cars. We have to buy construction of

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1 a railroad to connect to the repository and all of the  
2 things that we're buying fall into the responsibility  
3 of the Infrastructure Development Division.

4 The Operations Development Division is  
5 dealing with a lot of the planning issues developing  
6 transportation protocols, working with states on  
7 emergency preparedness training funds. A lot of the  
8 soft issues surrounding development of a  
9 transportation system are being handled in the  
10 Operations Development Division.

11 Under the Nuclear Waste Policy Act, all of  
12 our casks that we procure have to be certified by the  
13 Nuclear Regulatory Commission and we must provide  
14 advanced notice per the NRC requirements for shipments  
15 that we're going to make to the states and we've made  
16 the policy decision to also try and include others as  
17 necessary. But how will be notified is still  
18 something that's still part of an ongoing discussion  
19 on the security front, but we will be following the  
20 NRC requirements for pre-notification.

21 We are required under the Nuclear Waste  
22 Policy Act to use private industry to the fullest  
23 extent practicable and that's why I indicated earlier  
24 there's going to be a lot of contracts. They're going  
25 to be the heart of the development of the

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1 transportation system.

2 Under Section 180(c) of the Nuclear Waste  
3 Policy Act, we have to provide technical assistance  
4 and funds to states and tribes, to do emergency  
5 preparedness planning and training. We are working  
6 with states and tribes through a transportation  
7 external coordinating work group right now to define  
8 the kinds of activities that would be allowable under  
9 that funding and to define the process for approving  
10 the funding in the grant process and we're making some  
11 good progress there.

12 Overall, Transportation is a pretty  
13 interesting area. There's a lot of work to be done  
14 and yet pretty much all of the infrastructure that I'm  
15 responsible for developing is being driven by outside  
16 requirements. It would be wonderful to be king for a  
17 day and say, "I have to build a transportation system  
18 or we have to build a transportation system and here's  
19 what it's going to look like." Unfortunately, we're  
20 not in the driver's seat about what's going to be  
21 shipped when nor are contracts or at least agreements  
22 between the Department and the utilities that have the  
23 spent nuclear fuel at sites around the country, the 72  
24 sites around the country.

25 They are really in the driver's seat and

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1 that driver's seat is driven by the Nuclear Waste  
2 Policy Act so that the utility, the corporate entity,  
3 that has the oldest fuel has a ticket in line to ship  
4 first. They can use that ticket in line for any fuel  
5 that that corporate entity has. So they don't have to  
6 ship their oldest fuel. They can shift their youngest  
7 fuel. They can ship anything they want or they can  
8 trade that place in line with other utilities. So  
9 there's a complicated framework with all of the  
10 contents that could be shipped, trying to guess what  
11 will be shipped and make sure that we have the right  
12 infrastructure in place to handle it.

13 We also have the requirements for the  
14 receipt of the spent fuel and high level waste at the  
15 repository. I think you heard this morning that they  
16 have a phased approach to building the repository  
17 capability and there may be some constraints on the  
18 repository side about what can be received during  
19 initial operations. Those questions haven't been  
20 answered for me. So I'm in kind of a gray zone trying  
21 to figure out what exactly I need to buy in terms of  
22 casks, in terms of rolling stock whether it's cars or  
23 trucks or rail cars.

24 It would be nice to have absolute  
25 definition about what it is we're going to be shipping

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1 at least in the first couple of years so I could focus  
2 the acquisition efforts on that. In absence of any  
3 clear direction about what it is we're going to be  
4 shipping, we have to try and procure infrastructure  
5 that has the broadest capability possible for the  
6 dollars invested. So that decisions are made, we have  
7 the highest probability of being able to succeed.

8 Ideally, I'd be in a position of procuring  
9 all the infrastructure for all the contents that would  
10 have to be shipped and have that all available in year  
11 one so that whatever decision was made, I could pull  
12 the right items off the shelf and deploy them. I'm  
13 not going to be in that position and I think you've  
14 seen the funding profiles and there's going to be a  
15 fairly significant constraint, I am expecting, on  
16 funding profiles for transportation as well as the  
17 program as a whole.

18 In the middle, I have a line that shows  
19 the stakeholder interfaces coming down the middle and  
20 that's also a driver because we have an awful lot of  
21 states that are going to be transporting these  
22 contents through as well as tribes whose lands are  
23 going to be crossed. There's a lot of interested  
24 players in the industry. There are a lot of other  
25 folks that are passionately engaged in the discussion

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1 about what this transportation network should look  
2 like and what should be done to make sure it is safe  
3 and secure. So all those external drivers are shaping  
4 some of the things that we're doing and try and keep  
5 that in mind as I go through the rest of the  
6 presentation here.

7 On the institutional side in trying to get  
8 information from the shippers to identify what the  
9 ideal content would be, in November of 2003, we  
10 published a strategic plan for Transportation and we  
11 got a little bit of a challenge on it because it  
12 looked like more an institutional plan. But what it  
13 really said was strategic. It said that all of our  
14 decisions are going to be developed collaboratively  
15 with a broad base of stakeholders. We're going to  
16 include the industry. We're going to include the  
17 states and tribes. We're going to include people that  
18 have lots of experience transporting the kinds of  
19 contents we're going to moving, the naval reactors  
20 organization and the EM organization within the  
21 Department of Energy plus other countries that have  
22 significant experience shipping spent nuclear fuel.  
23 So we are working very diligently on this  
24 collaborative development of what the infrastructure  
25 should look like.

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1           Now we're trying to establish the approach  
2           to common cask procurement for both the use in  
3           transportation and for use in aging at the repository.  
4           I imagine you heard today in discussions about the  
5           repository development that there's an expectation  
6           that some of the contents that come in will have to be  
7           aged for a period of time before the heat load gets to  
8           the point where they can be disposed. So there will  
9           be aging casks that they will have to use for storage  
10          onsite for some period of time until they get the  
11          right balance between heat loads to actually be able  
12          to dispose and we in Transportation are looking at the  
13          procurement of casks that could support both the aging  
14          function at the repository as well as the  
15          transportation function.

16                 We're also have some considerable  
17          discussion with the development of the surface  
18          facilities at the repository to make sure that the  
19          casks and rolling stock that we do procure will  
20          adequately interface with their facilities, with their  
21          access and egress, routes from the repository.

22                 The priorities we have for this year, the  
23          primary one we have is support from the Nevada Rail  
24          Alignment Environment Impact Statement. Ruth  
25          indicated that my presentation is not on "The

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1 Environmental Impact Statement" and there was the  
2 significant EIS that was done for the repository  
3 itself that also included the information on  
4 transportation that was basis for our record of  
5 decision on both mode of transport which was mostly  
6 rail and the corridor for studying alignment options  
7 for building a railroad to connect an existing  
8 mainline track to the repository.

9 We're currently working on that  
10 environmental impact statement. We had originally  
11 hoped to have the draft done in the spring of this  
12 year, but during scoping, we had scoping meetings in  
13 five locations around the State of Nevada. We  
14 received over 4,000 comments from interested  
15 participants and were wading through that huge body of  
16 comments.

17 What's that done is it's caused us to  
18 increase the scope of the EIS. We are actually  
19 considering additional alignment options that were not  
20 in the repository FEIS and we've actually tossed out  
21 some options that were in there that we were asked not  
22 to pursue any further. I think it's appropriate that  
23 we wade through that and it's just going to be  
24 challenging to get the EIS out in the timeframe that  
25 we had hoped. The EIS that we're studying is the

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1 alignment options within the Caliente corridor.  
2 That's a nominally 320-mile long corridor, but we're  
3 going to be studying about 600 miles of alignment  
4 options to make sure we address all the comments that  
5 we received during the scoping process.

6 Support for state regional groups. I  
7 mentioned that we're doing a lot of collaborative work  
8 on our planning process and trying to identify what  
9 kinds of activities would be fundable under one of the  
10 provisions of the Nuclear Waste Policy Act. That work  
11 is done through both the Transportation coordinating  
12 group where we bring the states, tribes and industry  
13 together but we also have groups of states, the state  
14 regional groups, there's four of them that we support  
15 through cooperative agreements.

16 You really can't do transportation  
17 planning one state at a time. The ingress and egress  
18 routes from one state have to match up with those of  
19 their adjacent states and so we've grouped the country  
20 into four regions. There's a northeast region, a  
21 southern states region, a Midwest region and then the  
22 bulk of the western states are in a separate region.  
23 We are working very diligently both with these groups  
24 individually and through them combined at this  
25 Transportation External Coordinating Working Group

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1 (TEC) sessions that we have twice a year. We're  
2 making progress both on the effort to try and define  
3 the criteria and methodology for selecting the routes  
4 that we're going to use as well as identifying the  
5 funding requirements and allowable funded activities  
6 under this 180 Section under the Nuclear Waste Policy  
7 Act.

8 We're also this year trying to focus on  
9 acquisitions that will advance infrastructure  
10 development without major capital requirements.  
11 Again, our funding this year was substantially lower  
12 than what our request was. In Transportation, we had  
13 requested \$187 million and we got \$25 million. It's  
14 kind of hard to buy as many things as you had hoped to  
15 buy when your funding is that short.

16 What we are trying to do is to develop  
17 request for proposals on conceptual designs. The  
18 paperwork we have enough money to do to further some  
19 ideas about how to close the gap between the casks  
20 that exist currently and the certificates that exist  
21 currently and that we're going to need possibly to  
22 conduct shipments during the first year of operations.

23 This is a plot of the funding profile that  
24 I indicated. It's interesting. You can see during  
25 these early years in the late '90s and early 2000

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1 where the funding was around \$2 million to \$3 million.  
2 It crept up to \$4 million in 2002. It's actually  
3 bleaker than it looks because during that period of  
4 time, Transportation was not an standalone  
5 organization. It was Transportation and Waste  
6 Acceptance were combined into one organization and the  
7 bulk of that funding was going towards efforts in  
8 Waste Acceptance not in Transportation.

9           After the site recommendation was made in  
10 2002, the Transportation funding crept up to \$10  
11 million in 2003. I came on in the tail end of that  
12 year and helped craft a strategy that identified four  
13 projects to focus our efforts on. In 2004, we have  
14 fairly substantial funding and we're building up to  
15 advance to the ability to effectively spend \$187  
16 million this year which primarily would have gone  
17 towards acquisitions. It would have bought the  
18 prototype rail cars.

19           The Association of American Railroads has  
20 a new requirement for cars that ship spent nuclear  
21 fuel and high level waste. No cars exist that are  
22 approved to meet that standard right now. So we had  
23 anticipated using a fairly substantial chunk of that  
24 money to actually have conceptual designs done,  
25 prototypes built and testing begin.

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1           A lot of that's backed off. We're back  
2           into just the conceptual arena. Both the cask front  
3           and the repository front are in the rolling stock  
4           front and focusing the bulk of the funding that we got  
5           now this year on the rail line with EIS.

6           We did accomplish a fair amount with the \$64  
7           million we had in 2004. There's a good cross section  
8           here, but we did set up our strategy plan which was  
9           issued in November of 2004. It was a highlight. We  
10          pulled the state region groups in for a meeting with  
11          the Under Secretary shortly after that and he  
12          expressed his interest in supporting their activities  
13          and we actually challenged the state regional groups  
14          to propose projects that identified areas of  
15          significant interest to their region that might also  
16          benefit the planning activities within the Office of  
17          National Transportation.

18          A couple of good projects have been  
19          proposed. One of them, the Southern states want to  
20          study the options for moving contents from sites that  
21          don't have rail access to a railhead by using barges.  
22          So we're working with them to identify the scope of  
23          that project and to fund it. Again, I think the  
24          Northeastern region has also decided to piggyback with  
25          the Southern states on looking at the barge options

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1 for getting contents from sites without rail access to  
2 a railhead. The Midwest has other interests. The  
3 Western states are primarily interested in some of the  
4 planning models that we are developing. Looking at  
5 what the infrastructure needs might be under various  
6 scenarios and so we're engaging all of them in  
7 projects that benefit both their planning efforts and  
8 would further our needs as well.

9 We did get our record of decision out in  
10 April of 2004 on both mode and the corridor. The mode  
11 again is mostly rail mode to transport. Although  
12 there will be some truck shipments, we're hoping to  
13 ship the majority of the waste by rail. We had  
14 scoping meetings that ended in May and we began the  
15 actual EIS in June of 2004.

16 A lot of this is about the setting up the  
17 projects. The work breakdown structure, we actually  
18 organized four primary projects within the Office of  
19 National Transportation and there was a Nevada rail  
20 project which we talked a bit about here. There are  
21 other acquisitions which includes casks, rolling stock  
22 and facilities. There is an operations development  
23 project and there's institutional outreach.

24 Our 2005 plans, again we're focusing  
25 primarily on getting the environment impact statement

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1 thoroughly funded and to address all the comments that  
2 we got during the scoping meetings to make sure that  
3 we have a draft EIS when it does come out that  
4 addresses all the concerns that have been raised. We  
5 are working on the conceptual design for casks and  
6 rail cars. We're trying to pull the requests for  
7 proposals together. We would expect to get those  
8 requests for proposals out this year, but probably not  
9 have the selections made and the funding done until  
10 fiscal year 2005.

11 We're hoping to make decisions that will  
12 enable more robust planning. One area that we've been  
13 getting a lot of feedback on is whether or not we will  
14 use dedicated train where you would have a train that  
15 would only ship one cargo that would be destined just  
16 for the repository as opposed to having repository  
17 cargoes intermixed with other cargos on longer,  
18 regular or key trains. We believe that's a policy  
19 decision that the Department can make outside of the  
20 NEPA process and we are doing the staffing work to try  
21 and get that done.

22 One of the significant things about the  
23 decision of whether to use dedicated trains or not is  
24 it provides a much more clear framework for the states  
25 to do their planning within and it provides a lot more

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1 flexibility on whether you do or don't have specific  
2 discussion about routing.

3 We're also hoping to expand our  
4 consultation with the tribes. The Transportation  
5 External Coordinating Working Group that we have has  
6 tribal participation and we have a Tribal Working  
7 Group but not all of the tribes that are on potential  
8 routes between shipping sites and the repository  
9 participate in TEC.

10 We sent out letters to 40 tribes that are  
11 within a half mile of potential transportation routes  
12 and ask how they would like to be engaged in a  
13 government-to-government relationship with the Office  
14 of National Transportation and with the Department.  
15 A few of them have contacted us and actually the  
16 Tribal topic group with TEC let us know that if you  
17 want to talk to the tribes, writing letters and making  
18 phone calls is probably not going to do it. That was  
19 a requisite first step, but we're going to have to  
20 wind up doing a lot of visits and actually request  
21 audiences with them at their tribal locations and that  
22 will be the next phase that we go through.

23 We're continuing to work with the state  
24 regional groups on both the activities that they're  
25 participating in through TEC and with their special

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1 projects.

2 The Yucca Mountain final EIS (FEIS) was  
3 issued in 2002 and in there, there were two modes of  
4 transport that were covered, the mostly rail and the  
5 mostly truck. There were five corridors considered  
6 for access to the repository if rail were selected.  
7 There was no preference of a corridor in the final  
8 repository EIS but there was a preference for the  
9 mostly rail mode of transport.

10 On December 21, 2003, we put out a *Federal*  
11 *Register* notice stating our preference for the  
12 Caliente corridor. That preference was based on input  
13 from stakeholders. Going through the repository FEIS,  
14 we did not feel that there was any environmental  
15 driver that would rate one of the five corridors  
16 analyzed higher than the other, but we did look at the  
17 potential land use conflicts. Some of the corridors  
18 had considerably more private land in them than  
19 others. We wined up selecting a corridor that was  
20 99.9 plus percent BLM land in hopes of avoiding land  
21 use conflicts to the maximum extent practicable.

22 We also looked at the indirect costs  
23 associated with the decision on what corridor it would  
24 be and we had received unwavering opposition from both  
25 the State of Nevada and from the City of Las Vegas and

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1 from Clark County over selection of any corridor that  
2 would transit the Las Vegas valley and there were two  
3 corridors that would have been much simpler to  
4 construct that did cross either the northwest edge of  
5 the Las Vegas Valley or the eastern edge of the Las  
6 Vegas Valley. So both of those were tossed out to  
7 avoid those land use conflicts.

8 The Caliente corridor itself that we did  
9 select in our April record of decision starts, and I  
10 believe we have a slide here, yes, here near the town  
11 of Caliente on the western edge of the State of  
12 Nevada. It curves around and where the line turns  
13 from red to pink is where we go from what we call a  
14 common segment to alignment options. What you  
15 typically have in the middle there is a terrain  
16 feature, mountain range or something that you have  
17 multiple passes that you could to get around. So we  
18 have a number of alignment options that were proposed  
19 even in repository environmental impact statement.

20 We come back to a common segment and then  
21 this is the Nevada Test and Training Range in the  
22 brown here. On the western edge if the Nevada Test  
23 and Training Range again there are multiple alignment  
24 options. Some are to avoid train features. Some were  
25 to avoid environmental features like springs. Others

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1 were to avoid towns.

2           During the scoping process, we got some  
3 very interesting feedback. This area in the northwest  
4 corner of the Test and Training Range is near the town  
5 of Goldfield. There are a lot of mining activities  
6 between the town of Goldfield and the Nevada Test and  
7 Training Range. We had originally anticipated that  
8 the mining interests might actually be excited about  
9 the possibility of having rail access out there.

10           Well, it turns out the kind of mining  
11 they're doing is primarily cyanide leach extraction of  
12 gold from existing tailings. So they don't have large  
13 quantities of ore to move and they really wanted us to  
14 just stay out of there. They didn't want anything  
15 that would interrupt their ability to collect tailings  
16 to use for additional extraction operations.

17           At the same time, the City of Goldfield  
18 really said they would like us to come closer to the  
19 city. So there are some cities that actually see the  
20 potential of a rail line as being beneficial rather  
21 than something that's problematic. So that's one of  
22 the things that we're considering in our EIS now is an  
23 alignment option that does come over to the west side  
24 of the town of Goldfield.

25           You can also see if you look really

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1 closely that some of these pink options actually dip  
2 into the Nevada Test and Training Range and those  
3 alignments were there in the original repository FEIS.  
4 The Department of Defense and the Air Force made it  
5 again unequivocally clear that they did not want to  
6 see any line that would transit the Test and Training  
7 Range. That was unviable space for them. They had  
8 significant national security activities going on and  
9 didn't want either construction operations or  
10 transportation operations going on in that space and  
11 so we did drop two options from further consideration,  
12 one here in the northwest corner and one down a little  
13 bit further. There was an option that did just dipped  
14 into the Test and Training Range down there that we  
15 are no longer studying. There are a number of other  
16 options that we are looking at and we're hoping to  
17 have all of those outlined in the draft EIS when it  
18 comes out possibly later this year.

19 At the same time as our preference  
20 statement for the Caliente corridor, we made our  
21 announcement to do through a notice of intent to do an  
22 environmental impact statement. We're covering not  
23 just the alignment options but we're also covering the  
24 potential construction operation and eventual  
25 abandonment of a rail line to the repository. All of

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1 that's part of the scope and again, this is the note  
2 that we have over 4,000 comments in the five locations  
3 that we held meetings in Nevada.

4 We're moving forward. The EIS contracts  
5 were all awarded in good time. We're engaged pretty  
6 heavily in conducting field surveys and for those of  
7 you that have come all the way from Nevada to  
8 participate, you know that this has been one of the  
9 wettest winters that they've seen in a long time. The  
10 whole Southwest has had a real deluge this winter  
11 which has been great for the drought that they've had  
12 but it's been really difficult for the field work that  
13 we need to be doing.

14 Between the activities in the Nevada Test  
15 and Training Range, their flight operations and other  
16 activities and the bad weather, we've not been able to  
17 complete the aerial survey work that we had hoped to  
18 have done by now. So we're still engaged in that. We  
19 are working on the conceptual design for the railroad.  
20 We do have the bulk of the geotechnical work done and  
21 the bulk of the hydrology work done out along the  
22 corridor and the alignment options and so we've made  
23 significant progress in the EIS front moving towards  
24 a draft EIS.

25 This is again some of the areas that we're

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1 collecting data on to feed both the EIS and the  
2 ongoing design work for the railroad that will go  
3 beyond what's required for the EIS itself. But it's  
4 the geotechnical work, the aerial surveying and aerial  
5 mapping. We have really good data from the USGS now,  
6 their mapping data that's down to a nine meter contour  
7 interval. But we're trying to drive down with the  
8 aerial mapping as a five foot contour level which will  
9 give us a lot greater capability of doing optimal  
10 alignments from construction perspective for the rail  
11 line within the corridor.

12 We're looking at the hydrology. Another  
13 good thing about the rain over the winter is that  
14 everything is blooming out there. So the ability to  
15 look at endangered and threatened plants and animals,  
16 we have very good coverage of the plants that are out  
17 there because everything is blooming this spring. So  
18 that's been very encouraging.

19 Upcoming milestones for the EIS activities  
20 is to complete the data collection that will feed the  
21 draft EIS. We're hoping to have that draft EIS out  
22 this year. It's probably going to be six months later  
23 than originally expected again because of the increase  
24 in scope. We hope to have the public hearings after  
25 the draft EIS, time to incorporate the feedback we get

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1 during that process. I'm not expecting to have a  
2 final environmental impact statement or a record of  
3 decision about what alignment would be chosen until  
4 sometime in FY `06.

5           Shortly after issuing the record of  
6 decision on both end alignment that would be selected  
7 and the decision to actually construct a railroad  
8 which has not been made yet, we would then do the  
9 contracting work for the final design construction of  
10 a railroad itself.

11           On casks, we've had a number of meetings  
12 with the NRC to talk about casks both one on one with  
13 the Spent Fuel Project Office who will be responsible  
14 for actually doing the cask certification, Bill Brock  
15 and the people that work for him. We're talking about  
16 what we've done both in terms of looking at existing  
17 cask designs and capabilities and what gaps there are  
18 between what we could possibly have to ship when the  
19 repository opens and what we can ship now.

20           Our goal is to procure the minimum suite  
21 of casks and go through the fewest number of  
22 certifications required to make sure that we have all  
23 coverage we need. Again, we would like to spend as  
24 little money as possible and we'd like to not  
25 complicate the NRC's life anymore than necessary in

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1 looking at additional designs. We'd like to have  
2 casks that provide the maximum flexibility in terms of  
3 both fuel compatibility and handling capability.

4 It's interesting that when we first  
5 started our review we invited the cask vendors to come  
6 and talk to us and asked them what percentage of  
7 what's out there can be shipped with the existing  
8 casks with existing certificates and we got some  
9 pretty good answers from them, very encouraging. But  
10 we knew there was an element of sales involved in  
11 those visits and so we said, "Put it in writing."

12 But not to put a burden on them rather  
13 than say, "Just make some proposals to us," we paid  
14 them to develop cask capability reports and again to  
15 keep an even playing field, all of the vendors that  
16 had an existing certificate with the NRC for a Type B  
17 cask were allowed to participate. We wanted qualified  
18 viable vendors. Out of that invite, we had six takers  
19 and we got cask capability reports and when we waded  
20 through all the data that was presented to us it  
21 looked like about 60 percent of the contents out there  
22 that we would be responsible for shipping, this is on  
23 the commercial side, 60 percent of that content could  
24 be covered by existing hardware designs with existing  
25 certificates. Well, unfortunately, the world's never

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1 simple enough that you can stop with just talking to  
2 one group of stakeholders.

3 CHAIRMAN RYAN: Just to clarify, that was  
4 60 percent by rail. Or was that rail and road?

5 MR. LANTHRUM: Sixty percent  
6 representative of rail and truck.

7 CHAIRMAN RYAN: Okay.

8 MR. LANTHRUM: Right. There were casks  
9 that could cover 60 percent of the contents and that  
10 included both some truck shipments and some rail  
11 shipments.

12 CHAIRMAN RYAN: I just wanted to get  
13 detail.

14 MR. LANTHRUM: You bet. The cask  
15 perspective is not the only perspective you have to  
16 look at unfortunately. So we also went out to try and  
17 update information about the utilities themselves and  
18 what capabilities they had in terms of crane  
19 capacities, ingress/egress. Do they have real access?  
20 Do they not have real access? How much lay-down space  
21 do they have? Can they get casks into their spent  
22 fuel pools? How much space is there?

23 Getting those reports back and blending  
24 that with the information that we got from the cask  
25 vendors indicates that we only have about half the

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1 coverage that we had hoped for. So about 30 percent  
2 of the content out there can be served both by  
3 existing cask designs and by the infrastructure that's  
4 at the utilities. So we have a bigger gap that we  
5 have to close than we would have liked to have had.  
6 The good part is we have some very good information  
7 now to work from.

8 That gap that we've identified that  
9 combines both the utilities capabilities and cask  
10 matching with the fuel types itself will be the  
11 starting point for our next round of procurement which  
12 will be for conceptual designs to close the gap,  
13 again, with the eye on what the limitations are at the  
14 utilities not keeping it freeform for the cask vendors  
15 to propose solutions that wouldn't really be useable.  
16 This goes into the cask capability reports I just  
17 talked about and the next steps are to issue the RFP  
18 for conceptual designs to close that gap.

19 On the rolling stock, we did somewhat the  
20 same approach. We are obligated we believe to produce  
21 rail cars that meet this new AAR 2043 standard.  
22 Obligate may be too strong a word. The standard is an  
23 industry standard and so there's no regulatory  
24 requirement to meet it. The fact that the industry  
25 has bought into the standard would make it very

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1 difficult in contracts base to not meet it.

2           Looking at the basis of the standard  
3 there is nothing new on the cars that are specified  
4 under the standard. What the standard does is it  
5 combines the best of existing technologies in a  
6 number of areas to provide a rail that has the best  
7 operational characteristics possible. That seems a  
8 pretty good argument to me whether we're obligated  
9 regulatorily or not may be a separate question. But  
10 looking at having the best rolling stock possible  
11 seems to be a good goal to strive for. And whether  
12 it's cars that meet the AAR standard or just the best  
13 available technology, it's a worthwhile goal.

14           We invited the rail car manufacturing  
15 community to come in and talk to us, both the people  
16 that produce passenger cars and the people that  
17 produce freight cars, talk them to about whether or  
18 not they felt that this AAR standards was achievable,  
19 what kind of timeframes and again, the feedback we got  
20 was fairly encouraging. The timeframes that we were  
21 looking at, five year window from the procurement of  
22 conceptual designs through prototype development  
23 through testing for approval and then getting into the  
24 final procurement process for the actual fabrication,  
25 they all said it was doable.

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1           One thing that we had anticipated doing  
2 since we are looking at the possibility of having both  
3 the cask bearing cars, the buffer cars that would be  
4 provide space between the locomotive and the cask cars  
5 and between the cask cars and the escort cars where  
6 our security force would be and the escort cars  
7 themselves, all three of those cars would have to meet  
8 the standard. We had originally anticipated a  
9 separate contract for the escort car because it's much  
10 more like a passenger car and a separate contract for  
11 combined buffer car/load-bearing car because those are  
12 both more like the freight type cars.

13           The consistent input we got from the  
14 vendors was that it's not just the performance of the  
15 cars that's part of the standard, but the performance  
16 of the consist where the consist is the whole train.  
17 If you're looking at the dynamics of how the cars work  
18 with each other in the consist, they recommended that  
19 we do a single procurement for one manufacturer to do  
20 all the cars even if that manufacturer had to do a  
21 subcontract for one particular type of car that they  
22 may not be a specialist in. They felt that that would  
23 ensure that the consist was designed to be functional  
24 and to pass the dynamic testing that's required as  
25 part of the standard. So we've taken that into heart

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1 as we move forward with our RFPs on the next steps.

2 In addition to the rail cars and the casks  
3 and the possibility of having some truck shipments, we  
4 also have a number of facilities that we're going to  
5 be responsible for. One of the largest ones is the  
6 Fleet Management Facility. We have to have a place to  
7 maintain the casks to the 10 CFR 71 Subpart H QA/QC  
8 requirements.

9 There's at least an annual maintenance  
10 requirement and then other maintenance requirements  
11 that vary from certificate to certificate depending on  
12 the cask design. A place to do that, a place to  
13 maintain the records, a place to have a compliant  
14 operations are going to be necessary.

15 We're going to have to have a Fleet  
16 operations center, a place to actually track the  
17 shipments, to maintain communications with the escort  
18 force that we have. It could be collocated with the  
19 Fleet Management Facility. It could be located  
20 separately but that's another operational functional  
21 requirement that we're going to have to have.

22 Where the track ends near the repository,  
23 we're going to have to have an end-of-the-line  
24 facility. Somewhere when we procure all of our rail  
25 cars and casks, we need a significant amount of lay-

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1 down space for all the hardware. We're anticipating  
2 having a very large siting located as an end-of-the-  
3 line facility where our inactive rail cars would be  
4 staged, where we could do reorganization of the  
5 material as it's coming into the repository, where we  
6 could do final security trade-off, hand-offs between  
7 the security provided for Transportation and the  
8 security provided for the repository itself. So there  
9 are a number of facility requirements that we're going  
10 to have that we're looking into right now.

11 With my unease over our challenge with  
12 getting full funding in parallel with looking at the  
13 facility requirements and conceptual design for the  
14 facilities, we're also looking into what it would take  
15 to procure services instead of building facilities if  
16 that were necessary during the first few years of  
17 operations. We've contacted some of the cask vendors  
18 that do those services for the casks that they produce  
19 currently and we've talk to the railroads about their  
20 ability to maintain rail cars that we might be  
21 procuring. We believe that all that can be done as a  
22 service procurement. Even though our operational  
23 costs would be higher, it would defer the need for  
24 high capital costs for facility construction at least  
25 during the initial years of operation which would be

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1 possibly helpful.

2 In the Nevada Rail Alignment EIS for study  
3 purposes, we are looking at multiple locations that  
4 could be used for each of these facilities to provide  
5 an environmental basis for the footprint and the  
6 ground disturbance. No decisions have been made yet  
7 and it's possible even though we are considering  
8 locations within Nevada. Some of the facilities like  
9 the operation facility could be located outside of  
10 Nevada, but at least, we're considering the possible  
11 locations within this rail line at EIS that we're  
12 currently conducting.

13 On operational planning, one of the areas  
14 that we're looking at after talking to our  
15 international partners, the Europeans use burn-up  
16 credit fairly extensively in order to get maximum  
17 utility of the casks that they have. Under the  
18 current regulatory framework, we don't get any credit  
19 for the fact that the fuel that we are transporting,  
20 the spent fuel, has a significantly-reduced component  
21 of the fuel that is actually fissionable and there's  
22 a significant increase in components of fission  
23 products that act as poisons in any kind of a  
24 calculation of what you would have in terms of the  
25 criticality if you were to have an accident.

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1           One of the reasons we don't get to take  
2 credit for that is there's not a good benchmarking  
3 between the analytical work that's been done in this  
4 country and actual performance, actual measurement of  
5 true spent fuel. The French actually have a fairly  
6 significant set of data that they have produced from  
7 their fuel to provide a benchmark for their analytical  
8 work that's provided the basis for certificates to let  
9 them take credit for that. We are working with the  
10 French to procure some of their data. We're working  
11 with the NRC very closely on that. In fact, we are  
12 procuring the data and based on our willingness to do  
13 that, the NRC is going to fund the actual analytical  
14 work that could then be the basis for data that would  
15 be provided to the cask vendors to use in applications  
16 to take credit for burn-up.

17           The practical benefit, there is nothing  
18 that we would not be able to ship without burn-up  
19 credit. That's too many double negatives. We could  
20 ship everything without it. What you might be  
21 constrained with though is without being able to take  
22 burn-up credit, you might not be able to put as much  
23 fuel in a cask as the cask could physically hold. One  
24 of the ways to deal with the potential for criticality  
25 is just not put enough material there to get a

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1 critical reaction even without the conservatism that's  
2 put back in with the burn-up credit. So we're hoping  
3 to actually improve our efficiency of operations by  
4 pursuing burn-up credit, but we would be able to ship  
5 again a derated cask, if you will, with contents  
6 without the burn-up credit. But I think it's an  
7 activity worth pursuing.

8 We're also working on an optimization  
9 model for transportation planning and the first phase  
10 of the optimization model is looking at what our  
11 procurements need to have in terms of assumptions on  
12 turnaround time for casks at utilities, transit time  
13 for loaded casts to the repository and then turnaround  
14 time for casks at the repository, the amount of time  
15 casks would be in maintenance to meet their 10 CFR 71  
16 Subpart H requirements, to get a feeling for the  
17 actual volume of infrastructure that we have to have  
18 to do ongoing operations at the phased approach, the  
19 amount it is looking at, which was 400 metric tons the  
20 first year and increasing gradually over five years to  
21 3,000 metric tons per year. So the first iteration of  
22 the model is really an investment planning model, how  
23 many casks do we need, how many rail cars do we need  
24 to get the kind of through-put we're talking about  
25 with a set of assumptions.

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1           The next phase of utility for this model  
2 we'll be looking at how do you actually structure your  
3 operations to maximize the through-put with the  
4 resources that you do have. And again, we have the  
5 constraint of not knowing who's going to be shipping  
6 nor of knowing how many casks the shipper will be able  
7 to load. So we're looking at range of scenarios that  
8 would include things like the possibility of using  
9 marshaling yards where you could take one or two casks  
10 from one utility, combine them with one or more casks  
11 from another utility and combine those in a single  
12 train that would then transit to the repository, again  
13 reducing the number of shipments that you would make  
14 over all.

15           There are a number of modeling tools that  
16 we're supporting in Transportation. RADTRAN is one  
17 that Ruth is intimately familiar with. It's a  
18 radiological risk assessment tool that's combined with  
19 other tools to look at the risk associated with  
20 transportation activities both normal and acts of  
21 transportation. TRAGIS is a routing tool that looks  
22 at all the DOT requirements. It has U.S. Census data  
23 in it that's a very robust routing tool that has very  
24 good information about roads and railroads for doing  
25 transportation planning.

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1           The combination of RADTRAN and TRAGIS is  
2 a very effective tool for both the Department to use  
3 and we're hoping for our states to use. We actually  
4 conducted a training operation for our state regional  
5 groups down in Oak Ridge last January, I believe it  
6 was, where we went through both the RADTRAN and the  
7 TRAGIS operations. They aren't always as user-  
8 friendly since they were developed for the working  
9 community not for the lay community, but we have some  
10 very strong interest in the part of the state regional  
11 groups to get more engaged and we will support them in  
12 their efforts to try and come up to speed on the use  
13 of the tools and helping them deploy them.

14           We're also looking at other policies on  
15 best practices in operations. I believe I have some  
16 slides later, but one of the areas that we're  
17 concerned about right now is the security  
18 requirements. We expect that between now and the time  
19 we start shipping there's a potential for some  
20 significant changes in th security requirements for  
21 operations and so we're working very closely with a  
22 group in GSA that's developing best practices for  
23 transportation operations. They pulled in Department  
24 of Homeland Security, Department of Defense,  
25 Department of Transportation and the Federal Railroad

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1 Administration, a subset of DOT, to talk about best  
2 practices in transportation on a variety of fronts and  
3 security is just one of those. So we're hoping that  
4 as we stay engaged with other agencies that are going  
5 to have an impact on the requirements area that we'll  
6 be able to inform the development of the system as we  
7 go along.

8 Security. We did have a joint meeting  
9 with the NRC, DOT, DHS and others to talk about a  
10 joint transportation classification guide. One of the  
11 challenges we have is that each of the agencies has a  
12 different criteria for classification of documents  
13 which makes it very difficult to share information and  
14 then you have different terminology about the degree  
15 of classification or the kind of classification that  
16 you're using.

17 The first joint meeting of the interagency  
18 classification guide was held last month here in  
19 Washington. It was a good starting point. Most of  
20 what it highlighted was how much work there is to do,  
21 but at least we've kicked off the effort and we'll  
22 continue in that regard.

23 We're going to continue collaboration with  
24 our international partners. I'm very interested in  
25 seeing the degree to which the French and others have

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1 developed the recovery capabilities for spent fuel  
2 shipments. I'm hoping to participate in an accident  
3 training exercise in France this summer.  
4 Domestically, the Office of Naval Reactors has about  
5 every five years they do an exercise where they  
6 simulate an accident. They did one last summer in  
7 Kansas City that we participated in. We learned a lot  
8 from that. It was a very good exercise and again, it  
9 pulled in not just the Federal agency participants,  
10 but all of the state and local responder groups were  
11 able to participate as well. It was a very good  
12 exercise and we're looking at collaborating both with  
13 our international partners and with states on  
14 developing our own view on how to actually test the  
15 system that we develop before we actually deploy it.

16 We're ongoing with looks of threat  
17 analyses. When we started off, we thought we would  
18 mimic what DoD does which is really to focus on design  
19 basis threats where you look at the "granddaddy of all  
20 threats" and you build your protection coverage around  
21 the granddaddy of all threats. But as we talked to  
22 both the technical review board and others a better  
23 approach was suggested that rather than relying on  
24 analysis of the worse threat, you develop a matrix of  
25 the spectrum of threats and you look at the spectrum

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1 of mitigating actions that you could take to deal with  
2 those threats and out of those, you find the ones that  
3 are easily to deploy and you wind up with a ranking of  
4 deployable mitigations and actions that you can take  
5 that will cover a range of threats that has perhaps  
6 more utility than something that focuses only on the  
7 most significant of threats. We're still working with  
8 the Office of Security and Safety Performance  
9 Assurance within DOE to establish this matrix of  
10 threat scenarios as well as a matrix of mitigating  
11 actions that could be taken to deal with those  
12 threats.

13 Looking in security in a very broad sense,  
14 Secretary Abraham before he departed has announced in  
15 a meeting in Oak Ridge a security for the 21st century  
16 initiative which included personnel security, physical  
17 security, information security, cyber security and a  
18 whole bunch of aspects to it and it's very fortunate  
19 the Office of Safety and Security Performance  
20 Assurance that has the charter for implementing  
21 Secretary Abraham's vision on security for the 21st  
22 century. They were looking for projects to apply some  
23 of the ideas that they had and we came along at just  
24 the right time. So our transportation activities are  
25 being used as more or less a pilot project for them to

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1 actually make some significant advances and that's  
2 encouraging.

3           On our institutional front, we're working  
4 with the state regional groups on developing the  
5 routing criteria and the route selection methodology.  
6 Again, I told you that we were working with the  
7 efforts to identify what activities are possible under  
8 180(c) funding and how you would allocate the funds  
9 for that and we're encouraging them to develop special  
10 project proposals. Again, the idea of project is it's  
11 something that would benefit both them and the  
12 government, that would have a defined beginning and  
13 end, that you'd have some funding applied to an  
14 activity that would produce a result and then you move  
15 on to the next one instead rather than having just a  
16 base level of funding that's provided in perpetuity  
17 that may or may not have any direct benefits for  
18 either the states or the government.

19           Some of the topic groups that are active.  
20 We've had a creation of a new Security Topic Group  
21 that deals with the public aspects of security, what  
22 sort of information you will be able to share, who you  
23 will be sharing it with, the degree of planning  
24 integration that you have, who needs to be involved in  
25 planning integration and at least identify in the

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1 context that would have the security clearance to be  
2 involved in the more detailed discussions about both  
3 security threats and mitigating actions.

4 We have this Tribal Topic Group that I've  
5 mentioned and we've expanded it to include all the  
6 tribes along the transportation routes or potential  
7 transportation routes that were identified in the  
8 repository FEIS and again, we've not had a resounding  
9 success in getting response from the tribes. It's  
10 going to be our job to get out and engage them rather  
11 than waiting for them to response and engage us.  
12 We'll be doing that over the next year.

13 I mentioned the Routing Topic Group did  
14 have its working session on RADTRAN and TRAGIS in Oak  
15 Ridge in January and we continue to work on the DOE  
16 Transportation protocols which is really the  
17 operational aspect of implementing a transportation  
18 system and that will be done between now and the time  
19 that operations start.

20 Overall, we have some challenges. Not  
21 getting the money that we wanted is not the least of  
22 our challenges. The encouraging thing is that a lot  
23 of the work that we have to do doesn't require money.  
24 Money is really primarily to buy things and with the  
25 little bit of cushion we have in timing because of the

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1 status of the repository itself, I can focus on  
2 planning activities that don't require buying hardware  
3 right now. But at some point, I'm going to have to  
4 spend a lot of money to buy casks, rail cars and  
5 facilities. We are looking at our infrastructure  
6 acquisition plans and we're moving them forward in  
7 phases where we're dealing with conceptual design work  
8 right now which is not as expensive and we are  
9 focusing on completing the Nevada rail alignment and  
10 EIS which will define at least an alignment option  
11 that we could perhaps select for development of a  
12 natural railroad which we think is key to making the  
13 repository successful. With that, I'll make myself  
14 available for questions.

15 MEMBER WEINER: Thank you. Bill.

16 MEMBER HINZE: That's really impressive.  
17 Let me ask you. You were talking about challenges.  
18 What's the major challenge in laying out the Nevada  
19 rail alignment?

20 MR. LANTHRUM: There's a slide I've used  
21 in some of my other discussions. I'm wishing I had it  
22 here now. What I did was I took the terrain that we  
23 have in Nevada from the starting point in Caliente to  
24 the endpoint and I looked at just the elevation  
25 changes over distance and I compared it to five other

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1 operating Class I railroads in this country and  
2 elsewhere. It's a cakewalk by comparison. We do not  
3 have a difficult technical challenge.

4 That said, it's not going to be easy to  
5 build, but the technology is there. We're looking at  
6 trying to operate this at a two percent grade. We  
7 have seven mountain ranges to cross, but the elevation  
8 difference between the valleys and the tops of the  
9 mountains, that's a fairly worn down mountain range.  
10 So we're looking at 2,000/3,000 foot elevation  
11 differences. It's not like going across the Rockies  
12 or the Sierras or the Cascades even.

13 So from a purely technical perspective,  
14 we're not expecting to have to do any tunneling.  
15 We're not expecting to have to do significant cuts and  
16 fills to get the two percent grades that we want. The  
17 biggest issues we have are trying to impact the people  
18 that live on and use that land as little as possible  
19 in building a railroad.

20 There are a lot of ranchers out there and  
21 they've expressed some significant concerns about what  
22 having a railroad out there could do to their  
23 operations and we're trying to figure ways that we can  
24 mitigate the concerns that they have on the water  
25 developments that they've done, on where they move

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1 their herds whether it's cattle or sheep between  
2 grazing areas seasonally. They have some significant  
3 concerns about the willingness of animals to cross  
4 railroad tracks.

5 The animals out there are a lot more wild  
6 than the animals that you have in much more lush  
7 environs and they're not used to seeing people.  
8 They're not used to seeing vehicles. They're very  
9 skiddish and they've indicated that just getting them  
10 to cross roads is sometimes very difficult. So those  
11 are the kinds of challenges that we're dealing with  
12 primarily as how do we build a railroad across terrain  
13 that's very buildable and have the least overall  
14 impact possible with the residents, land owners and  
15 land users that are out there and there's a lot of  
16 interest out there.

17 MEMBER HINZE: Is the presence of capable  
18 seismic faults of concern? Is this entered into the  
19 alignment of the railroad line?

20 MR. LANTHRUM: It hasn't been a strong  
21 concern of ours looking at where other railroads have  
22 built. Again, you build railroads. You don't have  
23 high centers of gravity. You don't have things like  
24 tall buildings and so your seismic sensitivity is  
25 going to be less than a lot of other structures.

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1 We're looking at shipments on the order of two to  
2 three a week. So our frequency of operations is  
3 fairly low.

4 What I'm actually more concerned about  
5 than seismic activity is drainage. Again, I  
6 referenced the significant weather we've had out there  
7 in January and a lot of you might have seen some of  
8 the washouts that happened in Nevada as well as  
9 California. There were significant portions of track  
10 that follow canyons on the edge of rivers that were  
11 washed out. The track actually fell off. So what I'm  
12 more concerned about from an operational perspective  
13 is designing drainage and looking at the hydrology out  
14 there more so than seismic activity.

15 MEMBER HINZE: You mentioned the  
16 possibility of the mining companies and the city of  
17 Goldfield using the track. How do you interact your  
18 use of the line with the commercial uses of the line?

19 MR. LANTHRUM: One of the specific  
20 questions we asked when we started into the  
21 environmental impact statement was whether or not  
22 there was interest in making this line available for  
23 common carriage. So we specifically asked for input  
24 from the communities and from the land owners and from  
25 the land users out there if there were things that

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1 they'd like to see shipped in or things that they saw  
2 that might be shipped out to make the line for common  
3 carriage.

4 We have not made a decision yet about  
5 whether it would be available for common carriage, but  
6 the EIS scoping process is where we got the primary  
7 input and we're continuing to discuss with the  
8 communities out there possible uses for that railroad  
9 as part of our ongoing interactions and that will be  
10 part of the consideration when a decision is made.  
11 There's not a lot of industrial activity out there  
12 now. There is some hope that having a railroad  
13 available would make some things possible that  
14 currently are not possible. So a lot of the talk  
15 about possible common carriage uses of the rail line  
16 are for things that might come not things that are  
17 there currently.

18 MEMBER HINZE: If I understood correctly,  
19 you haven't made a decision on whether you're going to  
20 use dedicated trains or not.

21 MR. LANTHRUM: That's correct.

22 MEMBER HINZE: And is that also true in  
23 not just for the Nevada line but for the other areas  
24 of the country?

25 MR. LANTHRUM: Well, it's primarily true

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1 for other areas of the country. I think by default  
2 once you get to Nevada even if we were in a key train  
3 once you decouple from the mainline track in Caliente  
4 and connect to the line that goes to the repository,  
5 it's not likely there would be anything else.

6 So by default, it becomes a dedicated  
7 train at that point unless there is some significant  
8 interest in developing common carriage activities.  
9 But even if there, the line would be available. We  
10 wouldn't necessarily have to be shipping those  
11 commodities with our shipments. But it nominally is  
12 going to be a dedicated train once it gets to Nevada  
13 just by default.

14 MEMBER HINZE: Coming from Indiana and  
15 realizing that on the front page of our little local  
16 newspaper, quite frequently there are comments about  
17 nuclear waste trains passing through our city. Have  
18 you changed your criteria, modified your criteria, for  
19 the selection of routes as a result of your  
20 interaction with the state regional groups?

21 MR. LANTHRUM: What we're doing right now  
22 with the state regional group is to try and come up  
23 with again the criteria and the methodology, what kind  
24 of things would you weigh. It's a challenge  
25 particularly for rail shipments. For highway

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1 shipments, the states have a lot of latitude in  
2 designating alternate highway routes and it's a state  
3 prerogative under DOT regulations.

4 For rail shipments, the states don't  
5 really have any role because the rail shipments are  
6 all on private land. It's not state land or federal  
7 land. Interestingly though, the railroads have some  
8 of the same criteria in terms of industry standards  
9 that DOT establishes for highway shippers and the  
10 basic requirement for highway shipments is that you  
11 use interstate highways to the maximum extent  
12 practicable with the understanding that you're going  
13 to have to get from a shipping site to the interstate  
14 system and then from the interstate system to the  
15 receiving site wherever that is.

16 Similarly, the railroads encourage the use  
17 of Class 1 track which is their equivalent of the  
18 interstate system

19 MEMBER HINZE: Right.

20 MR. LANTHRUM: A lot of states have  
21 expressed concern about shipments through major  
22 population areas.

23 MEMBER HINZE: Exactly.

24 MR. LANTHRUM: But that's where the Class  
25 1 track is and what we're working with the states on

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1 is how do you weigh and again, Ruth has been helpful  
2 in some of the work that she's done on decision  
3 models, helping people weigh attributes that they're  
4 concerned about and weigh them against each other in  
5 helping to make informed decisions. If population  
6 concerns are a bigger deal than track quality, that  
7 would form one type of decision. If track quality is  
8 a bigger concern than population densities, then the  
9 decision would go another way. So we're giving the  
10 tools to the states.

11 We're working with them on developing a  
12 criteria, but we're not expecting the same criteria to  
13 be applied in all areas. There will be regional and  
14 local differences in what the expectations are and  
15 we'll be working closely with our state and local  
16 groups to identify our operational commitments based  
17 on their input. Again, the decisions are going to be  
18 Department's but we are asking for significant input  
19 and we're giving our stakeholders significant tools to  
20 work with to help make informed decisions.

21 MEMBER HINZE: Good. Thanks very much.  
22 I appreciate it.

23 MEMBER WEINER: Mike.

24 CHAIRMAN RYAN: Just one. Thanks for a  
25 real informative presentation. It strikes me though

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1 as we heard two presentations today, one about the  
2 design and issues related there and one about the  
3 transport system that we heard in both presentations  
4 the idea of optimization.

5 MR. LANTHRUM: Yes.

6 CHAIRMAN RYAN: And then it was clear how  
7 that's done, but as I was sitting here thinking about  
8 transportation, my principles of optimization there  
9 might be different than they might be for an  
10 engineering facility. How are you going to couple  
11 this optimization process so that you address both  
12 ends of it that may be compatible or may actually have  
13 points of conflict?

14 Let me give you an example. You might say  
15 well I can ship anything anytime if you give me a few  
16 hundred more million dollars that buys as many casks  
17 of each type as I need.

18 MR. LANTHRUM: Right.

19 CHAIRMAN RYAN: Obviously, that's probably  
20 outside the envelope.

21 MR. LANTHRUM: No, please. Let's keep it  
22 in the envelope.

23 CHAIRMAN RYAN: There'll be a limit. Two,  
24 from a facility operation facility, their optimization  
25 may be on wanting to get certain types of certain

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1 locations at one time and they could either be  
2 harmonious or clash. Have you guys put your heads  
3 together on that yet?

4 MR. LANTHRUM: We do a little bit. What  
5 I'm really seeing is that the optimization that I  
6 would do when I run the programs, I'll run it from a  
7 purely transportation perspective. How can I get the  
8 most through-put with the resources that I have  
9 available? That would be my goal.

10 I'm not kidding myself that I'm going to  
11 be the decision maker. What I do is I bring that to  
12 the table with the head of RW and say this would be a  
13 great transportation perspective. How does that play  
14 into the program decisions about what has to be done?

15 CHAIRMAN RYAN: The latter question is the  
16 key one because the through-put may or may not be  
17 acceptable at the other end.

18 MR. LANTHRUM: Absolutely.

19 CHAIRMAN RYAN: So I guess I just see that  
20 the facility design and their capabilities is as much  
21 a question for the transportation program as the  
22 routing and all the other challenges you so well  
23 articulated today.

24 MR. LANTHRUM: Absolutely. What I have to  
25 bring to the table is the view that I can offer an

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1 optimal system but that if I'm directed to deliver  
2 something suboptimal, there will be consequences. It  
3 will cost more for what I'm able to move and part of  
4 it is to show that I'm able to actually do good  
5 planning by presenting an optimal view.

6 If I'm given constraints, the modeling is  
7 capable of then taking the constraints that I'm dealt,  
8 that I have to work with, and reoptimizing within  
9 those constraints. It won't be as optimal a solution  
10 as I would come up with unconstrained, but I can  
11 refine things within a set of constraints.

12 For example, if there are a few specific  
13 sites that have a particular type of fuel that is of  
14 interest for delivery during the first year of  
15 operations and they are not located anywhere near each  
16 other. So I have assets spread at opposite ends of  
17 the country. That would not be an optimal setup. But  
18 how I conduct those shipments, I might be able to  
19 construct a view that would use fewer resources over  
20 a short period of time, for example, doing campaigning  
21 where I have more casks per train coming from distant  
22 locations and I stage things like I indicated in  
23 marshaling yards to build a fairly significant train  
24 before I run it to again maximize the use of resources  
25 within a constrained environment.

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1 CHAIRMAN RYAN: Sure, and I can appreciate  
2 the view that you have the key responsibility on the  
3 transportation side. But from a risk perspective or  
4 an optimization perspective, I don't separate the two.  
5 I look at the repository and the transportation system  
6 as a system that has to be optimized on whatever  
7 principle or point of optimization you pick. But it's  
8 very much a system.

9 MR. LANTHRUM: And it is going to be an  
10 iterative solution process.

11 CHAIRMAN RYAN: Right.

12 MR. LANTHRUM: But something has to be  
13 brought to the table to iterate and I think I want to  
14 be the first there.

15 CHAIRMAN RYAN: Thank you.

16 MEMBER WEINER: Jim.

17 MEMBER CLARKE: I'm just curious about  
18 this and this may be premature but as the train pulls  
19 out of Caliente headed for the repository, what will  
20 it look like? Will you have flexibility concerning  
21 how much you can put in the middle, the buffer cars,  
22 the locomotive, the escort cars? Is that a fairly  
23 flexible design?

24 MR. LANTHRUM: Well, it's a little bit  
25 flexible. The escort car under current designs would

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1 typically be at the end of the train just because the  
2 escort cars are often lighter than the load-bearing  
3 cars and from train dynamics, you don't run a light  
4 car in between two much heavier cars. You certainly  
5 don't want a really heavy car behind a light car when  
6 you hit the brakes. That's just not a good deal. It  
7 can tend to cause jack-knifing and other track  
8 problems.

9 It's very likely to be two engines and  
10 very likely to be puller engines as opposed to pusher  
11 engines followed by a buffer car followed by a series  
12 of load-bearing cars with casks followed by another  
13 buffer car and an escort car. How many cask cars?  
14 Again, it's desirable to have as many as you can so  
15 you can reduce the number of shipments that you have  
16 to conduct. But in the repository FEIS, we analyzed  
17 from one to five shipments per train. We can revisit  
18 that later if there were an opportunity of increasing  
19 it beyond five.

20 MEMBER CLARKE: Yes, I just wondered how  
21 that would coordinate with the repository, what's  
22 coming and when it's coming it.

23 MR. LANTHRUM: And actually when I talked  
24 about the end-of-line facility, that would anticipate  
25 to be near the receipt gate. The sally port where you

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1 actually do the hand-off between the transportation  
2 activities and transportation security requirements  
3 and where the repository of the security requirements  
4 take over, that sally port as originally designed  
5 would not have been long enough to get three of our  
6 consist cars in with casks. So we're working with  
7 them closely since that design hasn't been finalized  
8 to make the sally port larger.

9 But it may be that we'll have to do if  
10 we're able to run larger trains we may have to put  
11 three cars in, clear those in the repository while  
12 keeping two cars or more cars out in the line facility  
13 in the transportation area with our responsibility for  
14 security and then phase them into the repository.

15 Again, their cask handling capability, we  
16 made sure that the bounding requirements for our casks  
17 were going to be accommodated by their facility  
18 designs, their grappling hooks, their crane  
19 capacities, all of that would meet with both our  
20 largest casks and be able to handle the smallest casks  
21 that we're looking at. We've been working on that  
22 very closely with them.

23 And they do have the ability to stage  
24 things in lead storage. I think they've probably  
25 showed you the aging facility. There is an aging

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1 facility adjacent to the cask handling facility as  
2 well on the more distant location and they could stage  
3 things in the aging facility and then feed them  
4 through the actual fuel handling facility or cask  
5 handling facility as they were ready for them.

6 MEMBER CLARKE: Thank you.

7 MEMBER WEINER: Staff questions? Ashok.

8 MR. THADANI: Thank you. You know I am  
9 shocked. When I was heading up our Office of  
10 Research, even I didn't take the kinds of (budget)  
11 cuts you are experiencing here. It's incredible. But  
12 that does raise a question and that is the design  
13 fabrication of casks is fairly expensive as I  
14 understand and if you're going to conduct any testing  
15 that would be pretty expensive as well. So you talked  
16 about the accomplishments. This significant reduction  
17 of resources obviously it has fleshed out your plans  
18 and so on. But you didn't really say what's the real  
19 impact.

20 MR. LANTHRUM: The real impact is I did  
21 not buy casks or rail cars this year. If I had gotten  
22 the \$187 million that we requested, we would have  
23 actually funded development of prototype rail cars and  
24 started testing at TCCI. We're not going that. I  
25 would have bought casks this year and we would have

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1 started that process. We're not buying casks.

2 We're going to push out an RFP and we're  
3 going to push it out towards the end of the fiscal  
4 year so we don't have to award the contract until the  
5 next fiscal year. So that's what it's done. It's  
6 delayed the procurement of hardware. But the bulk of  
7 the funding, the real expense that I have, in the near  
8 term is in buying hardware.

9 About four to five years before we start,  
10 actually four years before we start shipment, the  
11 costs aren't going up significantly in providing  
12 training funds for states and tribes for emergency  
13 preparedness, but that's a little bit further off. We  
14 expect that to start around 2006 for shipments in  
15 2010. Now the 2010 is not going to be happening. The  
16 start of that funding process will then be tied to  
17 what the new date is when it's set by the repository  
18 and by the program.

19 MR. THADANI: Just a comment. In terms of  
20 criticality in getting the burn-up data from the  
21 French, it seems to me that would be the correct way  
22 to go to be able to do more realistic assessment of  
23 what the risks would be. So certainly, I think the  
24 path you're on is an important one.

25 MR. LANTHRUM: When we started the new

1 Office of National Transportation, we had these big  
2 tech meetings where we bring in all of our  
3 stakeholders and one of the clear messages that they  
4 gave us was don't reinvent the wheel. If there's  
5 something that's been done and the world has been  
6 shipping spent nuclear fuel for an extended period of  
7 time and has a good safety record in doing that. They  
8 said build on that safety record. You can make it  
9 better. You can do new things, but don't start from  
10 scratch. So we've taken that lesson to heart.

11 MR. THADANI: There's another safety  
12 benefit in that the number of trips, I guess, will be  
13 reduced if you do more realistic assessment. So I  
14 think there is some benefit too.

15 MEMBER WEINER: Mike and John, questions.  
16 Then I'm going to ask if you can keep them as short as  
17 possible because we have another member of the  
18 audience that --

19 MR. SCOTT: Mike Scott, ACNW staff. The  
20 District of Columbia is currently in court attempting  
21 to deny the railroads the permission to take hazardous  
22 materials through the District and I read in the paper  
23 this morning that a Federal judge has refused to block  
24 them from doing that. You mentioned that you're  
25 either planning to or you're already in negotiation

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1 with states and other entities. Do you see this court  
2 battle going on currently as having applicability to  
3 your situation?

4 MR. LANTHRUM: Depending on how it goes,  
5 it could clearly have some other applicability if  
6 other states wind up jumping onto it and if they  
7 continue to have success with their new prohibition.  
8 If they do, it just becomes another constraint that I  
9 have to consider in the way. It would make  
10 transportation more difficult, but it's always going  
11 to be achievable. It's just an additional constraint  
12 that we'd have to deal with.

13 MR. SCOTT: Thank you.

14 MEMBER WEINER: John. Engelbrecht von  
15 Tiesenhausen from -- Oh, I'm sorry.

16 DR. LARKINS: Just a quick question.

17 MEMBER WEINER: John.

18 DR. LARKINS: You mentioned one of the  
19 inhibitions to making progress in developing an  
20 optimization model was not knowing up front what the  
21 utilities might want to ship first. Why not engage  
22 them in the discussion, some pre-planning, as to what  
23 types of --

24 MR. LANTHRUM: They're suing us.

25 DR. LARKINS: Okay.

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1 MR. LANTHRUM: The discussions are very  
2 difficult with the current litigation.

3 MEMBER WEINER: Now I'd like to recognize  
4 Engelbrecht von Tiesenhausen from Floric County,  
5 Nevada and who has some questions for you, I assume,  
6 Gary.

7 DR. LARKINS: Okay.

8 MEMBER WEINER: Actually, he had some  
9 questions for the Committee on concerns that --  
10 Engelbrecht suggested that he could help and could  
11 relay some questions that he often hears from members  
12 of the public and I thought it would be helpful for  
13 the Committee to hear these questions in our session  
14 today. So, Engelbrecht, welcome. Thank you.

15 MR. von TIESENHAUSEN: Thank you, Dr.  
16 Ryan, Dr. Weinberg for giving me this opportunity to  
17 voice some of the questions that the public in the Las  
18 Vegas area has about transportation issues. Some of  
19 these are directed at the NRC. Some of these are  
20 directed at the DOE and some of these I'm not sure,  
21 but I'll just go through the list.

22 Cask certification is always an issues  
23 that comes up in the public's eye especially as far as  
24 the scaling goes if there are any difficulties.  
25 Scaling fires are sometimes problematic.

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1 Current status on the PPS. What will be  
2 done? What tests are planned and when will they be  
3 done and possibly where?

4 One big issue that always comes up and  
5 nobody ever has a good answer is Price-Anderson and  
6 liability issues. When does Price-Anderson kick in?  
7 How much is covered? If there are economic impacts  
8 due to a release that are not directly attributable to  
9 contamination, is that covered under Price-Anderson or  
10 not?

11 Spent fuel characteristics versus fresh  
12 fuel? A lot of the transportation experience that is  
13 often quoted has to do with fresh fuel transportation.  
14 What would be the differences if you used spent fuel?  
15 If it was in accidents that ruptured a cask, a remote  
16 possibility it may be, but what would be the  
17 difference in release in fresh versus spent fuel?

18 Routing issues. The NRC does have a role  
19 in routing issues and it is not clear to the public  
20 exactly what that is. If a railroad is constructed,  
21 who will run it? Maybe that decision has been made  
22 and what are the ramifications to the various  
23 decisions that could be made as who is responsible for  
24 the operation of the railroad?

25 Notification requirements and how will the

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1 public be advised? I know Gary touched on this a  
2 little but not completely. And will they be advised?

3 What are the differences between safety  
4 and security? How are those addressed?

5 That's about the end of my questions.  
6 Thank you for the opportunity to put this on the  
7 record.

8 CHAIRMAN RYAN: Sure, Engelbrecht, and  
9 again as I mentioned, I think it's helpful for us to  
10 hear those questions and as we think about  
11 transportation issues we can have them in our mind and  
12 in our record to refer back to. So I appreciate your  
13 sharing those. Thanks.

14 MR. von TIESENHAUSEN: Thank you.

15 MEMBER WEINER: Back over to you.

16 CHAIRMAN RYAN: Okay.

17 MEMBER WEINER: Thank you by the way.

18 Thank you very much for an excellent presentation and  
19 thank you, Engelbrecht, for bringing up the questions.

20 CHAIRMAN RYAN: Thank you very much.

21 Let's see. Who's up next?

22 MEMBER WEINER: EPRI is up.

23 CHAIRMAN RYAN: Our next session, the  
24 cognizant member is Dr. Hinze. So I'll turn the  
25 meeting over to you.

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1                   MEMBER HINZE: Fine. We'll let people get  
2 arranged here a bit. This brings to mind that John  
3 Kessler is going to be appearing before the Committee  
4 to discuss time of compliance and this is just about  
5 the decadal anniversary of the time that he made us a  
6 presentation on the same topic at a working group of  
7 this committee. John and the EPRI group have been  
8 looking intensively for the last couple of months of  
9 the concerns revolving around the time of compliance  
10 and the need to reconsider and to change the time of  
11 compliance issues in 40 CFR 197 and 10 CFR 63. John  
12 will be telling us about the results of his  
13 deliberations. Thank you, John.

14                   MR. KESSLER: Thank you, Bill, and thanks  
15 to the Committee for providing time on your agenda for  
16 me to discuss this report.

17                   The report was released a week ago  
18 yesterday. There's the title, "Yucca Mountain  
19 Licensing Standard Options for Very Long Timeframes,"  
20 and really the majority of the report is about the  
21 technical bases for what we think the standard at  
22 least we need to consider as well as the compliance  
23 assessments. The website is there. This is available  
24 to members of the public. If you click on that  
25 website or enter that, you should be able to download

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1 the report.

2 I would like to acknowledge the authors.  
3 The lead author, Matt Kozak, from Monitor Scientific  
4 is here. I was sort of the second author. There is  
5 another major author, Matthew Huber, from Pursue who  
6 helped us with teacher climate issues, really  
7 surveying what's known about paleoclimates and how we  
8 might use that as well as the uncertainties. The  
9 other contributors are Austin Long from Arizona who  
10 also discussed historically a future climate in every  
11 report, Mick Apted also from Monitor Scientific who  
12 talked about performance assessment issues as well as  
13 bringing in some of the international perspectives and  
14 Fraser King up in Canada talking about long-term  
15 material issues.

16 I think for the zero to one of you in the  
17 room I can go through real quickly. Those of you who  
18 don't know the background of this, the Energy Policy  
19 Act of 1992, EPA was to contract with the National  
20 Academy of Sciences to provide the technical bases for  
21 the Yucca Mountain specific standard. EPA's rule is  
22 to be based upon and consistent with the NAS  
23 recommendations. And then NRC is to issue an  
24 conforming/implementing regulation.

25 In 1995, the NAS TYMS Committee, Technical

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1 Basis for Yucca Mountain Standards, issued their  
2 report. In 2001, EPA and NRC issued their  
3 regulations. There were multiple law suits on those  
4 two regulations as well as other issues that didn't  
5 have to do with the regulations.

6 And last summer, the Court of Appeals  
7 ruled on those law suits. All the challenges raised  
8 were denied except one. The Court ruled that EPA did  
9 not follow the TYMS recommendations on the time period  
10 of compliance and gave EPA two options. One was EPA  
11 could go back to Congress and the other was that EPA  
12 could reissue a standard or issue a new standard or  
13 whatever based upon and consistent with the TYMS  
14 recommendation. So the options were reissue the  
15 original standard with appropriate explanation, I  
16 suppose, or what we're assuming for this report is  
17 that they may choose to issue a new standard with  
18 requirements for time periods to peak dose.

19 The purpose of the EPRI report here was to  
20 assess the technical implications and options that are  
21 associated with regulatory compliance periods in  
22 excess of 10,000 years that are consistent with the  
23 July 9th Court of Appeals ruling. So we're trying to  
24 come up with options and considerations that are based  
25 upon and consistent with the TYMS recommendations, but

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1 also would result in a standard that provides  
2 "meaningful" protection of public health and safety.

3 I've put "meaningful" in quotes there  
4 because that was something that the TYMS Committee  
5 report talked about was a necessary requirement and  
6 that also would be "reasonable" and implementable in  
7 a regulatory environment. "Reasonable" is in quotes  
8 there because that showed up in the House language  
9 that backed up the Energy Policy Act.

10 The implementable in the regulatory  
11 environment, what do I do and more what do I don't  
12 mean by implementable. What we mean by implementable  
13 is that NRC assuming they received an application,  
14 would be able to make a regulatory decision based on  
15 the information that could be provided by DOE. That  
16 is essentially you could have a docketable license  
17 application, that it is possible to pull together  
18 information to get a docketable license application.

19 So what we don't mean there is that we  
20 want a regulation such that we know Yucca Mountain is  
21 going to be pass, just that the information can be  
22 collected. Then it will be up to NRC to decide. We  
23 also want to avoid revisiting issues that were settled  
24 in the Court of Appeals ruling. We don't want to  
25 cover old ground.

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1           We made a few assumptions in the report  
2           that the July 9, 2004 Court of Appeals ruling is used  
3           as the primary guidance. What that means is that for  
4           the bottom bullet there we use the TYMS Committee  
5           report really as the bible. The Court ruling says  
6           make it based upon and consistent with that TYMS  
7           report. So we tried to suck that TYMS report dry in  
8           terms of everything that we could get out of it on how  
9           to come up with issues and approaches to what a  
10          regulation extending past 10,000 years would look like  
11          and admissible it there for the purposes of the  
12          arguments made in this report, we assumed no  
13          Congressional action. We understand that there may be  
14          Congressional action that will essentially bypass what  
15          EPA may be doing but for the purposes of this report  
16          we didn't assume that Congressional action occurred.

17                 Really, our main concerns that caused us  
18                 to want to pull together some ideas here with the  
19                 regulatory time of compliance for these very long  
20                 timeframes are laid out here. First of all, as I'll  
21                 try to show and talk about in a little bit more  
22                 detail, we do believe that uncertainties grow with  
23                 time and we're not alone in feeling that way. I'll  
24                 talk about a lot of other organizations that discuss  
25                 their feelings about uncertainties growing with time.

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1           The other concern is that it's really more  
2 of a recognition. We recognize that there will be an  
3 adjudicatory nature to the NRC licensing process with  
4 the Atomic Safety and Licensing Board hearings that  
5 will occur. We think that that's just going to drive  
6 the need for detailed models and data to very high  
7 degree and we're concerned that if uncertainties grow  
8 with time and we have an adjudicatory nature of a  
9 licensing process that it could present some issues.

10           Another thing about very long timeframes  
11 is that they are unprecedented in the U.S. and nearly  
12 so internationally. I would say really they are  
13 unprecedented even internationally in the sense that  
14 those countries that are calculating and do have  
15 requirements in their books for calculations to very  
16 long timeframes, none of them are anywhere near ready  
17 to subject that to the rigorous licensing process like  
18 may be occurring in the near future here in the U.S.  
19 for Yucca Mountain.

20           Another concern is that we're concerned  
21 that it could potentially penalize a good repository  
22 system. I mean system not only the geologic features  
23 but the engineer, really the combination of the  
24 engineering and geologic. One of the things about a  
25 good repository system is it's going to delay peak

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1 dose and you want the peak delayed. It's better from  
2 a safety standpoint. You get more radioactive decay.

3 The problem then is that it's harder to  
4 know the details of the repository behavior very far  
5 out in time. So in a sense, your good repository  
6 system could be harder to defend in an NRC's licensing  
7 process than some system with poorer characteristics  
8 that might have a peak that occurs much earlier in  
9 time.

10 Our last concern is that potentially we're  
11 really just talking about the math here with  
12 potentially little to no safety benefit. What do I  
13 mean by that? We've already seen DOE change their  
14 design in response to the very demanding requirements  
15 in the existing Part 197 and Part 63. We've seen them  
16 make some major changes to their engineer design  
17 because of that and we're not really sure whether  
18 simply extending the time period would add to that  
19 safety or would just require a lot more analysis and  
20 demonstration of the existing repository system design  
21 and its safety.

22 A quick going through the chapters of the  
23 report. We have an intro and background. We talk  
24 about treatment of uncertainties and the increase of  
25 uncertainties of time at Yucca Mountain. We have a

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1 chapter specifically on climate change. You're going  
2 to hear me talk a lot more about specifically climates  
3 to change in this report and what we think the  
4 implications are.

5 We have another chapter on international  
6 approaches to addressing uncertainties over long time  
7 timeframes. Then we have a section on really matching  
8 the regulations to the time scale and time dependent  
9 factors where we present some various options. It  
10 talks about the pros and the cons of various  
11 approaches. Then we really summarize the elements of  
12 what we think would be a new Yucca Mountain standard  
13 that we feel is based upon and consistent with the  
14 TYMS report. Conclusions and then we have an appendix  
15 really to talk about what we do and don't know about  
16 climate change and evolution and really why we think  
17 it's so difficult to deal with climate change details  
18 and why that's important.

19 Okay. I'm going to try to go through the  
20 long logic trail we have in this report as to how we  
21 got to the recommendations at the end that we got to.  
22 So we start with the bible. We talk about some of the  
23 main TYMS Committee recommendations and their  
24 comments. First is that they say that we recommend a  
25 compliance assessment be conducted for the time when

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1 greatest risk occurs within the limits imposed by long  
2 term stability of the geologic environment which means  
3 one million years as they go on to explain.

4 They also talk about the standard needing  
5 to be meaningful and what they meant there was the  
6 form of the standard. They talked about individual  
7 health risk is their preferred criterion. They talked  
8 about the compliance assessment also being based on  
9 conceptual and numerical models that reasonably  
10 reflect present day understanding of the features,  
11 events and processes (FEPs).

12 They also discussed which is the main part  
13 of this report that some FEPs necessary to perform  
14 those health risk assessments over very long time  
15 timeframes are less well understood than others and  
16 they talk a bit and provide an example or two as to  
17 how you deal with those less well-known FEPs. You  
18 will see that we don't think they went far enough in  
19 describing all the cases as to how to deal with those  
20 less well-known FEPs and we proposed some things that  
21 we think are based on their approach. The last point  
22 is that they mentioned in the report that they like  
23 the concept of the negligible incremental risk (NIR)  
24 to screen FEPs and I will talk a bit about how we took  
25 that and came up with an approach.

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1                   MEMBER HINZE: I think it would be  
2 worthwhile, John, if you just described what NIR is.

3                   MR. KESSLER: I will get to that.  
4 Negligible incremental risk, what they're arguing is  
5 that if you're below a certain risk level than you can  
6 essentially screen out those FEPs from further  
7 consideration and I'll talk about that in a bit more  
8 detail later on.

9                   This cartoon came really from the  
10 international literature. It's a presentation by  
11 Masuda in Japan, but it's being used quite a bit in  
12 other international publications. It just gives you  
13 in cartoon fashion. The components of the repository  
14 on the right there is some understanding of the  
15 predictability in terms of the confidence that we know  
16 the details about those particular components of the  
17 system over time and really the take-home message is  
18 that they're not all the same. We know some parts of  
19 the system better than we know others and  
20 specifically, details about the biosphere and human  
21 behavior are the least predictable. Surface  
22 environment comes next and then the geosphere and  
23 engineered barrier systems which is consistent with  
24 the TYMS report are the most predictable or most  
25 understood for the longest period of time.

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1                   Getting into the issue about  
2                   uncertainties. We asked ourselves, "Do uncertainties  
3                   grow with time?" The answer we believe is yes, they  
4                   do grow in time and in various ways. One thing that  
5                   we note in the report is that current approaches  
6                   where we deal with uncertainties, that a lot of them  
7                   are fixed in the sense that we assume some uncertain  
8                   distribution on neptunium, solubility or general  
9                   corrosion rate for Alloy 22 and we don't tend to say  
10                  that this band for the first 10,000 years in some  
11                  other uncertainty band beyond that.

12                  But does that mean that uncertainty grows  
13                  with time? We argue it does mean it actually does  
14                  mean uncertainties grow with time because the  
15                  projections of those fixed uncertainties as you make  
16                  one assumption you get one essentially pathway of what  
17                  you think dose versus time will be versus something  
18                  else and that does expand in time.

19                  For example, you could present that  
20                  uncertainty band and the growth of uncertainties in  
21                  two different ways. This is just an example of two  
22                  different ways that uncertainties are being presented.  
23                  Fortunately, for whatever it's worth, more often, we  
24                  present these dose versus time on uncertainties in a  
25                  log-log plot as you see at the left. And I believe

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1 that when the Court of Appeals was seeing some of  
2 these view graphs, they were seeing the ones on the  
3 left and they were saying, "Gee, it looks like  
4 uncertainties don't grow with time. The bands stay  
5 the same distance apart." We're arguing that's  
6 because it's on a log-log scale.

7 If you presented it on a semi-log scale,  
8 you could actually see now that the uncertainties do  
9 grow with time. Another point we'd like to make is  
10 that TYMS panel did note that eventually the  
11 uncertainties might decrease with time. We see that  
12 too. What I'd like to point out is that the  
13 uncertainties are growing right up to the time of peak  
14 dose and that's what matters is what uncertainties  
15 happen up to the time of peak. Whether they decrease  
16 again past peak dose is immaterial.

17 Stepping back here, the next main bullet  
18 there is that another way uncertainties grow with time  
19 is that our understanding of the FEPs that governs  
20 system behavior also decreases with time. For  
21 example, the long-term material degradation mechanisms  
22 would become less certain of what they really are.  
23 I'll talk a lot more about our understanding of future  
24 climate state that also decreases with time and what  
25 that means.

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1           As I mentioned earlier, the TYMS report  
2 partially recognized that uncertainties do grow with  
3 time. There are words in there that talk about that,  
4 but they also noted that some uncertainties decrease  
5 with time. They provided in the report a specific  
6 example on waste packages. They say eventually  
7 they've all failed. That means essentially the  
8 uncertainty as to whether they failed or not has  
9 decreased with time.

10           I would argue that's a specious argument  
11 because what we really care about is the peak failure  
12 rate. That's what tends to govern peak dose, not that  
13 whether all the containers have failed or not. But  
14 rate at which they're failing seems to be much more  
15 important to peak dose risk. I talked about that.

16           Going back to the bible again, they had  
17 some comments about uncertainty. They concluded that  
18 most physical and geological processes are  
19 sufficiently quantifiable and related uncertainties  
20 sufficiently boundable, that the performance  
21 assessment can be assessed over timeframes during  
22 which the yadda, yadda, yadda. The geologic record  
23 suggests that timeframe is on the order of  $10^6$  years.

24           What they're noticing, for example, is  
25 that once an exposure scenario has been adopted, and

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1 they're talking about mostly human behavior issues  
2 here, performance assessment calculations can be  
3 carried out with a degree of uncertainty comparable to  
4 the uncertainty associated with geologic processes and  
5 engineered systems.

6           So to summarize what all that says is in  
7 two points. They say most processes are sufficiently  
8 quantifiable and that you can include them. But they  
9 say some have to be specified such that the overall  
10 uncertainty is governed by these physical and  
11 geological processes. What we dive into in the report  
12 are what are those that have to be specified and how  
13 does one go about doing it based on the TYMS  
14 recommendations.

15           So the TYMS Committee had some options for  
16 dealing with uncertainties. They talked about, first  
17 of all, that the regulation and compliance assessment  
18 should be risk-based from the overall standpoint and  
19 that wherever possible include the consequences  
20 weighted by their probability of occurrence. They  
21 also included some other options for dealing with  
22 uncertainties. The primary one is to include the  
23 probabilities directly in the compliance assessment  
24 for most physical and geological processes.

25           The two we're going to talk about here

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1 that the EPRI report talks about are the others. For  
2 effects that aren't amenable to scientific analysis,  
3 establish their properties via rulemaking and human  
4 behavior they went on to great lengths in the report  
5 as an example of one of those that isn't amenable to  
6 scientific analyses where we don't know the details as  
7 something that should established via rulemaking.  
8 They also said with very few words that other FEPs can  
9 be bounded and they mentioned three: seismic and  
10 igneous processes and climate change and I'll talk a  
11 bit more about those in a minute.

12 First of all, I'd like to go through what  
13 we understood their philosophy was on the human  
14 behavior. They say it's highly uncertain. We agree.  
15 They say it's not subject to scientific analysis and  
16 the details and especially the future details of human  
17 behavior. We agree it's difficult to do. And  
18 therefore, the TYMS Committee recommended fixing human  
19 behavior to present day behavior. It seems like a  
20 reasonable approach.

21 The associated issue that TYMS also  
22 recommended fixing was the health physics quantities.  
23 For example, they recommended the use of standard  
24 dosimetric conversions. What does that really mean?  
25 That means that DOE now doesn't have to consider

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1 dosimetric uncertainties. That's taken off the table.  
2 So really, there were two things where the TYMS panel  
3 suggested you don't have to deal with the  
4 uncertainties. Just fix certain values and that was  
5 human behavior and dosimetry.

6 EPA adopted both recommendations. They  
7 suggested fixing human behavior to present day which  
8 included details about the groundwater plume size when  
9 that comes into the analysis as well as requiring  
10 standard dosimetric conversions.

11 Getting back to those ones where there's  
12 just a few words in the TYMS Report about sufficiently  
13 boundable, they mentioned three: seismic processes,  
14 igneous processes and climate change. So in the  
15 report we asked if these three are indeed sufficiently  
16 boundable and how to treat them one way or the other.

17 I'll talk about seismic and igneous first.  
18 Our feeling was having looked at it initially that we  
19 think that both seismic and igneous activity processes  
20 seem sufficiently boundable in the following way. We  
21 note that for seismicity that information on tectonic  
22 deformation rates over time periods greater than one  
23 million years is already being used to establish the  
24 importance of seismicity in that regard.

25 The next one is more of a subtle point in

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1 that DOE analyses on the physical limits of ground  
2 motion also look at applicable to longer time periods.  
3 What do I mean by that? I'm guessing that you may be  
4 aware of the work that DOE is doing now looking at  
5 recurrence intervals for earthquakes.

6 Right now, they're taking projections of  
7 essentially you have the magnitude of the earthquake  
8 across the X axis and the probability of recurrence  
9 across the Y axis. Obviously, you have a descending  
10 line. You can have higher and higher magnitude  
11 earthquakes with lower and lower recurrence  
12 frequencies. What they find is that that curve or the  
13 slope of that curve has been based on information  
14 collected for much shorter-lived facilities, say,  
15 nuclear power plants where maybe you have some  
16 facility life on the order of  $10^1/10^2$  years.

17 Well, now they're having to project those  
18 recurrence intervals out to these very low probability  
19 cases and they're finding that you exceed the physical  
20 limits of the geology to transmit that kind of an  
21 earthquake magnitude. If you simply extend it, you  
22 get accelerations in the three to 10 or more Gs which  
23 just isn't physically reasonable. So they're already  
24 having to make physical arguments to bound that for  
25 their 10,000 year analysis. We would think that those

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1 same kinds of physical arguments would be equally  
2 applicable for time periods beyond that.

3           Whether they actually get around to making  
4 those arguments, we don't know. But we think that  
5 we're planning to do arguments like that if DOE  
6 doesn't actually. They can talk about physical  
7 limitations and we all think that that's something  
8 that they can reign in seismicity in terms of  
9 something that can continue to be boundable.

10           For igneous activity, we think the nature  
11 and probability of eruptions being considered for the  
12 first 10,000 years also seems extendable for much  
13 longer time periods. For example, the igneous  
14 activity information that they're using already  
15 extends over the quaternary period which is much  
16 longer than one million years. It looks like some of  
17 the shortest records extend back about four to five  
18 million years that they're considering. So going just  
19 out to one million years at least for that aspect of  
20 it seems doable. And the last part of that is that is  
21 that DOE analyses that we've seen suggests that the  
22 dose risk due to igneous eruption peaks at or near  
23 10,000 years anyway.

24           So the last one is future climate details  
25 and I'd like to say that they have to be addressed

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1       somehow.  What I have here is a figure out of DOE's  
2       Yucca Mountain final environmental impact statement  
3       which is their projections of dose versus time.  You  
4       see lots of peaks there that we think are being driven  
5       by a combination of the details of the climate as well  
6       as their choices in models.

7                 Our thoughts about that figure that are  
8       relevant to how one deals with the long term of  
9       regulations is that the peaks are the results of  
10      assumptions about the details in climate change and  
11      the modeling approach.  DOE uses a series of steady-  
12      state flow and transport models for each assumed  
13      climate state.  They have instantaneous step changes  
14      in the climate.

15                They've also assumed that for all their  
16      Monte Carlo realizations that every climate change  
17      occurs at the same time.  So what happens then is that  
18      at some particular time from time T to T+1 you have  
19      net infiltration flow-focusing water table and  
20      saturated zone flux changes that all happen.  And what  
21      you get in modeling space is almost a flushing  
22      sometimes of radionuclides that can cause these peaks  
23      that we see in the FEIS.

24                Another point that could be made is that  
25      there is no change in the assumed human behavior.

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1 They assume present day human behavior for all of  
2 these other climate states and we would argue that for  
3 an internally-consistent performance assessment, one  
4 should recognize that humans in a full-glacial maximum  
5 climate are going to be doing different things. Most  
6 specifically, their uses of potentially-contaminated  
7 water could be quite different as well as details  
8 about the growing season and the crops they grow. We  
9 think that also they have a conservative net  
10 infiltration response that's assumed to future water  
11 climate states that's also part of that figure.

12 I think the figure, though it is here, was  
13 okay for its intended use and for Part 197 at the time  
14 in the sense that it was simply there to use to bound  
15 potential environmental impacts. It wasn't used for  
16 compliance purposes. If now the time period of  
17 compliance got extended, there would need to be some  
18 changes to that figure or how they do their analysis.

19 So one could ask "Why doesn't DOE just  
20 switch to a set of transient models?" I suppose  
21 theoretically DOE could switch to transient models.  
22 The question we asked was "To what end" because DOE  
23 would still need input on the magnitude of the climate  
24 change and its uncertainty, the timing of the change  
25 in uncertainty and what's potentially important is the

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1 rate of change between climate states as well as that  
2 uncertainty. That seemed to be what mattered to their  
3 models.

4 The magnitude and especially the rate of  
5 climate state change are both highly uncertain and  
6 they become even more so over very long timeframes.  
7 And there's still the issue of addressing the  
8 inconsistency with present day human behavior for  
9 future climates.

10 Back to what TYMS says specifically about  
11 future climate state uncertainties, they say it's well  
12 known that a climate can vary significantly over  
13 geological periods of time. Although the typical  
14 nature of past climate states is well known, it is  
15 obviously impossible to predict in detail either the  
16 nature or the timing of future climate change and this  
17 fact adds to the uncertainty of their model  
18 predictions.

19 We agree the details are impossible to  
20 predict. A review of the climate change issues and  
21 the uncertainties we provided in the appendix to  
22 suggest just how little we do know about the rates of  
23 change from climate state A to B. And it may be that  
24 those details may well drive the peak dose estimate.  
25 EPRI is very concerned that details that are

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1 "impossible" to predict should be what govern peak  
2 dose estimates out in these long time periods.

3 That drives us to the conclusion that it's  
4 necessary that the climate details should be  
5 established by the regulator to avoid requiring DOE to  
6 do something impossible, very much in the same  
7 philosophy that the regulator established future human  
8 behavior so that DOE doesn't have to speculate about  
9 what future humans are doing.

10 The question is for climate change "Should  
11 the peak dose be a function of these largely arbitrary  
12 assumptions DOE would be forced to make with respect  
13 to climate change? They just answered the question  
14 "no." It should be treated in a similar manner. It  
15 must be established to be a rulemaking and the  
16 rulemaking must also address climate change and human  
17 behavior in a self-consistent manner.

18 We recommend fixing the long-term climate  
19 to present day interglacial. Why? We think that  
20 recent evidence suggests that net infiltration has  
21 changed less than previously estimated. We understand  
22 there's some data that Yucca Mountain Project is  
23 pulling together that when they look at certain  
24 minerals they note that the rate of mineral growth is  
25 pretty constant through various climates that might

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1 imply that net infiltration hasn't changed that much  
2 from climate state A to B and so on.

3 We've also noticed that the biosphere dose  
4 conversion factors are greater for the interglacial  
5 climate than they are for glacial climate having to do  
6 with groundwater use, the growing season, the types of  
7 crops you grow where we have BDCFs that are lower for  
8 glacial and that they're the highest for interglacial.

9 We also say that if you fix the climate to  
10 the present day interglacial you can maintain an  
11 internally-consistent compliance assessment by using  
12 present day human behavior for which you do have  
13 information and you wouldn't have to speculate or pull  
14 in some other human behavior that might be relevant to  
15 a colder, wetter climate.

16 And the present day interglacial is the  
17 only climate state for which we have more detailed  
18 information. All the other climates we would have to  
19 speculate and make assumptions about past behavior  
20 being indicative of future climate states. We think  
21 the above is similar to the philosophy that's in the  
22 TYMS Report on use of human behavior.

23 I think I mentioned a bit that we found  
24 almost no guidance in the TYMS Report or in the EPA or  
25 NRC regulations for that matter on a boundable

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1 processes. One could ask how does one combine the  
2 three kinds of FEPs into a meaningful compliance  
3 assessment, in other words, those with sufficient  
4 information that uncertainties can be quantified,  
5 those that need to be fixed via rulemaking or those  
6 that one needs to somehow bound.

7 We didn't find any words in TYMS on that  
8 and so we had to go supplement and look elsewhere. We  
9 looked into an international guidance here and we  
10 noticed a couple things that came up over and over  
11 again in the international guidance. The first was a  
12 use of a stylized approach at very long timeframes.  
13 I'll talk a bit more about that in a minute.

14 They looked at the different dose limits  
15 in some cases and they also looked at alternative  
16 indicators of performance to using dose or health risk  
17 as the measure of performance. Most commonly when  
18 they looked at alternative indicators, they looked at  
19 things like flux and concentration. We only mention  
20 those in the report because at least our understanding  
21 of the court ruling was that NAS recommended that it  
22 be health risk-based and we're not quite sure what  
23 leeway there is for using alternative indicators based  
24 on the TYMS Report in combination with the court  
25 ruling.

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1           One of the things I would like to clarify,  
2 well, I'm not sure it will clarify, is the feeling  
3 that scientific accuracy is impossible to achieve over  
4 analyses stretching over many thousands of years. On  
5 the other hand, regulatory confidence can be achieved  
6 and that's because the process for achieving  
7 regulatory confidence is different than going after  
8 scientific accuracy.

9           It's not really necessary to have 100  
10 percent accurate answer but a range of possible  
11 answers may be all that's needed to establish  
12 sufficient regulatory confidence. So many use the  
13 concept of a stylized approach to do that.

14           In the report, one of the things that I  
15 asked Matt to do, we both looked hard when we see  
16 everybody using the word "stylized" and we never saw  
17 a definition of it. We adopted the following one that  
18 we think they mean and that works for us and that is  
19 "a set of assumptions established by policy that is  
20 used to limit the range of uncertainties considered in  
21 a performance assessment so that the assessment would  
22 yield a meaningful test of the ability to protect the  
23 public health and safety." The major parts of this  
24 are "a set of assumptions" that they're "established  
25 by policy." That may be the regulator. That may be

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1 in this case DOE establishing what they do for those  
2 set of assumptions that's used to limit the range of  
3 uncertainties when we may not know what the right  
4 range is or that it's really a wide-open range that  
5 was considered in the performance assessment so that  
6 it still yields this meaningful test.

7 So back to the international thoughts  
8 about this, we kept noticing that there was this  
9 consistent international thought about moving to a  
10 more stylized approach at these long times. The first  
11 one is ICRP 81. They note that another approach is  
12 the consideration of quantitative calculations further  
13 into the future making increasing use of stylized  
14 approaches in considering the time periods when  
15 judging the calculated results and I'll talk a bit  
16 more about ICRP in a few minutes.

17 Another one that came from the Nuclear  
18 Energy Agency where they note in a 2004 report that  
19 there is international consensus that a stylized  
20 approach is an appropriate means to define these  
21 assumptions. The appropriate approach defines a range  
22 of alternative, credible illustrations or stylized  
23 situations including for example different possible  
24 climate states, agricultural practices and exposure  
25 pathways in analyzing the resulting dose or risk for

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1 hypothetical, critical groups. They note that this  
2 avoids the open-ended speculation on issues such as  
3 future human habits for which uncertainties are large  
4 and irreducible.

5 I'm going to go through just to point your  
6 eye. This was something taken from a McCombie and  
7 Chapman report. This summarizes various countries'  
8 approaches on this time period. All of these  
9 approaches were in existence before July 9, 2004. One  
10 is that the timeframes for quantitative. Canada shows  
11 10,000 years. Finland, there's something in there  
12 changing at 10,000 years. France, again you see  
13 10,000. Germany, again 10,000. Sweden talks about  
14 1,000 and I'll talk a bit more about some recent SSI  
15 guidance there. Switzerland is one where they have no  
16 particular time limit. Essentially they don't have a  
17 time limit. U.K., it's a little more complicated.  
18 I'll talk a bit more about the U.K. one. And the U.S.  
19 ones are there.

20 I will note that there are two things that  
21 are incorrect in this particular table. In terms of  
22 191, the dose limits and the groundwater  
23 concentrations are also applicable at 10,000 years.  
24 But really what I want you to focus on here is that  
25 all the other guidance that where you see this 10,000

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1 year time is time when something else changes. That's  
2 what this view graph says. While differences exist,  
3 this 10,000 years in the future is broadly recognized  
4 as the time when something in the analysis should  
5 change.

6 This 10,000-year break point isn't  
7 inconsistent with the court decision in the sense that  
8 these other regulations came up with this  
9 independently. The fact that the EPA may choose to do  
10 something different at 10,000 years isn't inconsistent  
11 with the court decision. It's certainly not  
12 inconsistent with what other people have already  
13 thought about.

14 Also we notice that there's some shift  
15 away from direct dose or risk analyses and most still  
16 with dose or risk but they note that increased  
17 uncertainty renders these estimates less reliable. A  
18 couple examples. The NRPB in the U.K. notes that for  
19 times greater than 100 years or so but less than about  
20 10,000 risk to members of the critical group should be  
21 estimated for comparison to the risk constraint. They  
22 go on and say "As the time period of an assessment  
23 increases, assumptions about human environment and  
24 behavior will necessarily become increasingly  
25 arbitrary and therefore should be replaced by more

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1 general ones." And they note specifically about "the  
2 gradual change or the rate of change in such  
3 assumption may be difficult to implement in assessment  
4 and therefore for simplicity the board recommends that  
5 general assumptions should be applied after about  
6 10,000 years."

7 Another example is that SSI vaguely the  
8 equivalent of EPA in Sweden has issued some draft  
9 regulations for comments and they note that before  
10 1,000 years they really wanted a detailed compliance  
11 assessment paying particular attention "to conditions  
12 and processes early in the development of the  
13 repository that can affect its long-term protective  
14 capability." Then beyond 1,000 years, essentially,  
15 "the analyses should be successively regarded as an  
16 illustration of the protective capability of the  
17 repository assuming certain conditions" and that for  
18 very long time periods, hundreds of thousands of  
19 years, "the risk analyses may be based on stylized  
20 description of future cycles of major climate changes  
21 and large harmful occurrences such as earthquakes."  
22 So again, that theme comes in.

23 ICRP 81 and more recent ICRP guidance says  
24 some bit more about it. Now I'm switching to dose  
25 limits. We would argue that dose limit needs to take

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1 into account the growing uncertainties with time.  
2 ICRP 81 says on this issue that "as the timeframe  
3 increases, some allowance should be made for assessed  
4 dose or risk exceeding the dose or risk constraint."  
5 They note specifically that "this must not be  
6 misinterpreted as a reduction in the protection of  
7 future generations and hence a contradiction with the  
8 principle of the equity protection but rather is an  
9 adequate consideration of the uncertainties associated  
10 with the calculated results." And at the time we  
11 wrote that, we didn't know whether that really meant  
12 that dose constraint could be higher at longer times  
13 or an acceptance criteria through the practice may  
14 change and that we notice that practically there's no  
15 difference and that dose constraint need not be  
16 applied as a strict limit.

17           Something that I didn't know existed until  
18 last night because it just came out last week was  
19 there is another draft for consultation document out  
20 from ICRP Committee IV on optimization of radiological  
21 protection and in Annex II, they have a couple things  
22 that are useful to talk about. One is they suggest  
23 that you might relatively weight doses as you go out  
24 into time. They say for example "the weights can be  
25 assigned according to the time at which exposure is

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1 predicted to occur. Progressively less importance  
2 could be given to individual exposures received in the  
3 far future due to increasing uncertainty."

4           They noticed that in general, "both the  
5 individual doses and the size of the exposure  
6 population becoming increasingly difficult to predict"  
7 and they say, "As such, the use of exposures for  
8 decision making purposes becomes increasingly  
9 problematic as those exposures are predicted to occur  
10 farther and farther out into the future." The  
11 Commission feels that "our current state of knowledge  
12 and our ability to model populations becomes more  
13 difficult" and beyond such timeframes the Commission  
14 recommends that "predicted doses should not play a  
15 major part in decision making processes." I point  
16 this out simply because there's this common drumbeat  
17 among other international organizations, most of which  
18 have recognized it well before the court made their  
19 ruling that uncertainties grow and that something  
20 about at 10,000 years needs to change in how we do  
21 this.

22           Continuing with the dose constraint  
23 issues, again from ICRP guidance, they suggested dose  
24 constraints for various situations. The one I have  
25 highlighted in blue here up on the screen seems to be

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1 the one that would be applicable to deep geological  
2 disposal. They're suggesting a maximum constraint on  
3 the order of 1 millisievert per year. That's 100  
4 millirem per year for situations that have a societal  
5 benefit but without individual direct benefit and that  
6 there's no information, no training, no individual  
7 assessment for exposed individuals for normal  
8 situations. That kind of sounds like a deep geologic  
9 disposal application and that would be 100 millirem  
10 per year.

11 There's other dose limit  
12 considerations that one could get into. Certainly,  
13 everybody is aware of the intergenerational versus the  
14 intragenerational equity arguments. The  
15 intergenerational equity is that future generations  
16 should not suffer undue burdens. The  
17 intragenerational equity is to present that present  
18 generation should not suffer undue burden.

19 An example here is the National  
20 Association of Public Administrators, principals,  
21 where they really have four here and I would argue  
22 that three of them, trustee, sustainability and  
23 precautionary really address intergenerational equity,  
24 but intragenerational equity is also noted in the  
25 third one where they say that "near-term concrete

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1 hazards have priority over long-term hypothetical  
2 hazards" when one is making decisions about what to  
3 do.

4 Another point that comes along for dose  
5 limitations is the concept dose apportionment.  
6 Generally, most regulations consider that there's a  
7 dose constraint and then that dose constraint has to  
8 be divided up among maybe multiple sources, man-made  
9 sources, of radioactivity that the same individual  
10 could be exposed to such that the dose limit on any  
11 one of those activities is lower than the constraint.

12 We would question that 10,000 years out  
13 into the future especially for a site like Yucca  
14 Mountain whether there would be of these multiple  
15 sources for which one would need to apportion. This  
16 new ICRP document also addresses that in that they say  
17 that "should more than one licensed facility expose  
18 the same public individuals further consideration of  
19 the appropriate dose and strength for each such  
20 facility would be necessary." They are opening the  
21 possibility that one need not apportion doses and it  
22 would depend upon the situation.

23 The last point on this view graph is that  
24 there is a controversy about what the health risks are  
25 at low doses such that there may be a range of doses

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1 that there may be little to no health risk according  
2 to some.

3 The last component that we think needs  
4 addressing is how to do features of end step processes  
5 or FEPs screening for very long timeframes. And  
6 here's where we get back to this TYMs recommended  
7 concept of the negligible incremental risk. TYMs  
8 noted that they've adapted this from the negligible  
9 incremental dose concept which essentially says that  
10 "scenarios with a sufficiently low combination of  
11 probability and dose consequences need not be  
12 considered in compliance analysis."

13 In the TYMs Report, they recommend that a  
14 negligible incremental risk equivalent to a negligible  
15 incremental dose of one millirem per year is a  
16 starting point for EPA consideration. Again they  
17 recognize that this is a policy call for EPA to make  
18 but that was their recommended starting point for  
19 discussion.

20 So if we look at that, our take is that  
21 the current FEPs screening probability cutoff which is  
22 simply pure probability based is very conservative  
23 compared to this NID, negligible incremental dose, of  
24 suggested level of one millirem per year. The EPA  
25 adopted a probability cutoff of less than  $10^{-4}$  and  $10^4$

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1 years which translates to about less than  $10^{-8}$  per  
2 year. We would argue that's an extremely low  
3 screening level compared to the NID level suggested in  
4 the TYMS Report. For example, if some FEP had a  
5 probability of occurrence that was 10 percent, it  
6 would be screened only if the dose consequence was  
7 greater than about 10 millirem per year for this NID  
8 risk of one millirem per year.

9 What our argument is there is that DOE is  
10 presently conservative in the sense that they're  
11 addressing many more FEPs than would be the case if  
12 the TYMs recommended NID standard were to be used. We  
13 can't imagine an additional FEPs that would meet a one  
14 millirem per year NID risk criterion beyond 10,000  
15 years.

16 Finally, getting to the recommendations.  
17 Because the court rejected all the challenges to the  
18 existing regulations governing the first 10,000 years,  
19 we would recommend that EPA could take a surgical  
20 approach to revising its standard, meaning that  
21 specifying beyond 10,000 year requirements is a  
22 separate standalone provision that don't alter what's  
23 already required regarding the first 10,000 years.

24 We recommend that a change of approach to  
25 the regulation and its implementation should be

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1 adopted for those provisions of the regulation that  
2 will address timeframes beyond 10,000 years if the  
3 regulation as a whole is to remain implementable.  
4 Part of that change of approach is that a stylized  
5 approach for scenario identification and level of  
6 rigor in the model should be established by the NRC  
7 for time periods beyond 10,000 years.

8 In the sense that while EPA can make  
9 recommendations about stylization, it really comes  
10 down to the nuts and bolts in the details. It's up to  
11 NRC and DOE to hash that out. Those details would  
12 need to be established by NRC.

13 On future climate states, we would argue  
14 that they should be fixed by rulemaking to one or at  
15 most two what we think are bounding states. One would  
16 be, the one that we really argue could be the single  
17 bounding one, is the present day interglacial with the  
18 glacial being the other one.

19 If a glacial state climate is specified,  
20 the regulation should also specify a set of  
21 assumptions to govern human behavior that is  
22 consistent with the way humans would be expected to  
23 live. However, we think that it's preferable to  
24 simply assume the present-day interglacial climate  
25 state continues for the entire compliance period since

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1 it is likely to be reasonably bounding and the most  
2 implementable.

3 No additional FEPs screening is required  
4 for the time period beyond 10,000 years. As we noted  
5 earlier, that is because current FEPs screening  
6 criterion is already overly inclusive compared to the  
7 approach recommended by the TYMS panel. However, if  
8 it is so desired or required that additional FEPs  
9 screening beyond 10,000 years be done, the concept of  
10 the negligible incremental dose should be used as the  
11 screening tool.

12 And finally, a two-tiered dose limit  
13 should be specified, one level for the first 10,000  
14 years and a second higher level that is consistent  
15 with the increased uncertainty should be used for the  
16 period beyond 10,000 years. While EPRI is not  
17 advocating an exact numerical limit that would be a  
18 policy choice of EPA, we note that there is guidance  
19 out there from other bodies that would support a dose  
20 limit on the order of 100 millirem per year.

21 Where are we going next? We've requested  
22 in the report and when I sent out the email notifying  
23 people of the report that we seek feedback from all  
24 interested parties on the content and the  
25 recommendations made in the report, we'll note that we

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1 already have received preliminary comments from the  
2 State of Nevada and they have indicated in that first  
3 letter to us that they might provide additional  
4 comments later on.

5           We are still mulling over whether we will  
6 hold a workshop on this issue in the next few months  
7 just to talk in general about what are people's  
8 feelings on what the issues are and how one might  
9 address these longer time periods of compliance. EPRI  
10 really feels that it would be useful to have some sort  
11 of discussion about this early on so that all of us  
12 and especially EPA and NRC get some feeling for what  
13 people may be thinking about this.

14           Our eventual plan is to issue a final  
15 report because this was an interim report that we  
16 were seeking feedback on that takes into consideration  
17 the input we receive, if we have a workshop, the  
18 discussion that goes on there, other related  
19 documents, for example, this new ICRP draft  
20 recommendation that came along since we put out this  
21 report as well as other documents that others have  
22 written. For example, I know that NRC has already  
23 written a letter with their preliminary thoughts to  
24 EPA on what they think the regulations should be as an  
25 example. Then the final report would also response to

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1 the EPA draft rule assuming that no Congressional  
2 action that may affect this promulgation occurs. Any  
3 questions?

4 MEMBER HINZE: Thank you very much, John,  
5 and I also want to thank the two Matts for their  
6 contributions to this logically-presented argument and  
7 for your very meaty discussion. With that, we'll turn  
8 it over the Committee for any questions that they  
9 might have. James.

10 MEMBER CLARKE: Not right now.

11 MEMBER HINZE: Ruth.

12 MEMBER WEINER: That was a lot to digest  
13 in a short time.

14 MR. KESSLER: Sorry about that.

15 MEMBER WEINER: That's a really very  
16 thorough discussion. I just have one. If the  
17 uncertainty increases with time and the basis of the  
18 court's recommendation is this peak dose  
19 recommendation, is it possible that dose uncertainty  
20 band would be broad enough that you could argue that  
21 the dose didn't really increase significantly? In  
22 other words, if you took the peak dose in the pre  
23 10,000 year period and just called that a point and  
24 then broaden the uncertainty, the dose band, saying  
25 that your uncertainty increased estimating some kind

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1 of increase function, would it be possible to argue  
2 that?

3 MR. KESSLER: I think I'm still not quite  
4 understanding where you're coming from. In the sense  
5 -

6 MEMBER WEINER: In the sense that the  
7 uncertainty and dose, they become so large that you  
8 don't really know where in that uncertainty band the  
9 most likely dose is.

10 MR. KESSLER: I see what you're saying.  
11 We would argue that uncertainties that the band  
12 becomes larger as you approach peak dose and that if  
13 you're looking at uncertainty bands say that are  
14 between the 5th and the 95th percentile that may  
15 encompass two or more orders of magnitude, one can ask  
16 the question is that such a wide uncertainty band that  
17 the meaning of that band should we impute some meaning  
18 from that uncertainly band.

19 I think that we would argue that the  
20 meaning is you need to know that, and I think that a  
21 lot of these international recommendations recognize,  
22 that the meaning of the mean dose, even the maximum  
23 likelihood dose, becomes less because there could be  
24 a wealth of possibilities leading to significantly  
25 different consequences depending on how things play

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1 out. So if that's answering your question --

2 MEMBER WEINER: That is.

3 MR. KESSLER: Okay.

4 MEMBER WEINER: Thank you.

5 MEMBER HINZE: Dr. Ryan.

6 CHAIRMAN RYAN: Thanks, John. Thank you  
7 for your presentation. I'll just note for the  
8 Committee's benefit. We're taking a look too at  
9 these. There are two draft reports from ICRP.

10 MR. KESSLER: Right.

11 CHAIRMAN RYAN: And just so that  
12 everybody's on the same page, these are drafts for  
13 consultation.

14 MR. KESSLER: Correct.

15 CHAIRMAN RYAN: And they are foundation  
16 documents for the main recommendation that they have  
17 now extended the schedule for for about a year. So I  
18 just wanted to put all of that out. All of that is in  
19 a state of flux. I just thought that would be helpful  
20 to note.

21 I guess this is in your report in more  
22 detail, but could you explain a little bit more about  
23 this transition point and what you see changing? I  
24 wrestle with the question that Ruth raised and your  
25 answer in terms of how do you transition from a

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1 quantitative approach to a qualitative or one that's  
2 less reliant on quantitative thinking?

3 MR. KESSLER: I think that one is -- Given  
4 the regulatory environment we have in the U.S., I  
5 think that we're going to remain quantitative.  
6 There's going to be an estimate that's quantitative  
7 compared to some sort of limit no matter what the  
8 timeframe is. So we came at it from the other way,  
9 Mike, which is to say how one comes up with that  
10 estimate needs to have some bounds around it when  
11 these uncertainties grow with time.

12 The TYMS Report make it very clear in the  
13 example of human behavior how one puts bounds around  
14 uncertainties. We're arguing that additional bounds  
15 need to be put on specific things like climate state,  
16 but in addition, the level of rigor that's required in  
17 data and models for those long-term periods such that  
18 one can come up with some sort of quantitative  
19 estimate that can be used in the regulatory  
20 environment we have. I hope that answered your  
21 question.

22 CHAIRMAN RYAN: That's a good start, but  
23 if you could go to that graphic of uncertainty bands.

24 MR. KESSLER: Do you have a graph number  
25 for me?

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1 CHAIRMAN RYAN: Well, it's on page six.  
2 So it's probably slide 12.

3 MR. KESSLER: Okay.

4 CHAIRMAN RYAN: There you go. Help me  
5 with that axis on the Y-axis. I guess I'm reading  
6 that the peak -- I'm looking at this semi-long plot of  
7 the peak.

8 MR. KESSLER: Yes.

9 CHAIRMAN RYAN: Is it, oh, I don't know,  
10 1.4 something millirem per year correction?

11 MR. KESSLER: Right.

12 CHAIRMAN RYAN: Help me understand that  
13 magnitude. What is that from?

14 MR. KESSLER: This is something from some  
15 assessments. This is an example of the bands. It's  
16 not the be all and the end all even for EPRI's  
17 analysis. What we were trying to illustrate here was  
18 what you might see or what might get masked in terms  
19 uncertainty changes with time. Where the 1.4 number  
20 comes from essentially, but our estimate based on more  
21 best estimates rather than conservative analyses of  
22 the nominal release scenario. So it excludes things  
23 like igneous and human intrusion as to what we think  
24 is a reasonable upper range on dose estimates for that  
25 particular case.

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1                   CHAIRMAN RYAN: It seems to me that this  
2 transition point between 10,000 years and beyond is  
3 really related to that order of magnitude on the Y  
4 axis. That the dose numbers get higher on the Y axis  
5 at the peak based on whatever scenario you want to  
6 assume or gets accepted or whatever the thing might  
7 be. The comfort or the confidence that you get going  
8 beyond that peak in time or to that peak in time is  
9 influenced by the magnitude of the peak. I wonder if  
10 you thought about that. If a peak dose is much nearer  
11 the limit, there's going to be more question about it  
12 than if a peak dose's order of magnitude below a  
13 limit.

14                   MR. KESSLER: I think that you're talking  
15 about --

16                   CHAIRMAN RYAN: Given that the calculation  
17 that everybody's looking at is accepted as a  
18 reasonable calculation.

19                   MR. KESSLER: Let's separate concepts  
20 here. Okay. We're talking about irrespective of what  
21 the exact number is in these analyses.

22                   CHAIRMAN RYAN: That's what you've done  
23 here, but it led me to the question that I'm now  
24 posing to you.

25                   MR. KESSLER: Right.

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1                   CHAIRMAN RYAN: What do you think of that  
2 notion that the magnitude of the peak has an influence  
3 on how you might think about it as you approach it or  
4 as you pass it?

5                   MR. KESSLER: In a sense, it should not.  
6 What we're talking about here and we're advocating is  
7 a different dose limit that recognizes the inherent  
8 uncertainties in calculating doses for any site.  
9 Okay. In a sense, this is a generic part. We're  
10 recognizing that some parts of the system, almost any  
11 system, become inherently uncertain. We look at ICRP  
12 draft guidance that suggests that a higher dose --

13                   Let's see. They put it the other way  
14 around. In its most recent draft guidance, they talk  
15 about potentially reducing the weight of the  
16 importance of a particular dose number out at these  
17 long times specifically to take into account  
18 increasing uncertainties with time. So that's all the  
19 generic part and that's totally separate from what we  
20 may happen to be finding for a particular number at  
21 the time of peak dose.

22                   CHAIRMAN RYAN: And there's lots to  
23 wrestle with there, too, because it's in a way an  
24 artifact to say the longer amount of time a dose is  
25 estimated, the less weight I give it. So I'm

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1 multiplying it by 0.1 instead of 0.5 as a weighting  
2 factor. That's a little bit qualitative in how you  
3 get to that. You've translated a qualitative judgment  
4 into a numerical one.

5 MR. KESSLER: Yes.

6 CHAIRMAN RYAN: And the good news is if  
7 three people did it according to the rule, they would  
8 all get the same numerical answer.

9 MR. KESSLER: But doing that kind of  
10 approach is very precedented. We're doing it right  
11 now for human behavior just as an example that we're  
12 taking a qualitative statement.

13 Let's use present-day human behavior in  
14 Amargosa Valley. Now NRC and DOE have the task and  
15 they're saying take that general guidance and put it  
16 in real numbers and they did that. Nothing different  
17 here.

18 CHAIRMAN RYAN: And again, I'm not  
19 offering these comments to criticize your report or  
20 anything in any way.

21 MR. KESSLER: Right.

22 CHAIRMAN RYAN: Just to explore the  
23 concepts out loud for everybody's benefit especially  
24 my own. It's interesting. You have a lot of food for  
25 though. I think the next step is let's read the

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1 report in detail and call you back.

2 MR. KESSLER: And I welcome feedback  
3 formal or otherwise.

4 CHAIRMAN RYAN: All right. Thank you.

5 MEMBER HINZE: Allen.

6 VICE CHAIRMAN CROFF: I'm, I guess, with  
7 Ruth. I'm reeling just a little bit here, but the  
8 thing that struck me the most is the same that both  
9 Ruth and Mike have asked or followed up on. Let me  
10 make sure I understand what you've said and that's  
11 this business, the notion, that uncertainties grow  
12 with time at least up to the peak. It seems to me, I  
13 think, as you stated a feeling or a belief or maybe an  
14 article of faith, but we don't necessarily know that  
15 or it has not been documented in a logical way and  
16 subject to proof if you will. We simply believe that  
17 is the case but don't know that is the case. Is that  
18 an accurate characterization?

19 MR. KESSLER: No. You may be talking  
20 about one kind of uncertainty. I mentioned in  
21 whatever view graph I have here, I'll wind up taking  
22 too much time looking for it, that we talked about  
23 these fixed uncertainties and how they manifest  
24 themselves in time when you make your projections.  
25 And to me, that is a true indication that

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1       uncertainties do grow. Our knowledge or our lack of  
2       certainty causes us to have a wider and wider  
3       potential projection of dose versus time up to some  
4       time. That's one aspect.

5               Then the other aspect which I think you're  
6       probably talking about is this idea that conceptual  
7       model uncertainty, do we understand or is there some  
8       point in the future when we're confident that we even  
9       understand the fundamental processes and some  
10      particular set of FEPs starts to break down? That one  
11      is less well documented exactly when that happens and  
12      it of course varies from one to the next.

13              VICE CHAIRMAN CROFF: I'm thinking we get  
14      some of that in juxtaposed against radioactive decay.

15              MR. KESSLER: Right.

16              VICE CHAIRMAN CROFF: Where there's just  
17      less and less there as a function of time and when I  
18      add all that up, I'm not saying your belief is  
19      incorrect. But I'm saying I don't know that it's  
20      correct either. I'm asking has anybody really tried  
21      to go through and lay out all this and work this out.  
22      Or are we still -- Like I say, is it still a belief?

23              MR. KESSLER: Right. I think Matt Kozak  
24      would like to add something here.

25              MR. KOZAK: Yes, if you look at those

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1 curves, the peak dose quite frankly associated with  
2 Yucca Mountain isn't influenced heavily by decay and  
3 so it can take that to a large extent out of the  
4 equation. The neptunium and it's progeny are what are  
5 leading to the peak dose and in fact to some extent,  
6 you get an increase as you go further out in time  
7 because you have more time for the in-growth for some  
8 of the progeny.

9 It's happening over the same time scale as  
10 we're coming to peak. So you're right. The short-  
11 lived stuff is disappearing but that's happening in  
12 the first 10,000 years. When we start getting out in  
13 the post 10,000 years, the decay more or less has  
14 happened and we have something else going on.

15 Let me just interject one more thing and  
16 that is that the one thing that people's intuition  
17 leads them to say that the uncertainties grow comes  
18 from the idea that around 10,000 years is when we may  
19 see the next major climate change. Now some of the  
20 discussion that we have in the report says maybe we  
21 don't even know that, but that I think is where the  
22 gut reaction of a lot of people comes from.

23 If you look at the Nordic countries at  
24 10,000 years, they go to some other indicator because  
25 they say at that point we're under a kilometer of ice.

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1 So why are we doing those calculations? So it's  
2 considerations like that that people have to start  
3 thinking about things after 10,000 that they don't  
4 have to consider before.

5 VICE CHAIRMAN CROFF: I understand the  
6 specific examples. I'm not sure that we can  
7 generalize it. If one would imagine that it took 100  
8 million years for the neptunium to reach the biosphere  
9 as opposed to one million or a half or whatever it's  
10 currently projected to do, we started getting into a  
11 very different regime in terms of decay and what's  
12 important and what's not and whether there's anything  
13 left to be important.

14 MR. KOZAK: Yes.

15 VICE CHAIRMAN CROFF: I just wanted to  
16 raise.

17 MR. KESSLER: In some, we're not  
18 generalizing it, Allen, in the sense that there's  
19 these couple different options for dealing with  
20 uncertainties and one is that I think we would agree  
21 that for a lot of the geologic and some of the  
22 physical processes that they can be treated with a  
23 reasonable amount of uncertainty such that they can be  
24 fully incorporated in a probabilistic compliance  
25 assessment. It's just some of them that need

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1 additional specification or at least be addressed in  
2 some particular way.

3 VICE CHAIRMAN CROFF: Okay. I don't think  
4 there is an answer to this so I'll pass.

5 MEMBER HINZE: Dr. Clarke.

6 MEMBER CLARKE: I just had a quick one,  
7 John, to clarify. I think it's on page 17, slides 33  
8 and 34 is where I found them.

9 MR. KESSLER: Thirty-three?

10 MEMBER CLARKE: Yes, the cutoff for the  
11 negligible incremental dose at one millirem per year.  
12 That's at a risk level of -- what would that be?  $10^{-5}$ .

13 MR. KESSLER: No, that's at where  
14 essentially P equals 1.

15 CHAIRMAN RYAN: The risk level of one  
16 millirem here is  $10^{-7}$ .

17 MEMBER CLARKE:  $10^{-7}$ .

18 MR. KESSLER: Oh, health risk. Sorry. I  
19 misunderstood the question.

20 MEMBER CLARKE: I was thinking 15 but it's  
21  $10^{-4}$ .

22 CHAIRMAN RYAN: What I remember is  $10^{-7}$ .

23 MEMBER CLARKE: I'm using the cutoff  $10^{-4}$   
24 which is 15.

25 MR. KESSLER: Too many different kinds of

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1 risks here.

2 MEMBER CLARKE: I'm sorry.

3 MR. KESSLER: No. I misinterpreted your  
4 question. Mike answered.

5 CHAIRMAN RYAN: (Off mic) -- is in fact  
6 below that.

7 MEMBER CLARKE: Okay.

8 MEMBER HINZE: Staff. Michael.

9 MR. LEE: Michael Lee. I read the report.  
10 Nice report, John. Congratulations to you and your  
11 authors. It gives us a lot of food for thought for  
12 everyone in there. I just have a couple questions and  
13 observations. In May 2005, NEA is going to have a  
14 working group on the treatment of uncertainties in  
15 long-term PAs. I think the goal of that working group  
16 is to try to develop a consensus document on how  
17 repository developers and decision makers could use  
18 these results. Does EPRI intend on observing or  
19 sending a participant to that working group?

20 MR. KESSLER: If we're invited.

21 Obviously, we are not a member of NEA and it would  
22 only be if an NEA member felt it was useful for us to  
23 be there. I do know that it's my understanding that  
24 some members of the NEA group have had the website  
25 forwarded to them. So at least, they're aware that it

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1 exists.

2 MR. LEE: Sure. The other  
3 comment/question I had is a few minutes ago you made  
4 reference to an NRC letter to DOE. Is that is recent  
5 letter? The EPA, excuse me. The EPA.

6 MR. KESSLER: NRC letter to EPA. If I  
7 said, I misspoke.

8 MR. LEE: Maybe it was to --

9 MR. KESSLER: I think I did -- The example  
10 that I remember was about NRC, and if I misspoke I  
11 apologize, and a DOE interaction that established for  
12 example the quantitative details of human behavior.  
13 That's what I remember or at least meaning to say if  
14 I didn't use those words.

15 MR. LEE: Thank you. For some folks in  
16 the audience, they may not be aware that NAS wrote a,  
17 for lack of a better description, rebuttal paper on  
18 the EPA standard after EPA implemented its  
19 recommendations. You didn't make reference to that in  
20 the report.

21 MR. KESSLER: No.

22 MR. LEE: Would you care to elaborate for  
23 the Committee's benefit as to why?

24 MR. KESSLER: The rebuttal was used by at  
25 least one of the parties in the lawsuits and our

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1 reading of how the court dealt with that essentially  
2 was if it's not in the bible document the court didn't  
3 consider it as part of their ruling. That's why we  
4 didn't consider it.

5 MR. LEE: But in your opinion just as an  
6 opinion, is it valuable for the parties as they go  
7 back and reexamine the NAS recommendations to take  
8 into account what the TYMS Committee said regarding  
9 possible implementation of their recommendations?

10 MR. KESSLER: I think it's valuable for  
11 EPA and NRC to take into account everything that they  
12 can within the confines of the court ruling.

13 MR. LEE: Last question. Our previous  
14 speaker made reference to being king-for-a-day and if  
15 you had an opportunity to be king-for-a-day, would you  
16 have any recommendations on future standards relative  
17 to issues NRC should focus on as opposed to EPA?  
18 There's always been a little tension between the two  
19 agencies on what EPA should specify in its standards  
20 and what NRC should be given a discretion over in  
21 terms of the implementation.

22 MR. KESSLER: Well, oh dear. This is a  
23 king-for-a-day comment. It is not industry policy or  
24 anything else. I think it would be useful for EPA to  
25 recognize who is actually implementing this regulation

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1 and it's not EPA. The more EPA knows about the actual  
2 processes and the actual way NRC is going to have to  
3 deal with whatever they are handed the better. For  
4 example, it would be nice if the EPA decision makers  
5 knew what the heck an ASLB was as an example.

6 In terms of specific recommendation, I  
7 would like, we have them in the report, in terms of  
8 what we would like this to be. If we go back to the  
9 recommendations we made to the NAS in 1994, EPRI  
10 recommended that the time period of compliance should  
11 be 1,000 years because of growing uncertainties. But  
12 we've not revisited that because the court made its  
13 ruling and we weren't going back over old ground.

14 I would say that starting from here, we've  
15 provided specific recommendations and our opinion is  
16 that while EPA has to set the overall regulation,  
17 they're not the implementing regulator. Since that's  
18 the way the law reads, it would be useful for EPA to  
19 take into account how NRC does business.

20 MR. LEE: Thank you.

21 MEMBER HINZE: Further questions? Latif.

22 MR. HAMDAN: Yes. John, I too thought it  
23 was an excellent not only presentation but the ideas  
24 that you and your team came up with are excellent and  
25 worth further discussion in my opinion. As you have

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1       been saying, EPA is the agency who is going to issue  
2       the standards. So the question for you is has EPRI or  
3       you personally talked to EPA about these ideas and  
4       these thoughts because after they are going to come up  
5       with the standards in two or three months and did you  
6       talk to EPA about it? What do you think the EPA's  
7       response is going to be?

8               MR. KESSLER: Certainly, we talked to EPA  
9       about this report. I was there yesterday and  
10       essentially just walked through the exact same  
11       presentation with them. I gave them the ideas that  
12       were in the report. Did I get any indication of what  
13       EPA is thinking or what they thought was good or what  
14       they thought was bad? None whatsoever. Other than  
15       what's already reported in the press, I have no idea  
16       what EPA is thinking.

17              MR. HAMDAN: Apart from your discussion  
18       yesterday, what do you think EPA might do with your  
19       recommendations?

20              MR. KESSLER: I have no idea.

21              MEMBER HINZE: We have no one in the  
22       audience that is going to comment on it.

23              MR. KESSLER: Honestly, I do not know.  
24       EPA didn't share anything with me. I didn't ask for  
25       anything. It's not appropriate. All I wanted to do

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1 was to make sure that EPA had some thoughts from us  
2 and I walked through the same presentation with them  
3 yesterday.

4 MEMBER HINZE: Dr. Ryan.

5 CHAIRMAN RYAN: Thank you. Again, thank  
6 you, John. We appreciate your presentation and your  
7 response to questions and dialogue. It's helpful for  
8 us as we think ahead. Thank you very much. We're on  
9 schedule for a break. Let's see Latif or somebody  
10 from staff. Mike, do we need the recorder at this  
11 point? We're going to consider just subjects and our  
12 trip to Japan slides and so forth. I think we're off  
13 the record for the rest of the day. Thank you very  
14 much. We'll reconvene at 3:40 p.m. please.

15 (Whereupon, at 3:21 p.m., the above-  
16 entitled matter concluded.)  
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