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UNITED STATES NUCLEAR REGULATORY COMMISSION'S

ADVISORY COMMITTEE ON NUCLEAR WASTE

April 19, 2005

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1 UNITED STATES OF AMERICA

2 NUCLEAR REGULATORY COMMISSION

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4 ADVISORY COMMITTEE ON NUCLEAR WASTE

5 (ACNW)

6 159TH MEETING

7 + + + + +

8 TUESDAY,

9 APRIL 19, 2005

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11 ROCKVILLE, MARYLAND

12 + + + + +

13

14 The Advisory Committee met at 8:30 a.m. in Room

15 T-2B3 of the Nuclear Regulatory Commission, Two White

16 Flint North, 11545 Rockville Pike, Dr. Michael T.

17 Ryan, Chairman, presiding.

18 COMMITTEE MEMBERS:

19 MICHAEL T. RYAN, Chairman

20 ALLEN G. CROFF, Vice Chairman

21 JAMES H. CLARKE, Member

22 WILLIAM J. HINZE, Member

23 RUTH F. WEINER, Member

24

25

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

15

1 OTHERS PRESENT:

2 TERRY DEVINE, CRCPD, via teleconference

3 BRUCE HINKLEY, DOE

4 JOHN KESSLER, EPRI

5 J. GARY LANTHRUM, DOE

6 ENGELBRECHT VON TIESENHAUSEN, Clark County,

7 Nevada

8 GARY LANTHRUM, DOE

9 MARTIN MALSCH, State of Nevada

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

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

2 (8:30 a.m.)

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

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

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

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

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

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

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

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

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

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.

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

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?

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

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

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

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

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 permitees. 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

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.

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

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

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.

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

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. Al
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

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

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

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 they 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

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

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 DR. WEINBERG: 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

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.

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

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

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 DR. WEINBERG: 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 DR. WEINBERG: 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 DR. WEINBERG: Okay. Yeah, that's it. I
19 already asked about web security.
20 VICE CHAIRMAN CROFF: You done?
21 DR. WEINBERG: 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

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

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

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

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.

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

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.

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

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,

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

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

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

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 DR. WEINBERG: I did have one follow-up to

19 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

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 DR. WEINBERG: 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

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, the

7 vehicle, like the web based or whatever, where that

8 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

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,

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

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

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

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

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.

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

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

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)

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

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

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,

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 changed 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

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

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.

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

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

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

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

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

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 DR. WEINBERG: Is the fuel, the commercial
19 spent fuel also going to be in packages surrounded by
20 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.

1 DR. WEINBERG: 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 DR. WEINBERG: 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.

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?

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.

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

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.

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

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

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

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

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

MR. HINKLEY: The aging casks?

MEMBER HINZE: The aging casks?

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

MEMBER HINZE: And this is because some of

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

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?

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

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

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

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

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 --

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

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

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

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

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

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

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.

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

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.

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,

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

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

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.

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.

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

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

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

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

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

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.

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.

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

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

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

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

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 DR. WEINBERG: 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

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 DR. WEINBERG: 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

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 DR. WEINBERG: 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 DR. WEINBERG: 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 DR. WEINBERG: What happens if you find a
22 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?

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 DR. WEINBERG: It is designed for
8 retrieval?
9 MR. HINKLEY: Yes, ma'am.
10 DR. WEINBERG: 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 DR. WEINBERG: 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

1 development and that kind of thing.

2 DR. WEINBERG: And the waste packages that

3 are going to be emplaced, I imagine you don't have --

4 MR. HINKLEY: Still are under development.

5 DR. WEINBERG: Okay. Thank you.

6 MR. HINKLEY: Thanks.

7 VICE CHAIRMAN CROFF: Jim?

8 MEMBER CLARKE: Just a couple of quick

9 ones. I guess all the welding for the LI 22 will be

10 done in surface facilities, all the final sealing of

11 the waste packages?

12 MR. HINKLEY: Yes.

13 MEMBER CLARKE: And I was wondering about

14 the number of transfers that a material might undergo.

15 Am I correct in assuming that everything will undergo

16 at least one transfer and maybe two?

17 MR. HINKLEY: Well, yes. If we are going

18 to move spent nuclear fuel to be able to stay in the

19 thermal management program, yes then we will be moving

20 it. You know, you may have the ability to take it out

21 of the transportation cask and if the world is good,

22 move it right into a waste package and it's the right

23 kind and the right aging, and that.

24 MEMBER CLARKE: Right.

25 MR. HINKLEY: And be able to put it in

1 one. Go ahead and take the waste package over to be
2 welded, sealed and then sent to emplacement.
3 MEMBER CLARKE: Right, that's the best
4 case.
5 MR. HINKLEY: That's the best case.
6 MEMBER CLARKE: Okay.
7 MR. HINKLEY: So it could require, you
8 know for example in one of those cells, for example
9 let's talk about FHF. You'd have an aging cask right
10 there as well. So, you know, you may take part of an
11 incoming shipment, put part of it in the aging cask.
12 And so then you might have to be able to wait for the
13 next one and move them until, you know, you could get
14 your right thermal mixing.
15 MEMBER CLARKE: Yes. And then out of the
16 aging cask and into the waste package?
17 MR. HINKLEY: Right. And back and forth.
18 Because, you know, really that's kind of the staging
19 area, if you recall. In FHF it's really just that
20 cell.
21 MEMBER CLARKE: Do you have pretty good
22 information to manage all that? I mean --
23 MR. HINKLEY: Yes. The requirements for
24 the generator, in fact, are very detailed. So we
25 would have the best information available on those

1 fuel records.

2 Remember, some of the fuel has -- some of

3 it as been the pools for a very long time. So I think

4 it will still be a challenge on handling fuel that

5 hasn't been handled in a very long time.

6 MEMBER CLARKE: Thank you.

7 CHAIRMAN RYAN: I guess I'm not sure what

8 the plans might in the generator end, Bruce, but I

9 would think too that there's an opportunity for fuel

10 that's in pools now to at least have some kind of an

11 inspection and view of it as it goes into

12 transportation or aging at a power plant.

13 We did hear a presentation, what? About

14 a year ago? On some examination of some spent fuel

15 that had been in dry storage for a while, and that was

16 an interesting presentation that there wasn't any real

17 evidence of degradation over I think it was 15 years

18 or so. So I think there's an additional opportunity

19 to get more information as fuel starts to move on the

20 generator end.

21 MR. HINKLEY: Right.

22 VICE CHAIRMAN CROFF: Regarding the

23 packages, is it still the plan to have a fill gas

24 inside the package, like helium?

25 MR. HINKLEY: When the packages are

1 received?

2 VICE CHAIRMAN CROFF: No, before they're

3 emplacement in the waste packages?

4 MR. HINKLEY: That's the current plan,

5 yes.

6 VICE CHAIRMAN CROFF: And how does that

7 get in? I assume it means somehow pumping the air

8 out, putting the helium in. But are there valves on

9 this? And at what stage does this all get done?

10 MR. HINKLEY: I'd prefer to get back to

11 before we get into that specific design. But it would

12 be done over in that waste closure cell, you know

13 prior to the final welding and that kind of thing.

14 Because there are ports -- remember when it comes in

15 we take a gas sample as it comes in.

16 VICE CHAIRMAN CROFF: Yes.

17 MR. HINKLEY: So I would assume there'll

18 be an ability to have the port and put the gas in the

19 waste closure cell. But I'm not the right one to

20 answer that question, but we can get back to you.

21 VICE CHAIRMAN CROFF: Okay. At closure,

22 is it still the plan to backfill the emplacement

23 drifts?

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

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

1 VICE CHAIRMAN CROFF: Okay.

2 MR. HINKLEY: Sorry.

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

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

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

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

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

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

1 from the fuel. But we will have both storm drains and
2 floor drains and things like that that we'll be
3 monitoring and I assume process.
4 I don't know what the design of the low-
5 level waste processing system is.
6 VICE CHAIRMAN CROFF: Okay. Thanks.
7 Mike?
8 MR. LEE: Mike Lee.
9 Nice presentation, Bruce.
10 MR. HINKLEY: Okay.
11 MR. LEE: One for Dr. Hinze. The last
12 design we saw for the aging pad was a cut and fill
13 design that was in reference to an earlier question.
14 MEMBER HINZE: Well, as I understand it,
15 there are 80 meters from top to bottom. And whether
16 that's 40 and 40, 40 cut and 40 fill makes a
17 difference from the seismic response.
18 MR. LEE: Right.
19 Just a couple of quick questions. Last
20 time the Committee was briefed there was a talk of
21 doing some prototype development work up at the Atlas
22 facility or some off-site location. Can you talk to
23 the Committee about what DOE plans are for proof of
24 system, if you will, for some of the unique features
25 of the repository?

1 MR. HINKLEY: Well, I mean there's
2 prototype development for the waste packages that is
3 ongoing. As far as there are -- as part of the
4 overall plan and schedule there are prototypes for any
5 of the specialized lifting and handling equipment.
6 And all I can tell you is I know they're on the
7 schedule, because I get to look at the schedule.
8 Exactly where they're being done, I don't
9 know.
10 MR. LEE: This came up in an earlier
11 presentation because I think the thinking from the DOE
12 representatives was at some point the prototypes would
13 be perfected and there was a need to begin to work
14 through some procedures and tests, and get some
15 operational experience but do so in an environment
16 that was outside the test site area.
17 MR. HINKLEY: I know those discussions are
18 still ongoing. And there is prototype development in
19 the integrated schedule.
20 MR. LEE: Okay. Is there any prep work
21 going on at the site right now in advance of the
22 construction authorization application, like utility
23 work or things like that?
24 MR. HINKLEY: No.
25 MR. LEE: Okay. And just as a data point

1 for the members, we have in the queue a request for
2 presentation on the staff's October 8th letter, that's
3 in June where the staff will get into some of the
4 issues that they raised concerning the level of detail
5 in the design, as well as the pre-closure safety
6 analysis perspective from the NRC's perspective.
7 MR. SCOTT: Mike Scott.
8 Over the years there has been a
9 considerable amount of discussion about whether the
10 transfer system should have liquid pools or entirely
11 dry. The way I understand from your presentation, the
12 new one or the one you have now is entirely dry. Is
13 that correct?
14 MR. HINKLEY: Yes, sir.
15 MR. SCOTT: Okay. That presents
16 interesting questions about recovery from casualties
17 of moving equipment because of the radiation fields
18 associated with that. I would be interested to hear
19 how your design is addressing recoverability from
20 moving equipment type casualties and to what extent
21 you've used operating experience information in the
22 design for those type of considerations?
23 MR. HINKLEY: What I'd like to do, Mike,
24 is get back to you on that. I am, again, on any of
25 the off normal operations, we have off normal

1 considerations. I'm not prepared to discuss that.
2 That wasn't part of what I was ready to brief. But we
3 can follow-up with either a letter or some
4 information.
5 What I do know is that the design of the
6 remote handling equipment and manipulators, there are
7 designed into the building features that allow us to
8 do both remote maintenance with a separate set of
9 manipulators as well as to remove some of the
10 equipment.
11 Now, there are still conversations going
12 on. Ideally, of course, you don't ever want to go
13 into the transfer cells. But that's still under
14 consideration what we would have to do and what
15 requirements would be necessary to ever to go into
16 those cells.
17 CHAIRMAN RYAN: Maybe that's a subject
18 that we could take up at a briefing. You know, I
19 don't know that a long letter would be as helpful as
20 maybe an interactive briefing that could think that
21 off normal condition recovery question and other
22 design detail questions for a briefing down the line.
23 So is that fair enough?
24 MR. HINKLEY: That's fair.
25 MR. SCOTT: Can I just follow-up on the

1 second part of the question was operating experience.
2 Do you have a formal operating experience program to
3 incorporate lessons learned, especially dry fuel
4 handling facilities into your design?
5 MR. HINKLEY: Again, the specific
6 methodology of the design and operating experience
7 would be on the Bechtel SAIC side.
8 I know that, for example, Cogema is part
9 of the design development team. And that they have
10 also utilized some other fuel fabrication facilities
11 and some utility operating experience, but not on dry
12 fuel operations. And they've dealt with some of the
13 national labs. But I don't know how formal that
14 program is.
15 MR. SCOTT: Thank you.
16 VICE CHAIRMAN CROFF: John Flack?
17 MR. FLACK: Just from a risk perspective,
18 and again commercial reactors, is the risk being
19 driven -- I would think it would be driven by load
20 drops, dropped casks somewhere in the process or have
21 you looked at that as --
22 MR. HINKLEY: No, no, no. That's one of
23 the major contributors, yes.
24 MR. FLACK: Yes. Okay. And that's
25 usually driven by human error. So when you do your

1 reliability analysis, do you look at that from that
2 perspective? You know, since you're still in the
3 design phase, especially with the I&C and that sort of
4 thing, that you've looked at what kinds of errors
5 could occur that could cause these sort of accidents
6 to take place and try to design them out at this stage
7 when you have a chance?
8 MR. HINKLEY: Well, I know that's part of
9 the design process, again, from BSC and that's in
10 their fault tree analysis and their reliability
11 modeling.
12 Again, the process exists. We're very
13 early in the design phase. Let's say that process and
14 that methodology is in place, but right now we're
15 pretty preliminary on most of the design and control
16 systems.
17 VICE CHAIRMAN CROFF: Ashok?
18 MR. THADANI: Let me first follow-up on
19 John's question, and then I have another point that I
20 know you will appreciate.
21 Do you have in the design any
22 consideration of where you cut off things to consider,
23 accidents to consider or eliminate? Is there such a
24 thing as a cut off frequency, that this is really not
25 credible; and you can quantify that, if you will?

1 MR. HINKLEY: Well, because it's in, if
2 you would, because in Part 63 then it is really a
3 reliability based accident analysis and fault tree. So
4 by definition since it's driven by probability, you
5 know there are combinations of accident scenarios that
6 would be eliminated as part of that analysis.
7 MR. THADANI: So then going to what I
8 think Ruth was trying to understand, you know do you
9 have a real backdown design basis and then beyond
10 design basis? I'm using reactor language because I'm
11 a reactor person, like you. I mean, is there such a
12 thing as accident management strategies that you think
13 of as you go forward?
14 MR. HINKLEY: Let me try and answer it in
15 two parts.
16 I know that we have design criteria and
17 the safety analysis report, of course, would be based
18 on if you would, the design basis and the design
19 criteria. So that clearly exists.
20 What the accident management strategy is,
21 I'm not in the licensing area. I'm probably not the
22 right person to answer that question. I don't know
23 what all the accidents are that have been analyzed in
24 the pre-closure safety analysis.
25 MR. THADANI: Maybe as Mike indicated

1 earlier, when you talked about making bounding
2 assumptions versus mean values, if you will, there is
3 a relationship here in terms of the issues.
4 MR. HINKLEY: Yes.
5 MR. THADANI: I'm a reactor person, like
6 you, and you might recall that same sort of thinking
7 went into earlier designs and even recent designs of
8 nuclear power plants. The philosophy of often times
9 making bounding assumptions.
10 MR. HINKLEY: Yes.
11 MR. THADANI: And I'm reminded an event.
12 And the analysis for overpressure protection of
13 reactor coolant pressure boundary, you want to assume
14 that the power operated relief valves didn't exist.
15 And we know from the experience at Three Mile Island
16 that was not a very good way to address the issue of
17 overpressure protection.
18 What that tells me is it seems to me that
19 you would first want to make sure, I'd say regardless
20 of licensing requirements, what would be doing some
21 realistic analysis, what would be the expected
22 response, expected response and then depending, I
23 suppose, some other requirements establish what
24 margins you're heading on.
25 MR. HINKLEY: Yes.

1 MR. THADANI: And so it sort of ties in
2 with this issue of bounding assumptions can mask
3 potentially important safety matters. So it always
4 helps to do a realistic analysis. And this is an
5 issue, it seems to me, it would be very useful to
6 understand.
7 MR. HINKLEY: No, I understand your point.
8 Again if in a follow-up briefing you'd like a more
9 detailed discussion on the pre-closure safety analysis
10 and the accident management strategy, then we'd be
11 pleased to do that.
12 CHAIRMAN RYAN: And I think your
13 presentation today, Bruce, has really helped us shape
14 these ideas a little bit. So don't feel like we don't
15 recognize the progress you've made. It always leads to
16 good questions.
17 MR. HINKLEY: Thank you.
18 VICE CHAIRMAN CROFF: John, did you have
19 a question.
20 DR. LARKINS: I just had a quick question.
21 You mentioned the ventilation system that's required
22 to meet the thermal limits in both the surface and
23 subsurface. How far along are you in the design of
24 the--
25 MR. HINKLEY: I added during operation.

1 DR. LARKINS: During operation?

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

7 VICE CHAIRMAN CROFF: Latif?

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

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

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

22 Realistically speaking this is not an
23 operating plant. There is not a lot of high pressure
24 systems. There's not a lot of instrumentation and
25 controls relatively speaking. So most of the

1 challenges are in the development of the waste
2 packages which then involves, you know, rolling of
3 very steel and some challenges in the welding and
4 final closure. But the manipulation of such heavy
5 loads so frequently, that all has to be done remotely
6 is one of the significant challenges.
7 Now, interestingly, if you take -- you
8 have a challenging design and then you move it out
9 into Yucca Mountain, which has its own challenges
10 being just because of the remote location and the
11 environment. There are a lot of human factors that
12 are involved, whether it was a standard facility or a
13 nuclear facility, you know to get the design done.
14 So those are the major challenges now.
15 I'd like to think we're still on schedule to have
16 sufficient design to submit the license application at
17 year end. So then let's say we'll still have the
18 design concepts, but the final calculations and the
19 material section that, we still have a ways to go.
20 VICE CHAIRMAN CROFF: Okay. Thanks. I
21 think we're about out of questions and out of time for
22 this.
23 Thank you very much for an interesting
24 presentation. And we thank you. Look forward to
25 hearing from you again in a year or two.

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

2 CHAIRMAN RYAN: Yes. We've had an

3 additional request for somebody to speak to the

4 Committee. And it's Martin Malsch. And we slotted

5 this few minutes here to hear what Mr. Malsch has to

6 say.

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

8 CHAIRMAN RYAN: Please, so I can get it on

9 the record.

10 MR. MALSCH: Okay. Thank you. I just

11 wanted to make a few brief remarks on behalf of the

12 State of Nevada.

13 My remarks are in three categories.

14 First, a few brief comments on the presentation here

15 this morning. Second, some more slightly lengthier

16 comments about something that the NRC staff said

17 yesterday about following up on the ongoing

18 investigations of the USGS. And then something about

19 the presentations this afternoon, and in particular

20 the nature of a petition for rulemaking, which Nevada

21 filed a few weeks ago.

22 First let me address briefly the remarks

23 this morning. First, it struck me that as the speaker

24 said, there's a ways to go before the final design is

25 developed. I understood the Commission in part

1 contemplated that the LA would include a level of
2 detail equivalent to what we would now see in a final
3 safety analysis report. And it struck me that the DOE
4 is a long ways away from that. And quite aways away
5 from meeting a schedule of filing an LA or submitting
6 an LA in 2004.
7 Among other things, I didn't hear anything
8 at all in the presentation about airplane crashes. Now
9 that, of course, goes to overall site suitability.
10 But as we know also from the experience in the Private
11 Fuel Storage Facility proceeding there's a possible
12 spillover into the facility design as to whether
13 certain features of facilities are designed or
14 hardened against airplane crashes. And I heard no
15 presentation about that.
16 Then there's this question about the aging
17 facility, which always fascinates the State of Nevada.
18 Apparently the purpose of the facility is to enable
19 the site to accept spent fuel that doesn't meet
20 emplacement thermal criteria. There's even a
21 reference someplace in the slides here to accepting
22 the youngest fuel first, which I thought was contrary
23 to the overall design philosophy of accepting the
24 oldest fuel first. This combined with what we still
25 think is a rather large aging facility leads Nevada to

1 be curious about whether this is really nothing other
2 than a monitored retrievable storage facility in
3 disguise, which of course is something which is
4 prohibited by the Nuclear Waste Policy Act.
5 The third comment I would have about this
6 morning's presentation is that I notice that the
7 emplacement drift ground support materials are not
8 classified as important to waste isolation, and I
9 don't know whether or not that's true. I suppose that
10 depends upon how they factor into the total systems
11 performance assessment. But somewhere along the lines
12 here DOE seems to have forgotten about the concept of
13 retrievable. And I'm wondering whether they are
14 consciously building into the design a retrievability
15 option, which is of course as required by Part 63.
16 And I saw that missing from the presentation.
17 Let me now go over into the remarks which
18 the NRC offered yesterday about how they're following
19 up on the allegations concerning USGS.
20 I just wanted to emphasize that the
21 problem goes far beyond USGS. These allegations only
22 came to light after DOE was forced to review some so-
23 called archival emails as a result of Nevada's
24 challenge to the original LSN certification. We had
25 been reviewing the old emails and, of course, we can't

1 predict what the review of the new emails might still
2 produce in terms of surprises for us. But we have
3 looked at some of the old emails. And I'd like to
4 have you just consider what they tell us about the
5 project so far.
6 They show current project management
7 Bechtel SAIC directing its quality assurance personnel
8 not to the use "violated" in their reports. A less
9 disturbing term, non-complaint was preferred.
10 They showed project personnel adopting the
11 position that the NRC should only be given the minimum
12 information on the KTIs.
13 Project personnel afraid to call whole
14 programs deficient because fixing them would be too
15 expensive.
16 Secret communications. The question of
17 whether of critical representations to the NRC about
18 safety priorities are correct.
19 Efforts to keep some people in blissful
20 ignorance about technical problems.
21 An assumption that the proof that will get
22 through the so called regulatory hoops need not be
23 rigorous from a scientific point.
24 A program that carefully manipulates
25 statistics to assure that the results are always in

1 the right place.

2 A program where scientific instruments are

3 documented as properly calibrated before they're even

4 received, much less calibrated.

5 And a project where discord and distrust

6 are so rampant that senior officials are called

7 "swindlers, certifiable jerks" and worse.

8 And the management to the principal

9 contractor is called "craven and ignorant."

10 They evidence a project where dramatic and

11 unexpected information in an email entitled "Water,

12 water everywhere" apparently gives DOE ulcers but not

13 enough discomfort to delay a scientific report to the

14 Congress.

15 Let me just focus on two emails in

16 particular which I think the Committee might find

17 interesting.

18 There's an email in the year 2002 speaking

19 about the whole effort to prioritize the KTIs. In

20 part, we see an email which says: "I already saw a

21 note, though secretly sent to his favorite DOE folks,

22 arguing that prioritization based on any kind of TSPA

23 results is not to be trusted." I've already said,

24 it's directly contrary to representations which DOE

25 made to you people and to the NRC about how one could

1 base a prioritization on the KTIs on the TSPA.

2 Then there's another email that dates back

3 to 1998 which says, in part, as follows: "In the

4 absence of statistics they have relied on expert

5 opinion alone, but mostly internal experts like Bruce.

6 I would not characterize this as emphasizing elicited

7 information." And then here's the important part.

8 "Who's kidding who? These guys are going to assign

9 probability distributions that keep the expected

10 values in the right place."

11 But there are some good people in the

12 project. There is another email which says, as

13 follows: "I don't know how to fight lies and

14 misinformation. And no one seems to care about the

15 truth or even making sure the right people are doing

16 the right stuff." Apparently the email drafter here

17 was concerned about the truth and doing the right

18 stuff.

19 All these emails are attached to the State

20 of Nevada's testimony a short time ago before the

21 House Subcommittee of Federal Workforce and Agency

22 Organization. If the Committee's interested, I'm

23 happy to leave a copy of the emails with you if you'd

24 like to look at them.

25 And then thirdly and very briefly, let me

1 address some of this afternoon's remarks in which
2 there will be some discussion about DOE's plans for
3 its NEPA review of transportation issues.
4 In the oral argument before the Court of
5 Appeals the NRC staff represented with respect to NEPA
6 that it would not adopt the DOE Environmental Impact
7 Statement unless it satisfied the requirements of
8 NEPA, the NRC's regulations and the regulations of the
9 Council on Environmental Quality. And that meant, of
10 course, that it would be open to any participant or
11 party in the licensing proceeding who opposed the
12 adoption of an DOE Environmental Impact Statement to
13 raise any issue within the scope of NEPA, the Council
14 on Environmental Quality's regulations and the NRC's
15 regulations. As opposed to, for example, being
16 confined to raise issues only dealing with new
17 information or new changes developed since the
18 Environmental Impact Statement.
19 Our petition for rulemaking that we filed
20 a few weeks ago asked the NRC essentially to codify
21 that representation to the Court of Appeals into the
22 regulations, so there should be no question about
23 this. That's the thrust of our petition for
24 rulemaking. But I thought that it was important for
25 you to know that because it influences the scope of

1 the Commission's review of the DOE EIS and then it
2 also, perhaps, conceivably the scope of this
3 Committee's role with respect to the DOE EIS.
4 And with that, let me conclude and say
5 thank you for allowing me to address you this morning.
6 CHAIRMAN RYAN: Thank you, Mr. Malsch. We
7 did have your petition documentation. It came to the
8 Committee's attention, and that's been distributed.
9 And if you'd like to make your written
10 material as part of your presentation, we'd be happy
11 to have that copy as well.
12 MR. MALSCH: Sure. Thank you very much.
13 CHAIRMAN RYAN: Thank you.
14 With that, we're scheduled for finishing
15 this morning. Mr. von Tiesenhausen will be up after
16 the following presentation after lunch.
17 Thank you all very much.
18 We'll reconvene sharply at 1:00.
19 (Whereupon, the Committee was adjourned at
20 11:42 a.m., to reconvene this same day at 1:00 p.m)
21 CHAIRMAN RYAN: On the record. Okay.
22 We'll come to order please. I would like to remind
23 everybody to please put your cell phones in off or
24 mute. That would be helpful. Thanks very much. And
25 this portion of the meeting on Transportation Aspects

1 of the Yucca Mountain Environmental Impact Statement
2 (EIS) Update will be led by Dr. Weinberg. Ruth.
3 DR. WEINBERG: Thank you and I would like
4 to welcome Gary Lanthrum, Director of the Office of
5 National Transportation and to clarify that this is
6 not an update on the EIS but an update on Department
7 of Energy transportation plans. Is that correct,
8 Gary?
9 MR. LANTHRUM: That is correct. Is it all
10 mine now?
11 DR. WEINBERG: It's all yours. Take it
12 away.
13 MR. LANTHRUM: Thank you very much. I see
14 a number of familiar faces out here and for the
15 familiar faces, there'll be a number of slides you've
16 seen before. Unfortunately, the Transportation
17 Program has not been charging ahead at a rapid pace,
18 partly because of funding and other issues, but we'll
19 get into that as we go along and hopefully for some of
20 you, all of the slides will be new.
21 As a bit of background, the Office of
22 National Transportation (ONT) within the Office of
23 Civilian Radioactive Waste Management, we have office
24 within offices and directors reporting to directors
25 reporting to directors. It's a confusing

1 organizational chart. But the Office of National
2 Transportation was formed in 2003. I came on board in
3 August of that year and it was about time the
4 Transportation Program got some new legs again after
5 the site recommendation which was made in 2002.
6 Following that, funding increased for
7 Transportation in 2003 in the genesis of a program to
8 focus on what it would take to ship spent nuclear fuel
9 and high level waste to a repository began in earnest
10 and I was lucky enough, I still think, to get the job
11 and pull that together. I've organized the Office of
12 National Transportation into two divisions and you'll
13 understand a little bit more later as I go through it.
14 But there's an Infrastructure Development Division and
15 Operations Development Division.
16 All of the work since we're trying to
17 build the capability to do operations and we're trying
18 to build the capability to make shipments, all of the
19 work is project ties right now. Although at some
20 point, those projects are going to transition into
21 actual operations. But the bulk of the projects are
22 to buy things. We're going to be a very contract-
23 intensive organization. We have to buy casks. We
24 have to buy rail cars. We have to buy construction of
25 a railroad to connect to the repository and all of the

1 things that we're buying fall into the responsibility
2 of the Infrastructure Development Division.
3 The Operations Development Division is
4 dealing with a lot of the planning issues developing
5 transportation protocols, working with states on
6 emergency preparedness training funds. A lot of the
7 soft issues surrounding development of a
8 transportation system are being handled in the
9 Operations Development Division.
10 Under the Nuclear Waste Policy Act, all of
11 our casks that we procure have to be certified by the
12 Nuclear Regulatory Commission and we must provide
13 advanced notice per the NRC requirements for shipments
14 that we're going to make to the states and we've made
15 the policy decision to also try and include others as
16 necessary. But how will be notified is still
17 something that's still part of an ongoing discussion
18 on the security front, but we will be following the
19 NRC requirements for pre-notification.
20 We are required under the Nuclear Waste
21 Policy Act to use private industry to the fullest
22 extent practicable and that's why I indicated earlier
23 there's going to be a lot of contracts. They're going
24 to be the heart of the development of the
25 transportation system.

1 Under Section 180(c) of the Nuclear Waste
2 Policy Act, we have to provide technical assistance
3 and funds to states and tribes, to do emergency
4 preparedness planning and training. We are working
5 with states and tribes through a transportation
6 external coordinating work group right now to define
7 the kinds of activities that would be allowable under
8 that funding and to define the process for approving
9 the funding in the grant process and we're making some
10 good progress there.
11 Overall, Transportation is a pretty
12 interesting area. There's a lot of work to be done
13 and yet pretty much all of the infrastructure that I'm
14 responsible for developing is being driven by outside
15 requirements. It would be wonderful to be king for a
16 day and say, "I have to build a transportation system
17 or we have to build a transportation system and here's
18 what it's going to look like." Unfortunately, we're
19 not in the driver's seat about what's going to be
20 shipped when nor are contracts or at least agreements
21 between the Department and the utilities that have the
22 spent nuclear fuel at sites around the country, the 72
23 sites around the country.
24 They are really in the driver's seat and
25 that driver's seat is driven by the Nuclear Waste

1 Policy Act so that the utility, the corporate entity,
2 that has the oldest fuel has a ticket in line to ship
3 first. They can use that ticket in line for any fuel
4 that that corporate entity has. So they don't have to
5 ship their oldest fuel. They can shift their youngest
6 fuel. They can ship anything they want or they can
7 trade that place in line with other utilities. So
8 there's a complicated framework with all of the
9 contents that could be shipped, trying to guess what
10 will be shipped and make sure that we have the right
11 infrastructure in place to handle it.
12 We also have the requirements for the
13 receipt of the spent fuel and high level waste at the
14 repository. I think you heard this morning that they
15 have a phased approach to building the repository
16 capability and there may be some constraints on the
17 repository side about what can be received during
18 initial operations. Those questions haven't been
19 answered for me. So I'm in kind of a gray zone trying
20 to figure out what exactly I need to buy in terms of
21 casks, in terms of rolling stock whether it's cars or
22 trucks or rail cars.
23 It would be nice to have absolute
24 definition about what it is we're going to be shipping
25 at least in the first couple of years so I could focus

1 the acquisition efforts on that. In absence of any
2 clear direction about what it is we're going to be
3 shipping, we have to try and procure infrastructure
4 that has the broadest capability possible for the
5 dollars invested. So that decisions are made, we have
6 the highest probability of being able to succeed.
7 Ideally, I'd be in a position of procuring
8 all the infrastructure for all the contents that would
9 have to be shipped and have that all available in year
10 one so that whatever decision was made, I could pull
11 the right items off the shelf and deploy them. I'm
12 not going to be in that position and I think you've
13 seen the funding profiles and there's going to be a
14 fairly significant constraint, I am expecting, on
15 funding profiles for transportation as well as the
16 program as a whole.
17 In the middle, I have a line that shows
18 the stakeholder interfaces coming down the middle and
19 that's also a driver because we have an awful lot of
20 states that are going to be transporting these
21 contents through as well as tribes whose lands are
22 going to be crossed. There's a lot of interested
23 players in the industry. There are a lot of other
24 folks that are passionately engaged in the discussion
25 about what this transportation network should look

1 like and what should be done to make sure it is safe
2 and secure. So all those external drivers are shaping
3 some of the things that we're doing and try and keep
4 that in mind as I go through the rest of the
5 presentation here.
6 On the institutional side in trying to get
7 information from the shippers to identify what the
8 ideal content would be, in November of 2003, we
9 published a strategic plan for Transportation and we
10 got a little bit of a challenge on it because it
11 looked like more an institutional plan. But what it
12 really said was strategic. It said that all of our
13 decisions are going to be developed collaboratively
14 with a broad base of stakeholders. We're going to
15 include the industry. We're going to include the
16 states and tribes. We're going to include people that
17 have lots of experience transporting the kinds of
18 contents we're going to moving, the naval reactors
19 organization and the EM organization within the
20 Department of Energy plus other countries that have
21 significant experience shipping spent nuclear fuel.
22 So we are working very diligently on this
23 collaborative development of what the infrastructure
24 should look like.
25 Now we're trying to establish the approach

1 to common cask procurement for both the use in
2 transportation and for use in aging at the repository.
3 I imagine you heard today in discussions about the
4 repository development that there's an expectation
5 that some of the contents that come in will have to be
6 aged for a period of time before the heat load gets to
7 the point where they can be disposed. So there will
8 be aging casks that they will have to use for storage
9 onsite for some period of time until they get the
10 right balance between heat loads to actually be able
11 to dispose and we in Transportation are looking at the
12 procurement of casks that could support both the aging
13 function at the repository as well as the
14 transportation function.
15 We're also have some considerable
16 discussion with the development of the surface
17 facilities at the repository to make sure that the
18 casks and rolling stock that we do procure will
19 adequately interface with their facilities, with their
20 access and egress, routes from the repository.
21 The priorities we have for this year, the
22 primary one we have is support from the Nevada Rail
23 Alignment Environment Impact Statement. Ruth
24 indicated that my presentation is not on "The
25 Environmental Impact Statement" and there was the

1 significant EIS that was done for the repository
2 itself that also included the information on
3 transportation that was basis for our record of
4 decision on both mode of transport which was mostly
5 rail and the corridor for studying alignment options
6 for building a railroad to connect an existing
7 mainline track to the repository.
8 We're currently working on that
9 environmental impact statement. We had originally
10 hoped to have the draft done in the spring of this
11 year, but during scoping, we had scoping meetings in
12 five locations around the State of Nevada. We
13 received over 4,000 comments from interested
14 participants and were wading through that huge body of
15 comments.
16 What's that done is it's caused us to
17 increase the scope of the EIS. We are actually
18 considering additional alignment options that were not
19 in the repository FEIS and we've actually tossed out
20 some options that were in there that we were asked not
21 to pursue any further. I think it's appropriate that
22 we wade through that and it's just going to be
23 challenging to get the EIS out in the timeframe that
24 we had hoped. The EIS that we're studying is the
25 alignment options within the Caliente corridor.

1 That's a nominally 320-mile long corridor, but we're
2 going to be studying about 600 miles of alignment
3 options to make sure we address all the comments that
4 we received during the scoping process.
5 Support for state regional groups. I
6 mentioned that we're doing a lot of collaborative work
7 on our planning process and trying to identify what
8 kinds of activities would be fundable under one of the
9 provisions of the Nuclear Waste Policy Act. That work
10 is done through both the Transportation coordinating
11 group where we bring the states, tribes and industry
12 together but we also have groups of states, the state
13 regional groups, there's four of them that we support
14 through cooperative agreements.
15 You really can't do transportation
16 planning one state at a time. The ingress and egress
17 routes from one state have to match up with those of
18 their adjacent states and so we've grouped the country
19 into four regions. There's a northeast region, a
20 southern states region, a Midwest region and then the
21 bulk of the western states are in a separate region.
22 We are working very diligently both with these groups
23 individually and through them combined at this
24 Transportation External Coordinating Working Group
25 (TEC) sessions that we have twice a year. We're

1 making progress both on the effort to try and define
2 the criteria and methodology for selecting the routes
3 that we're going to use as well as identifying the
4 funding requirements and allowable funded activities
5 under this 180 Section under the Nuclear Waste Policy
6 Act.
7 We're also this year trying to focus on
8 acquisitions that will advance infrastructure
9 development without major capital requirements.
10 Again, our funding this year was substantially lower
11 than what our request was. In Transportation, we had
12 requested $187 million and we got $25 million. It's
13 kind of hard to buy as many things as you had hoped to
14 buy when your funding is that short.
15 What we are trying to do is to develop
16 request for proposals on conceptual designs. The
17 paperwork we have enough money to do to further some
18 ideas about how to close the gap between the casks
19 that exist currently and the certificates that exist
20 currently and that we're going to need possibly to
21 conduct shipments during the first year of operations.
22 This is a plot of the funding profile that
23 I indicated. It's interesting. You can see during
24 these early years in the late '90s and early 2000
25 where the funding was around $2 million to $3 million.

1 It crept up to $4 million in 2002. It's actually
2 bleaker than it looks because during that period of
3 time, Transportation was not an standalone
4 organization. It was Transportation and Waste
5 Acceptance were combined into one organization and the
6 bulk of that funding was going towards efforts in
7 Waste Acceptance not in Transportation.
8 After the site recommendation was made in
9 2002, the Transportation funding crept up to $10
10 million in 2003. I came on in the tail end of that
11 year and helped craft a strategy that identified four
12 projects to focus our efforts on. In 2004, we have
13 fairly substantial funding and we're building up to
14 advance to the ability to effectively spend $187
15 million this year which primarily would have gone
16 towards acquisitions. It would have bought the
17 prototype rail cars.
18 The Association of American Railroads has
19 a new requirement for cars that ship spent nuclear
20 fuel and high level waste. No cars exist that are
21 approved to meet that standard right now. So we had
22 anticipated using a fairly substantial chunk of that
23 money to actually have conceptual designs done,
24 prototypes built and testing begin.
25 A lot of that's backed off. We're back

1 into just the conceptual arena. Both the cask front
2 and the repository front are in the rolling stock
3 front and focusing the bulk of the funding that we got
4 now this year on the rail line with EIS.
5 We did accomplish a fair amount withe $64
6 million we had in 2004. There's a good cross section
7 here, but we did set up our strategy plan which was
8 issued in November of 2004. It was a highlight. We
9 pulled the state region groups in for a meeting with
10 the Under Secretary shortly after that and he
11 expressed his interest in supporting their activities
12 and we actually challenged the state regional groups
13 to propose projects that identified areas of
14 significant interest to their region that might also
15 benefit the planning activities within the Office of
16 National Transportation.
17 A couple of good projects have been
18 proposed. One of them, the Southern states want to
19 study the options for moving contents from sites that
20 don't have rail access to a railhead by using barges.
21 So we're working with them to identify the scope of
22 that project and to fund it. Again, I think the
23 Northeastern region has also decided to piggyback with
24 the Southern states on looking at the barge options
25 for getting contents from sites without rail access to

1 a railhead. The Midwest has other interests. The
2 Western states are primarily interested in some of the
3 planning models that we are developing. Looking at
4 what the infrastructure needs might be under various
5 scenarios and so we're engaging all of them in
6 projects that benefit both their planning efforts and
7 would further our needs as well.
8 We did get our record of decision out in
9 April of 2004 on both mode and the corridor. The mode
10 again is mostly rail mode to transport. Although
11 there will be some truck shipments, we're hoping to
12 ship the majority of the waste by rail. We had
13 scoping meetings that ended in May and we began the
14 actual EIS in June of 2004.
15 A lot of this is about the setting up the
16 projects. The work breakdown structure, we actually
17 organized four primary projects within the Office of
18 National Transportation and there was a Nevada rail
19 project which we talked a bit about here. There are
20 other acquisitions which includes casks, rolling stock
21 and facilities. There is an operations development
22 project and there's institutional outreach.
23 Our 2005 plans, again we're focusing
24 primarily on getting the environment impact statement
25 thoroughly funded and to address all the comments that

1 we got during the scoping meetings to make sure that
2 we have a draft EIS when it does come out that
3 addresses all the concerns that have been raised. We
4 are working on the conceptual design for casks and
5 rail cars. We're trying the pull the requests for
6 proposals together. We would expect to get those
7 requests for proposals out this year, but probably not
8 have the selections made and the funding done until
9 fiscal year 2005.
10 We're hoping to make decisions that will
11 enable more robust planning. One area that we've been
12 getting a lot of feedback on is whether or not we will
13 use dedicated train where you would have a train that
14 would only ship one cargo that would be destined just
15 for the repository as opposed to having repository
16 cargoes intermixed with other cargos on longer,
17 regular or key trains. We believe that's a policy
18 decision that the Department can make outside of the
19 NEPA process and we are doing the staffing work to try
20 and get that done.
21 One of the significant things about the
22 decision of whether to use dedicated trains or not is
23 it provides a much more clear framework for the states
24 to do their planning within and it provides a lot more
25 flexibility on whether you do or don't have specific

1 discussion about routing.

2 We're also hoping to expand our

3 consultation with the tribes. The Transportation

4 External Coordinating Working Group that we have has

5 tribal participation and we have a Tribal Working

6 Group but not all of the tribes that are on potential

7 routes between shipping sites and the repository

8 participate in TEC.

9 We sent out letters to 40 tribes that are

10 within a half mile of potential transportation routes

11 and ask how they would like to be engaged in a

12 government-to-government relationship with the Office

13 of National Transportation and with the Department.

14 A few of them have contacted us and actually the

15 Tribal topic group with TEC let us know that if you

16 want to talk to the tribes, writing letters and making

17 phone calls is probably not going to do it. That was

18 a requisite first step, but we're going to have to

19 wind up doing a lot of visits and actually request

20 audiences with them at their tribal locations and that

21 will be the next phase that we go through.

22 We're continuing to work with the state

23 regional groups on both the activities that they're

24 participating in through TEC and with their special

25 projects.

1 The Yucca Mountain final EIS (FEIS) was
2 issued in 2002 and in there, there were two modes of
3 transport that were covered, the mostly rail and the
4 mostly truck. There were five corridors considered
5 for access to the repository if rail were selected.
6 There was no preference of a corridor in the final
7 repository EIS but there was a preference for the
8 mostly rail mode of transport.
9 On December 21, 2003, we put out a *Federal*
10 *Register* notice stating our preference for the
11 Caliente corridor. That preference was based on input
12 from stakeholders. Going through the repository FEIS,
13 we did not feel that there was any environmental
14 driver that would rate one of the five corridors
15 analyzed higher than the other, but we did look at the
16 potential land use conflicts. Some of the corridors
17 had considerately more private land in them than
18 others. We winded up selecting a corridor that was
19 99.9 plus percent BLM land in hopes of avoiding land
20 use conflicts to the maximum extent practicable.
21 We also looked at the indirect costs
22 associated with the decision on what corridor it would
23 be and we had received unwavering opposition from both
24 the State of Nevada and from the City of Las Vegas and
25 from Clark County over selection of any corridor that

1 would transit the Las Vegas valley and there were two
2 corridors that would have been much simpler to
3 construct that did cross either the northwest edge of
4 the Las Vegas Valley or the eastern edge of the Las
5 Vegas Valley. So both of those were tossed out to
6 avoid those land use conflicts.
7 The Caliente corridor itself that we did
8 select in our April record of decision starts, and I
9 believe we have a slide here, yes, here near the town
10 of Caliente on the western edge of the State of
11 Nevada. It curves around and where the line turns
12 from red to pink is where we go from what we call a
13 common segment to alignment options. What you
14 typically have in the middle there is a terrain
15 feature, mountain range or something that you have
16 multiple passes that you could to get around. So we
17 have a number of alignment options that were proposed
18 even in repository environmental impact statement.
19 We come back to a common segment and then
20 this is the Nevada Test and Training Range in the
21 brown here. On the western edge if the Nevada Test
22 and Training Range again there are multiple alignment
23 options. Some are to avoid train features. Some were
24 to avoid environmental features like springs. Others
25 were to avoid towns.

1 During the scoping process, we got some
2 very interesting feedback. This are in the northwest
3 corner of the Test and Training Range is near the town
4 of Goldfield. There are a lot of mining activities
5 between the town of Goldfield and the Nevada Test and
6 Training Range. We had originally anticipated that
7 the mining interests might actually be excited about
8 the possibility of having rail access out there.
9 Well, it turns out the kind of mining
10 they're doing is primarily cyanide leach extraction of
11 gold from existing tailings. So they don't have large
12 quantities of ore to move and they really wanted us to
13 just stay out of there. They didn't want anything
14 that would interrupt their ability to collect tailings
15 to use for additional extraction operations.
16 At the same time, the City of Goldfield
17 really said they would like us to come closer to the
18 city. So there are some cities that actually see the
19 potential of a rail line as being beneficial rather
20 than something that's problematic. So that's one of
21 the things that we're considering in our EIS now is an
22 alignment option that does come over to the west side
23 of the town of Goldfield.
24 You can also see if you look really
25 closely that some of these pink options actually dip

1 into the Nevada Test and Training Range and those
2 alignments were there in the original repository FEIS.
3 The Department of Defense and the Air Force made it
4 again unequivocally clear that they did not want to
5 see any line that would transit the Test and Training
6 Range. That was unviable space for them. They had
7 significant national security activities going on and
8 didn't want either construction operations or
9 transportation operations going on in that space and
10 so we did drop two options from further consideration,
11 one here in the northwest corner and one down a little
12 bit further. There was an option that did just dipped
13 into the Test and Training Range down there that we
14 are no longer studying. There are a number of other
15 options that we are looking at and we're hoping to
16 have all of those outlined in the draft EIS when it
17 comes out possibly later this year.
18 At the same time as our preference
19 statement for the Caliente corridor, we made our
20 announcement to do through a notice of intent to do an
21 environmental impact statement. We're covering not
22 just the alignment options but we're also covering the
23 potential construction operation and eventual
24 abandonment of a rail line to the repository. All of
25 that's part of the scope and again, this is the note

1 that we have over 4,000 comments in the five locations
2 that we held meetings in Nevada.
3 We're moving forward. The EIS contracts
4 were all awarded in good time. We're engaged pretty
5 heavily in conducting field surveys and for those of
6 you that have come all the way from Nevada to
7 participate, you know that this has been one of the
8 wettest winters that they've seen in a long time. The
9 whole Southwest has had a real deluge this winter
10 which has been great for the drought that they've had
11 but it's been really difficult for the field work that
12 we need to be doing.
13 Between the activities in the Nevada Test
14 and Training Range, their flight operations and other
15 activities and the bad weather, we've not been able to
16 complete the aerial survey work that we had hoped to
17 have done by now. So we're still engaged in that. We
18 are working on the conceptual design for the railroad.
19 We do have the bulk of the geotechnical work done and
20 the bulk of the hydrology work done out along the
21 corridor and the alignment options and so we've made
22 significant progress in the EIS front moving towards
23 a draft EIS.
24 This is again some of the areas that we're
25 collecting data on to feed both the EIS and the

1 ongoing design work for the railroad that will go
2 beyond what's required for the EIS itself. But it's
3 the geotechnical work, the aerial surveying and aerial
4 mapping. We have really good data from the USGS now,
5 their mapping data that's down to a nine meter contour
6 interval. But we're trying to drive down with the
7 aerial mapping as a five foot contour level which will
8 give us a lot greater capability of doing optimal
9 alignments from construction perspective for the rail
10 line within the corridor.
11 We're looking at the hydrology. Another
12 good thing about the rain over the winter is that
13 everything is blooming out there. So the ability to
14 look at endangered and threatened plants and animals,
15 we have very good coverage of the plants that are out
16 there because everything is blooming this spring. So
17 that's been very encouraging.
18 Upcoming milestones for the EIS activities
19 is to complete the data collection that will feed the
20 draft EIS. We're hoping to have that draft EIS out
21 this year. It's probably going to be six months later
22 than originally expected again because of the increase
23 in scope. We hope to have the public hearings after
24 the draft EIS, time to incorporate the feedback we get
25 during that process. I'm not expecting to have a

1 final environmental impact statement or a record of
2 decision about what alignment would be chosen until
3 sometime in FY '06.
4 Shortly after issuing the record of
5 decision on both end alignment that would be selected
6 and the decision to actually construct a railroad
7 which has not been made yet, we would then do the
8 contracting work for the final design construction of
9 a railroad itself.
10 On casks, we've had a number of meetings
11 with the NRC to talk about casks both one on one with
12 the Spent Fuel Project Office who will be responsible
13 for actually doing the cask certification, Bill Brock
14 and the people that work for him. We're talking about
15 what we've done both in terms of looking at existing
16 cask designs and capabilities and what gaps there are
17 between what we could possibly have to ship when the
18 repository opens and what we can ship now.
19 Our goal is to procure the minimum suite
20 of casks and go through the fewest number of
21 certifications required to make sure that we have all
22 coverage we need. Again, we would like to spend as
23 little money as possible and we'd like to not
24 complicate the NRC's life anymore than necessary in
25 looking at additional designs. We'd like to have

1 casks that provide the maximum flexibility in terms of
2 both fuel compatibility and handling capability.
3 It's interesting that when we first
4 started our review we invited the cask vendors to come
5 and talk to us and asked them what percentage of
6 what's out there can be shipped with the existing
7 casks with existing certificates and we got some
8 pretty good answers from them, very encouraging. But
9 we knew there was an element of sales involved in
10 those visits and so we said, "Put it in writing."
11 But not to put a burden on them rather
12 than say, "Just make some proposals to us," we paid
13 them to develop cask capability reports and again to
14 keep an even playing field, all of the vendors that
15 had an existing certificate with the NRC for a Type B
16 cask were allowed to participate. We wanted qualified
17 viable vendors. Out of that invite, we had six takers
18 and we got cask capability reports and when we waded
19 through all the data that was presented to us it
20 looked like about 60 percent of the contents out there
21 that we would be responsible for shipping, this is on
22 the commercial side, 60 percent of that content could
23 be covered by existing hardware designs with existing
24 certificates. Well, unfortunately, the world's never
25 simple enough that you can stop with just talking to

1 one group of stakeholders.

2 CHAIRMAN RYAN: Just to clarify, that was

3 60 percent by rail. Or was that rail and road?

4 MR. LANTHRUM: Sixty percent

5 representative of rail and truck.

6 CHAIRMAN RYAN: Okay.

7 MR. LANTHRUM: Right. There were casks

8 that could cover 60 percent of the contents and that

9 included both some truck shipments and some rail

10 shipments.

11 CHAIRMAN RYAN: I just wanted to get

12 detail.

13 MR. LANTHRUM: You bet. The cask

14 perspective is not the only perspective you have to

15 look at unfortunately. So we also went out to try and

16 update information about the utilities themselves and

17 what capabilities they had in terms of crane

18 capacities, ingress/egress. Do they have real access?

19 Do they not have real access? How much lay-down space

20 do they have? Can they get casks into their spent

21 fuel pools? How much space is there?

22 Getting those reports back and blending

23 that with the information that we got from the cask

24 vendors indicates that we only have about half the

25 coverage that we had hoped for. So about 30 percent

1 of the content out there can be served both by
2 existing cask designs and by the infrastructure that's
3 at the utilities. So we have a bigger gap that we
4 have to close than we would have liked to have had.
5 The good part is we have some very good information
6 now to work from.
7 That gap that we've identified that
8 combines both the utilities capabilities and cask
9 matching with the fuel types itself will be the
10 starting point for our next round of procurement which
11 will be for conceptual designs to close the gap,
12 again, with the eye on what the limitations are at the
13 utilities not keeping it freeform for the cask vendors
14 to propose solutions that wouldn't really be useable.
15 This goes into the cask capability reports I just
16 talked about and the next steps are to issue the RFP
17 for conceptual designs to close that gap.
18 On the rolling stock, we did somewhat the
19 same approach. We are obligated we believe to produce
20 rail cars that meet this new AAR 2043 standard.
21 Obligate may be too strong a word. The standard is an
22 industry standard and so there's no regulatory
23 requirement to meet it. The fact that the industry
24 has bought into the standard would make it very
25 difficult in contracts base to not meet it.

1 Looking at the basis of the standard
2 there is nothing new on the cars that are specified
3 under the standard. What the standard does is it
4 combines the best of existing technologies in a
5 number of areas to provide a rail that has the best
6 operational characteristics possible. That seems a
7 pretty good argument to me whether we're obligated
8 regulatorily or not may be a separate question. But
9 looking at having the best rolling stock possible
10 seems to be a good goal to strive for. And whether
11 it's cars that meet the AAR standard or just the best
12 available technology, it's a worthwhile goal.
13 We invited the rail car manufacturing
14 community to come in and talk to us, both the people
15 that produce passenger cars and the people that
16 produce freight cars, talk them to about whether or
17 not they felt that this AAR standards was achievable,
18 what kind of timeframes and again, the feedback we got
19 was fairly encouraging. The timeframes that we were
20 looking at, five year window from the procurement of
21 conceptual designs through prototype development
22 through testing for approval and then getting into the
23 final procurement process for the actual fabrication,
24 they all said it was doable.
25 One thing that we had anticipated doing

1 since we are looking at the possibility of having both
2 the cask bearing cars, the buffer cars that would be
3 provide space between the locomotive and the cask cars
4 and between the cask cars and the escort cars where
5 our security force would be and the escort cars
6 themselves, all three of those cars would have to meet
7 the standard. We had originally anticipated a
8 separate contract for the escort car because it's much
9 more like a passenger car and a separate contract for
10 combined buffer car/load-bearing car because those are
11 both more like the freight type cars.
12 The consistent input we got from the
13 vendors was that it's not just the performance of the
14 cars that's part of the standard, but the performance
15 of the consist where the consist is the whole train.
16 If you're looking at the dynamics of how the cars work
17 with each other in the consist, they recommended that
18 we do a single procurement for one manufacturer to do
19 all the cars even if that manufacturer had to do a
20 subcontract for one particular type of car that they
21 may not be a specialist in. They felt that that would
22 ensure that the consist was designed to be functional
23 and to pass the dynamic testing that's required as
24 part of the standard. So we've taken that into heart
25 as we move forward with our RFPs on the next steps.

1 In addition to the rail cars and the casks
2 and the possibility of having some truck shipments, we
3 also have a number of facilities that we're going to
4 be responsible for. One of the largest ones is the
5 Fleet Management Facility. We have to have a place to
6 maintain the casks to the 10 CFR 71 Subpart H QA/QC
7 requirements.
8 There's at least an annual maintenance
9 requirement and then other maintenance requirements
10 that vary from certificate to certificate depending on
11 the cask design. A place to do that, a place to
12 maintain the records, a place to have a compliant
13 operations are going to be necessary.
14 We're going to have to have a Fleet
15 operations center, a place to actually track the
16 shipments, to maintain communications with the escort
17 force that we have. It could be collocated with the
18 Fleet Management Facility. It could be located
19 separately but that's another operational functional
20 requirement that we're going to have to have.
21 Where the track ends near the repository,
22 we're going to have to have an end-of-the-line
23 facility. Somewhere when we procure all of our rail
24 cars and casks, we need a significant amount of lay-
25 down space for all the hardware. We're anticipating

1 having a very large siting located as an end-of-the-
2 line facility where our inactive rail cars would be
3 staged, where we could do reorganization of the
4 material as it's coming into the repository, where we
5 could do final security trade-off, hand-offs between
6 the security provided for Transportation and the
7 security provided for the repository itself. So there
8 are a number of facility requirements that we're going
9 to have that we're looking into right now.
10 With my unease over our challenge with
11 getting full funding in parallel with looking at the
12 facility requirements and conceptual design for the
13 facilities, we're also looking into what it would take
14 to procure services instead of building facilities if
15 that were necessary during the first few years of
16 operations. We've contacted some of the cask vendors
17 that do those services for the casks that they produce
18 currently and we've talk to the railroads about their
19 ability to maintain rail cars that we might be
20 procuring. We believe that all that can be done as a
21 service procurement. Even though our operational
22 costs would be higher, it would defer the need for
23 high capital costs for facility construction at least
24 during the initial years of operation which would be
25 possibly helpful.

1 In the Nevada Rail Alignment EIS for study
2 purposes, we are looking at multiple locations that
3 could be used for each of these facilities to provide
4 an environmental basis for the footprint and the
5 ground disturbance. No decisions have been made yet
6 and it's possible even though we are considering
7 locations within Nevada. Some of the facilities like
8 the operation facility could be located outside of
9 Nevada, but at least, we're considering the possible
10 locations within this rail line at EIS that we're
11 currently conducting.
12 On operational planning, one of the areas
13 that we're looking at after talking to our
14 international partners, the Europeans use burn-up
15 credit fairly extensively in order to get maximum
16 utility of the casks that they have. Under the
17 current regulatory framework, we don't get any credit
18 for the fact that the fuel that we are transporting,
19 the spent fuel, has a significantly-reduced component
20 of the fuel that is actually fissionable and there's
21 a significant increase in components of fission
22 products that act as poisons in any kind of a
23 calculation of what you would have in terms of the
24 criticality if you were to have an accident.
25 One of the reasons we don't get to take

1 credit for that is there's not a good benchmarking
2 between the analytical work that's been done in this
3 country and actual performance, actual measurement of
4 true spent fuel. The French actually have a fairly
5 significant set of data that they have produced from
6 their fuel to provide a benchmark for their analytical
7 work that's provided the basis for certificates to let
8 them take credit for that. We are working with the
9 French to procure some of their data. We're working
10 with the NRC very closely on that. In fact, we are
11 procuring the data and based on our willingness to do
12 that, the NRC is going to fund the actual analytical
13 work that could then be the basis for data that would
14 be provided to the cask vendors to use in applications
15 to take credit for burn-up.
16 The practical benefit, there is nothing
17 that we would not be able to ship without burn-up
18 credit. That's too many double negatives. We could
19 ship everything without it. What you might be
20 constrained with though is without being able to take
21 burn-up credit, you might not be able to put as much
22 fuel in a cask as the cask could physically hold. One
23 of the ways to deal with the potential for criticality
24 is just not put enough material there to get a
25 critical reaction even without the conservatism that's

1 put back in with the burn-up credit. So we're hoping
2 to actually improve our efficiency of operations by
3 pursuing burn-up credit, but we would be able to ship
4 again a derated cask, if you will, with contents
5 without the burn-up credit. But I think it's an
6 activity worth pursuing.
7 We're also working on an optimization
8 model for transportation planning and the first phase
9 of the optimization model is looking at what our
10 procurements need to have in terms of assumptions on
11 turnaround time for casks at utilities, transit time
12 for loaded casts to the repository and then turnaround
13 time for casks at the repository, the amount of time
14 casks would be in maintenance to meet their 10 CFR 71
15 Subpart H requirements, to get a feeling for the
16 actual volume of infrastructure that we have to have
17 to do ongoing operations at the phased approach, the
18 amount it is looking at, which was 400 metric tons the
19 first year and increasing gradually over five years to
20 3,000 metric tons per year. So the first iteration of
21 the model is really an investment planning model, how
22 many casks do we need, how many rail cars do we need
23 to get the kind of through-put we're talking about
24 with a set of assumptions.
25 The next phase of utility for this model

1 we'll be looking at how do you actually structure your
2 operations to maximize the through-put with the
3 resources that you do have. And again, we have the
4 constraint of not knowing who's going to be shipping
5 nor of knowing how many casks the shipper will be able
6 to load. So we're looking at range of scenarios that
7 would include things like the possibility of using
8 marshaling yards where you could take one or two casks
9 from one utility, combine them with one or more casks
10 from another utility and combine those in a single
11 train that would then transit to the repository, again
12 reducing the number of shipments that you would make
13 over all.
14 There are a number of modeling tools that
15 we're supporting in Transportation. RADTRAN is one
16 that Ruth is intimately familiar with. It's a
17 radiological risk assessment tool that's combined with
18 other tools to look at the risk associated with
19 transportation activities both normal and acts of
20 transportation. TRAGIS is a routing tool that looks
21 at all the DOT requirements. It has U.S. Census data
22 in it that's a very robust routing tool that has very
23 good information about roads and railroads for doing
24 transportation planning.
25 The combination of RADTRAN and TRAGIS is

1 a very effective tool for both the Department to use
2 and we're hoping for our states to use. We actually
3 conducted a training operation for our state regional
4 groups down in Oak Ridge last January, I believe it
5 was, where we went through both the RADTRAN and the
6 TRAGIS operations. They aren't always as user-
7 friendly since they were developed for the working
8 community not for the lay community, but we have some
9 very strong interest in the part of the state regional
10 groups to get more engaged and we will support them in
11 their efforts to try and come up to speed on the use
12 of the tools and helping them deploy them.
13 We're also looking at other policies on
14 best practices in operations. I believe I have some
15 slides later, but one of the areas that we're
16 concerned about right now is the security
17 requirements. We expect that between now and the time
18 we start shipping there's a potential for some
19 significant changes in th security requirements for
20 operations and so we're working very closely with a
21 group in GSA that's developing best practices for
22 transportation operations. They pulled in Department
23 of Homeland Security, Department of Defense,
24 Department of Transportation and the Federal Railroad
25 Administration, a subset of DOT, to talk about best

1 practices in transportation on a variety of fronts and
2 security is just one of those. So we're hoping that
3 as we stay engaged with other agencies that are going
4 to have an impact on the requirements area that we'll
5 be able to inform the development of the system as we
6 go along.
7 Security. We did have a joint meeting
8 with the NRC, DOT, DHS and others to talk about a
9 joint transportation classification guide. One of the
10 challenges we have is that each of the agencies has a
11 different criteria for classification of documents
12 which makes it very difficult to share information and
13 then you have different terminology about the degree
14 of classification or the kind of classification that
15 you're using.
16 The first joint meeting of the interagency
17 classification guide was held last month here in
18 Washington. It was a good starting point. Most of
19 what it highlighted was how much work there is to do,
20 but at least we've kicked off the effort and we'll
21 continue in that regard.
22 We're going to continue collaboration with
23 our international partners. I'm very interested in
24 seeing the degree to which the French and others have
25 developed the recovery capabilities for spent fuel

1 shipments. I'm hoping to participate in an accident
2 training exercise in France this summer.
3 Domestically, the Office of Naval Reactors has about
4 every five years they do an exercise where they
5 simulate an accident. They did one last summer in
6 Kansas City that we participated in. We learned a lot
7 from that. It was a very good exercise and again, it
8 pulled in not just the Federal agency participants,
9 but all of the state and local responder groups were
10 able to participate as well. It was a very good
11 exercise and we're looking at collaborating both with
12 our international partners and with states on
13 developing our own view on how to actually test the
14 system that we develop before we actually deploy it.
15 We're ongoing with looks of threat
16 analyses. When we started off, we thought we would
17 mimic what DoD does which is really to focus on design
18 basis threats where you look at the "granddaddy of all
19 threats" and you build your protection coverage around
20 the granddaddy of all threats. But as we talked to
21 both the technical review board and others a better
22 approach was suggested that rather than relying on
23 analysis of the worse threat, you develop a matrix of
24 the spectrum of threats and you look at the spectrum
25 of mitigating actions that you could take to deal with

1 those threats and out of those, you find the ones that
2 are easily to deploy and you wind up with a ranking of
3 deployable mitigations and actions that you can take
4 that will cover a range of threats that has perhaps
5 more utility than something that focuses only on the
6 most significant of threats. We're still working with
7 the Office of Security and Safety Performance
8 Assurance within DOE to establish this matrix of
9 threat scenarios as well as a matrix of mitigating
10 actions that could be taken to deal with those
11 threats.
12 Looking in security in a very broad sense,
13 Secretary Abraham before he departed has announced in
14 a meeting in Oak Ridge a security for the 21st century
15 initiative which included personnel security, physical
16 security, information security, cyber security and a
17 whole bunch of aspects to it and it's very fortunate
18 the Office of Safety and Security Performance
19 Assurance that has the charter for implementing
20 Secretary Abraham's vision on security for the 21st
21 century. They were looking for projects to apply some
22 of the ideas that they had and we came along at just
23 the right time. So our transportation activities are
24 being used as more or less a pilot project for them to
25 actually make some significant advances and that's

1 encouraging.

2 On our institutional front, we're working

3 with the state regional groups on developing the

4 routing criteria and the route selection methodology.

5 Again, I told you that we were working with the

6 efforts to identify what activities are possible under

7 180(c) funding and how you would allocate the funds

8 for that and we're encouraging them to develop special

9 project proposals. Again, the idea of project is it's

10 something that would benefit both them and the

11 government, that would have a defined beginning and

12 end, that you'd have some funding applied to an

13 activity that would produce a result and then you move

14 on to the next one instead rather than having just a

15 base level of funding that's provided in perpetuity

16 that may or may not have any direct benefits for

17 either the states or the government.

18 Some of the topic groups that are active.

19 We've had a creation of a new Security Topic Group

20 that deals with the public aspects of security, what

21 sort of information you will be able to share, who you

22 will be sharing it with, the degree of planning

23 integration that you have, who needs to be involved in

24 planning integration and at least identify in the

25 context that would have the security clearance to be

1 involved in the more detailed discussions about both
2 security threats and mitigating actions.
3 We have this Tribal Topic Group that I've
4 mentioned and we've expanded it to include all the
5 tribes along the transportation routes or potential
6 transportation routes that were identified in the
7 repository FEIS and again, we've not had a resounding
8 success in getting response from the tribes. It's
9 going to be our job to get out and engage them rather
10 than waiting for them to response and engage us.
11 We'll be doing that over the next year.
12 I mentioned the Routing Topic Group did
13 have its working session on RADTRAN and TRAGIS in Oak
14 Ridge in January and we continue to work on the DOE
15 Transportation protocols which is really the
16 operational aspect of implementing a transportation
17 system and that will be done between now and the time
18 that operations start.
19 Overall, we have some challenges. Not
20 getting the money that we wanted is not the least of
21 our challenges. The encouraging thing is that a lot
22 of the work that we have to do doesn't require money.
23 Money is really primarily to buy things and with the
24 little bit of cushion we have in timing because of the
25 status of the repository itself, I can focus on

1 planning activities that don't require buying hardware
2 right now. But at some point, I'm going to have to
3 spend a lot of money to buy casks, rail cars and
4 facilities. We are looking at our infrastructure
5 acquisition plans and we're moving them forward in
6 phases where we're dealing with conceptual design work
7 right now which is not as expensive and we are
8 focusing on completing the Nevada rail alignment and
9 EIS which will define at least an alignment option
10 that we could perhaps select for development of a
11 natural railroad which we think is key to making the
12 repository successful. With that, I'll make myself
13 available for questions.
14 DR. WEINBERG: Thank you. Bill.
15 MEMBER HINZE: That's really impressive.
16 Let me ask you. You were talking about challenges.
17 What's the major challenge in laying out the Nevada
18 rail alignment?
19 MR. LANTHRUM: There's a slide I've used
20 in some of my other discussions. I'm wishing I had it
21 here now. What I did was I took the terrain that we
22 have in Nevada from the starting point in Caliente to
23 the endpoint and I looked at just the elevation
24 changes over distance and I compared it to five other
25 operating Class I railroads in this country and

1 elsewhere. It's a cakewalk by comparison. We do not
2 have a difficult technical challenge.
3 That said, it's not going to be easy to
4 build, but the technology is there. We're looking at
5 trying to operate this at a two percent grade. We
6 have seven mountain ranges to cross, but the elevation
7 difference between the valleys and the tops of the
8 mountains, that's a fairly worn down mountain range.
9 So we're looking at 2,000/3,000 foot elevation
10 differences. It's not like going across the Rockies
11 or the Sierras or the Cascades even.
12 So from a purely technical perspective,
13 we're not expecting to have to do any tunneling.
14 We're not expecting to have to do significant cuts and
15 fills to get the two percent grades that we want. The
16 biggest issues we have are trying to impact the people
17 that live on and use that land as little as possible
18 in building a railroad.
19 There are a lot of ranchers out there and
20 they've expressed some significant concerns about what
21 having a railroad out there could do to their
22 operations and we're trying to figure ways that we can
23 mitigate the concerns that they have on the water
24 developments that they've done, on where they move
25 their herds whether it's cattle or sheep between

1 grazing areas seasonally. They have some significant
2 concerns about the willingness of animals to cross
3 railroad tracks.
4 The animals out there are a lot more wild
5 than the animals that you have in much more lush
6 environs and they're not used to seeing people.
7 They're not used to seeing vehicles. They're very
8 skiddish and they've indicated that just getting them
9 to cross roads is sometimes very difficult. So those
10 are the kinds of challenges that we're dealing with
11 primarily as how do we build a railroad across terrain
12 that's very buildable and have the least overall
13 impact possible with the residents, land owners and
14 land users that are out there and there's a lot of
15 interest out there.
16 MEMBER HINZE: Is the presence of capable
17 seismic faults of concern? Is this entered into the
18 alignment of the railroad line?
19 MR. LANTHRUM: It hasn't been a strong
20 concern of ours looking at where other railroads have
21 built. Again, you build railroads. You don't have
22 high centers of gravity. You don't have things like
23 tall buildings and so your seismic sensitivity is
24 going to be less than a lot of other structures.
25 We're looking at shipments on the order of two to

1 three a week. So our frequency of operations is
2 fairly low.
3 What I'm actually more concerned about
4 than seismic activity is drainage. Again, I
5 referenced the significant weather we've had out there
6 in January and a lot of you might have seen some of
7 the washouts that happened in Nevada as well as
8 California. There were significant portions of track
9 that follow canyons on the edge of rivers that were
10 washed out. The track actually fell off. So what I'm
11 more concerned about from an operational perspective
12 is designing drainage and looking at the hydrology out
13 there more so than seismic activity.
14 MEMBER HINZE: You mentioned the
15 possibility of the mining companies and the city of
16 Goldfield using the track. How do you interact your
17 use of the line with the commercial uses of the line?
18 MR. LANTHRUM: One of the specific
19 questions we asked when we started into the
20 environmental impact statement was whether or not
21 there was interest in making this line available for
22 common carriage. So we specifically asked for input
23 from the communities and from the land owners and from
24 the land users out there if there were things that
25 they'd like to see shipped in or things that they saw

1 that might be shipped out to make the line for common
2 carriage.
3 We have not made a decision yet about
4 whether it would be available for common carriage, but
5 the EIS scoping process is where we got the primary
6 input and we're continuing to discuss with the
7 communities out there possible uses for that railroad
8 as part of our ongoing interactions and that will be
9 part of the consideration when a decision is made.
10 There's not a lot of industrial activity out there
11 now. There is some hope that having a railroad
12 available would make some things possible that
13 currently are not possible. So a lot of the talk
14 about possible common carriage uses of the rail line
15 are for things that might come not things that are
16 there currently.
17 MEMBER HINZE: If I understood correctly,
18 you haven't made a decision on whether you're going to
19 use dedicated trains or not.
20 MR. LANTHRUM: That's correct.
21 MEMBER HINZE: And is that also true in
22 not just for the Nevada line but for the other areas
23 of the country?
24 MR. LANTHRUM: Well, it's primarily true
25 for other areas of the country. I think by default

1 once you get to Nevada even if we were in a key train
2 once you decouple from the mainline track in Caliente
3 and connect to the line that goes to the repository,
4 it's not likely there would be anything else.
5 So by default, it becomes a dedicated
6 train at that point unless there is some significant
7 interest in developing common carriage activities.
8 But even if there, the line would be available. We
9 wouldn't necessarily have to be shipping those
10 commodities with our shipments. But it nominally is
11 going to be a dedicated train once it gets to Nevada
12 just by default.
13 MEMBER HINZE: Coming from Indiana and
14 realizing that on the front page of our little local
15 newspaper, quite frequently there are comments about
16 nuclear waste trains passing through our city. Have
17 you changed your criteria, modified your criteria, for
18 the selection of routes as a result of your
19 interaction with the state regional groups?
20 MR. LANTHRUM: What we're doing right now
21 with the state regional group is to try and come up
22 with again the criteria and the methodology, what kind
23 of things would you weigh. It's a challenge
24 particularly for rail shipments. For highway
25 shipments, the states have a lot of latitude in

1 designating alternate highway routes and it's a state
2 prerogative under DOT regulations.
3 For rail shipments, the states don't
4 really have any role because the rail shipments are
5 all on private land. It's not state land or federal
6 land. Interestingly though, the railroads have some
7 of the same criteria in terms of industry standards
8 that DOT establishes for highway shippers and the
9 basic requirement for highway shipments is that you
10 use interstate highways to the maximum extent
11 practicable with the understanding that you're going
12 to have to get from a shipping site to the interstate
13 system and then from the interstate system to the
14 receiving site wherever that is.
15 Similarly, the railroads encourage the use
16 of Class 1 track which is their equivalent of the
17 interstate system
18 MEMBER HINZE: Right.
19 MR. LANTHRUM: A lot of states have
20 expressed concern about shipments through major
21 population areas.
22 MEMBER HINZE: Exactly.
23 MR. LANTHRUM: But that's where the Class
24 1 track is and what we're working with the states on
25 is how do you weigh and again, Ruth has been helpful

1 in some of the work that she's done on decision
2 models, helping people weigh attributes that they're
3 concerned about and weigh them against each other in
4 helping to make informed decisions. If population
5 concerns are a bigger deal than track quality, that
6 would form one type of decision. If track quality is
7 a bigger concern than population densities, then the
8 decision would go another way. So we're giving the
9 tools to the states.
10 We're working with them on developing a
11 criteria, but we're not expecting the same criteria to
12 be applied in all areas. There will be regional and
13 local differences in what the expectations are and
14 we'll be working closely with our state and local
15 groups to identify our operational commitments based
16 on their input. Again, the decisions are going to be
17 Department's but we are asking for significant input
18 and we're giving our stakeholders significant tools to
19 work with to help make informed decisions.
20 MEMBER HINZE: Good. Thanks very much.
21 I appreciate it.
22 DR. WEINBERG: Mike.
23 CHAIRMAN RYAN: Just one. Thanks for a
24 real informative presentation. It strikes me though
25 as we heard two presentations today, one about the

1 design and issues related there and one about the
2 transport system that we heard in both presentations
3 the idea of optimization.
4 MR. LANTHRUM: Yes.
5 CHAIRMAN RYAN: And then it was clear how
6 that's done, but as I was sitting here thinking about
7 transportation, my principles of optimization there
8 might be different than they might be for an
9 engineering facility. How are you going to couple
10 this optimization process so that you address both
11 ends of it that may be compatible or may actually have
12 points of conflict?
13 Let me give you an example. You might say
14 well I can ship anything anytime if you give me a few
15 hundred more million dollars that buys as many casks
16 of each type as I need.
17 MR. LANTHRUM: Right.
18 CHAIRMAN RYAN: Obviously, that's probably
19 outside the envelope.
20 MR. LANTHRUM: No, please. Let's keep it
21 in the envelope.
22 CHAIRMAN RYAN: There'll be a limit. Two,
23 from a facility operation facility, their optimization
24 may be on wanting to get certain types of certain
25 locations at one time and they could either be

1 harmonious or clash. Have you guys put your heads
2 together on that yet?
3 MR. LANTHRUM: We do a little bit. What
4 I'm really seeing is that the optimization that I
5 would do when I run the programs, I'll run it from a
6 purely transportation perspective. How can I get the
7 most through-put with the resources that I have
8 available? That would be my goal.
9 I'm not kidding myself that I'm going to
10 be the decision maker. What I do is I bring that to
11 the table with the head of RW and say this would be a
12 great transportation perspective. How does that play
13 into the program decisions about what has to be done?
14 CHAIRMAN RYAN: The latter question is the
15 key one because the through-put may or may not be
16 acceptable at the other end.
17 MR. LANTHRUM: Absolutely.
18 CHAIRMAN RYAN: So I guess I just see that
19 the facility design and their capabilities is as much
20 a question for the transportation program as the
21 routing and all the other challenges you so well
22 articulated today.
23 MR. LANTHRUM: Absolutely. What I have to
24 bring to the table is the view that I can offer an
25 optimal system but that if I'm directed to deliver

1 something suboptimal, there will be consequences. It
2 will cost more for what I'm able to move and part of
3 it is to show that I'm able to actually do good
4 planning by presenting an optimal view.
5 If I'm given constraints, the modeling is
6 capable of then taking the constraints that I'm dealt,
7 that I have to work with, and reoptimizing within
8 those constraints. It won't be as optimal a solution
9 as I would come up with unconstrained, but I can
10 refine things within a set of constraints.
11 For example, if there are a few specific
12 sites that have a particular type of fuel that is of
13 interest for delivery during the first year of
14 operations and they are not located anywhere near each
15 other. So I have assets spread at opposite ends of
16 the country. That would not be an optimal setup. But
17 how I conduct those shipments, I might be able to
18 construct a view that would use fewer resources over
19 a short period of time, for example, doing campaigning
20 where I have more casks per train coming from distant
21 locations and I stage things like I indicated in
22 marshaling yards to build a fairly significant train
23 before I run it to again maximize the use of resources
24 within a constrained environment.
25 CHAIRMAN RYAN: Sure, and I can appreciate

1 the view that you have the key responsibility on the
2 transportation side. But from a risk perspective or
3 an optimization perspective, I don't separate the two.
4 I look at the repository and the transportation system
5 as a system that has to be optimized on whatever
6 principle or point of optimization you pick. But it's
7 very much a system.
8 MR. LANTHRUM: And it is going to be an
9 iterative solution process.
10 CHAIRMAN RYAN: Right.
11 MR. LANTHRUM: But something has to be
12 brought to the table to iterate and I think I want to
13 be the first there.
14 CHAIRMAN RYAN: Thank you.
15 DR. WEINBERG: Jim.
16 MEMBER CLARKE: I'm just curious about
17 this and this may be premature but as the train pulls
18 out of Caliente headed for the repository, what will
19 it look like? Will you have flexibility concerning
20 how much you can put in the middle, the buffer cars,
21 the locomotive, the escort cars? Is that a fairly
22 flexible design?
23 MR. LANTHRUM: Well, it's a little bit
24 flexible. The escort car under current designs would
25 typically be at the end of the train just because the

1 escort cars are often lighter than the load-bearing
2 cars and from train dynamics, you don't run a light
3 car in between two much heavier cars. You certainly
4 don't want a really heavy car behind a light car when
5 you hit the brakes. That's just not a good deal. It
6 can tend to cause jack-knifing and other track
7 problems.
8 It's very likely to be two engines and
9 very likely to be puller engines as opposed to pusher
10 engines followed by a buffer car followed by a series
11 of load-bearing cars with casks followed by another
12 buffer car and an escort car. How many cask cars?
13 Again, it's desirable to have as many as you can so
14 you can reduce the number of shipments that you have
15 to conduct. But in the repository FEIS, we analyzed
16 from one to five shipments per train. We can revisit
17 that later if there were an opportunity of increasing
18 it beyond five.
19 MEMBER CLARKE: Yes, I just wondered how
20 that would coordinate with the repository, what's
21 coming and when it's coming it.
22 MR. LANTHRUM: And actually when I talked
23 about the end-of-line facility, that would anticipate
24 to be near the receipt gate. The sally port where you
25 actually do the hand-off between the transportation

1 activities and transportation security requirements
2 and where the repository of the security requirements
3 take over, that sally port as originally designed
4 would not have been long enough to get three of our
5 consist cars in with casks. So we're working with
6 them closely since that design hasn't been finalized
7 to make the sally port larger.
8 But it may be that we'll have to do if
9 we're able to run larger trains we may have to put
10 three cars in, clear those in the repository while
11 keeping two cars or more cars out in the line facility
12 in the transportation area with our responsibility for
13 security and then phase them into the repository.
14 Again, their cask handling capability, we
15 made sure that the bounding requirements for our casks
16 were going to be accommodated by their facility
17 designs, their grappling hooks, their crane
18 capacities, all of that would meet with both our
19 largest casks and be able to handle the smallest casks
20 that we're looking at. We've been working on that
21 very closely with them.
22 And they do have the ability to stage
23 things in lead storage. I think they've probably
24 showed you the aging facility. There is an aging
25 facility adjacent to the cask handling facility as

1 well on the more distant location and they could stage
2 things in the aging facility and then feed them
3 through the actual fuel handling facility or cask
4 handling facility as they were ready for them.
5 MEMBER CLARKE: Thank you.
6 DR. WEINBERG: Staff questions? Ashok.
7 MR. THADANI: Thank you. You know I am
8 shocked. When I was heading up our Office of
9 Research, even I didn't take the kinds of (budget)
10 cuts you are experiencing here. It's incredible. But
11 that does raise a question and that is the design
12 fabrication of casks is fairly expensive as I
13 understand and if you're going to conduct any testing
14 that would be pretty expensive as well. So you talked
15 about the accomplishments. This significant reduction
16 of resources obviously it has fleshed out your plans
17 and so on. But you didn't really say what's the real
18 impact.
19 MR. LANTHRUM: The real impact is I did
20 not buy casks or rail cars this year. If I had gotten
21 the $187 million that we requested, we would have
22 actually funded development of prototype rail cars and
23 started testing at TCCI. We're not going that. I
24 would have bought casks this year and we would have
25 started that process. We're not buying casks.

1 We're going to push out an RFP and we're
2 going to push it out towards the end of the fiscal
3 year so we don't have to award the contract until the
4 next fiscal year. So that's what it's done. It's
5 delayed the procurement of hardware. But the bulk of
6 the funding, the real expense that I have, in the near
7 term is in buying hardware.
8 About four to five years before we start,
9 actually four years before we start shipment, the
10 costs aren't going up significantly in providing
11 training funds for states and tribes for emergency
12 preparedness, but that's a little bit further off. We
13 expect that to start around 2006 for shipments in
14 2010. Now the 2010 is not going to be happening. The
15 start of that funding process will then be tied to
16 what the new date is when it's set by the repository
17 and by the program.
18 MR. THADANI: Just a comment. In terms of
19 criticality in getting the burn-up data from the
20 French, it seems to me that would be the correct way
21 to go to be able to do more realistic assessment of
22 what the risks would be. So certainly, I think the
23 path you're on is an important one.
24 MR. LANTHRUM: When we started the new
25 Office of National Transportation, we had these big

1 tech meetings where we bring in all of our
2 stakeholders and one of the clear messages that they
3 gave us was don't reinvent the wheel. If there's
4 something that's been done and the world has been
5 shipping spent nuclear fuel for an extended period of
6 time and has a good safety record in doing that. They
7 said build on that safety record. You can make it
8 better. You can do new things, but don't start from
9 scratch. So we've taken that lesson to heart.
10 MR. THADANI: There's another safety
11 benefit in that the number of trips, I guess, will be
12 reduced if you do more realistic assessment. So I
13 think there is some benefit too.
14 DR. WEINBERG: Mike and John, questions.
15 Then I'm going to ask if you can keep them as short as
16 possible because we have another member of the
17 audience that --
18 MR. SCOTT: Mike Scott, ACNW staff. The
19 District of Columbia is currently in court attempting
20 to deny the railroads the permission to take hazardous
21 materials through the District and I read in the paper
22 this morning that a Federal judge has refused to block
23 them from doing that. You mentioned that you're
24 either planning to or you're already in negotiation
25 with states and other entities. Do you see this court

1 battle going on currently as having applicability to
2 your situation?
3 MR. LANTHRUM: Depending on how it goes,
4 it could clearly have some other applicability if
5 other states wind up jumping onto it and if they
6 continue to have success with their new prohibition.
7 If they do, it just becomes another constraint that I
8 have to consider in the way. It would make
9 transportation more difficult, but it's always going
10 to be achievable. It's just an additional constraint
11 that we'd have to deal with.
12 MR. SCOTT: Thank you.
13 DR. WEINBERG: John. Engelbrecht von
14 Tiesenhausen from -- Oh, I'm sorry.
15 DR. LARKINS: Just a quick question.
16 DR. WEINBERG: John.
17 DR. LARKINS: You mentioned one of the
18 inhibitions to making progress in developing an
19 optimization model was not knowing up front what the
20 utilities might want to ship first. Why not engage
21 them in the discussion, some pre-planning, as to what
22 types of --
23 MR. LANTHRUM: They're suing us.
24 DR. LARKINS: Okay.
25 MR. LANTHRUM: The discussions are very

1 difficult with the current litigation.

2 DR. WEINBERG: Now I'd like to recognize

3 Engelbrecht von Tiesenhausen from Floric County,

4 Nevada and who has some questions for you, I assume,

5 Gary.

6 DR. LARKINS: Okay.

7 DR. WEINBERG: Actually, he had some

8 questions for the Committee on concerns that --

9 Engelbrecht suggested that he could help and could

10 relay some questions that he often hears from members

11 of the public and I thought it would be helpful for

12 the Committee to hear these questions in our session

13 today. So, Engelbrecht, welcome. Thank you.

14 MR. von TIESENHAUSEN: Thank you, Dr.

15 Ryan, Dr. Weinberg for giving me this opportunity to

16 voice some of the questions that the public in the Las

17 Vegas area has about transportation issues. Some of

18 these are directed at the NRC. Some of these are

19 directed at the DOE and some of these I'm not sure,

20 but I'll just go through the list.

21 Cask certification is always an issues

22 that comes up in the public's eye especially as far as

23 the scaling goes if there are any difficulties.

24 Scaling fires are sometimes problematic.

25 Current status on the PPS. What will be

1 done? What tests are planned and when will they be
2 done and possibly where?
3 One big issue that always comes up and
4 nobody ever has a good answer is Price-Anderson and
5 liability issues. When does Price-Anderson kick in?
6 How much is covered? If there are economic impacts
7 due to a release that are not directly attributable to
8 contamination, is that covered under Price-Anderson or
9 not?
10 Spent fuel characteristics versus fresh
11 fuel? A lot of the transportation experience that is
12 often quoted has to do with fresh fuel transportation.
13 What would be the differences if you used spent fuel?
14 If it was in accidents that ruptured a cask, a remote
15 possibility it may be, but what would be the
16 difference in release in fresh versus spent fuel?
17 Routing issues. The NRC does have a role
18 in routing issues and it is not clear to the public
19 exactly what that is. If a railroad is constructed,
20 who will run it? Maybe that decision has been made
21 and what are the ramifications to the various
22 decisions that could be made as who is responsible for
23 the operation of the railroad?
24 Notification requirements and how will the
25 public be advised? I know Gary touched on this a

1 little but not completely. And will they be advised?
2 What are the differences between safety
3 and security? How are those addressed?
4 That's about the end of my questions.
5 Thank you for the opportunity to put this on the
6 record.
7 CHAIRMAN RYAN: Sure, Engelbrecht, and
8 again as I mentioned, I think it's helpful for us to
9 hear those questions and as we think about
10 transportation issues we can have them in our mind and
11 in our record to refer back to. So I appreciate your
12 sharing those. Thanks.
13 MR. von TIESENHAUSEN: Thank you.
14 DR. WEINBERG: Back over to you.
15 CHAIRMAN RYAN: Okay.
16 DR. WEINBERG: Thank you by the way.
17 Thank you very much for an excellent presentation and
18 thank you, Engelbrecht, for bringing up the questions.
19 CHAIRMAN RYAN: Thank you very much.
20 Let's see. Who's up next?
21 DR. WEINBERG: EPRI is up.
22 CHAIRMAN RYAN: Our next session, the
23 cognizant member is Dr. Hinze. So I'll turn the
24 meeting over to you.
25 MEMBER HINZE: Fine. We'll let people get

1 arranged here a bit. This brings to mind that John
2 Kessler is going to be appearing before the Committee
3 to discuss time of compliance and this is just about
4 the decadal anniversary of the time that he made us a
5 presentation on the same topic at a working group of
6 this committee. John and the EPRI group have been
7 looking intensively for the last couple of months of
8 the concerns revolving around the time of compliance
9 and the need to reconsider and to change the time of
10 compliance issues in 40 CFR 197 and 10 CFR 63. John
11 will be telling us about the results of his
12 deliberations. Thank you, John.
13 MR. KESSLER: Thank you, Bill, and thanks
14 to the Committee for providing time on your agenda for
15 me to discuss this report.
16 The report was released a week ago
17 yesterday. There's the title, "Yucca Mountain
18 Licensing Standard Options for Very Long Timeframes,"
19 and really the majority of the report is about the
20 technical bases for what we think the standard at
21 least we need to consider as well as the compliance
22 assessments. The website is there. This is available
23 to members of the public. If you click on that
24 website or enter that, you should be able to download
25 the report.

1 I would like to acknowledge the authors.
2 The lead author, Matt Kozak, from Monitor Scientific
3 is here. I was sort of the second author. There is
4 another major author, Matthew Huber, from Pursue who
5 helped us with teacher climate issues, really
6 surveying what's known about paleoclimates and how we
7 might use that as well as the uncertainties. The
8 other contributors are Austin Long from Arizona who
9 also discussed historically a future climate in every
10 report, Mick Apted also from Monitor Scientific who
11 talked about performance assessment issues as well as
12 bringing in some of the international perspectives and
13 Fraser King up in Canada talking about long-term
14 material issues.
15 I think for the zero to one of you in the
16 room I can go through real quickly. Those of you who
17 don't know the background of this, the Energy Policy
18 Act of 1992, EPA was to contract with the National
19 Academy of Sciences to provide the technical bases for
20 the Yucca Mountain specific standard. EPA's rule is
21 to be based upon and consistent with the NAS
22 recommendations. And then NRC is to issue an
23 conforming/implementing regulation.
24 In 1995, the NAS TYMS Committee, Technical
25 Basis for Yucca Mountain Standards, issued their

1 report. In 2001, EPA and NRC issued their
2 regulations. There were multiple law suits on those
3 two regulations as well as other issues that didn't
4 have to do with the regulations.
5 And last summer, the Court of Appeals
6 ruled on those law suits. All the challenges raised
7 were denied except one. The Court ruled that EPA did
8 not follow the TYMS recommendations on the time period
9 of compliance and gave EPA two options. One was EPA
10 could go back to Congress and the other was that EPA
11 could reissue a standard or issue a new standard or
12 whatever based upon and consistent with the TYMS
13 recommendation. So the options were reissue the
14 original standard with appropriate explanation, I
15 suppose, or what we're assuming for this report is
16 that they may choose to issue a new standard with
17 requirements for time periods to peak dose.
18 The purpose of the EPRI report here was to
19 assess the technical implications and options that are
20 associated with regulatory compliance periods in
21 excess of 10,000 years that are consistent with the
22 July 9th Court of Appeals ruling. So we're trying to
23 come up with options and considerations that are based
24 upon and consistent with the TYMS recommendations, but
25 also would result in a standard that provides

1 "meaningful" protection of public health and safety.

2 I've put "meaningful" in quotes there

3 because that was something that the TYMS Committee

4 report talked about was a necessary requirement and

5 that also would be "reasonable" and implementable in

6 a regulatory environment. "Reasonable" is in quotes

7 there because that showed up in the House language

8 that backed up the Energy Policy Act.

9 The implementable in the regulatory

10 environment, what do I do and more what do I don't

11 mean by implementable. What we mean by implementable

12 is that NRC assuming they received an application,

13 would be able to make a regulatory decision based on

14 the information that could be provided by DOE. That

15 is essentially you could have a docketable license

16 application, that it is possible to pull together

17 information to get a docketable license application.

18 So what we don't mean there is that we

19 want a regulation such that we know Yucca Mountain is

20 going to be pass, just that the information can be

21 collected. Then it will be up to NRC to decide. We

22 also want to avoid revisiting issues that were settled

23 in the Court of Appeals ruling. We don't want to

24 cover old ground.

25 We made a few assumptions in the report

1 that the July 9, 2004 Court of Appeals ruling is used
2 as the primary guidance. What that means is that for
3 the bottom bullet there we use the TYMS Committee
4 report really as the bible. The Court ruling says
5 make it based upon and consistent with that TYMS
6 report. So we tried to suck that TYMS report dry in
7 terms of everything that we could get out of it on how
8 to come up with issues and approaches to what a
9 regulation extending past 10,000 years would look like
10 and admittable it there for the purposes of the
11 arguments made in this report, we assumed no
12 Congressional action. We understand that there may be
13 Congressional action that will essentially bypass what
14 EPA may be doing but for the purposes of this report
15 we didn't assume that Congressional action occurred.
16 Really, our main concerns that caused us
17 to want to pull together some ideas here with the
18 regulatory time of compliance for these very long
19 timeframes are laid out here. First of all, as I'll
20 try to show and talk about in a little bit more
21 detail, we do believe that uncertainties grow with
22 time and we're not alone in feeling that way. I'll
23 talk about a lot of other organizations that discuss
24 their feelings about uncertainties growing with time.
25 The other concern is that it's really more

1 of a recognition. We recognize that there will be an
2 adjudicatory nature to the NRC licensing process with
3 the Atomic Safety and Licensing Board hearings that
4 will occur. We think that that's just going to drive
5 the need for detailed models and data to very high
6 degree and we're concerned that if uncertainties grow
7 with time and we have an adjudicatory nature of a
8 licensing process that it could present some issues.
9 Another thing about very long timeframes
10 is that they are unprecedented in the U.S. and nearly
11 so internationally. I would say really they are
12 unprecedented even internationally in the sense that
13 those countries that are calculating and do have
14 requirements in their books for calculations to very
15 long timeframes, none of them are anywhere near ready
16 to subject that to the rigorous licensing process like
17 may be occurring in the near future here in the U.S.
18 for Yucca Mountain.
19 Another concern is that we're concerned
20 that it could potentially penalize a good repository
21 system. I mean system not only the geologic features
22 but the engineer, really the combination of the
23 engineering and geologic. One of the things about a
24 good repository system is it's going to delay peak
25 dose and you want the peak delayed. It's better from

1 a safety standpoint. You get more radioactive decay.
2 The problem then is that it's harder to
3 know the details of the repository behavior very far
4 out in time. So in a sense, your good repository
5 system could be harder to defend in an NRC's licensing
6 process than some system with poorer characteristics
7 that might have a peak that occurs much earlier in
8 time.
9 Our last concern is that potentially we're
10 really just talking about the math here with
11 potentially little to no safety benefit. What do I
12 mean by that? We've already seen DOE change their
13 design in response to the very demanding requirements
14 in the existing Part 197 and Part 63. We've seen them
15 make some major changes to their engineer design
16 because of that and we're not really sure whether
17 simply extending the time period would add to that
18 safety or would just require a lot more analysis and
19 demonstration of the existing repository system design
20 and its safety.
21 A quick going through the chapters of the
22 report. We have an intro and background. We talk
23 about treatment of uncertainties and the increase of
24 uncertainties of time at Yucca Mountain. We have a
25 chapter specifically on climate change. You're going

1 to hear me talk a lot more about specifically climates
2 to change in this report and what we think the
3 implications are.
4 We have another chapter on international
5 approaches to addressing uncertainties over long time
6 timeframes. Then we have a section on really matching
7 the regulations to the time scale and time dependent
8 factors where we present some various options. It
9 talks about the pros and the cons of various
10 approaches. Then we really summarize the elements of
11 what we think would be a new Yucca Mountain standard
12 that we feel is based upon and consistent with the
13 TYMS report. Conclusions and then we have an appendix
14 really to talk about what we do and don't know about
15 climate change and evolution and really why we think
16 it's so difficult to deal with climate change details
17 and why that's important.
18 Okay. I'm going to try to go through the
19 long logic trail we have in this report as to how we
20 got to the recommendations at the end that we got to.
21 So we start with the bible. We talk about some of the
22 main TYMS Committee recommendations and their
23 comments. First is that they say that we recommend a
24 compliance assessment be conducted for the time when
25 greatest risk occurs within the limits imposed by long

1 term stability of the geologic environment which means
2 one million years as they go on to explain.
3 They also talk about the standard needing
4 to be meaningful and what they meant there was the
5 form of the standard. They talked about individual
6 health risk is their preferred criterion. They talked
7 about the compliance assessment also being based on
8 conceptual and numerical models that reasonably
9 reflect present day understanding of the features,
10 events and processes (FEPs).
11 They also discussed which is the main part
12 of this report that some FEPs necessary to perform
13 those health risk assessments over very long time
14 timeframes are less well understood than others and
15 they talk a bit and provide an example or two as to
16 how you deal with those less well-known FEPs. You
17 will see that we don't think they went far enough in
18 describing all the cases as to how to deal with those
19 less well-known FEPs and we proposed some things that
20 we think are based on their approach. The last point
21 is that they mentioned in the report that they like
22 the concept of the negligible incremental risk (NIR)
23 to screen FEPs and I will talk a bit about how we took
24 that and came up with an approach.
25 MEMBER HINZE: I think it would be

1 worthwhile, John, if you just described what NIR is.
2 MR. KESSLER: I will get to that.
3 Negligible incremental risk, what they're arguing is
4 that if you're below a certain risk level than you can
5 essentially screen out those FEPs from further
6 consideration and I'll talk about that in a bit more
7 detail later on.
8 This cartoon came really from the
9 international literature. It's a presentation by
10 Masuda in Japan, but it's being used quite a bit in
11 other international publications. It just gives you
12 in cartoon fashion. The components of the repository
13 on the right there is some understanding of the
14 predictability in terms of the confidence that we know
15 the details about those particular components of the
16 system over time and really the take-home message is
17 that they're not all the same. We know some parts of
18 the system better than we know others and
19 specifically, details about the biosphere and human
20 behavior are the least predictable. Surface
21 environment comes next and then the geosphere and
22 engineered barrier systems which is consistent with
23 the TYMS report are the most predictable or most
24 understood for the longest period of time.
25 Getting into the issue about

1 uncertainties. We asked ourselves, "Do uncertainties
2 grow with time?" The answer we believe is yes, they
3 do grow in time and in various ways. One thing that
4 we note in the report is that current approaches
5 where we deal with uncertainties, that a lot of them
6 are fixed in the sense that we assume some uncertain
7 distribution on neptunium, solubility or general
8 corrosion rate for Alloy 22 and we don't tend to say
9 that this band for the first 10,000 years in some
10 other uncertainty band beyond that.
11 But does that mean that uncertainty grows
12 with time? We argue it does mean it actually does
13 mean uncertainties grow with time because the
14 projections of those fixed uncertainties as you make
15 one assumption you get one essentially pathway of what
16 you think dose versus time will be versus something
17 else and that does expand in time.
18 For example, you could present that
19 uncertainty band and the growth of uncertainties in
20 two different ways. This is just an example of two
21 different ways that uncertainties are being presented.
22 Fortunately, for whatever it's worth, more often, we
23 present these dose versus time on uncertainties in a
24 log-log plot as you see at the left. And I believe
25 that when the Court of Appeals was seeing some of

1 these view graphs, they were seeing the ones on the
2 left and they were saying, "Gee, it looks like
3 uncertainties don't grow with time. The bands stay
4 the same distance apart." We're arguing that's
5 because it's on a log-log scale.
6 If you presented it on a semi-log scale,
7 you could actually see now that the uncertainties do
8 grow with time. Another point we'd like to make is
9 that TYMS panel did note that eventually the
10 uncertainties might decrease with time. We see that
11 too. What I'd like to point out is that the
12 uncertainties are growing right up to the time of peak
13 dose and that's what matters is what uncertainties
14 happen up to the time of peak. Whether they decrease
15 again past peak dose is immaterial.
16 Stepping back here, the next main bullet
17 there is that another way uncertainties grow with time
18 is that our understanding of the FEPs that governs
19 system behavior also decreases with time. For
20 example, the long-term material degradation mechanisms
21 would become less certain of what they really are.
22 I'll talk a lot more about our understanding of future
23 climate state that also decreases with time and what
24 that means.
25 As I mentioned earlier, the TYMS report

1 partially recognized that uncertainties do grow with
2 time. There are words in there that talk about that,
3 but they also noted that some uncertainties decrease
4 with time. They provided in the report a specific
5 example on waste packages. They say eventually
6 they've all failed. That means essentially the
7 uncertainty as to whether they failed or not has
8 decreased with time.
9 I would argue that's a specious argument
10 because what we really care about is the peak failure
11 rate. That's what tends to govern peak dose, not that
12 whether all the containers have failed or not. But
13 rate at which they're failing seems to be much more
14 important to peak dose risk. I talked about that.
15 Going back to the bible again, they had
16 some comments about uncertainty. They concluded that
17 most physical and geological processes are
18 sufficiently quantifiable and related uncertainties
19 sufficiently boundable, that the performance
20 assessment can be assessed over timeframes during
21 which the yadda, yadda, yadda. The geologic record
22 suggests that timeframe is on the order of 10^6 years.
23 What they're noticing, for example, is
24 that once an exposure scenario has been adopted, and
25 they're talking about mostly human behavior issues

1 here, performance assessment calculations can be
2 carried out with a degree of uncertainty comparable to
3 the uncertainty associated with geologic processes and
4 engineered systems.
5 So to summarize what all that says is in
6 two points. They say most processes are sufficiently
7 quantifiable and that you can include them. But they
8 say some have to be specified such that the overall
9 uncertainty is governed by these physical and
10 geological processes. What we dive into in the report
11 are what are those that have to be specified and how
12 does one go about doing it based on the TYMS
13 recommendations.
14 So the TYMS Committee had some options for
15 dealing with uncertainties. They talked about, first
16 of all, that the regulation and compliance assessment
17 should be risk-based from the overall standpoint and
18 that wherever possible include the consequences
19 weighted by their probability of occurrence. They
20 also included some other options for dealing with
21 uncertainties. The primary one is to include the
22 probabilities directly in the compliance assessment
23 for most physical and geological processes.
24 The two we're going to talk about here
25 that the EPRI report talks about are the others. For

1 effects that aren't amenable to scientific analysis,
2 establish their properties via rulemaking and human
3 behavior they went on to great lengths in the report
4 as an example of one of those that isn't amenable to
5 scientific analyses where we don't know the details as
6 something that should established via rulemaking.
7 They also said with very few words that other FEPs can
8 be bounded and they mentioned three: seismic and
9 igneous processes and climate change and I'll talk a
10 bit more about those in a minute.
11 First of all, I'd like to go through what
12 we understood their philosophy was on the human
13 behavior. They say it's highly uncertain. We agree.
14 They say it's not subject to scientific analysis and
15 the details and especially the future details of human
16 behavior. We agree it's difficult to do. And
17 therefore, the TYMS Committee recommended fixing human
18 behavior to present day behavior. It seems like a
19 reasonable approach.
20 The associated issue that TYMS also
21 recommended fixing was the health physics quantities.
22 For example, they recommended the use of standard
23 dosimetric conversions. What does that really mean?
24 That means that DOE now doesn't have to consider
25 dosimetric uncertainties. That's taken off the table.

1 So really, there were two things where the TYMS panel
2 suggested you don't have to deal with the
3 uncertainties. Just fix certain values and that was
4 human behavior and dosimetry.
5 EPA adopted both recommendations. They
6 suggested fixing human behavior to present day which
7 included details about the groundwater plume size when
8 that comes into the analysis as well as requiring
9 standard dosimetric conversions.
10 Getting back to those ones where there's
11 just a few words in the TYMS Report about sufficiently
12 boundable, they mentioned three: seismic processes,
13 igneous processes and climate change. So in the
14 report we asked if these three are indeed sufficiently
15 boundable and how to treat them one way or the other.
16 I'll talk about seismic and igneous first.
17 Our feeling was having looked at it initially that we
18 think that both seismic and igneous activity processes
19 seem sufficiently boundable in the following way. We
20 note that for seismicity that information on tectonic
21 deformation rates over time periods greater than one
22 million years is already being used to establish the
23 importance of seismicity in that regard.
24 The next one is more of a subtle point in
25 that DOE analyses on the physical limits of ground

1 motion also look at applicable to longer time periods.
2 What do I mean by that? I'm guessing that you may be
3 aware of the work that DOE is doing now looking at
4 recurrence intervals for earthquakes.
5 Right now, they're taking projections of
6 essentially you have the magnitude of the earthquake
7 across the X axis and the probability of recurrence
8 across the Y axis. Obviously, you have a descending
9 line. You can have higher and higher magnitude
10 earthquakes with lower and lower recurrence
11 frequencies. What they find is that that curve or the
12 slope of that curve has been based on information
13 collected for much shorter-lived facilities, say,
14 nuclear power plants where maybe you have some
15 facility life on the order of $10^1/10^2$ years.
16 Well, now they're having to project those
17 recurrence intervals out to these very low probability
18 cases and they're finding that you exceed the physical
19 limits of the geology to transmit that kind of an
20 earthquake magnitude. If you simply extend it, you
21 get accelerations in the three to 10 or more Gs which
22 just isn't physically reasonable. So they're already
23 having to make physical arguments to bound that for
24 their 10,000 year analysis. We would think that those
25 same kinds of physical arguments would be equally

1 applicable for time periods beyond that.

2 Whether they actually get around to making

3 those arguments, we don't know. But we think that

4 we're planning to do arguments like that if DOE

5 doesn't actually. They can talk about physical

6 limitations and we all think that that's something

7 that they can reign in seismicity in terms of

8 something that can continue to be boundable.

9 For igneous activity, we think the nature

10 and probability of eruptions being considered for the

11 first 10,000 years also seems extendable for much

12 longer time periods. For example, the igneous

13 activity information that they're using already

14 extends over the quaternary period which is much

15 longer than one million years. It looks like some of

16 the shortest records extend back about four to five

17 million years that they're considering. So going just

18 out to one million years at least for that aspect of

19 it seems doable. And the last part of that is that is

20 that DOE analyses that we've seen suggests that the

21 dose risk due to igneous eruption peaks at or near

22 10,000 years anyway.

23 So the last one is future climate details

24 and I'd like to say that they have to be addressed

25 somehow. What I have here is a figure out of DOE's

1 Yucca Mountain final environmental impact statement
2 which is their projections of dose versus time. You
3 see lots of peaks there that we think are being driven
4 by a combination of the details of the climate as well
5 as their choices in models.
6 Our thoughts about that figure that are
7 relevant to how one deals with the long term of
8 regulations is that the peaks are the results of
9 assumptions about the details in climate change and
10 the modeling approach. DOE uses a series of steady-
11 state flow and transport models for each assumed
12 climate state. They have instantaneous step changes
13 in the climate.
14 They've also assumed that for all their
15 Monte Carlo realizations that every climate change
16 occurs at the same time. So what happens then is that
17 at some particular time from time T to T+1 you have
18 net infiltration flow-focusing water table and
19 saturated zone flux changes that all happen. And what
20 you get in modeling space is almost a flushing
21 sometimes of radionuclides that can cause these peaks
22 that we see in the FEIS.
23 Another point that could be made is that
24 there is no change in the assumed human behavior.
25 They assume present day human behavior for all of

1 these other climate states and we would argue that for
2 an internally-consistent performance assessment, one
3 should recognize that humans in a full-glacial maximum
4 climate are going to be doing different things. Most
5 specifically, their uses of potentially-contaminated
6 water could be quite different as well as details
7 about the growing season and the crops they grow. We
8 think that also they have a conservative net
9 infiltration response that's assumed to future water
10 climate states that's also part of that figure.
11 I think the figure, though it is here, was
12 okay for its intended use and for Part 197 at the time
13 in the sense that it was simply there to use to bound
14 potential environmental impacts. It wasn't used for
15 compliance purposes. If now the time period of
16 compliance got extended, there would need to be some
17 changes to that figure or how they do their analysis.
18 So one could ask "Why doesn't DOE just
19 switch to a set of transient models?" I suppose
20 theoretically DOE could switch to transient models.
21 The question we asked was "To what end" because DOE
22 would still need input on the magnitude of the climate
23 change and its uncertainty, the timing of the change
24 in uncertainty and what's potentially important is the
25 rate of change between climate states as well as that

1 uncertainty. That seemed to be what mattered to their
2 models.
3 The magnitude and especially the rate of
4 climate state change are both highly uncertain and
5 they become even more so over very long timeframes.
6 And there's still the issue of addressing the
7 inconsistency with present day human behavior for
8 future climates.
9 Back to what TYMS says specifically about
10 future climate state uncertainties, they say it's well
11 known that a climate can vary significantly over
12 geological periods of time. Although the typical
13 nature of past climate states is well known, it is
14 obviously impossible to predict in detail either the
15 nature or the timing of future climate change and this
16 fact adds to the uncertainty of their model
17 predictions.
18 We agree the details are impossible to
19 predict. A review of the climate change issues and
20 the uncertainties we provided in the appendix to
21 suggest just how little we do know about the rates of
22 change from climate state A to B. And it may be that
23 those details may well drive the peak dose estimate.
24 EPRI is very concerned that details that are
25 "impossible" to predict should be what govern peak

1 dose estimates out in these long time periods.

2 That drives us to the conclusion that it's

3 necessary that the climate details should be

4 established by the regulator to avoid requiring DOE to

5 do something impossible, very much in the same

6 philosophy that the regulator established future human

7 behavior so that DOE doesn't have to speculate about

8 what future humans are doing.

9 The question is for climate change "Should

10 the peak dose be a function of these largely arbitrary

11 assumptions DOE would be forced to make with respect

12 to climate change? They just answered the question

13 "no." It should be treated in a similar manner. It

14 must be established to be a rulemaking and the

15 rulemaking must also address climate change and human

16 behavior in a self-consistent manner.

17 We recommend fixing the long-term climate

18 to present day interglacial. Why? We think that

19 recent evidence suggests that net infiltration has

20 changed less than previously estimated. We understand

21 there's some data that Yucca Mountain Project is

22 pulling together that when they look at certain

23 minerals they note that the rate of mineral growth is

24 pretty constant through various climates that might

25 imply that net infiltration hasn't changed that much

1 from climate state A to B and so on.

2 We've also noticed that the biosphere dose

3 conversion factors are greater for the interglacial

4 climate than they are for glacial climate having to do

5 with groundwater use, the growing season, the types of

6 crops you grow where we have BDCFs that are lower for

7 glacial and that they're the highest for interglacial.

8 We also say that if you fix the climate to

9 the present day interglacial you can maintain an

10 internally-consistent compliance assessment by using

11 present day human behavior for which you do have

12 information and you wouldn't have to speculate or pull

13 in some other human behavior that might be relevant to

14 a colder, wetter climate.

15 And the present day interglacial is the

16 only climate state for which we have more detailed

17 information. All the other climates we would have to

18 speculate and make assumptions about past behavior

19 being indicative of future climate states. We think

20 the above is similar to the philosophy that's in the

21 TYMS Report on use of human behavior.

22 I think I mentioned a bit that we found

23 almost no guidance in the TYMS Report or in the EPA or

24 NRC regulations for that matter on a boundable

25 processes. One could ask how does one combine the

1 three kinds of FEPs into a meaningful compliance
2 assessment, in other words, those with sufficient
3 information that uncertainties can be quantified,
4 those that need to be fixed via rulemaking or those
5 that one needs to somehow bound.
6 We didn't find any words in TYMS on that
7 and so we had to go supplement and look elsewhere. We
8 looked into an international guidance here and we
9 noticed a couple things that came up over and over
10 again in the international guidance. The first was a
11 use of a stylized approach at very long timeframes.
12 I'll talk a bit more about that in a minute.
13 They looked at the different dose limits
14 in some cases and they also looked at alternative
15 indicators of performance to using dose or health risk
16 as the measure of performance. Most commonly when
17 they looked at alternative indicators, they looked at
18 things like flux and concentration. We only mention
19 those in the report because at least our understanding
20 of the court ruling was that NAS recommended that it
21 be health risk-based and we're not quite sure what
22 leeway there is for using alternative indicators based
23 on the TYMS Report in combination with the court
24 ruling.
25 One of the things I would like to clarify,

1 well, I'm not sure it will clarify, is the feeling
2 that scientific accuracy is impossible to achieve over
3 analyses stretching over many thousands of years. On
4 the other hand, regulatory confidence can be achieved
5 and that's because the process for achieving
6 regulatory confidence is different than going after
7 scientific accuracy.
8 It's not really necessary to have 100
9 percent accurate answer but a range of possible
10 answers may be all that's needed to establish
11 sufficient regulatory confidence. So many use the
12 concept of a stylized approach to do that.
13 In the report, one of the things that I
14 asked Matt to do, we both looked hard when we see
15 everybody using the word "stylized" and we never saw
16 a definition of it. We adopted the following one that
17 we think they mean and that works for us and that is
18 "a set of assumptions established by policy that is
19 used to limit the range of uncertainties considered in
20 a performance assessment so that the assessment would
21 yield a meaningful test of the ability to protect the
22 public health and safety." The major parts of this
23 are "a set of assumptions" that they're "established
24 by policy." That may be the regulator. That may be
25 in this case DOE establishing what they do for those

1 set of assumptions that's used to limit the range of
2 uncertainties when we may not know what the right
3 range is or that it's really a wide-open range that
4 was considered in the performance assessment so that
5 it still yields this meaningful test.
6 So back to the international thoughts
7 about this, we kept noticing that there was this
8 consistent international thought about moving to a
9 more stylized approach at these long times. The first
10 one is ICRP 81. They note that another approach is
11 the consideration of quantitative calculations further
12 into the future making increasing use of stylized
13 approaches in considering the time periods when
14 judging the calculated results and I'll talk a bit
15 more about ICRP in a few minutes.
16 Another one that came from the Nuclear
17 Energy Agency where they note in a 2004 report that
18 there is international consensus that a stylized
19 approach is an appropriate means to define these
20 assumptions. The appropriate approach defines a range
21 of alternative, credible illustrations or stylized
22 situations including for example different possible
23 climate states, agricultural practices and exposure
24 pathways in analyzing the resulting dose or risk for
25 hypothetical, critical groups. They note that this

1 avoids the open-ended speculation on issues such as
2 future human habits for which uncertainties are large
3 and irreduceable.
4 I'm going to go through just to point your
5 eye. This was something taken from a McCombie and
6 Chapman report. This summarizes various countries'
7 approaches on this time period. All of these
8 approaches were in existence before July 9, 2004. One
9 is that the timeframes for quantitative. Canada shows
10 10,000 years. Finland, there's something in there
11 changing at 10,000 years. France, again you see
12 10,000. Germany, again 10,000. Sweden talks about
13 1,000 and I'll talk a bit more about some recent SSI
14 guidance there. Switzerland is one where they have no
15 particular time limit. Essentially they don't have a
16 time limit. U.K., it's a little more complicated.
17 I'll talk a bit more about the U.K. one. And the U.S.
18 ones are there.
19 I will note that there are two things that
20 are incorrect in this particular table. In terms of
21 191, the dose limits and the groundwater
22 concentrations are also applicable at 10,000 years.
23 But really what I want you to focus on here is that
24 all the other guidance that where you see this 10,000
25 year time is time when something else changes. That's

1 what this view graph says. While differences exist,
2 this 10,000 years in the future is broadly recognized
3 as the time when something in the analysis should
4 change.
5 This 10,000-year break point isn't
6 inconsistent with the court decision in the sense that
7 these other regulations came up with this
8 independently. The fact that the EPA may choose to do
9 something different at 10,000 years isn't inconsistent
10 with the court decision. It's certainly not
11 inconsistent with what other people have already
12 thought about.
13 Also we notice that there's some shift
14 away from direct dose or risk analyses and most still
15 with dose or risk but they note that increased
16 uncertainty renders these estimates less reliable. A
17 couple examples. The NRPB in the U.K. notes that for
18 times greater than 100 years or so but less than about
19 10,000 risk to members of the critical group should be
20 estimated for comparison to the risk constraint. They
21 go on and say "As the time period of an assessment
22 increases, assumptions about human environment and
23 behavior will necessarily become increasingly
24 arbitrary and therefore should be replaced by more
25 general ones." And they note specifically about "the

1 gradual change or the rate of change in such
2 assumption may be difficult to implement in assessment
3 and therefore for simplicity the board recommends that
4 general assumptions should be applied after about
5 10,000 years."
6 Another example is that SSI vaguely the
7 equivalent of EPA in Sweden has issued some draft
8 regulations for comments and they note that before
9 1,000 years they really wanted a detailed compliance
10 assessment paying particular attention "to conditions
11 and processes early in the development of the
12 repository that can affect its long-term protective
13 capability." Then beyond 1,000 years, essentially,
14 "the analyses should be successively regarded as an
15 illustration of the protective capability of the
16 repository assuming certain conditions" and that for
17 very long time periods, hundreds of thousands of
18 years, "the risk analyses may be based on stylized
19 description of future cycles of major climate changes
20 and large harmful occurrences such as earthquakes."
21 So again, that theme comes in.
22 ICRP 81 and more recent ICRP guidance says
23 some bit more about it. Now I'm switching to dose
24 limits. We would argue that dose limit needs to take
25 into account the growing uncertainties with time.

1 ICRP 81 says on this issue that "as the timeframe
2 increases, some allowance should be made for assessed
3 dose or risk exceeding the dose or risk constraint."
4 They note specifically that "this must not be
5 misinterpreted as a reduction in the protection of
6 future generations and hence a contradiction with the
7 principle of the equity protection but rather is an
8 adequate consideration of the uncertainties associated
9 with the calculated results." And at the time we
10 wrote that, we didn't know whether that really meant
11 that dose constraint could be higher at longer times
12 or an acceptance criteria through the practice may
13 change and that we notice that practically there's no
14 difference and that dose constraint need not be
15 applied as a strict limit.
16 Something that I didn't know existed until
17 last night because it just came out last week was
18 there is another draft for consultation document out
19 from ICRP Committee IV on optimization of radiological
20 protection and in Annex II, they have a couple things
21 that are useful to talk about. One is they suggest
22 that you might relatively weight doses as you go out
23 into time. They say for example "the weights can be
24 assigned according to the time at which exposure is
25 predicted to occur. Progressively less importance

1 could be given to individual exposures received in the
2 far future due to increasing uncertainty."
3 They noticed that in general, "both the
4 individual doses and the size of the exposure
5 population becoming increasingly difficult to predict"
6 and they say, "As such, the use of exposures for
7 decision making purposes becomes increasingly
8 problematic as those exposures are predicted to occur
9 farther and farther out into the future." The
10 Commission feels that "our current state of knowledge
11 and our ability to model populations becomes more
12 difficult" and beyond such timeframes the Commission
13 recommends that "predicted doses should not play a
14 major part in decision making processes." I point
15 this out simply because there's this common drumbeat
16 among other international organizations, most of which
17 have recognized it well before the court made their
18 ruling that uncertainties grow and that something
19 about at 10,000 years needs to change in how we do
20 this.
21 Continuing with the dose constraint
22 issues, again from ICRP guidance, they suggested dose
23 constraints for various situations. The one I have
24 highlighted in blue here up on the screen seems to be
25 the one that would be applicable to deep geological

1 disposal. They're suggesting a maximum constraint on
2 the order of 1 millisievert per year. That's 100
3 millirem per year for situations that have a societal
4 benefit but without individual direct benefit and that
5 there's no information, no training, no individual
6 assessment for exposed individuals for normal
7 situations. That kind of sounds like a deep geologic
8 disposal application and that would be 100 millirem
9 per year.
10 There's other dose limit
11 considerations that one could get into. Certainly,
12 everybody is aware of the intergenerational versus the
13 intragenerational equity arguments. The
14 intergenerational equity is that future generations
15 should not suffer undue burdens. The
16 intragenerational equity is to present that present
17 generation should not suffer undue burden.
18 An example here is the National
19 Association of Public Administrators, principals,
20 where they really have four here and I would argue
21 that three of them, trustee, sustainability and
22 precautionary really address intergenerational equity,
23 but intragenerational equity is also noted in the
24 third one where they say that "near-term concrete
25 hazards have priority over long-term hypothetical

1 hazards" when one is making decisions about what to
2 do.
3 Another point that comes along for dose
4 limitations is the concept dose apportionment.
5 Generally, most regulations consider that there's a
6 dose constraint and then that dose constraint has to
7 be divided up among maybe multiple sources, man-made
8 sources, of radioactivity that the same individual
9 could be exposed to such that the dose limit on any
10 one of those activities is lower than the constraint.
11 We would question that 10,000 years out
12 into the future especially for a site like Yucca
13 Mountain whether there would be of these multiple
14 sources for which one would need to apportion. This
15 new ICRP document also addresses that in that they say
16 that "should more than one licensed facility expose
17 the same public individuals further consideration of
18 the appropriate dose and strength for each such
19 facility would be necessary." They are opening the
20 possibility that one need not apportion doses and it
21 would depend upon the situation.
22 The last point on this view graph is that
23 there is a controversy about what the health risks are
24 at low doses such that there may be a range of doses
25 that there may be little to no health risk according

1 to some.

2 The last component that we think needs

3 addressing is how to do features of end step processes

4 or FEPs screening for very long timeframes. And

5 here's where we get back to this TYMs recommended

6 concept of the negligible incremental risk. TYMs

7 noted that they've adapted this from the negligible

8 incremental dose concept which essentially says that

9 "scenarios with a sufficiently low combination of

10 probability and dose consequences need not be

11 considered in compliance analysis."

12 In the TYMs Report, they recommend that a

13 negligible incremental risk equivalent to a negligible

14 incremental dose of one millirem per year is a

15 starting point for EPA consideration. Again they

16 recognize that this is a policy call for EPA to make

17 but that was their recommended starting point for

18 discussion.

19 So if we look at that, our take is that

20 the current FEPs screening probability cutoff which is

21 simply pure probability based is very conservative

22 compared to this NID, negligible incremental dose, of

23 suggested level of one millirem per year. The EPA

24 adopted a probability cutoff of less than 10^{-4} and 10^{4}

25 years which translates to about less than 10^{-8} per

1 year. We would argue that's an extremely low
2 screening level compared to the NID level suggested in
3 the TYMS Report. For example, if some FEP had a
4 probability of occurrence that was 10 percent, it
5 would be screened only if the dose consequence was
6 greater than about 10 millirem per year for this NID
7 risk of one millirem per year.
8 What our argument is there is that DOE is
9 presently conservative in the sense that they're
10 addressing many more FEPs than would be the case if
11 the TYMs recommended NID standard were to be used. We
12 can't imagine an additional FEPs that would meet a one
13 millirem per year NID risk criterion beyond 10,000
14 years.
15 Finally, getting to the recommendations.
16 Because the court rejected all the challenges to the
17 existing regulations governing the first 10,000 years,
18 we would recommend that EPA could take a surgical
19 approach to revising its standard, meaning that
20 specifying beyond 10,000 year requirements is a
21 separate standalone provision that don't alter what's
22 already required regarding the first 10,000 years.
23 We recommend that a change of approach to
24 the regulation and its implementation should be
25 adopted for those provisions of the regulation that

1 will address timeframes beyond 10,000 years if the
2 regulation as a whole is to remain implementable.
3 Part of that change of approach is that a stylized
4 approach for scenario identification and level of
5 rigor in the model should be established by the NRC
6 for time periods beyond 10,000 years.
7 In the sense that while EPA can make
8 recommendations about stylization, it really comes
9 down to the nuts and bolts in the details. It's up to
10 NRC and DOE to hash that out. Those details would
11 need to be established by NRC.
12 On future climate states, we would argue
13 that they should be fixed by rulemaking to one or at
14 most two what we think are bounding states. One would
15 be, the one that we really argue could be the single
16 bounding one, is the present day interglacial with the
17 glacial being the other one.
18 If a glacial state climate is specified,
19 the regulation should also specify a set of
20 assumptions to govern human behavior that is
21 consistent with the way humans would be expected to
22 live. However, we think that it's preferable to
23 simply assume the present-day interglacial climate
24 state continues for the entire compliance period since
25 it is likely to be reasonably bounding and the most

1 implementable.

2 No additional FEPs screening is required
3 for the time period beyond 10,000 years. As we noted
4 earlier, that is because current FEPs screening
5 criterion is already overly inclusive compared to the
6 approach recommended by the TYMS panel. However, if
7 it is so desired or required that additional FEPs
8 screening beyond 10,000 years be done, the concept of
9 the negligible incremental dose should be used as the
10 screening tool.

11 And finally, a two-tiered dose limit
12 should be specified, one level for the first 10,000
13 years and a second higher level that is consistent
14 with the increased uncertainty should be used for the
15 period beyond 10,000 years. While EPRI is not
16 advocating an exact numerical limit that would be a
17 policy choice of EPA, we note that there is guidance
18 out there from other bodies that would support a dose
19 limit on the order of 100 millirem per year.

20 Where are we going next? We've requested
21 in the report and when I sent out the email notifying
22 people of the report that we seek feedback from all
23 interested parties on the content and the
24 recommendations made in the report, we'll note that we
25 already have received preliminary comments from the

1 State of Nevada and they have indicated in that first
2 letter to us that they might provide additional
3 comments later on.
4 We are still mulling over whether we will
5 hold a workshop on this issue in the next few months
6 just to talk in general about what are people's
7 feelings on what the issues are and how one might
8 address these longer time periods of compliance. EPRI
9 really feels that it would be useful to have some sort
10 of discussion about this early on so that all of us
11 and especially EPA and NRC get some feeling for what
12 people may be thinking about this.
13 Our eventual plan is to issue a final
14 report because this was an interim report that we
15 were seeking feedback on that takes into consideration
16 the input we receive, if we have a workshop, the
17 discussion that goes on there, other related
18 documents, for example, this new ICRP draft
19 recommendation that came along since we put out this
20 report as well as other documents that others have
21 written. For example, I know that NRC has already
22 written a letter with their preliminary thoughts to
23 EPA on what they think the regulations should be as an
24 example. Then the final report would also response to
25 the EPA draft rule assuming that no Congressional

1 action that may affect this promulgation occurs. Any
2 questions?
3 MEMBER HINZE: Thank you very much, John,
4 and I also want to thank the two Matts for their
5 contributions to this logically-presented argument and
6 for your very meaty discussion. With that, we'll turn
7 it over the Committee for any questions that they
8 might have. James.
9 MEMBER CLARKE: Not right now.
10 MEMBER HINZE: Ruth.
11 DR. WEINBERG: That was a lot to digest in
12 a short time.
13 MR. KESSLER: Sorry about that.
14 DR. WEINBERG: That's a really very
15 thorough discussion. I just have one. If the
16 uncertainty increases with time and the basis of the
17 court's recommendation is this peak dose
18 recommendation, is it possible that dose uncertainty
19 band would be broad enough that you could argue that
20 the dose didn't really increase significantly? In
21 other words, if you took the peak dose in the pre
22 10,000 year period and just called that a point and
23 then broaden the uncertainty, the dose band, saying
24 that your uncertainty increased estimating some kind
25 of increase function, would it be possible to argue

1 that?

2 MR. KESSLER: I think I'm still not quite

3 understanding where you're coming from. In the sense

4 -

5 DR. WEINBERG: In the sense that the

6 uncertainty and dose, they become so large that you

7 don't really know where in that uncertainty band the

8 most likely dose is.

9 MR. KESSLER: I see what you're saying.

10 We would argue that uncertainties that the band

11 becomes larger as you approach peak dose and that if

12 you're looking at uncertainty bands say that are

13 between the 5th and the 95th percentile that may

14 encompass two or more orders of magnitude, one can ask

15 the question is that such a wide uncertainty band that

16 the meaning of that band should we impute some meaning

17 from that uncertainly band.

18 I think that we would argue that the

19 meaning is you need to know that, and I think that a

20 lot of these international recommendations recognize,

21 that the meaning of the mean dose, even the maximum

22 likelihood dose, becomes less because there could be

23 a wealth of possibilities leading to significantly

24 different consequences depending on how things play

25 out. So if that's answering your question --

1 DR. WEINBERG: That is.

2 MR. KESSLER: Okay.

3 DR. WEINBERG: Thank you.

4 MEMBER HINZE: Dr. Ryan.

5 CHAIRMAN RYAN: Thanks, John. Thank you
6 for your presentation. I'll just note for the
7 Committee's benefit. We're taking a look too at
8 these. There are two draft reports from ICRP.

9 MR. KESSLER: Right.

10 CHAIRMAN RYAN: And just so that
11 everybody's on the same page, these are drafts for
12 consultation.

13 MR. KESSLER: Correct.

14 CHAIRMAN RYAN: And they are foundation
15 documents for the main recommendation that they have
16 now extended the schedule for for about a year. So I
17 just wanted to put all of that out. All of that is in
18 a state of flux. I just thought that would be helpful
19 to note.

20 I guess this is in your report in more
21 detail, but could you explain a little bit more about
22 this transition point and what you see changing? I
23 wrestle with the question that Ruth raised and your
24 answer in terms of how do you transition from a
25 quantitative approach to a qualitative or one that's

1 less reliant on quantitative thinking?

2 MR. KESSLER: I think that one is -- Given

3 the regulatory environment we have in the U.S., I

4 think that we're going to remain quantitative.

5 There's going to be an estimate that's quantitative

6 compared to some sort of limit no matter what the

7 timeframe is. So we came at it from the other way,

8 Mike, which is to say how one comes up with that

9 estimate needs to have some bounds around it when

10 these uncertainties grow with time.

11 The TYMS Report make it very clear in the

12 example of human behavior how one puts bounds around

13 uncertainties. We're arguing that additional bounds

14 need to be put on specific things like climate state,

15 but in addition, the level of rigor that's required in

16 data and models for those long-term periods such that

17 one can come up with some sort of quantitative

18 estimate that can be used in the regulatory

19 environment we have. I hope that answered your

20 question.

21 CHAIRMAN RYAN: That's a good start, but

22 if you could go to that graphic of uncertainty bands.

23 MR. KESSLER: Do you have a graph number

24 for me?

25 CHAIRMAN RYAN: Well, it's on page six.

1 So it's probably slide 12.

2 MR. KESSLER: Okay.

3 CHAIRMAN RYAN: There you go. Help me

4 with that axis on the Y-axis. I guess I'm reading

5 that the peak -- I'm looking at this semi-long plot of

6 the peak.

7 MR. KESSLER: Yes.

8 CHAIRMAN RYAN: Is it, oh, I don't know,

9 1.4 something millirem per year correction?

10 MR. KESSLER: Right.

11 CHAIRMAN RYAN: Help me understand that

12 magnitude. What is that from?

13 MR. KESSLER: This is something from some

14 assessments. This is an example of the bands. It's

15 not the be all and the end all even for EPRI's

16 analysis. What we were trying to illustrate here was

17 what you might see or what might get masked in terms

18 uncertainty changes with time. Where the 1.4 number

19 comes from essentially, but our estimate based on more

20 best estimates rather than conservative analyses of

21 the nominal release scenario. So it excludes things

22 like igneous and human intrusion as to what we think

23 is a reasonable upper range on dose estimates for that

24 particular case.

25 CHAIRMAN RYAN: It seems to me that this

1 transition point between 10,000 years and beyond is
2 really related to that order of magnitude on the Y
3 axis. That the dose numbers get higher on the Y axis
4 at the peak based on whatever scenario you want to
5 assume or gets accepted or whatever the thing might
6 be. The comfort or the confidence that you get going
7 beyond that peak in time or to that peak in time is
8 influenced by the magnitude of the peak. I wonder if
9 you thought about that. If a peak dose is much nearer
10 the limit, there's going to be more question about it
11 than if a peak dose's order of magnitude below a
12 limit.
13 MR. KESSLER: I think that you're talking
14 about --
15 CHAIRMAN RYAN: Given that the calculation
16 that everybody's looking at is accepted as a
17 reasonable calculation.
18 MR. KESSLER: Let's separate concepts
19 here. Okay. We're talking about irrespective of what
20 the exact number is in these analyses.
21 CHAIRMAN RYAN: That's what you've done
22 here, but it led me to the question that I'm now
23 posing to you.
24 MR. KESSLER: Right.
25 CHAIRMAN RYAN: What do you think of that

1 notion that the magnitude of the peak has an influence
2 on how you might think about it as you approach it or
3 as you pass it?
4 MR. KESSLER: In a sense, it should not.
5 What we're talking about here and we're advocating is
6 a different dose limit that recognizes the inherent
7 uncertainties in calculating doses for any site.
8 Okay. In a sense, this is a generic part. We're
9 recognizing that some parts of the system, almost any
10 system, become inherently uncertain. We look at ICRP
11 draft guidance that suggests that a higher dose --
12 Let's see. They put it the other way
13 around. In its most recent draft guidance, they talk
14 about potentially reducing the weight of the
15 importance of a particular dose number out at these
16 long times specifically to take into account
17 increasing uncertainties with time. So that's all the
18 generic part and that's totally separate from what we
19 may happen to be finding for a particular number at
20 the time of peak dose.
21 CHAIRMAN RYAN: And there's lots to
22 wrestle with there, too, because it's in a way an
23 artifact to say the longer amount of time a dose is
24 estimated, the less weight I give it. So I'm
25 multiplying it by 0.1 instead of 0.5 as a weighting

1 factor. That's a little bit qualitative in how you
2 get to that. You've translated a qualitative judgment
3 into a numerical one.
4 MR. KESSLER: Yes.
5 CHAIRMAN RYAN: And the good news is if
6 three people did it according to the rule, they would
7 all get the same numerical answer.
8 MR. KESSLER: But doing that kind of
9 approach is very precedented. We're doing it right
10 now for human behavior just as an example that we're
11 taking a qualitative statement.
12 Let's use present-day human behavior in
13 Amargosa Valley. Now NRC and DOE have the task and
14 they're saying take that general guidance and put it
15 in real numbers and they did that. Nothing different
16 here.
17 CHAIRMAN RYAN: And again, I'm not
18 offering these comments to criticize your report or
19 anything in any way.
20 MR. KESSLER: Right.
21 CHAIRMAN RYAN: Just to explore the
22 concepts out loud for everybody's benefit especially
23 my own. It's interesting. You have a lot of food for
24 though. I think the next step is let's read the
25 report in detail and call you back.

1 MR. KESSLER: And I welcome feedback
2 formal or otherwise.
3 CHAIRMAN RYAN: All right. Thank you.
4 MEMBER HINZE: Allen.
5 VICE CHAIRMAN CROFF: I'm, I guess, with
6 Ruth. I'm reeling just a little bit here, but the
7 thing that struck me the most is the same that both
8 Ruth and Mike have asked or followed up on. Let me
9 make sure I understand what you've said and that's
10 this business, the notion, that uncertainties grow
11 with time at least up to the peak. It seems to me, I
12 think, as you stated a feeling or a belief or maybe an
13 article of faith, but we don't necessarily know that
14 or it has not been documented in a logical way and
15 subject to proof if you will. We simply believe that
16 is the case but don't know that is the case. Is that
17 an accurate characterization?
18 MR. KESSLER: No. You may be talking
19 about one kind of uncertainty. I mentioned in
20 whatever view graph I have here, I'll wind up taking
21 too much time looking for it, that we talked about
22 these fixed uncertainties and how they manifest
23 themselves in time when you make your projections.
24 And to me, that is a true indication that
25 uncertainties do grow. Our knowledge or our lack of

1 certainty causes us to have a wider and wider
2 potential projection of dose versus time up to some
3 time. That's one aspect.
4 Then the other aspect which I think you're
5 probably talking about is this idea that conceptual
6 model uncertainty, do we understand or is there some
7 point in the future when we're confident that we even
8 understand the fundamental processes and some
9 particular set of FEPs starts to break down? That one
10 is less well documented exactly when that happens and
11 it of course varies from one to the next.
12 VICE CHAIRMAN CROFF: I'm thinking we get
13 some of that in juxtaposed against radioactive decay.
14 MR. KESSLER: Right.
15 VICE CHAIRMAN CROFF: Where there's just
16 less and less there as a function of time and when I
17 add all that up, I'm not saying your belief is
18 incorrect. But I'm saying I don't know that it's
19 correct either. I'm asking has anybody really tried
20 to go through and lay out all this and work this out.
21 Or are we still -- Like I say, is it still a belief?
22 MR. KESSLER: Right. I think Matt Kozak
23 would like to add something here.
24 MR. KOZAK: Yes, if you look at those
25 curves, the peak dose quite frankly associated with

1 Yucca Mountain isn't influenced heavily by decay and
2 so it can take that to a large extent out of the
3 equation. The neptunium and it's progeny are what are
4 leading to the peak dose and in fact to some extent,
5 you get an increase as you go further out in time
6 because you have more time for the in-growth for some
7 of the progeny.
8 It's happening over the same time scale as
9 we're coming to peak. So you're right. The short-
10 lived stuff is disappearing but that's happening in
11 the first 10,000 years. When we start getting out in
12 the post 10,000 years, the decay more or less has
13 happened and we have something else going on.
14 Let me just interject one more thing and
15 that is that the one thing that people's intuition
16 leads them to say that the uncertainties grow comes
17 from the idea that around 10,000 years is when we may
18 see the next major climate change. Now some of the
19 discussion that we have in the report says maybe we
20 don't even know that, but that I think is where the
21 gut reaction of a lot of people comes from.
22 If you look at the Nordic countries at
23 10,000 years, they go to some other indicator because
24 they say at that point we're under a kilometer of ice.
25 So why are we doing those calculations? So it's

1 considerations like that that people have to start
2 thinking about things after 10,000 that they don't
3 have to consider before.
4 VICE CHAIRMAN CROFF: I understand the
5 specific examples. I'm not sure that we can
6 generalize it. If one would imagine that it took 100
7 million years for the neptunium to reach the biosphere
8 as opposed to one million or a half or whatever it's
9 currently projected to do, we started getting into a
10 very different regime in terms of decay and what's
11 important and what's not and whether there's anything
12 left to be important.
13 MR. KOZAK: Yes.
14 VICE CHAIRMAN CROFF: I just wanted to
15 raise.
16 MR. KESSLER: In some, we're not
17 generalizing it, Allen, in the sense that there's
18 these couple different options for dealing with
19 uncertainties and one is that I think we would agree
20 that for a lot of the geologic and some of the
21 physical processes that they can be treated with a
22 reasonable amount of uncertainty such that they can be
23 fully incorporated in a probabilistic compliance
24 assessment. It's just some of them that need
25 additional specification or at least be addressed in

1 some particular way.

2 VICE CHAIRMAN CROFF: Okay. I don't think

3 there is an answer to this so I'll pass.

4 MEMBER HINZE: Dr. Clarke.

5 MEMBER CLARKE: I just had a quick one,

6 John, to clarify. I think it's on page 17, slides 33

7 and 34 is where I found them.

8 MR. KESSLER: Thirty-three?

9 MEMBER CLARKE: Yes, the cutoff for the

10 negligible incremental dose at one millirem per year.

11 That's at a risk level of -- what would that be? 10^{-5}.

12 MR. KESSLER: No, that's at where

13 essentially P equals 1.

14 CHAIRMAN RYAN: The risk level of one

15 millirem here is 10^{-7}.

16 MEMBER CLARKE: 10^{-7}.

17 MR. KESSLER: Oh, health risk. Sorry. I

18 misunderstood the question.

19 MEMBER CLARKE: I was thinking 15 but it's

20 10^{-4}.

21 CHAIRMAN RYAN: What I remember is 10^{-7}.

22 MEMBER CLARKE: I'm using the cutoff 10^{-4}

23 which is 15.

24 MR. KESSLER: Too many different kinds of

25 risks here.

1 MEMBER CLARKE: I'm sorry.

2 MR. KESSLER: No. I misinterpreted your

3 question. Mike answered.

4 CHAIRMAN RYAN: (Off mic) -- is in fact

5 below that.

6 MEMBER CLARKE: Okay.

7 MEMBER HINZE: Staff. Michael.

8 MR. LEE: Michael Lee. I read the report.

9 Nice report, John. Congratulations to you and your

10 authors. It gives us a lot of food for thought for

11 everyone in there. I just have a couple questions and

12 observations. In May 2005, NEA is going to have a

13 working group on the treatment of uncertainties in

14 long-term PAs. I think the goal of that working group

15 is to try to develop a consensus document on how

16 repository developers and decision makers could use

17 these results. Does EPRI intend on observing or

18 sending a participant to that working group?

19 MR. KESSLER: If we're invited.

20 Obviously, we are not a member of NEA and it would

21 only be if an NEA member felt it was useful for us to

22 be there. I do know that it's my understanding that

23 some members of the NEA group have had the website

24 forwarded to them. So at least, they're aware that it

25 exists.

1 MR. LEE: Sure. The other
2 comment/question I had is a few minutes ago you made
3 reference to an NRC letter to DOE. Is that is recent
4 letter? The EPA, excuse me. The EPA.
5 MR. KESSLER: NRC letter to EPA. If I
6 said, I misspoke.
7 MR. LEE: Maybe it was to --
8 MR. KESSLER: I think I did -- The example
9 that I remember was about NRC, and if I misspoke I
10 apologize, and a DOE interaction that established for
11 example the quantitative details of human behavior.
12 That's what I remember or at least meaning to say if
13 I didn't use those words.
14 MR. LEE: Thank you. For some folks in
15 the audience, they may not be aware that NAS wrote a,
16 for lack of a better description, rebuttal paper on
17 the EPA standard after EPA implemented its
18 recommendations. You didn't make reference to that in
19 the report.
20 MR. KESSLER: No.
21 MR. LEE: Would you care to elaborate for
22 the Committee's benefit as to why?
23 MR. KESSLER: The rebuttal was used by at
24 least one of the parties in the lawsuits and our
25 reading of how the court dealt with that essentially

1 was if it's not in the bible document the court didn't
2 consider it as part of their ruling. That's why we
3 didn't consider it.
4 MR. LEE: But in your opinion just as an
5 opinion, is it valuable for the parties as they go
6 back and reexamine the NAS recommendations to take
7 into account what the TYMS Committee said regarding
8 possible implementation of their recommendations?
9 MR. KESSLER: I think it's valuable for
10 EPA and NRC to take into account everything that they
11 can within the confines of the court ruling.
12 MR. LEE: Last question. Our previous
13 speaker made reference to being king-for-a-day and if
14 you had an opportunity to be king-for-a-day, would you
15 have any recommendations on future standards relative
16 to issues NRC should focus on as opposed to EPA?
17 There's always been a little tension between the two
18 agencies on what EPA should specify in its standards
19 and what NRC should be given a discretion over in
20 terms of the implementation.
21 MR. KESSLER: Well, oh dear. This is a
22 king-for-a-day comment. It is not industry policy or
23 anything else. I think it would be useful for EPA to
24 recognize who is actually implementing this regulation
25 and it's not EPA. The more EPA knows about the actual

1 processes and the actual way NRC is going to have to
2 deal with whatever they are handed the better. For
3 example, it would be nice if the EPA decision makers
4 knew what the heck an ASLB was as an example.
5 In terms of specific recommendation, I
6 would like, we have them in the report, in terms of
7 what we would like this to be. If we go back to the
8 recommendations we made to the NAS in 1994, EPRI
9 recommended that the time period of compliance should
10 be 1,000 years because of growing uncertainties. But
11 we've not revisited that because the court made its
12 ruling and we weren't going back over old ground.
13 I would say that starting from here, we've
14 provided specific recommendations and our opinion is
15 that while EPA has to set the overall regulation,
16 they're not the implementing regulator. Since that's
17 the way the law reads, it would be useful for EPA to
18 take into account how NRC does business.
19 MR. LEE: Thank you.
20 MEMBER HINZE: Further questions? Latif.
21 MR. HAMDAN: Yes. John, I too thought it
22 was an excellent not only presentation but the ideas
23 that you and your team came up with are excellent and
24 worth further discussion in my opinion. As you have
25 been saying, EPA is the agency who is going to issue

1 the standards. So the question for you is has EPRI or
2 you personally talked to EPA about these ideas and
3 these thoughts because after they are going to come up
4 with the standards in two or three months and did you
5 talk to EPA about it? What do you think the EPA's
6 response is going to be?
7 MR. KESSLER: Certainly, we talked to EPA
8 about this report. I was there yesterday and
9 essentially just walked through the exact same
10 presentation with them. I gave them the ideas that
11 were in the report. Did I get any indication of what
12 EPA is thinking or what they thought was good or what
13 they thought was bad? None whatsoever. Other than
14 what's already reported in the press, I have no idea
15 what EPA is thinking.
16 MR. HAMDAN: Apart from your discussion
17 yesterday, what do you think EPA might do with your
18 recommendations?
19 MR. KESSLER: I have no idea.
20 MEMBER HINZE: We have no one in the
21 audience that is going to comment on it.
22 MR. KESSLER: Honestly, I do not know.
23 EPA didn't share anything with me. I didn't ask for
24 anything. It's not appropriate. All I wanted to do
25 was to make sure that EPA had some thoughts from us

1 and I walked through the same presentation with them
2 yesterday.
3 MEMBER HINZE: Dr. Ryan.
4 CHAIRMAN RYAN: Thank you. Again, thank
5 you, John. We appreciate your presentation and your
6 response to questions and dialogue. It's helpful for
7 us as we think ahead. Thank you very much. We're on
8 schedule for a break. Let's see Latif or somebody
9 from staff. Mike, do we need the recorder at this
10 point? We're going to consider just subjects and our
11 trip to Japan slides and so forth. I think we're off
12 the record for the rest of the day. Thank you very
13 much. We'll reconvene at 3:40 p.m. please.
14 (Whereupon, at 3:21 p.m., the above-
15 entitled matter concluded.)
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CERTIFICATE

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

Name of Proceeding: Advisory Committee on Nuclear Waste 159TH Meeting

Docket Number: n/a

Location: Rockville, MD

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

Rebecca Davis

Rebecca Davis
Official Reporter
Neal R. Gross & Co., Inc.

Yucca Mountain Licensing Standard Options for Very Long Time Frames – Technical Bases and EPRI Recommendations

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Presented to the Advisory Committee on Nuclear Waste, 19 April 2005

EPRI

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- Available at the following public web site: http://www.epriweb.com/public/000000000001011754.pdf
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Background

- Energy Policy Act of 1992: EPA to contract with NAS to provide technical bases for a Yucca Mountain-specific standard
  - EPA rule to be "based upon and consistent with" the NAS recommendations
  - NRC to issue a conforming, implementing regulation
- 1995: NAS "TYMS" (Technical Bases for Yucca Mountain Standards) Committee report issued
- 2001: EPA and NRC issue regulations (40CFR 197 and 10 CFR 63, respectively)

Background (continued)

- Multiple lawsuits on the two regulations (and other issues)
- July 9, 2004: Court of Appeals ruling
  - All challenges raised in the lawsuits are denied except one:
  - Court ruled that EPA did not follow TYMS recommendation on the time period of compliance
  - Court gave EPA two options:
    - EPA to go back to Congress
    - Issue standard "based upon and consistent with" the TYMS recommendations
      - Reissue original standard with appropriate explanation
      - *Issue a new standard with requirements for time periods to peak dose*

Purpose of the Report

Assess the technical implications and options associated with regulatory compliance periods in excess of 10,000 years that:

- Are consistent with the July 9, 2004 Court of Appeals ruling
  - I.e., "based upon and consistent with" the TYMS recommendations
- Result in a standard that provides "meaningful" protection of public health and safety
- Would be "reasonable" and implementable in a regulatory environment
  - "Implementable": NRC would be able to make a regulatory decision based on information that could be provided by DOE

Avoid revisiting issues settled in the Court of Appeals ruling

Assumptions Made in the EPRI Report

- July 9, 2004 Court of Appeals ruling is used as the primary guidance
- For the purposes of the arguments made in the report, EPRI assumes no Congressional action
- Use the TYMS Committee report as the "bible", wherever possible

EPRI Main Concerns with a Regulatory Time of Compliance for VERY Long Time Frames

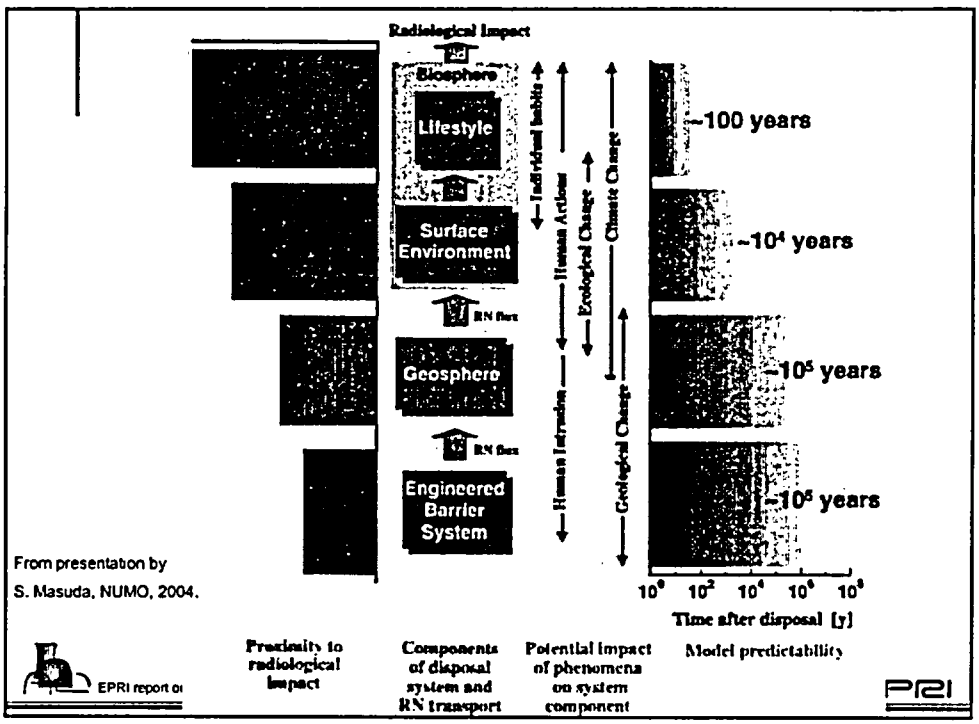
- Uncertainties grow with time
- Adjudicatory nature of NRC licensing process
- Unprecedented in the US, and nearly so internationally
  - Even in those countries who are calculating to very long time frames, none of them have been subjected to a rigorous licensing process
- Potentially penalizes a good repository "system" (engineered and geologic features)
  - The longer the peak is delayed, the better from a "safety" standpoint (more radioactive decay)
  - Harder to know the "details" of repository behavior very far out in time, so could be harder to defend in NRC's licensing process than a system with poorer characteristics
- Potentially will just be about the "math" with little to no "safety" benefit

Report Organization

- Introduction and Background
- Treatment of Uncertainties Over Very Long Time Periods
- The Increase of Uncertainties with Time at Yucca Mountain
- Climate Change
- International Approaches to Addressing Uncertainties Over Very Long Times
- Matching Regulations to Time Scale and Time-Dependent Factors
- Elements of a New Yucca Mountain Standard
- Conclusions
- Appendix: Climate Change and Evolution

Main TYMS Committee Recommendations and Comments

- "[W]e recommend that compliance assessment be conducted for the time when the greatest risk occurs, within the limits imposed by long-term stability of the geologic environment [one million years]." (pp. 6-7)
- The standard should be "meaningful"
  - Form of the standard (individual health risk)
  - Compliance assessment based on conceptual and numerical models that reasonably reflect present-day understanding of FEPs
- Some FEPs necessary to perform health risk assessments over very long time frames are less well understood than others
- Concept of "Negligible Incremental Risk" (NIR) to screen FEPs

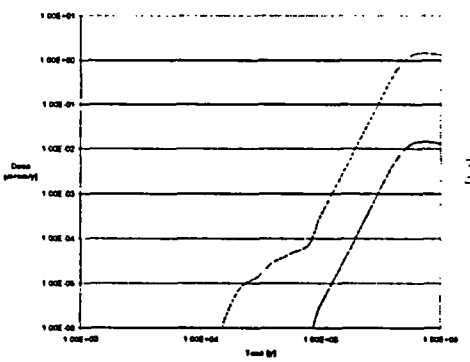


From presentation by S. Masuda, NUMO, 2004.

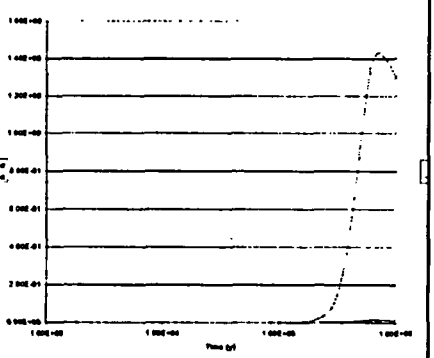
Do Uncertainties Grow With Time? Yes, in Various Ways

- For time-invariant uncertainties: projections cause a wider distribution of results up to the time of peak dose risk
  - Examples on the next slide
- Our understanding of the FEPs that govern system behavior decreases with time
  - Long-term material degradation mechanisms
  - Future climate state (more on this later)
- NAS partially recognized uncertainties grow with time
  - NAS also notes that some uncertainties decrease with time
    - **NAS example of waste packages – eventually they have all failed.**
    - **Peak failure *rate* is more important to peak dose risk.**

Uncertainty Bands Can be Masked (to some) if Presented Certain Ways



EPRI TSPA result plotted log-log



Same result plotted semilog

TYMS Comments on Uncertainty

- "We conclude [most] physical and geological processes are sufficiently quantifiable and the related uncertainties sufficiently boundable that the performance can be assessed over time frames during which the geological system is relatively stable or varies in a boundable manner. The geologic record suggests that this time frame is on the order of 10^6 years... **Once an exposure scenario has been adopted, performance assessment calculations can be carried out with a degree of uncertainty comparable to the uncertainty associated with geologic processes and engineered systems.**"
  - Most processes are "sufficiently quantifiable..."
  - **Some have to be specified** such that overall uncertainty is governed by these "physical" and "geological" processes

TYMS Committee Options for Dealing with Uncertainties

- Regulation and compliance assessment should be risk-based
  - Include consequences weighted by their probability of occurrence
- Options:
  - Include probabilities directly into the compliance assessment for "most physical and geologic processes"
  - For FEPs not amenable to scientific analysis, establish their properties via rulemaking (human behavior was the example)
  - Other FEPs can be "**bounded**": seismic and igneous processes, climate change

TYMS Report Provides Detailed Reasoning on Use of Rulemaking for Human Behavior

- Highly uncertain
- Not subject to scientific analysis
- TYMS recommends fixing human behavior to present-day behavior
- Associated issue that TYMS also recommended fixing: health physics quantities
  - TYMS recommends use of standard dosimetric conversions
  - Eliminates need for DOE to consider dosimetric uncertainties
- EPA adopted both recommendations: fix human behavior to present-day (includes groundwater plume size); standard dosimetric conversions

Three Sets of FEPs Considered "Sufficiently Boundable" by TYMS

- Seismic processes
- Igneous processes
- Climate change

EPRI asked if these three are, indeed, "sufficiently boundable", and how to treat them

Seismic and Igneous Activity Seem Sufficiently Boundable

- Seismicity
  - Information on tectonic deformation rates over time periods >1Myrs
  - DOE analyses on physical limits to ground motion look applicable to longer time periods
- Igneous activity
  - Nature and probability of eruptions being considered for the first 10kyrs seem extendable for much longer time periods
    - Igneous activity information over the Quaternary period being used, longer than 1Myrs (shortest record extends back 4-5 Myrs)
  - DOE analyses suggest dose risk due to igneous eruption peaks within or near 10kyrs

Future Climate Details Must Be Addressed

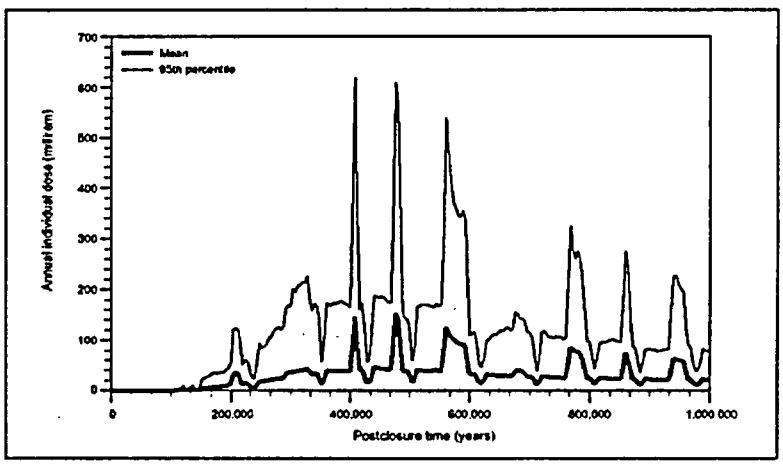


Figure 5-4. Mean and 95th-percentile (based on 300 simulations of total system performance, each using random samples of uncertain parameters) annual individual dose at the RMEI location during 1 million years after repository closure for the nominal scenario under the higher-temperature repository operating mode.

From Yucca Mountain Final Environmental Impact Statement, DOE/EIS-0250, 2002

EPRI Thoughts About the FEIS Figure

- Peaks are the result of assumptions about the details of climate change, and the modeling approach
  - DOE uses a series of steady-state flow and transport models for each assumed climate state
  - Instantaneous step changes in climate
    - Net infiltration, flow focusing, water table, saturated zone flux
  - All changes assumed to occur at exactly the same time
  - No change in assumed human behavior
  - Conservative net infiltration response assumed to future "wetter" climate states
- Such and approach was OK for its intended use per Part 197 at the time
  - Simply used to bound potential environmental impacts
  - Not for compliance purposes

Why Not Just Switch to a Transient Set of Models?

- Theoretically, DOE could do this
- To what end? DOE would still need input on:
  - Magnitude of change (and uncertainty)
  - Timing of the change (and uncertainty)
  - *Rate of change between climate states (and uncertainty)*
- The magnitude, and especially the rate of climate state change are both highly uncertain – even more so over very long time frames
- Still must address issue of inconsistency with present-day human behavior

Future Climate State Uncertainties

- TYMS: "...it is well known that climate can vary significantly over geologic periods of time. Although the typical nature of past climate changes is well known, it is obviously impossible to predict in detail either the nature or the timing of future climate change. This fact adds to the uncertainty of the model predictions." (emphasis added)
- EPRI agrees that the details are "impossible" to predict
  - A review of climate change issues and uncertainties is in the report appendix
- The details may well drive the peak dose estimate
- Therefore, the necessary climate details should be established *by the regulator* to avoid requiring DOE to do something "impossible"

Treating Climate Change If the Compliance Time Period is Extended

Should the peak dose be a function of largely arbitrary assumptions that DOE would be forced to make w.r.t. climate change?

- No. It should be treated in a manner similar to that for human behavior: set uncertain aspects of future climates to established values (or a given "state")
- It must be established via rulemaking
- Rulemaking must address climate change and human behavior in a self-consistent manner

EPRI Recommends Fixing the Long-Term Climate to Present-Day Interglacial

- Recent evidence suggesting net infiltration has changed less than previously estimated
- Biosphere dose conversion factors greater for interglacial
- Maintain internally consistent compliance assessment (human behavior linked to climate state)
- The *only* climate state for which we have more detailed information
- Above is similar in philosophy to TYMS for human behavior

Almost No Guidance from TYMS (or EPA or NRC) on "Boundable" Processes

- How does one combine the three kinds of FEPs into a "meaningful" compliance assessment?
  - Those with sufficient information that uncertainties can be quantified and incorporated into models
  - Those that need to be fixed via rulemaking
  - Those one needs to somehow "bound"
- EPRI looked to international guidance to supplement TYMS
  - Use of "stylized" approach at very long time frames
  - Dose limits
  - Alternative indicators of performance (e.g., flux, concentration)

Separate "Scientific" and "Regulatory" Uncertainty

- Scientific accuracy is impossible to achieve for analyses stretching over many thousands of years. On the other hand, regulatory confidence *can* be achieved.
- The process for achieving regulatory confidence is different.
  - Not necessary to have a 100% "accurate" answer, but a range of possible answers
  - Hence, many use the concept of a "stylized" approach
- EPRI defines a "stylized" approach as follows:
  - "A set of assumptions established by policy that is used to limit the range of uncertainties considered in the performance assessment, so that the assessment would yield a meaningful test of the ability to protect public health and safety."

Consistent International Thought: Move to a More "Stylized" Approach at Long Times

- ICRP 81: "Another approach is the consideration of quantitative calculations further into the future making increasing use of stylised approaches and considering the time periods when judging the calculated results "
- NEA (2004): "There is international consensus that a "stylised approach" is an appropriate means to define these assumptions. ... The approach involves defining a range of alternative "credible illustrations" or "stylised situations," including, for example, different possible future climate states, agricultural practices and exposure pathways, and analyzing the resultant dose or risk for hypothetical critical groups. This avoids open-ended speculation on issues such as future human habits for which uncertainties are large and irreducible."

Timescales in national waste disposal regulations	
Canada	Time frame for quantitative compliance 10,000 years; requirement that longer periods be addressed qualitatively to ensure that no sudden increase in risk would occur
Finland	Up to 'reasonably predictable time periods' (~10,000 years), dose constraint from expected evolution; beyond, quantities of nuclides migrating to be below specified limits (derived from natural backgrounds)
France	Stability of geological barrier to be demonstrated for a period of at least 10,000 years; calculations of dose for normal evolution extend to 100,000 years; thereafter the situation is 'hypothetical'
Germany	No timeframe officially specified; recommendation of the RSK for dose calculations to 10,000 years and use of other safety indicators thereafter
Sweden	Little formal guidance on timescales; SKI and SSI preparing new regulations which uses individual dose to 1000 years and collective dose thereafter
Switzerland	Doses and risks shall 'at no time' exceed specified values
UK	The official guidelines specify a risk target for the post closure period which is of undefined duration. The advisory body, NRPB, has proposed different approaches for different time periods (NRPB, 1992)
USA	40 CFR 191 (EPA, 1993) specifies dose limits for 1000 years, cumulative release limits for 10,000 years, groundwater permissible concentrations for 1000 years; 10 CFR 60 (NRC, 83a) specifies 'substantially complete containment' for 300-1000 years, water travel times of at least 1000 years; 40 CFR 197 (EPA, 1999) requires compliance demonstration for 10,000 years, presentation of results to peak dose or risk

From McCombie and Chapman (2002)

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Timescales Treatment in National Waste Disposal Regulations

- While differences exist between regulations, ~10,000 years into the future is broadly recognized as the time when something in the analysis should change
  - 10,000 year "break point" not inconsistent with Court decision
    - Other regulations reached their conclusions independently
  - Some shift away from direct dose or risk analyses
  - Most stick with dose or risk, but note that increase in uncertainties render estimates less reliable
- Example 1, NRPB (1992), UK:

  "For times greater than 100 years or so, but less than about 10,000 years into the future, the Board considers that the risk to members of the critical group should be estimated for comparison with the risk constraint. As the time period of an assessment increases, assumptions about the human environment and human behaviour will necessarily become increasingly arbitrary, and therefore should be replaced by more general ones. *Gradual changes in such assumptions may be difficult to implement in assessments, and therefore, for simplicity, the Board recommends that general assumptions should be applied after about 10,000 years.*"

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Timescales Treatment in National Waste Disposal Regulations (continued)

- Example 2, SSI (2004, Sweden) draft regulations
  - <1000 years: account for considerable detail paying attention to "...conditions and processes in the early development of the repository, which can affect its long term protective capability..."
  - 1000 to 10^6 years: analyses should "be successively regarded as an illustration of the protective capability of the repository assuming certain conditions. ... [F]or very long periods, hundreds of thousands of years, the risk analysis may be based on a stylized description of future cycles of major climatic changes, and large harmful occurrences such as earthquakes."

Dose Limits for Very Long Time Frames

- Adequate consideration of uncertainties:

  ICRP 81: "...as the time frame increases, some allowance should be made for assessed dose or risk exceeding the dose or risk constraint. *This must not be misinterpreted as a reduction in the protection of future generations and, hence, a contradiction with the principle of equity of protection, but rather as an adequate consideration of the uncertainties associated with the calculated results."* (emphasis added)
- Unclear whether this means dose constraint can be higher at longer times or acceptance criterion for a practice may change
  - Latter equivalent to relaxation of the level of conservatism
- Practically speaking there is no difference – the dose constraint need not be applied as a strict limit in the distant future

ICRP (2005) Suggested Maximum Dose Constraints

Maximum constraint (effective dose, mSv in a year)	Situation to which it applies
100	In emergency situations, for workers, other than for saving life or preventing serious injury or preventing catastrophic circumstances, and for public evacuation and relocation; and for high levels of controllable existing exposures. There is neither individual nor societal benefit from levels of individual exposure above this constraint.
20	For situations where there is direct or indirect benefit for exposed individuals, who receive information and training, and monitoring or assessment. It applies into occupational exposure, for countermeasures such as sheltering, iodine prophylaxis in accidents, and for controllable existing exposures such as radon, and for comforters and carers to patients undergoing therapy with radionuclides.
1	For situations having societal benefit, but without individual direct benefit, and there is no information, no training, and no individual assessment for the exposed individuals in normal situations.
0.01	Minimum value of any constraint

Other Dose Limit Considerations

- Intergenerational versus intragenerational equity
  - Intergenerational equity: future generations should not suffer undue burdens
  - Intragenerational equity: present generation should not suffer undue burden to mitigate negligible risks to future generations
- Example: NAPA (1997) principles:

  Trustee Principle: Every generation has obligations as trustee to protect the interests of future generations.

  Sustainability Principle: No generation should deprive future generations of the opportunity for a quality of life comparable to its own.

  Chain of Obligation Principle: Each generation's primary obligation is to provide for the needs of the living and succeeding generations. *Near-term concrete hazards have priority over long-term hypothetical hazards.* (emphasis added)

  Precautionary Principle: Actions that pose a realistic threat of irreversible harm or catastrophic consequences should not be pursued unless there is some compelling countervailing need to benefit either current or future generations.
- Dose apportionment
- Controversy about health risks at low doses

Features, Events, and Processes (FEPs) Screening for Very Long Time Frames

- TYMS recommended the concept of "Negligible Incremental Risk (NIR)
- Adapted from Negligible Incremental Dose (NID) concept
  - Scenarios with a sufficiently low combination of probability and dose consequence need not be considered in compliance analysis
- TYMS recommended a NIR equivalent to a NID of 1 mrem/yr as a starting point for EPA consideration

Current FEPs Screening Probability Cutoff is VERY Conservative Compared to NID

- Instead, EPA adopted a probability cutoff: $<10^{-4}$ in 10^{4} years
  - $<\sim 10^{-8}$ per year
  - Very low screening level compared to NID level suggested by TYMS
    - Example: If FEP has P=10%, would be screened in only if the dose consequence was >10 mrem/yr (for a NID risk of 1 mrem/yr)
- Therefore, DOE is presently conservative by addressing many more FEPs than would be the case if the TYMS-recommended NID standard were use
- Probably no additional FEPs would meet a 1 mrem/yr NID risk criterion

EPRI Recommendations

- Because the court rejected all challenges to the existing regulations governing the first 10,000 years, EPA should take a surgical approach to revising its standard: specifying beyond 10,000 year requirements as separate, stand-alone, provisions that do not alter what is required regarding the first 10,000 years;
- A change of approach to the regulation and its implementation should be adopted for those provisions of the regulation that will address time frames beyond 10,000 years if the regulation, as a whole, is to remain implementable;
- The use of a "stylized" approach for scenario identification and level of rigor in the models should be established by the NRC for time periods beyond 10,000 years;

EPRI Recommendations (continued)

- Future climate states should be fixed by rulemaking to one or, at most, two: present-day "interglacial" and "glacial;" if a "glacial" climate state is specified, the regulation should also specify a set of assumptions to govern human behavior that is consistent with the way humans would be expected to live in such a climate. *However, it is preferable to simply assume the present-day interglacial climate state continues for the entire compliance period since it is likely to be reasonably bounding and the most implementable*;

EPRI Recommendations (continued)

- No additional FEPs screening is required for the time period beyond 10,000 years. This is because the current FEPs screening criterion (FEPs with a probability lower than approximately 10^{-8} per year can be screened out) is already overly inclusive compared to the approach recommended by the TYMS panel. If additional FEPs screening beyond 10,000 years is required by EPA, the concept of negligible incremental dose should be used as a screening tool; and
- A two-tiered dose limit should be specified: one level for the first 10,000 years; and a second, higher level consistent with the increased uncertainty should be used for the period beyond 10,000 years.
  - Exact numerical limits are a policy choice for EPA to make

EPRI Next Steps on This Issue

- EPRI seeks feedback from all interested parties on the content and recommendations made in this interim report.
- EPRI considering holding a workshop on this issue in the next few months
- Plan is to issue the "final" report taking into consideration
  - Input received on this report
  - Workshop discussion (if held)
  - Other related documents
  - EPA draft rule (assuming no Congressional action that may affect its promulgation)

BY E. von TIESENHAUSEN, ~~158th~~ 159th ACNW MEETING, APRIL 19, 2005

Transportation Issues for the ACNW

- Cask certification, what are the required tests and how is it done.
- Current status of the PPS and what will be done
- Price Anderson and liability issues. What is covered and what is not?
- Review of accidents: tank cars vs spent fuel casks
- Spent fuel characteristics vs fresh fuel EASTON, FALL.
- Routing issues, what is the NRC's role
- Who will run the railroad and what are the ramifications RAILROAD.
- Notification requirements and how will the public be advised?
- Safety vs. security. What are the differences.

U.S. Department of Energy
Office of Civilian Radioactive Waste Management

www.ocrwm.doe.gov

Preclosure and Repository Design Update

Presented to:
Advisory Committee on Nuclear Waste

Presented by:
Bruce Hinkley
Shaw/Stone & Webster
Office of Repository Development
U.S. Department of Energy

April 19, 2005
Rockville, MD

Design Update

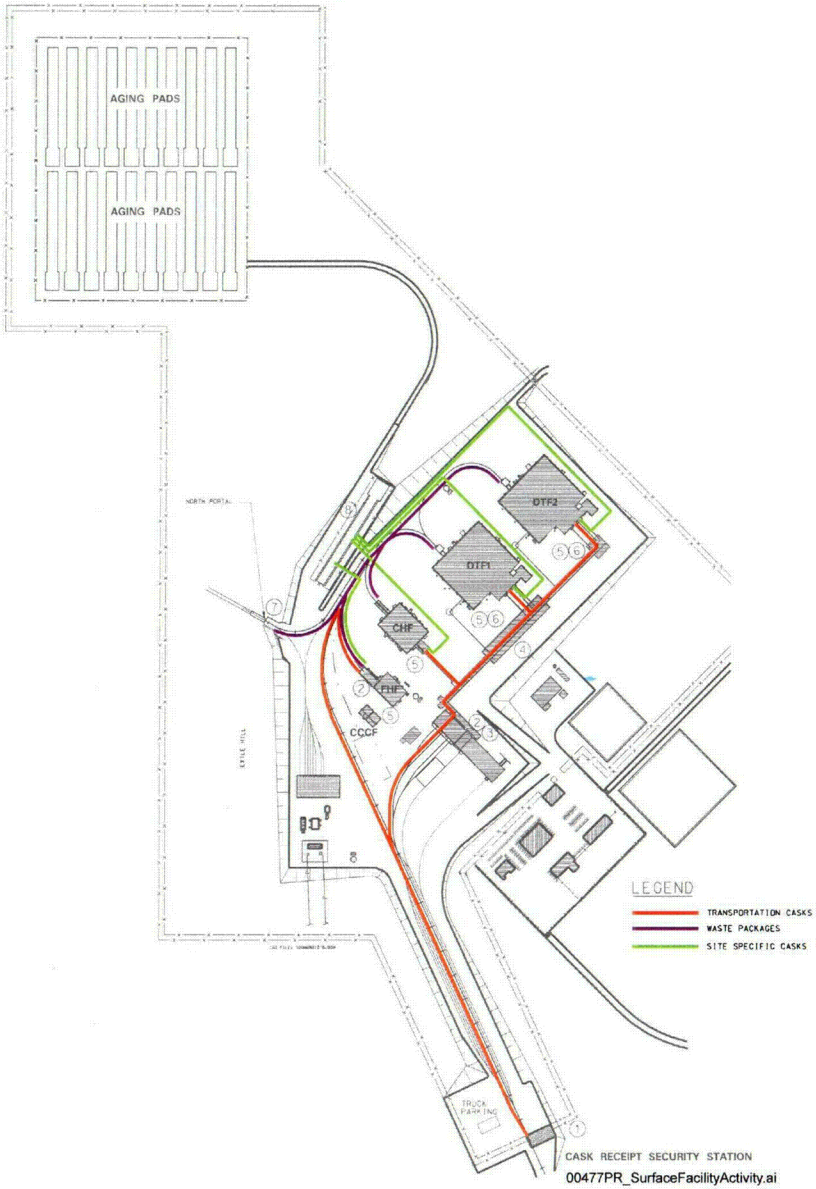
- Overall Design Status Update
  - Surface facility modifications/additions and phased construction changes
  - Subsurface facility layout and ground support changes
- Recent Specific Areas of Focus to Support License application
  - NRC request for additional design information
  - Aging System
  - Electrical Distribution
  - Equipment Design Development
- Integrated Waste Stream Management
- Thermal Design Requirements and Criteria
- Emplacement Drift Ground Support
- Path Forward

Surface Facilities

Surface Facilities

- Recent design changes
  - Emplacement Portal (North Portal) layout changes
  - Integration of the Transportation Cask Receipt Facility with the Warehouse Non-Nuclear Receipt Facility
  - Addition of a Fuel Handling Facility (FHF)
  - Addition of Central Control Center Facility (CCCF)
  - Addition of a second closure cell to the Canister Handling Facility (CHF)
  - Reduction in Aging System capacity from 40,000 MTHM to 21,000 MTHM

Emplacement Portal Plan



00477PR_SurfaceFacilityActivity.ai

SUMMARY OF ACTIVITIES

1. INITIAL RECEIPT WASTE ACCEPTANCE CRITERIA CONFIRMATION AND SECURITY SCREENING
2. RADIOLOGICAL SURVEY
3. TRANSFER OF TRANSPORTATION CASK TO SITE RAIL TRANSFER CASK
4. SHORT-TERM STAGING OF TRANSPORTATION CASKS IN BUFFER AREA
5. TRANSFER OF WASTE TO WASTE PACKAGE OR SITE SPECIFIC CASK: CLOSURE OF WASTE PACKAGE OR SITE SPECIFIC CASK: WASTE PACKAGE SURFACE INSPECTION: RADIOLOGICAL SURVEY: AND PLACEMENT OF WASTE PACKAGE INTO SHIELDED WASTE PACKAGE TRANSPORTER
6. WET OR DRY REMEDIATION OF DAMAGED FUEL OR NON-STANDARD ITEMS
7. TRANSPORT OF WASTE PACKAGE TO ASSIGNED EMPLACEMENT DRIFT
8. AGING OF WASTE

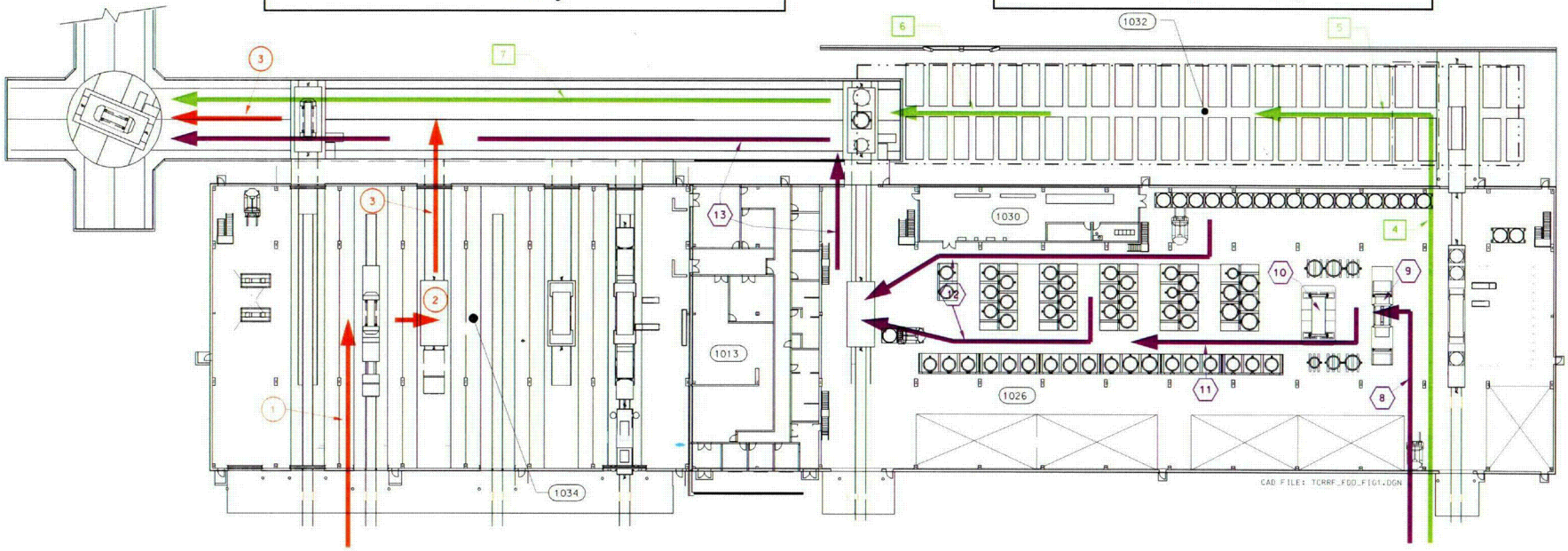
This drawing is preliminary and not intended for construction, procurement, or fabrication.

C01

Transportation Cask Receipt Facility

Transportation Cask Receipt & Return Facility

Warehouse Non-Nuclear Receipt Facility



TRANSPORTATION CASK OPERATIONS

1. PERFORM TRANSPORTATION CASK RECEIPT INSPECTION AND SURVEY
2. CASK/SKID TRANSFER TO SITE RAIL TRANSFER CAST (SRTC)
3. TRANSFER OF SRTC FROM RECEIPT BLDG. TO PROCESSING VIA BUFFER

SITE SPECIFIC CASK OPERATIONS

4. NEW MSC RECEIPT AND INSPECTION
5. TRANSFER MSC/SKID TO STAGEING PAD
6. TRANSFER TO MSC/SKID TO SRTC
6. TRANSFER OF MSC TO PROCESS BLDG. VIA BUFFER

WASTE PACKAGE OPERATIONS

8. WASTE PACKAGE LID RECEIPT
9. WASTE PACKAGE AND LID TRANSFER TO STAND FOR INSPECTION
10. TRUNNION COLLAR INSTALLATION
11. VERTICALIZE AND STAGE WASTE PACKAGE AND LID
12. WASTE PACKAGE AND LID TRANSFER FROM INVENTORY TO SRTC
13. TRANSFER WASTE PACKAGE AND LID FROM RECEIPT BLDG. TO PROCESS BLDG. VIA BUFFER

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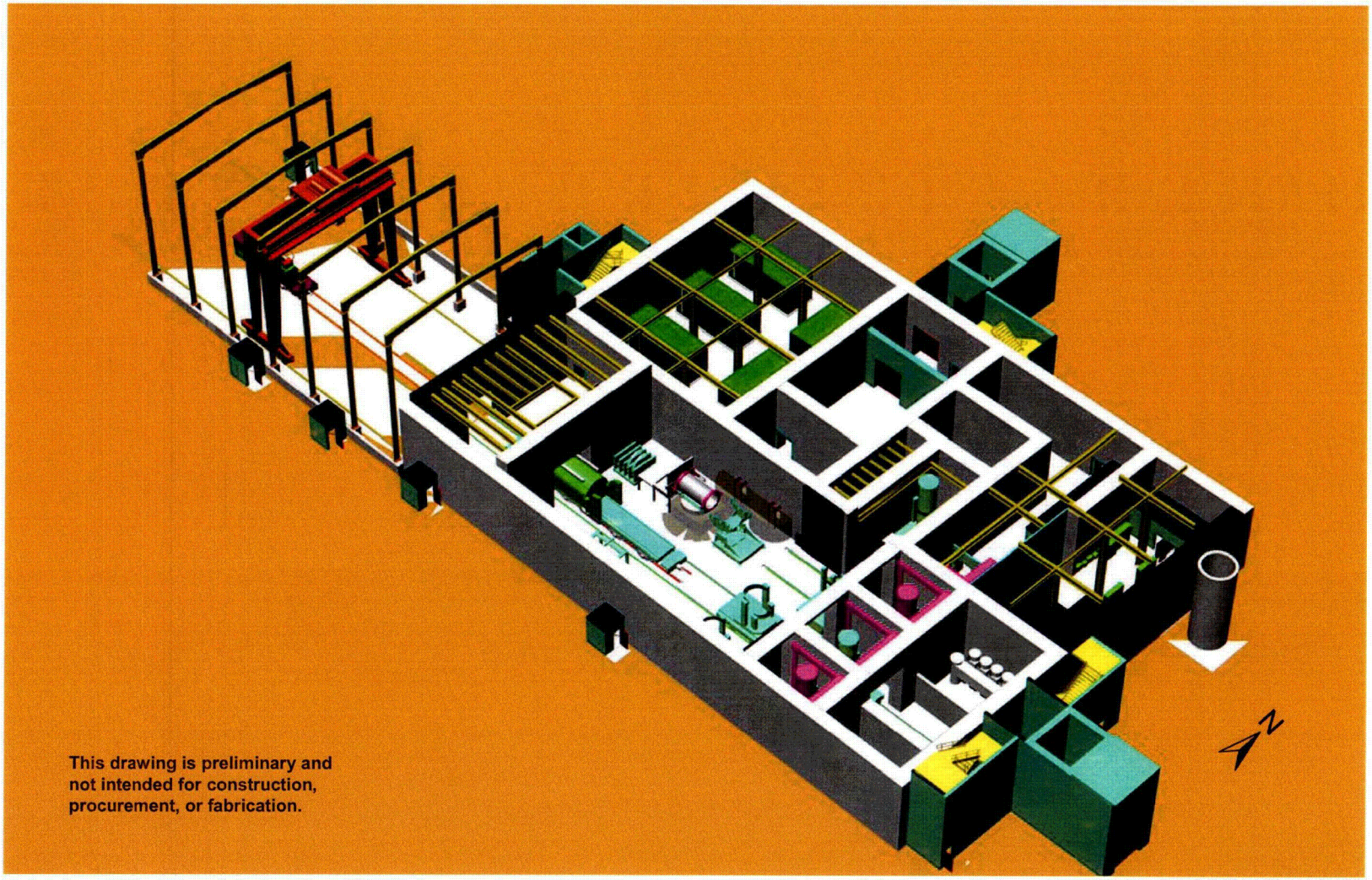
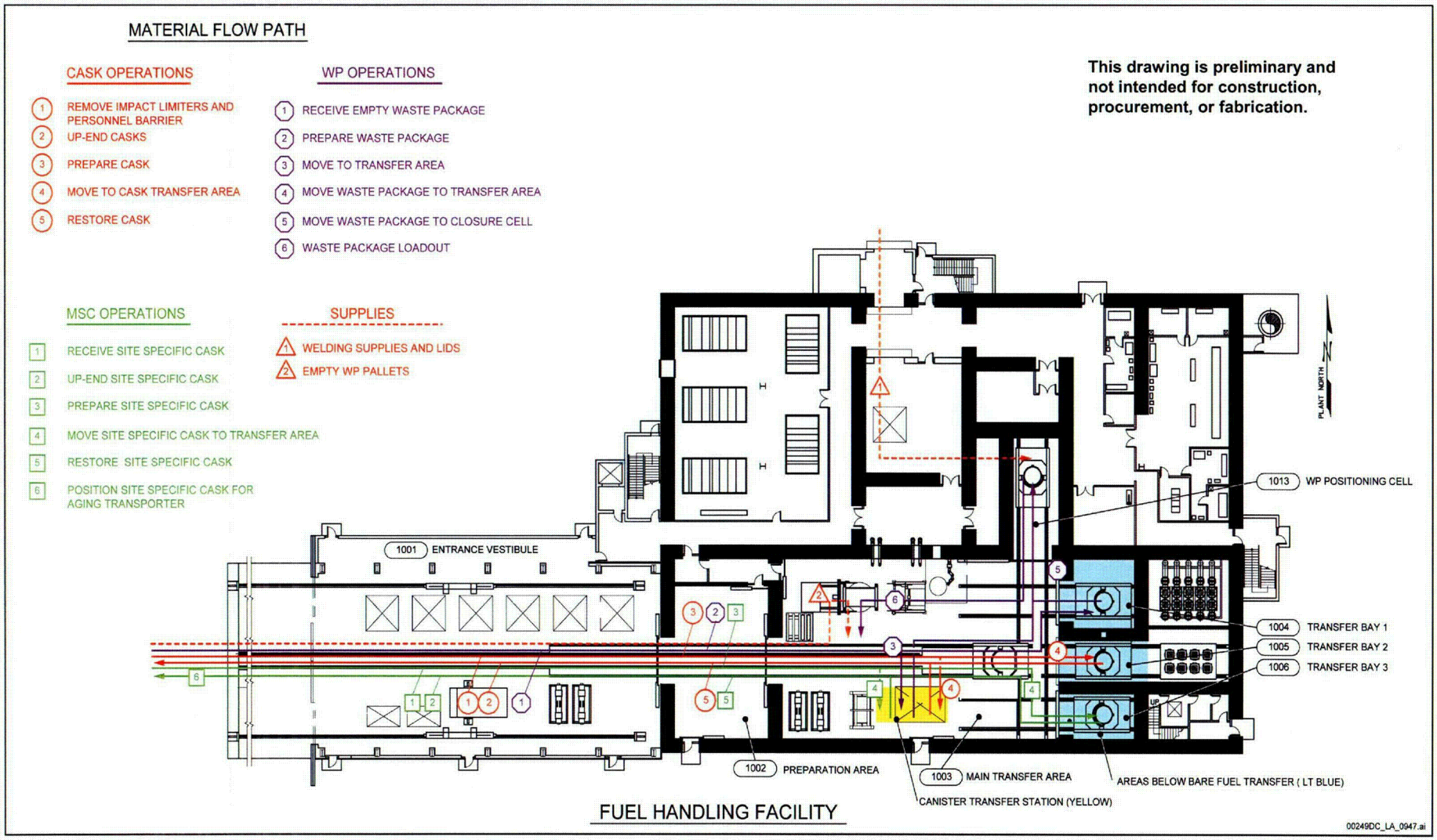
C02

Fuel Handling Facility



C03

Fuel Handling Facility – Sketch

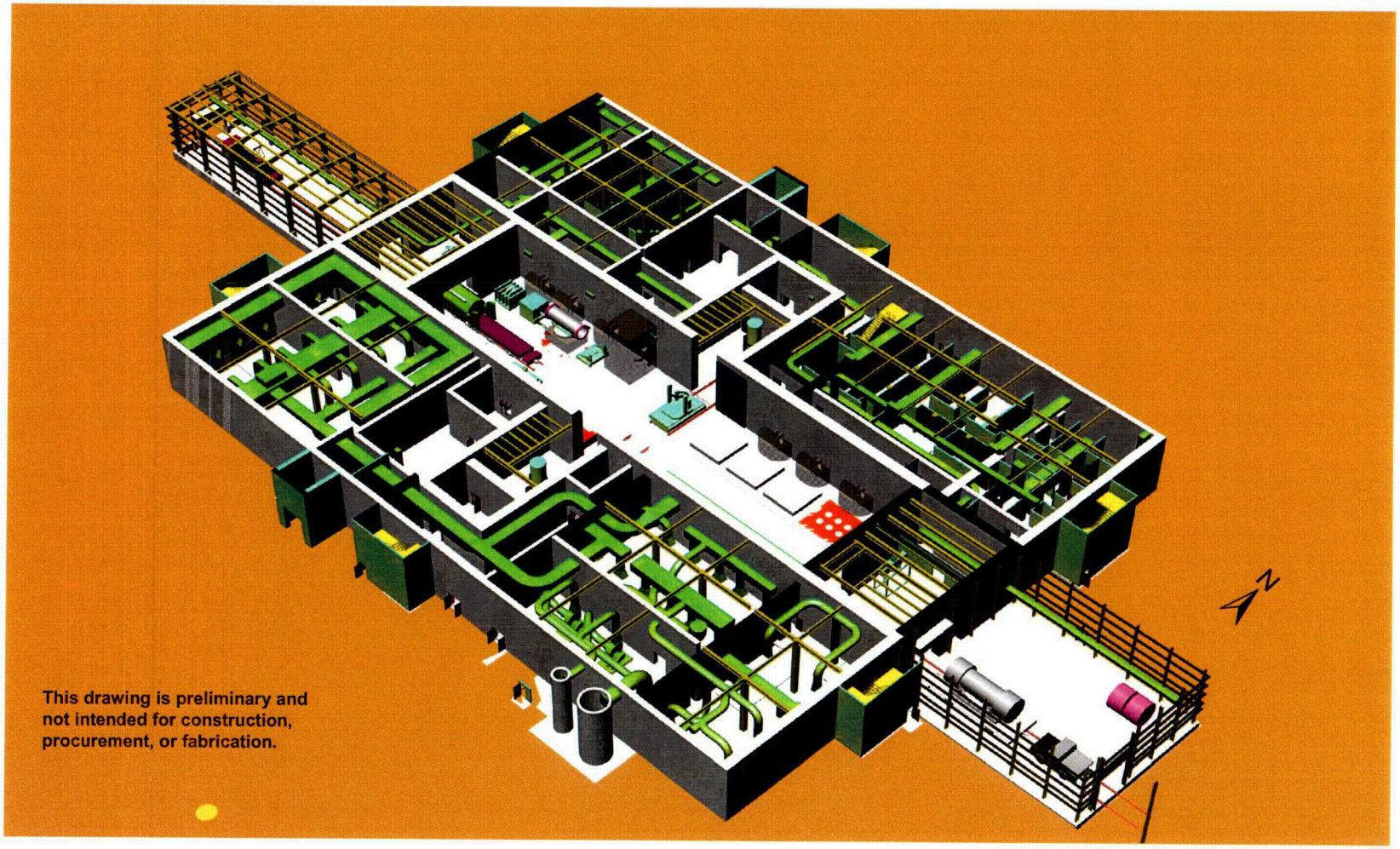


C04

Fuel Handling Facility Description

- Fuel Handling Facility Features
  - Modeled after the TAN (Test Area North) facility at Idaho National Lab
  - Designed to handle uncanistered Spent Nuclear Fuel (SNF) in small fuel transfer cell
  - Capable of handling canistered waste forms in large main transfer bay
  - Contains one closure cell for waste package welding

Canister Handling Facility



Canister Handling Facility – Sketch

TRANSPORTATION CASK OPERATIONS

1. Remove Impact Limiters and Personnel Barrier
2. Upend Cask
3. Transfer Cask to Pit
4. Return Cask

WASTE PACKAGE OPERATIONS

5. Receive Empty WP
6. Transfer WP to Pit
7. Transfer WP to WP Trolley
8. Transfer WP to WP Positioning Cell
9. Transfer Welded WP to Survey Station
10. Transfer to Tilt Station and Down End WP on to WP Pallet
11. Remove WP Trunnions (Both Ends)
12. Transfer Wp to WP Transporter
13. Transfer WP To Emplacement

SITE SPECIFIC CASK OPERATIONS

14. Receive Site Specific Casks
15. Transfer Site Specific Cask to Pit
16. Transfer Loaded Site Specific Casks

CANISTER HANDLING FACILITY
MATERIAL FLOW PATH

THROUGHPUT

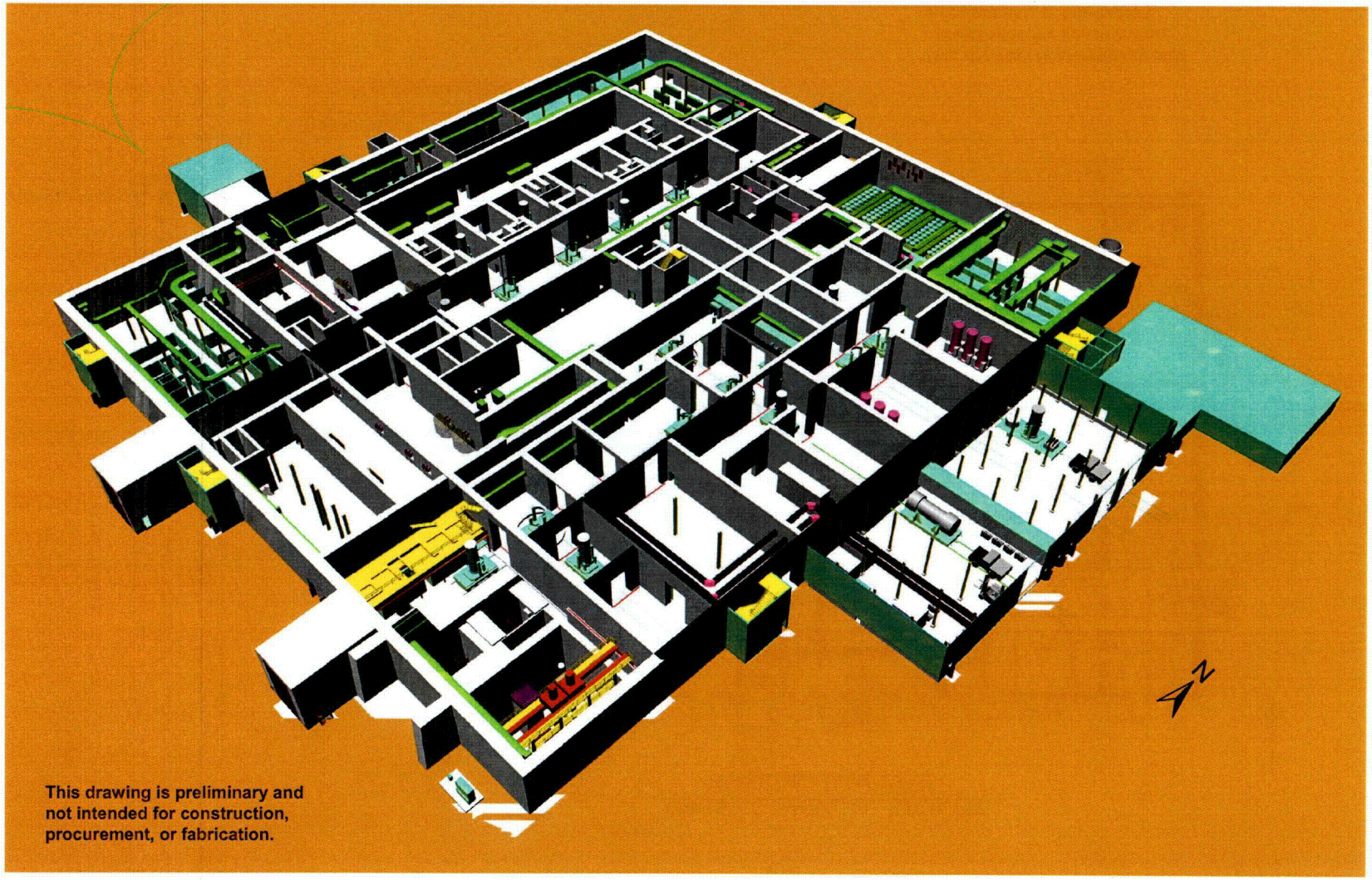
Up to 180 waste packages/year

WASTE FORMS

DOE HLW
DOE SNF

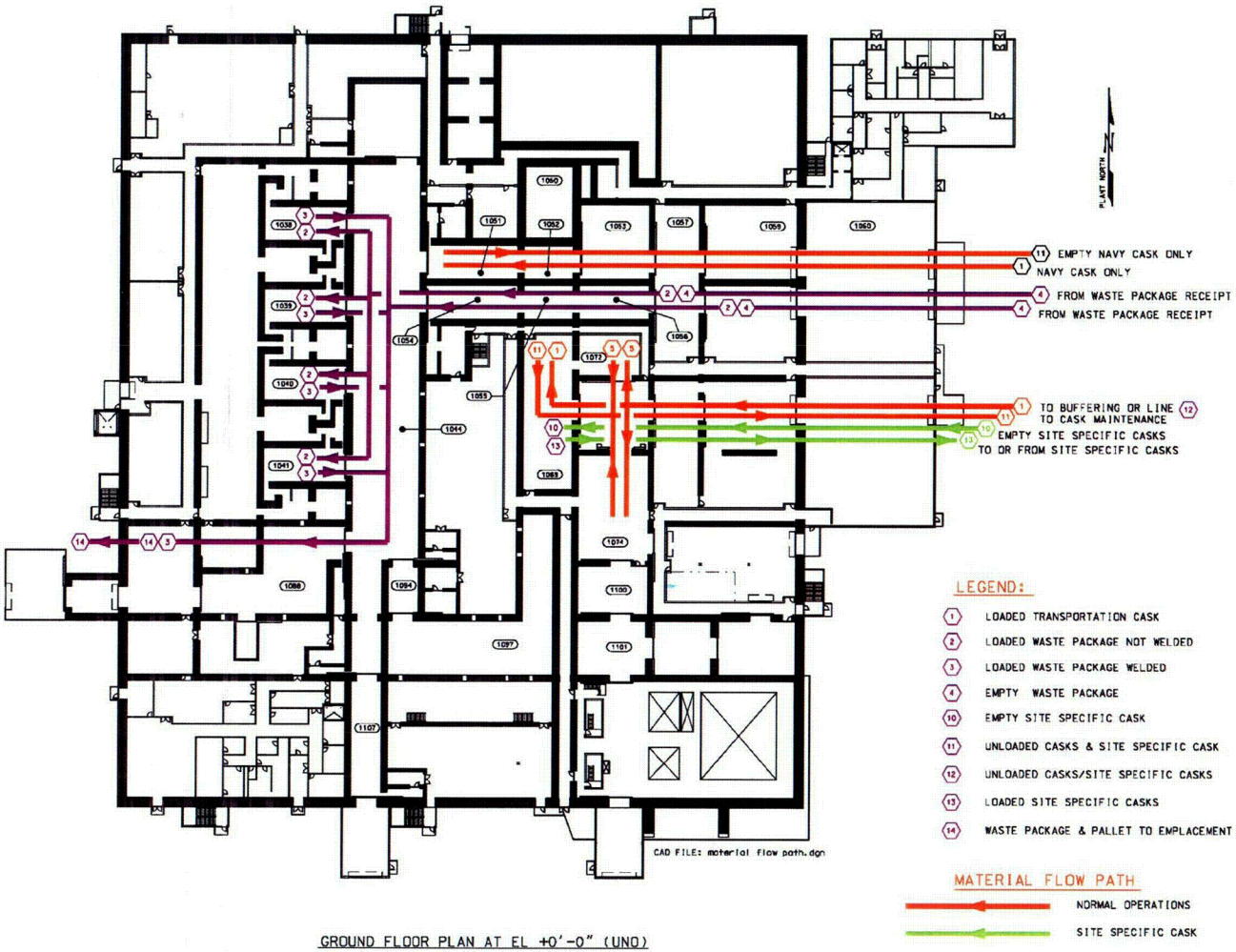
This drawing is preliminary and not intended for construction, procurement, or fabrication.

Dry Transfer Facility (DTF)



C07

Dry Transfer Facility – Sketch



THROUGHPUT

Up to 180 waste packages/year

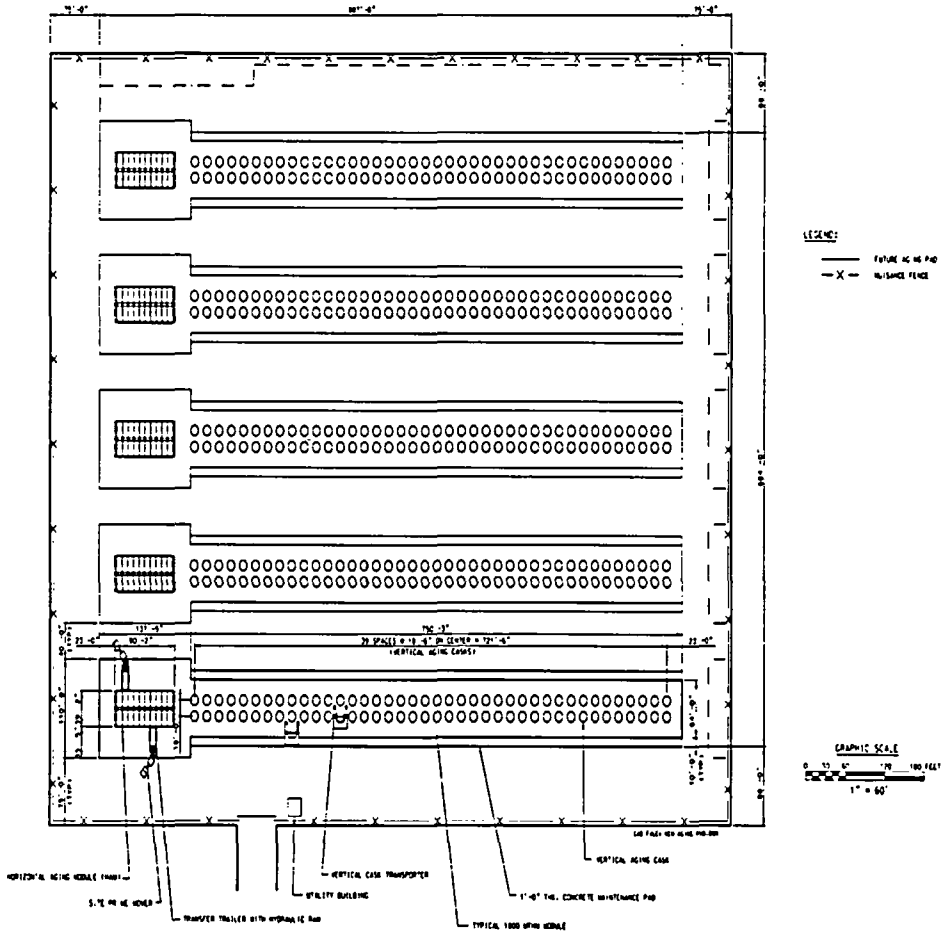
WASTE FORMS

Bare CSNF
Canistered CSNF (OPC)
DOE SNF
DOE HLW
Remediation

This drawing is preliminary and not intended for construction, procurement, or fabrication.

Aging Pad

- Reduced to 21,000 metric tons of heavy metal capacity, built as needed



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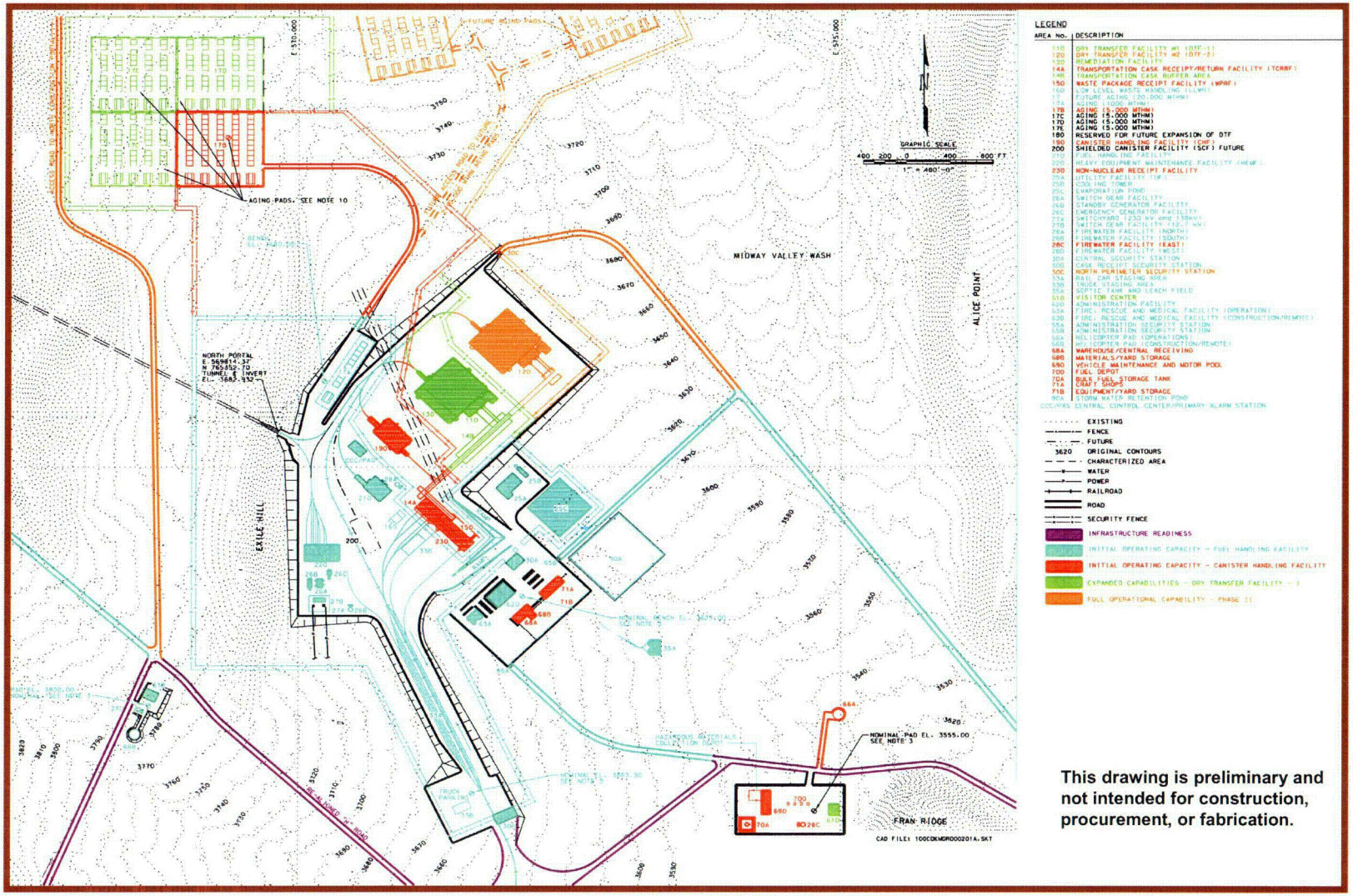
Surface Facilities Construction Sequence



This drawing is preliminary and not intended for construction, procurement, or fabrication.

C09

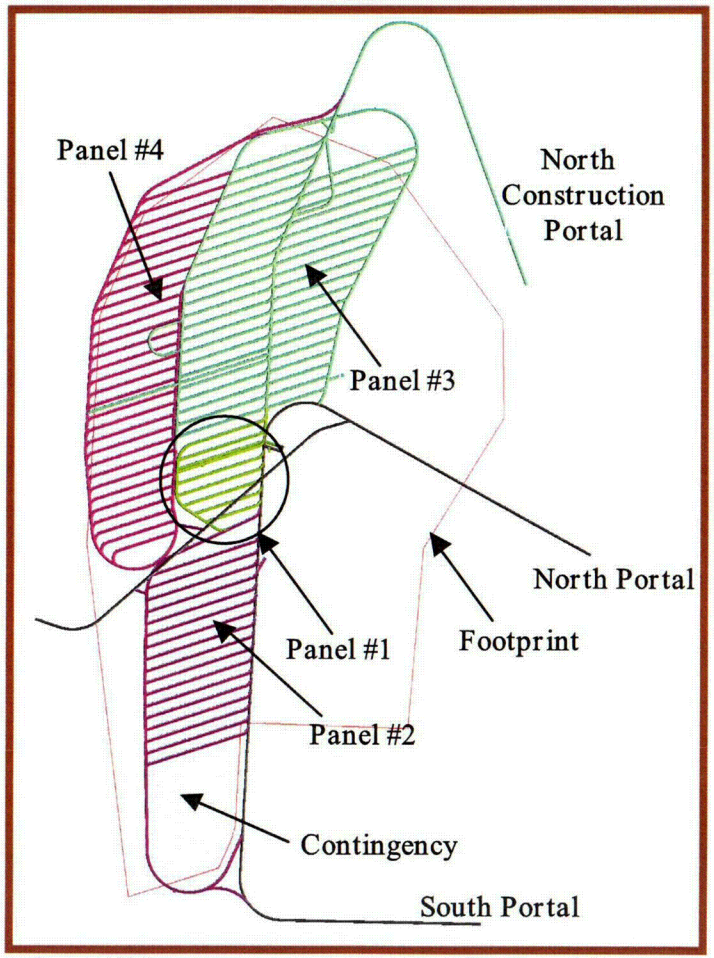
Subsurface Facilities

Subsurface Design Changes

- Recent design changes
  - Revised panel layouts and ventilation system
  - Revised ground support
  - Returned to rail system for waste package transporter
  - Increased radius of emplacement drift turnouts
  - Moved ventilation control doors to outer end of turnouts

Subsurface Configuration

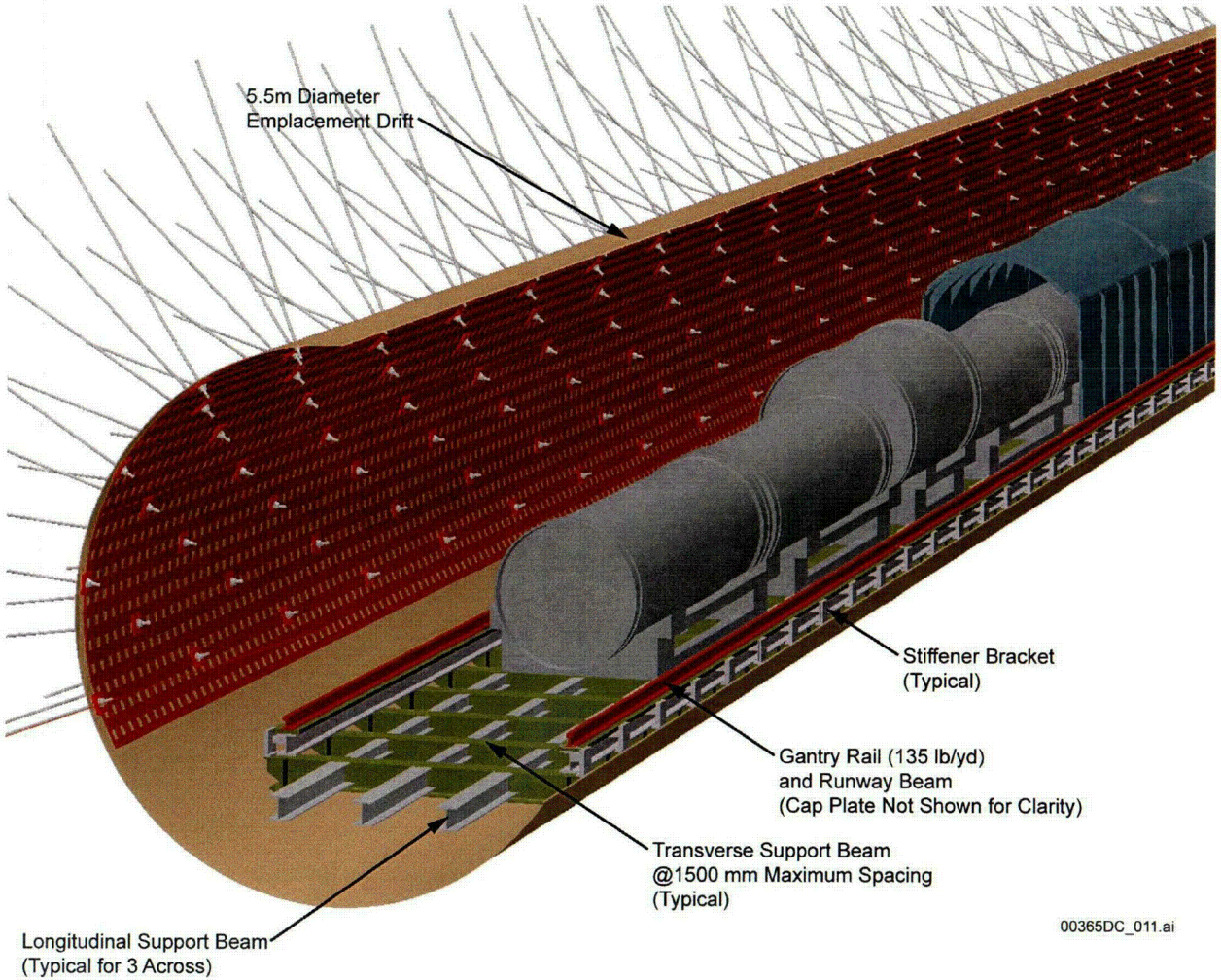
- Panel numbers represent the proposed emplacement sequence
- Sequence:
  - Panel 1, Initial development
    - Develop 3 emplacement drifts (one used for performance confirmation)
    - Develop 1 monitoring drift – not intended for emplacement
  - Complete remaining drifts
    - Panel 1 - 8 total (5 remaining drifts)
    - Panel 2 - 17 total (excludes contingency)
    - Panel 3 - 41 total (19 East & 22 West)
    - Panel 4 - 30 total
- Total emplacement length available is approximately 40 miles (64 km)
- Available contingency of 11.4% for the 70,000 metric tons of heavy metal



This drawing is preliminary and not intended for construction, procurement, or fabrication.

C10

Emplacement Drift Isometric



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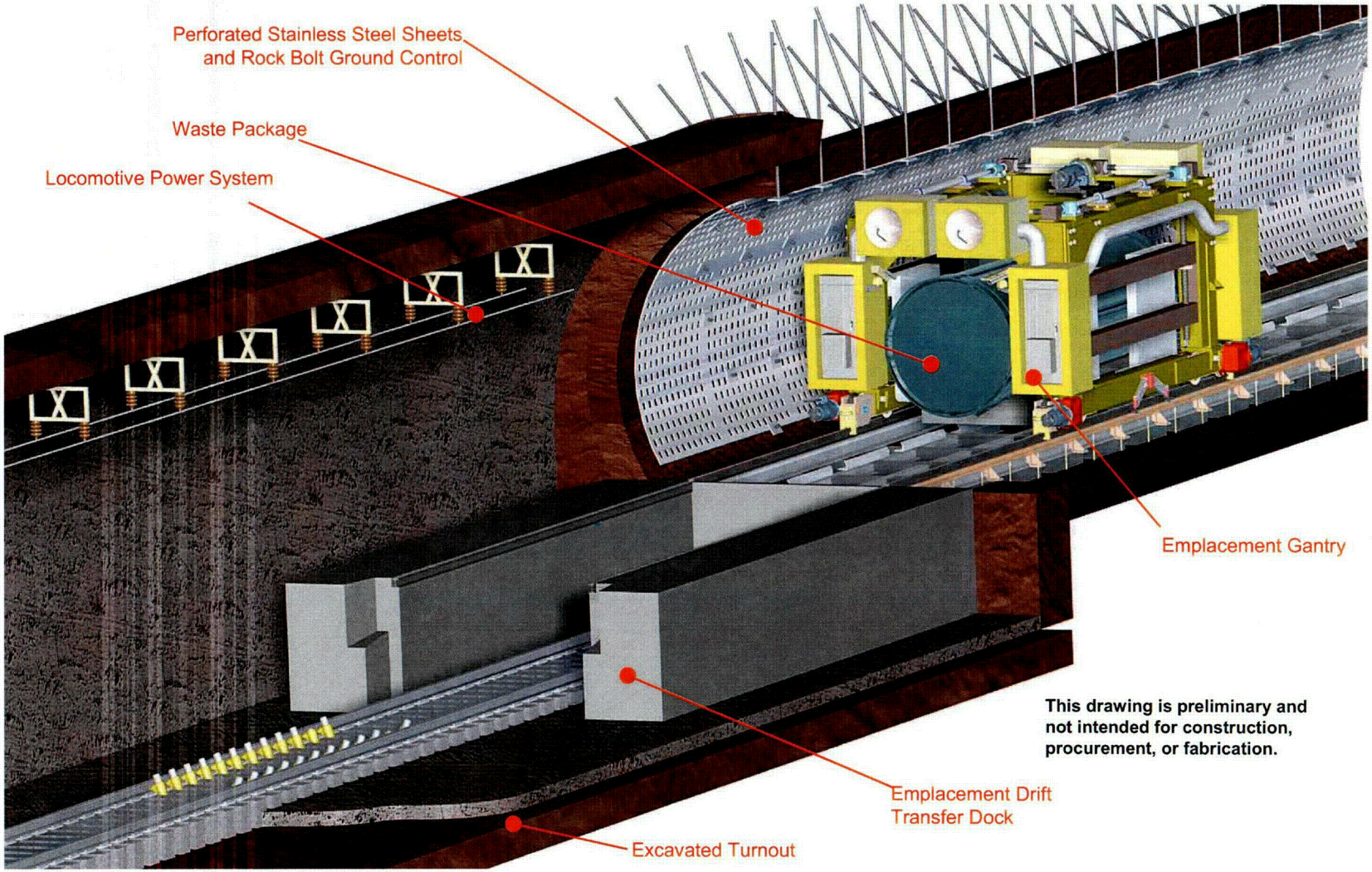
Emplacement Drift Entrance

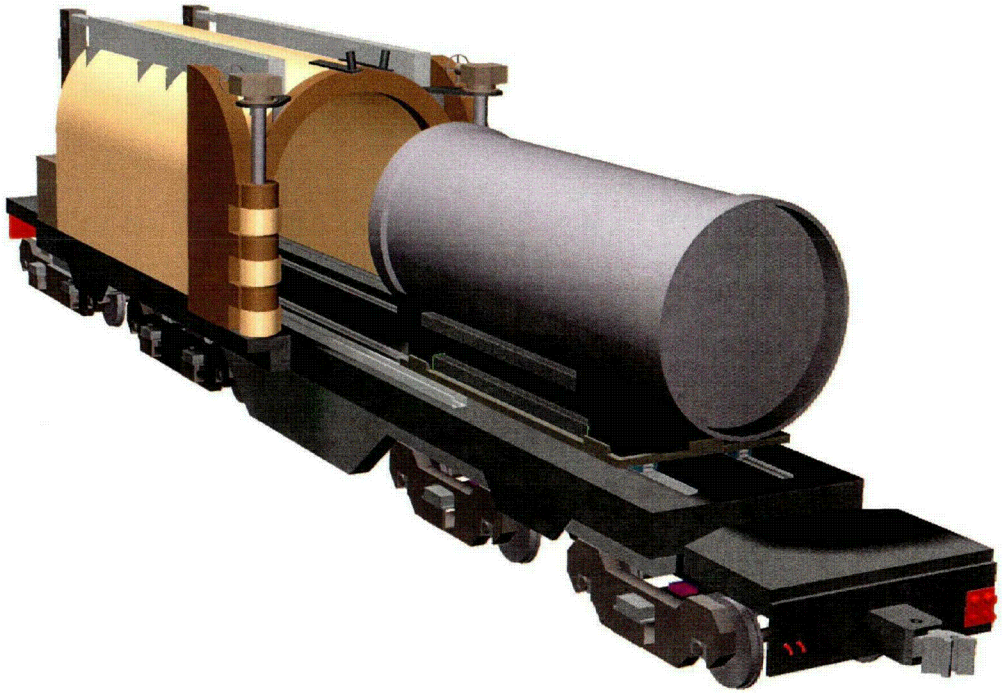


This drawing is preliminary and not intended for construction, procurement, or fabrication.

C12

Waste Package Transporter

- Transports individual waste package on pallets from the surface facilities to the emplacement drifts
- Weight:
  - 350 tons loaded
  - 265 tons unloaded
- 5.0 mph maximum operating speed
- One locomotive moves transporter underground, and backs transporter into drift
- All manual and remote control operations are through the transport locomotive

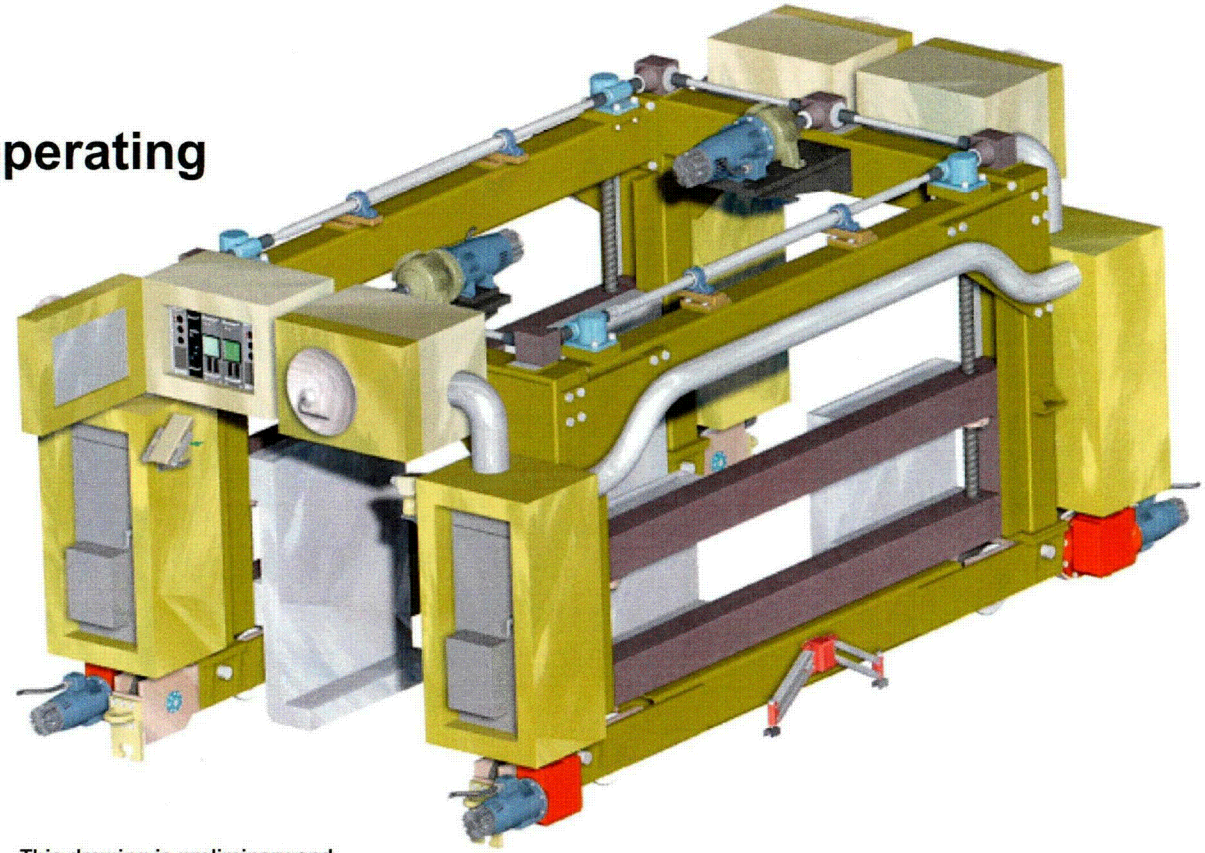


This drawing is preliminary and not intended for construction, procurement, or fabrication.

C13

Emplacement Gantry

- Moves and emplaces waste packages on pallets within emplacement drift
- 40-60 tons weight
- 1.7 mph maximum operating speed
- Remote controlled



This drawing is preliminary and not intended for construction, procurement, or fabrication.

C14

Design Status

- NRC's October 8, 2004, letter identified design information needs, which we are addressing. Examples are:
  - Aging Cask design/analysis
  - Electrical Distribution System
  - Target Reliability Data Issues
- DOE/BSC reviews during the summer and fall of 2004 identified potential surface facility enhancements, based upon the design at that time
- DOE has defined the work scope for design enhancements and schedules have been developed for those enhancements

Bases and Objectives for Enhancements

- Continue development of the design for the operations approach
- Increase conservatism in Preclosure Safety Analysis (PCSA) (e.g., use of bounding versus mean values in Category 1 event sequence analyses)
- Enhance the design solution (e.g., addition of fire suppression system)
- Improve the documentation of how the design satisfies the design bases (e.g., reliability values)

Examples of Enhancement and Design Development Areas

- Expand the design details for the aging system
- Define system boundaries for the important to safety (ITS) electrical system design
- Advance the design of non-standard equipment to confirm Preclosure Safety Analysis reliability

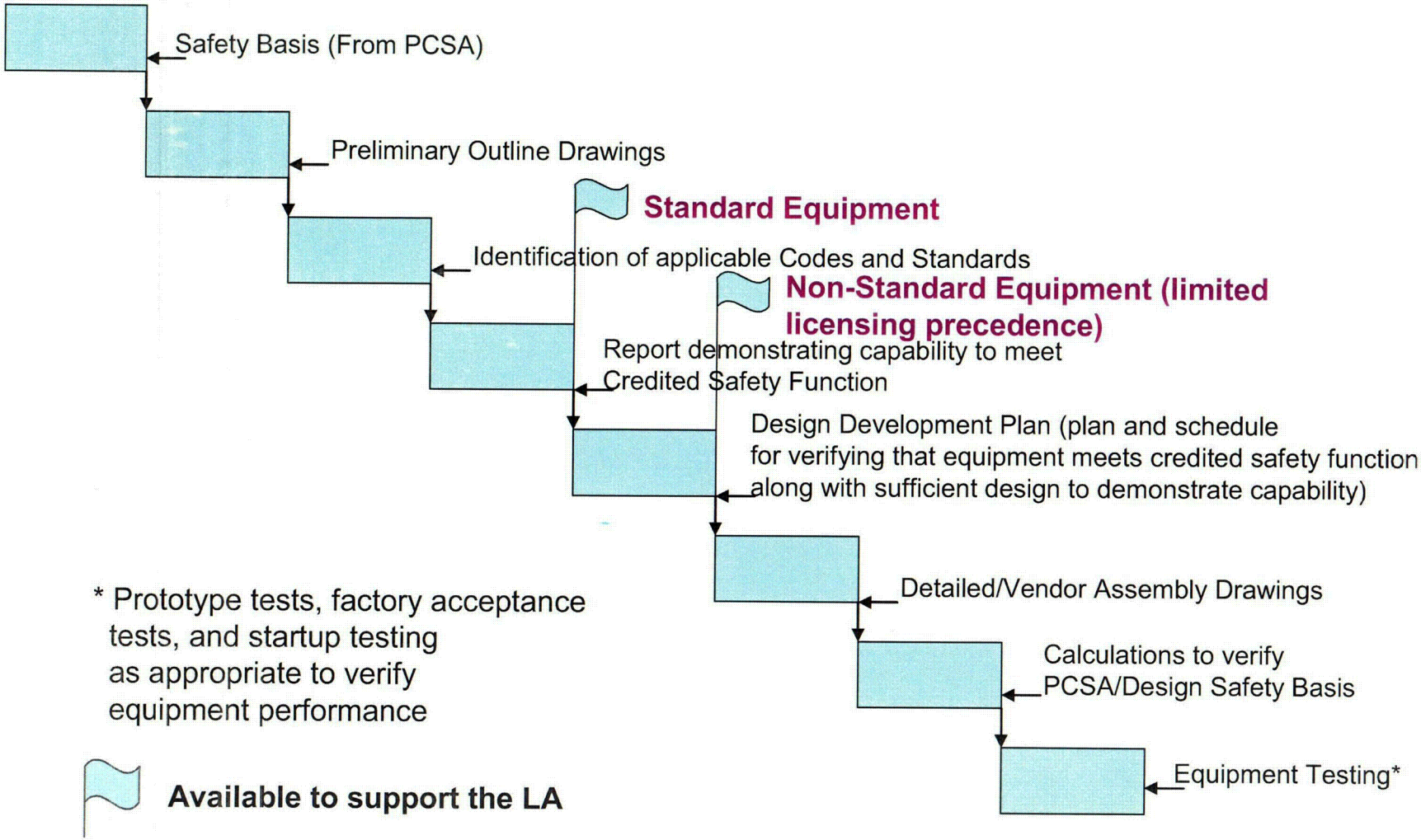
Aging System

- Evaluate dry storage system design(s) already certified under 10 CFR 72 for compliance with 10CFR63
  - Evaluate existing storage system designs against YMP site specific criteria (with vendor support)
  - Determine extent of existing vendor Safety Analysis Report (SAR) analyses that are "bounding" for Geologic Repository Operations Area (GROA) conditions
  - Perform YMP-specific analyses where warranted (e.g., seismic)
- Design supported by the suite of calculations and analyses described in NUREG-1567 and NUREG-1536

Electrical System

- Portions of the electrical system will be ITS
- The grid reliability is modeled as part of the electrical system fault tree
- Loss of grid power concurrent with a Category 1 event sequence is classified as a Category 2 event sequence
- Diesel generators provide defense-in-depth, but do not provide an ITS function
- Grid, on site distribution, and component reliability will be monitored

Equipment Design Development



C15

Integrated Waste Stream Management

- Waste stream management
  - Starts at utility and DOE sites
    - Use waste generator records to derive thermal output
  - Continues throughout repository preclosure period
  - Waste form thermal output
    - Commercial spent nuclear fuel (CSNF) heat load is key variable
    - Age young CSNF to meet thermal criteria
    - Blend CSNF to meet thermal criteria

Integrated Waste Stream Management

- Waste stream management
  - DOE Design Basis Waste Stream report used for planning
    - YFF5 or YFF10: Youngest Fuel First, minimum age out of reactor (5 or 10 years)
  - Average waste stream (YFF10)
    - CSNF - 17 yrs out of reactor, 4 percent enrichment,

      44 GWd/MTHM burnup
  - WP (waste package) emplacement follows nominal pattern, interspersing CSNF (commercial spent nuclear fuel) WPs with cooler DOE SNF (spent nuclear fuel) and HLW (high level waste) WPs
  - Actual emplacement pattern may vary, but thermal criteria must be met
  - Will require alternating emplacement of hotter and cooler WPs

Integrated Waste Stream Management

- Waste stream management tools
  - Total System Model evaluates entire Office of Civilian Radioactive Waste Management (OCRWM) system, including throughput
  - Throughput modeling evaluates facilities and emplacement operations
    - Includes waste receipt, SNF assembly management, aging needs, WP loading and emplacement

Thermal Design Requirements and Criteria

- Waste forms
  - CSNF – maintain cladding below allowable temperature limits
    - Surface operations 400°C normal
    - Surface operations off-normal limits under development
    - Subsurface operations and postclosure 350°C
  - DOE SNF and HLW – maintain canisters below allowable temperature limits
    - Surface and subsurface operations – various SNF and canister temperatures

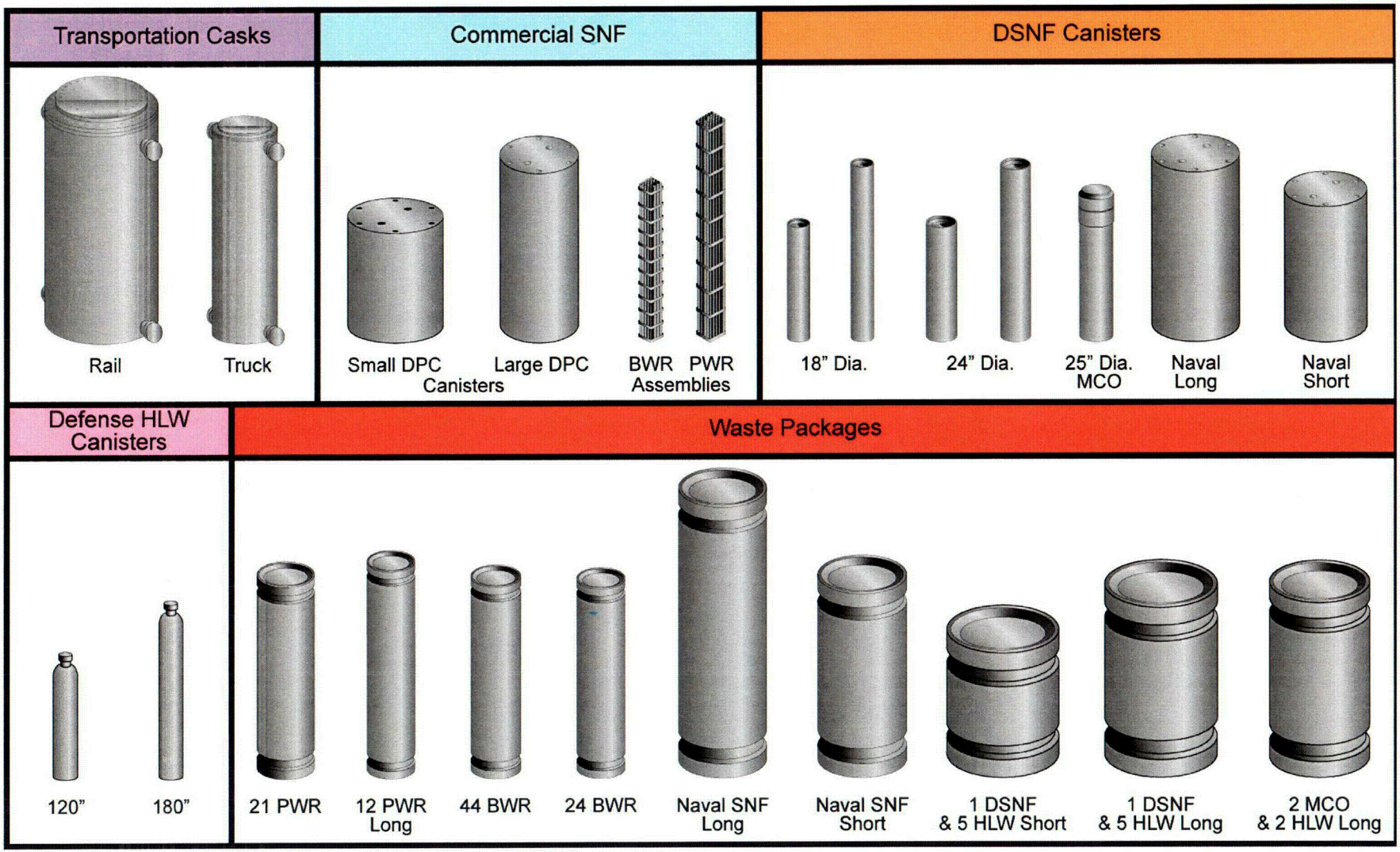
Thermal Design Requirements and Criteria

- Natural and engineered barriers
  - Emplacement drift wall post closure temperature 200°C max; preclosure 96°C
  - Emplacement drift rock pillar – center portion below 96°C
  - Waste package surface temperature 300°C max
  - Waste package thermal power 11.8 kW max at emplacement
  - Initial maximum average thermal line load 1.45 kW/m

Thermal Design Requirements and Criteria

- Repository closure
  - Thermal pulse after closure does not exceed
    - Emplacement drift wall 200°C
    - Waste package surface 300°C
    - CSNF cladding 350°C
    - HLW 400°C
  - Thermal conditions important for closure
    - Repository temperature at closure
    - Repository thermal power at closure
    - Repository thermal power rate of change
  - Performance Confirmation to confirm thermal calculations

Waste Forms and Waste Packages



Drawing Not To Scale
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C16

Thermal Management Design Features

- Repository systems, structures and components performing thermal management functions
  - Transportation casks
  - Waste package
  - Aging system
  - Surface waste processing facilities
  - Surface Heating, Ventilation & Air Conditioning (HVAC) systems
  - Subsurface facility
  - Subsurface ventilation system

Thermal Management Concept of Operations

- Surface facilities
  - Generator records evaluated prior to waste shipment to determine waste disposition upon arrival at repository
    - Into WPs for emplacement or into aging casks to aging pad
    - Will have wide range of waste characteristics, depending upon inventory of waste shipper
  - Waste processed through waste transfer facilities
  - CSNF exceeding emplacement thermal criteria sent to aging
  - Buffer areas and aging pads support limited segregation of waste forms
    - Interspersed emplacement of WPs affects extent of segregation

Thermal Management Concept of Operations

- **Surface facilities** (continued)
  - Facilities and systems designed to maintain thermal limits
    - DTF includes staging for 48 PWR and 72 BWR SNF assemblies and 10 DOE SNF or HLW canisters
    - CHF includes staging for 10 DOE SNF or HLW canisters
    - FHF includes cell for aging cask in lieu of staging area
  - Thermal analyses for bounding waste form heat loads
  - Thermal analyses for off normal conditions (e.g., loss of HVAC)

Thermal Management Concept of Operations

- Aging pads
  - Aging casks allow assemblies to cool until CSNF meets thermal emplacement criteria
  - Up to 21,000 MTHM capacity
  - Potentially utilizes various types of casks to accommodate various types of CSNF
  - Potentially includes capability for aging existing Dual Purpose Canisters

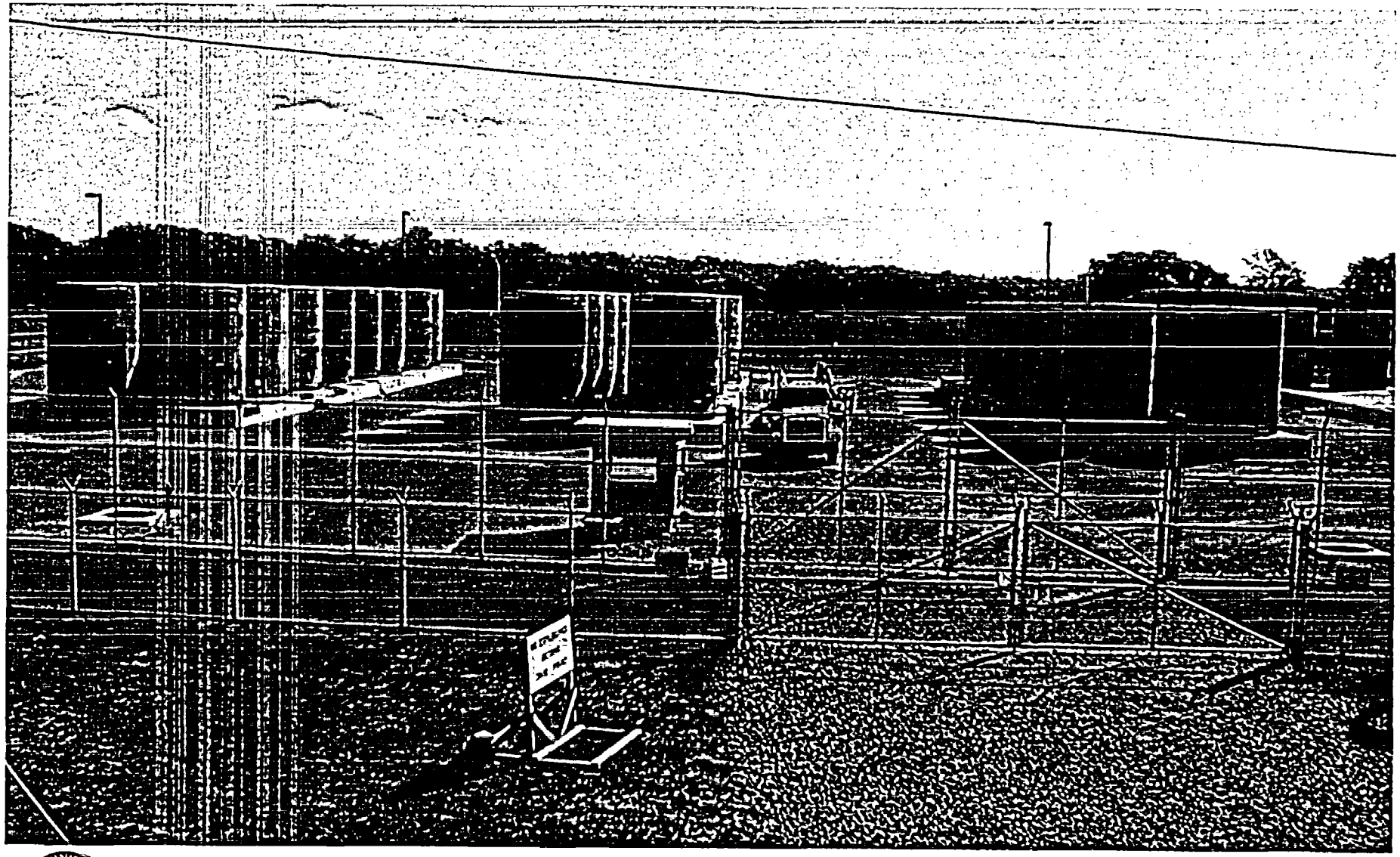
Thermal Management Concept of Operations

- Waste packages
  - WP loading controls to be developed
    - Address thermal, criticality, shielding criteria
    - May be similar to controls on loading existing dry casks
  - Primary CSNF WPs have capacity of 21 PWR or 44 BWR assemblies
  - A 12 PWR WP is available for longer SNF, but can also be used for particularly hot SNF assemblies to maintain overall WP thermal output limit, but would result in a larger WP inventory and inefficient use of the drift length
  - 21 PWR and 44 BWR WPs could be short loaded to meet thermal limits, but would result in inefficient use of WPs and drifts

Thermal Management Concept of Operations

- Subsurface facilities
  - Facilities and systems designed to maintain thermal limits
    - Duration and flow rates for preclosure ventilation are established to meet thermal design limits
    - Approximately 50 years preclosure ventilation planned from final emplacement
    - Waste packages and cladding can withstand extended interruptions in ventilation
    - Initial postclosure conditions must be met prior to closure

Typical Aging Facility



Thermal Management Ongoing Evaluations

- Throughput modeling
  - Throughput capability of waste handling facilities
  - System operations optimization
  - Safety and operational evaluations (operator dose, minimize waste form handling operations, safety analysis input)
  - Waste package and aging cask loading
  - Emplacement drift loading
- Thermal evaluations

Thermal Management Ongoing Evaluations

- Total System Model
  - Effects of varying waste stream on facility operations
  - Durations of facility operations
  - Optimization of operations
- Total System Performance Analysis (TSPA)
  - Evaluation of postclosure performance
- Preclosure Safety Analysis
  - Effects of thermal management on compliance with preclosure performance objectives

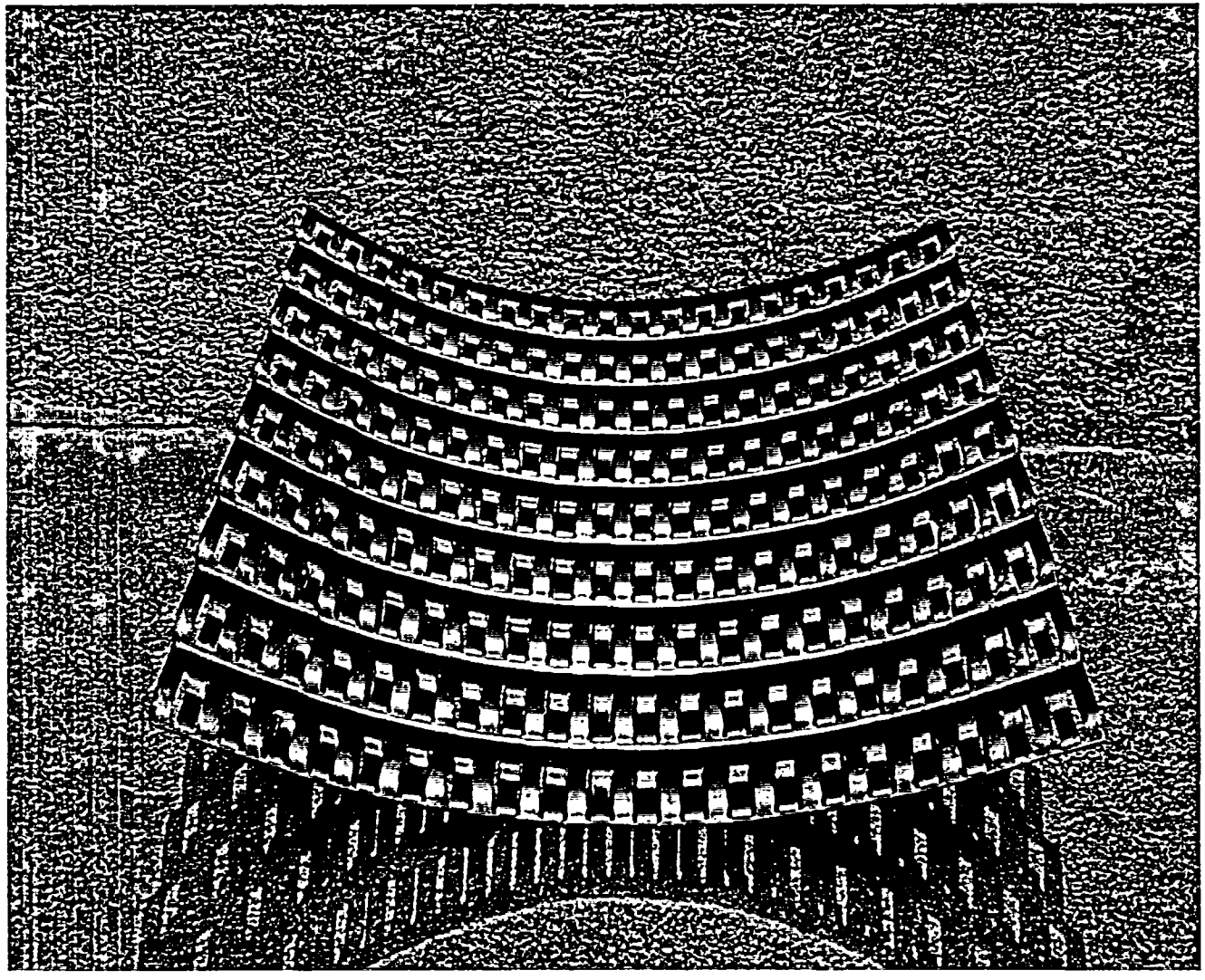
Thermal Management Strategy Summary

- Thermal emplacement limits require some aging
- Aging systems will be similar to existing dry cask storage facilities
- Ventilation is required to meet thermal limits in both surface and subsurface facilities
- Thermal goals must be satisfied before repository closure

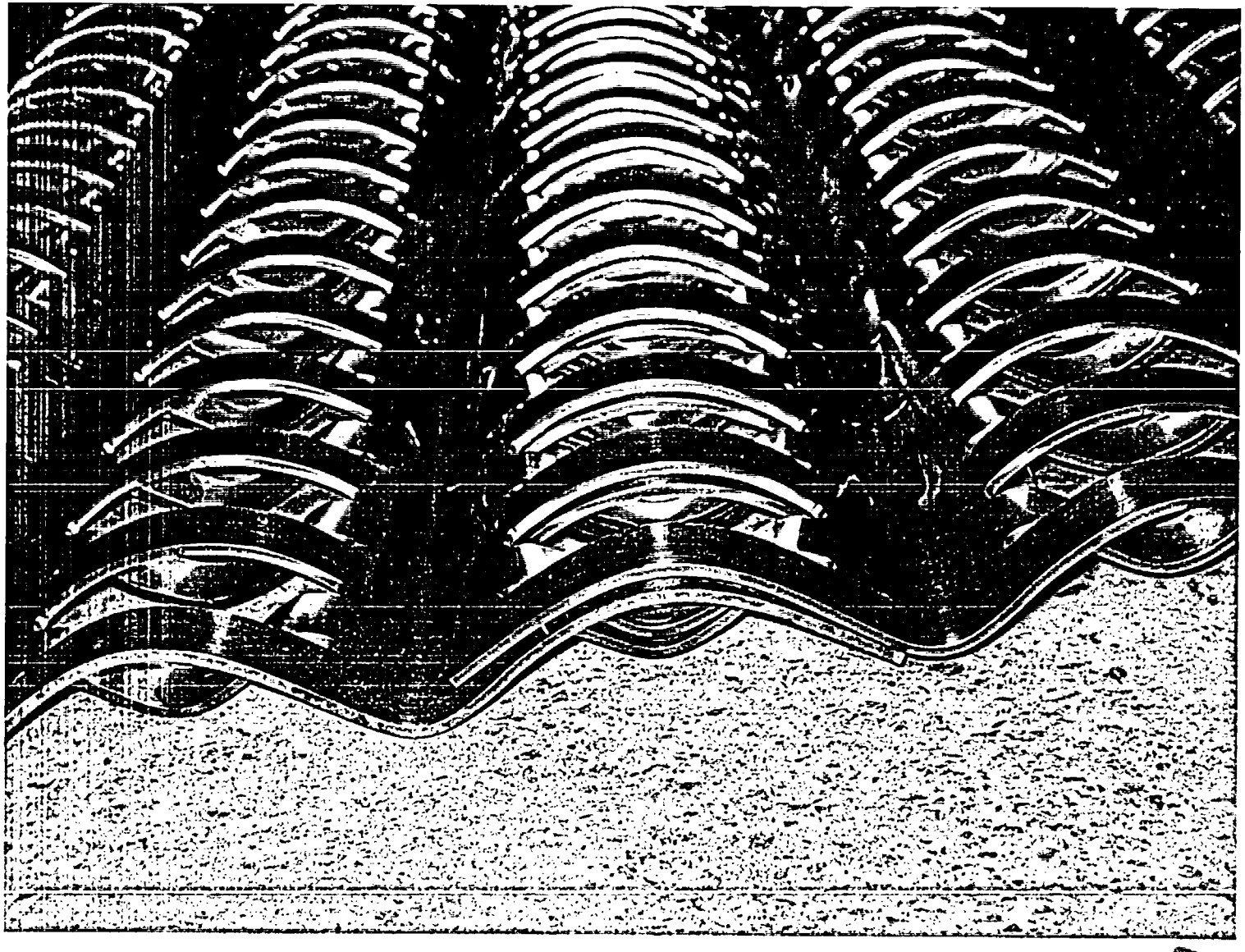
Emplacement Drift Ground Support

- Bernold Stainless Steel (SS) Plates secured with SS rock bolts
- Allows for air flow to eliminate any moisture traps between plate and rock wall
- Not classified as Important To Waste Isolation (ITWI)
- Confinement of Rock Surface (preventing unraveling of small rock particles during preclosure)
- No planned maintenance

Bernold-Plate Type S



SS Sample Showing Overlap At Joint



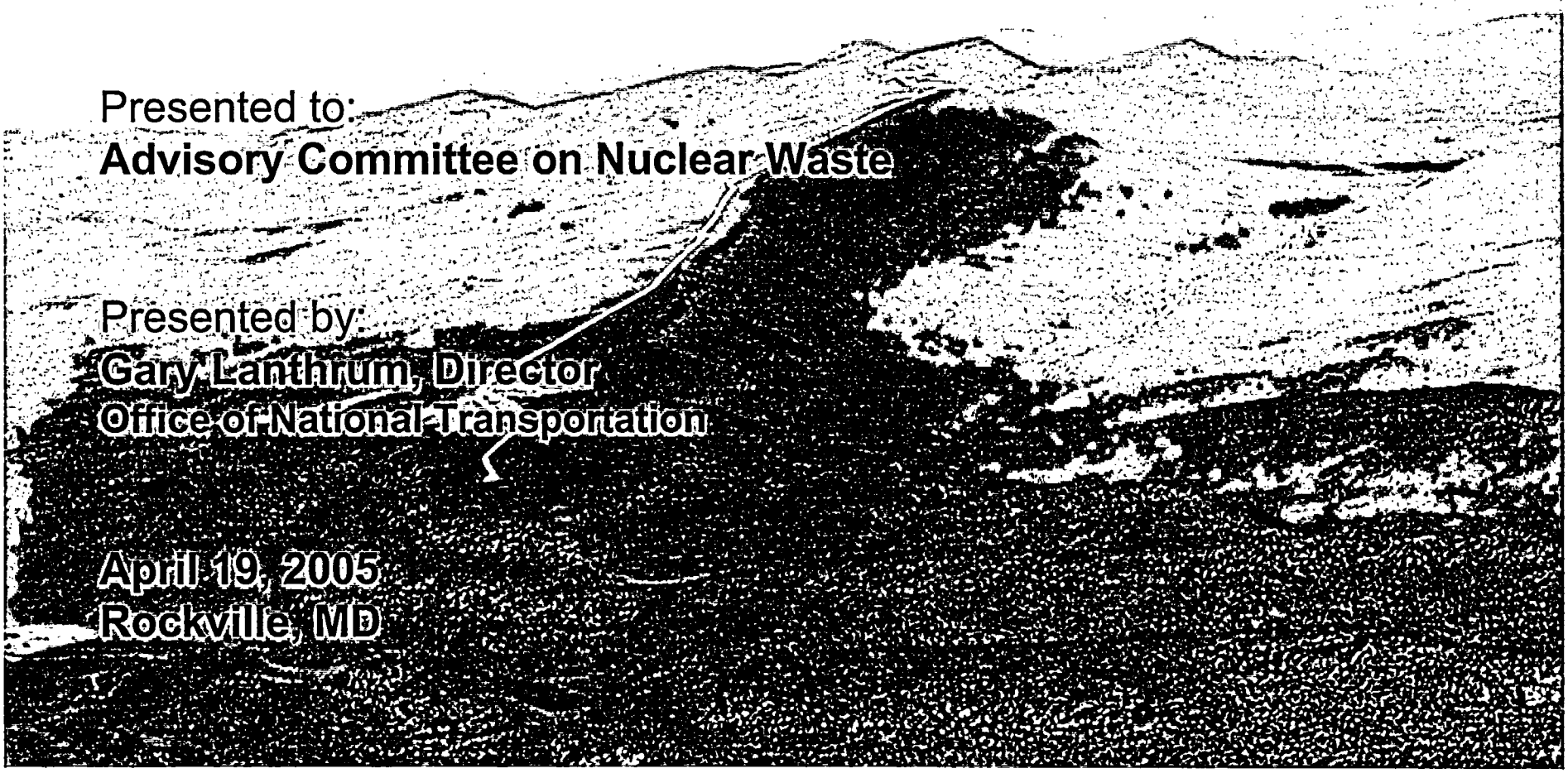
Conclusion and Path Forward

- Significant technical progress over the past year
- Project focus
  - License Application readiness
  - Support to NRC information needs

U.S. Department of Energy
Office of Civilian Radioactive Waste Management

www.ocrwm.doe.gov

Office of National Transportation Update



Presented to:
Advisory Committee on Nuclear Waste

Presented by:
Gary Lanthrum, Director
Office of National Transportation

April 19, 2005
Rockville, MD

Introduction

- Office of National Transportation (ONT) was established in 2003
  - Prior to 2003, the Transportation Program was in stasis while Repository Site Recommendation was being developed
  - The President and Congress approved Yucca Mountain, Nevada, as the site for the Nation's first repository in 2002
  - Transportation funding increased in 2003, and a Director for ONT was selected in August
  - ONT's work scope was organized into four projects:
    - Institutional
    - Operational Infrastructure
    - Fleet Acquisition
    - Nevada Rail

Office of National Transportation Organization

Director, Office of National Transportation
J. Gary Lanthrum

Vernita Galloway
Vic Trebules

Operations Development Division
Judith A. Holm

Jay Jones
Corinne Macaluso
Narendra Mathur
Nancy Thompson
Priscilla Bumbaca

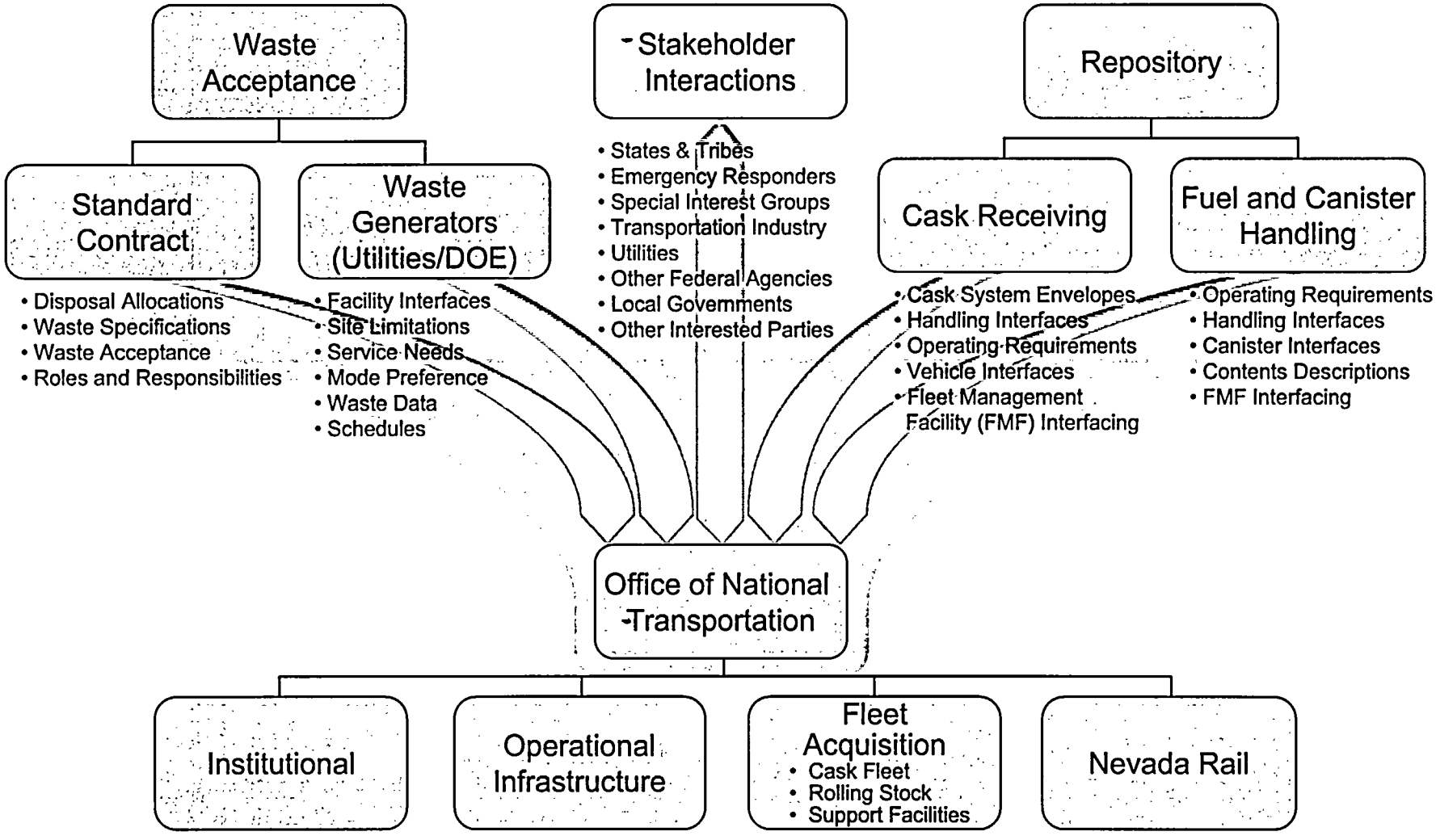
Infrastructure Development Division
Ned B. Larson

Dorothy Callier
Robert Clark
Robin Sweeney

Transportation under the Nuclear Waste Policy Act (NWPA)

- Transportation casks must be certified by the Nuclear Regulatory Commission (NRC)
- The Department of Energy (DOE) must provide advance notification to states per NRC regulations
- DOE must use private industry to the fullest extent possible in each aspect of transportation
- Under Section 180 (c), DOE must provide technical assistance and funds to states and Tribes for training in safe, routine transportation and emergency response procedures

Key Programmatic Interfaces



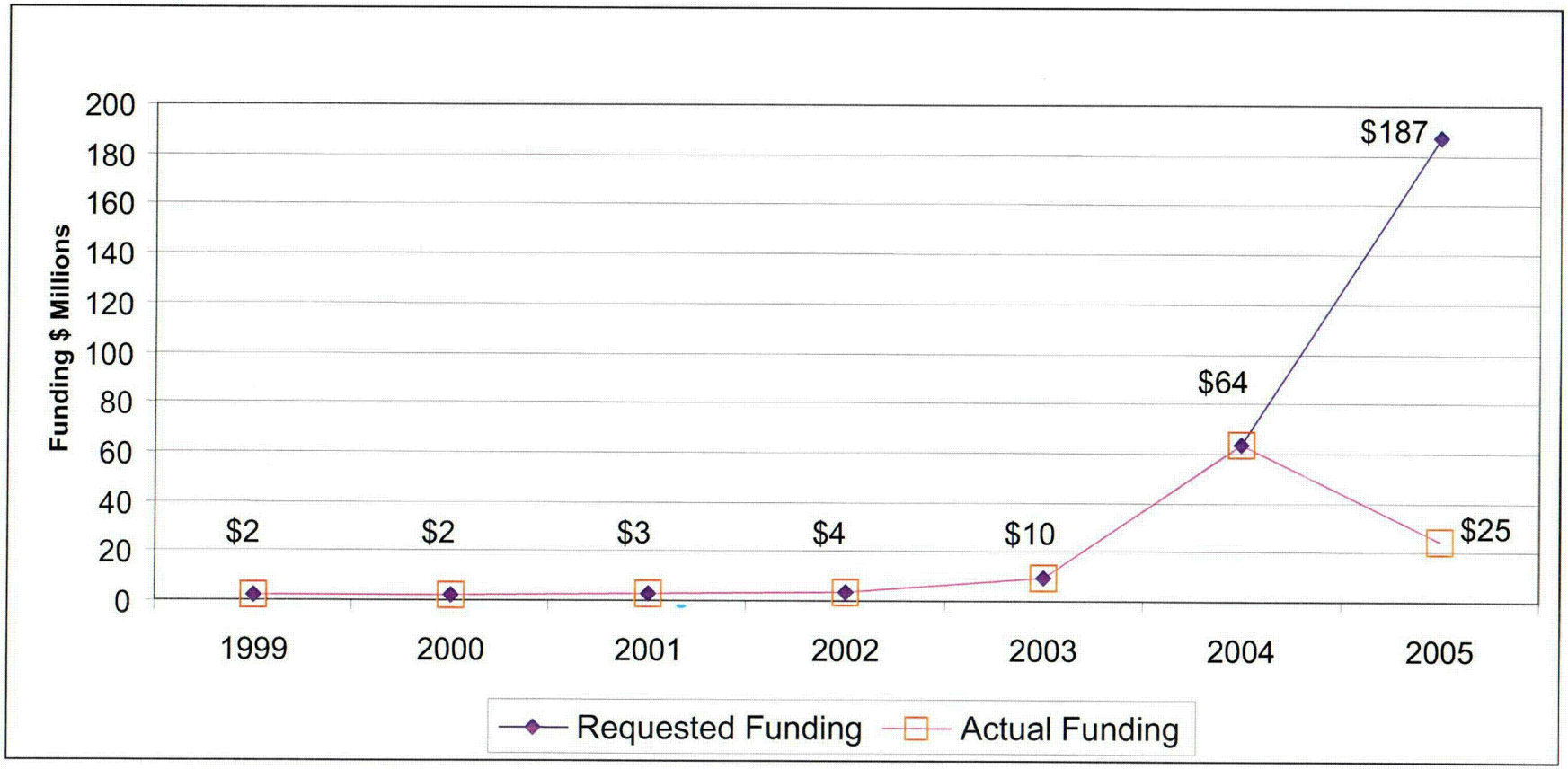
Integration of Transportation Program Components

- We are obtaining the information needed from shippers to acquire the appropriate transportation infrastructure
- Interface with vendors and cask capability reports have been extremely valuable in determining the types of casks needed and when
- DOE is establishing an approach to common cask procurements
- Coordination with the DOE surface design effort has helped prioritize transportation infrastructure development efforts

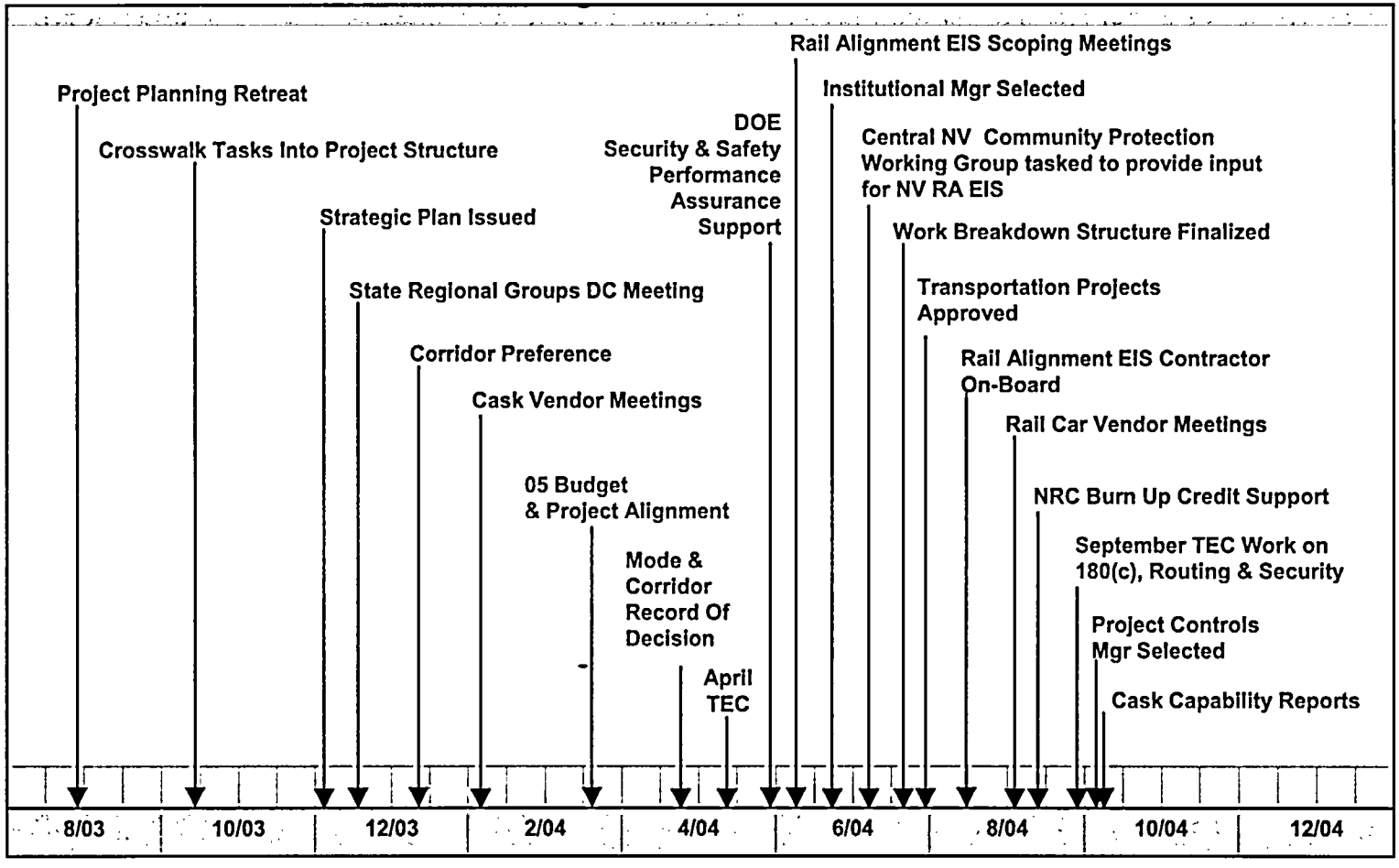
Office of National Transportation Priorities

- Support for the Nevada Rail Alignment Environmental Impact Statement (EIS)
- Support for State Regional Group (SRG) Cooperative Agreements, tribal interactions, and Transportation External Coordination Working Group (TEC) activities
- Focus on acquisitions that will advance infrastructure development without major capital requirements such as procurement of designs rather than fabrication of hardware

Transportation Funding Profile



Transportation Program FY04 Accomplishments



Transportation Program FY 2005 Plans

- The Transportation Program will focus on completing draft Nevada Rail Alignment Environmental Impact Statement (EIS)
- Begin conceptual design work for casks and rail cars
- Announce decisions that will enable more detailed operational planning discussions
- Initiate consultation with Native American tribes along potential transportation corridors
- Continue working with State Regional Groups (SRG) and other stakeholders through the TEC regarding route selection criteria, 180(c) policy development, and security planning

Yucca Mountain Final Environmental Impact Statement

- Final Environmental Impact Statement (FEIS) for the repository was issued February 2002
- Two modes of transportation were considered nationally, and three implementing alternatives were considered in Nevada
  - The FEIS stated a preference for mostly rail as the preferred mode for both national and Nevada transportation
- Five alternative corridors for providing rail access to Yucca Mountain were analyzed in the FEIS
  - No corridor preference was stated in the FEIS

Corridor Selection

- The Department announced its preference for Caliente corridor and Carlin as the secondary preference in a December 21, 2003, *Federal Register* Notice (FRN)
- The Caliente corridor preference was based on the impacts analyzed in the final EIS and other factors, including:
  - Input from stakeholders
  - Potential land use conflicts
  - Direct and indirect costs associated with constructing and operating a rail line
- The Caliente corridor has a number of alignment options

Selection of Caliente Corridor

- On April 8, 2004, DOE published its selection of mostly rail as the mode of transport, both nationally and in the State of Nevada
- DOE also selected Caliente as the rail corridor in which to determine a rail alignment for the construction and operation of a rail line in Nevada
- Also on April 8, DOE issued a Notice of Intent to prepare a Rail Alignment EIS

Map of Caliente Rail Corridor

c18

Notice of Intent

- The proposed action was to determine a rail alignment for the construction and operation of a rail line for Spent Nuclear Fuel (SNF) and High-Level Waste (HLW) and other materials from a site near Caliente to Yucca Mountain
- EIS will cover alignment, design, construction, operation, and possible eventual abandonment of rail line
- DOE held public scoping meetings in five locations in Nevada
  - Over 4,000 comments were received

Developing a Rail Line in Nevada

- Work on the Nevada Rail Alignment EIS is moving forward
- Contracts were awarded to perform data collection for the EIS and develop conceptual design
  - Conducting field surveys
  - Developing conceptual design
- Several alternative routes were suggested by the public
  - The EIS will be extended slightly to collect data on the alternative routes to evaluate their feasibility

Field Surveys of Caliente Corridor

Data and collection and analysis:

- Geotechnical
- Aerial Mapping
- Hydrology
- Sensitive Species
- Cultural Resources
- Route Optimization

Will Support:

- Preparation of the Rail Alignment EIS
- Investigation of potential sources of construction materials
- Assessment of potential mineral and energy resources
- Conceptual and final design of the rail line and structures
- Ongoing engineering efforts

Upcoming Milestones for Nevada Rail Alignment

- Complete technical data collection along the corridor
- Issue draft Rail Alignment EIS
  - Hold public hearings to obtain comments on Draft Rail Alignment EIS
- Issue Final Rail Alignment EIS in FY06
- Issue Record of Decision (ROD) for rail alignment
- Begin final design/construction

Cask System Requirements

- Maximizing the use of available cask designs and NRC Certificates of Compliance (CoC) for transport casks
- Cask systems that provide the maximum flexibility in terms of facility and fuel compatibility
- Coordination efforts are underway to ensure transportation casks are compatible with the Yucca Mountain Surface Facilities
  - Size and weight parameters have been bounded for facility design work
  - Cask handling considerations are being integrated with facility design efforts

Cask Capability Assessment Reports

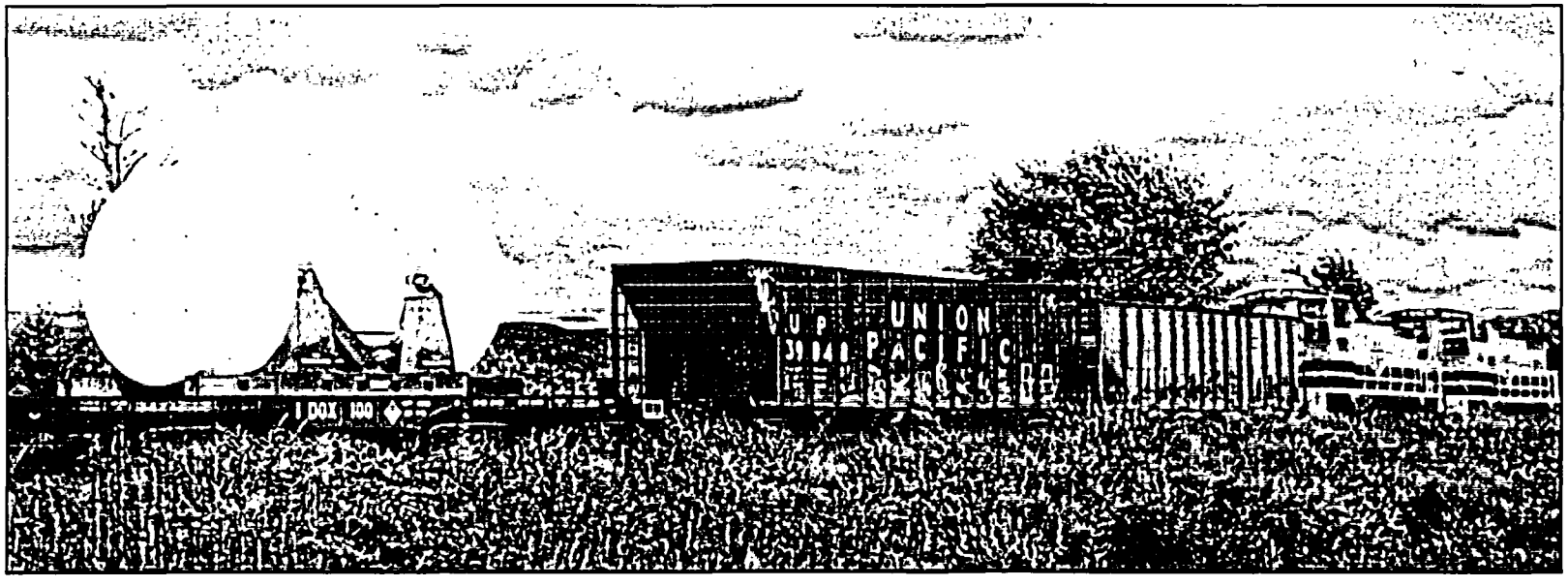
- Purchase orders to perform cask capability assessments were placed with vendors possessing NRC Certificates
- Vendors are now familiar with DOE's SNF and HLW data
- Meetings held in late August and early September of 2004 provided an opportunity for vendors to discuss the data and their ability to meet ONT's needs
- Preliminary summaries of vendor data indicate that about 30 percent of the fuel eligible for shipment could be accommodated by existing casks, Certificates, and current utility infrastructure
- Casks exist today that can transport DOE waste material
  - Generally, the thermal, structural, and shielding requirements for commercial SNF bound those of the DOE material

Next Steps in Cask Procurement

- Issue draft Request for Proposals (RFP) to solicit input on approaches to enhancing capabilities of casks to accommodate a broader range of the eligible SNF including fuel assemblies located at facilities with infrastructure limitations
- Issue cask RFP
- Award conceptual design tasks for required new or modified casks
- Approve cask conceptual designs and approve beginning of final design/certification of casks offering innovative solutions
- Place orders for fabrication of casks

Rolling Stock Acquisition Status

- We are developing our policy on implementation of the Association of American Railroads (AAR) standard for rail cars shipping
- ONT plans to procure ~120 cask cars, 60 buffer cars, and 30 escort cars
- Locomotives may be procured later



Fleet Management and Support Facilities

- Support facilities include:
  - Fleet Management Facility (FMF) to maintain transportation equipment
  - Fleet operations center
  - Rail line maintenance facility and
  - Rail sidings and end-of-line facility
- Locations of the FMF and other support facilities are being evaluated in the Nevada Rail Alignment EIS
  - Preliminary work to provide input into the EIS has been performed

Operational Planning Update

- Operations planning activities include:
  - Continuing Burn-Up Credit data collection and analysis
  - Progress on developing optimization model for transportation planning
  - Supporting modeling tools, especially RADTRAN and TRAGIS
  - Examining federal agency regulations and policies to ensure "best practices" inform the path forward for operations

Operational Planning Update

(Continued)

- Security activities include engaging the DOE Office of Security and Safety Performance Assurance on risk management options for transportation security
  - Launching Transportation Classification Guide interagency working group and review
  - Continuing collaboration with our international partners on transportation sabotage studies
  - Examining threat analyses to identify appropriate countermeasures to build at the front end of ONT system
  - Initiating analysis for personnel, physical and information security, including requirements and special training needs

Institutional Project Update

- Work with the four SRGs continues on:
  - Development of routing criteria and route selection methodology
  - Recommendations for implementing Section 180 (c) of the Nuclear Waste Policy Act, and
  - Special project support
- TEC Topic Groups are active:
  - Additional participants have been added to the Security Topic Group
  - Tribal Topic Group is being expanded to include the tribes potentially along transportation routes
  - Routing Topic Group held training on RADTRAN, TRAGIS, and Decision Model
  - Work on updates to the DOE Transportation Protocols and development of detailed operational plans will follow key policy decisions

Summary

- ONT continues to make progress despite a myriad of challenges
  - FY 2005 activities have been reprioritized to focus on development of critical infrastructure
- Infrastructure acquisition plans are moving forward in phases, emphasizing flexibility
- By focusing on completion of the Nevada Rail Alignment EIS and development of conceptual designs for cask and rail cars, progress on final design/construction and fabrication can begin quickly when funding increases

United States Nuclear Regulatory Commission

National Source Tracking Rulemaking

April 19, 2004

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1

United States Nuclear Regulatory Commission

National Source Tracking

- Background
- Structure
- Rule Content
- Schedule

2

United States Nuclear Regulatory Commission

National Source Tracking - Background

- Joint NRC/DOE report on RDD recommends development of a national source tracking system
- IAEA Code of Conduct recommends establishment of a national register of radioactive sources
- NRC commitment to Congress to develop a tracking system

3

United States Nuclear Regulatory Commission

National Source Tracking - Background

- NRC and 33 Agreement States issue licenses for the medical, industrial, and academic uses of nuclear material
- Current regulations do not require tracking of sources
- Majority of licenses set possession limits
- Interim inventory

4

United States Nuclear Regulatory Commission

National Source Tracking - Structure

- Interagency Coordinating Committee
- Steering Committee
- National Source Tracking Working Group
- National Source Tracking Rulemaking Working Group
- IT Team

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United States Nuclear Regulatory Commission

National Source Tracking - Background

- Life cycle account of sources
- Improve source accountability and give better information to decision-makers
- Transaction based
- Data to be Official Use Only
- Be primarily Web-based
- Will require rulemaking to implement

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United States Nuclear Regulatory Commission

National Source Tracking - Elements

Thresholds for Reporting

- IAEA Code of Conduct Categories 1 and 2
  - Commission added 7 isotopes to list
- Most common isotopes
  - Co-60 (0.3 TBq)
  - Cs-137 (1 TBq)
  - Ir-192 (0.8 TBq)
  - Am-241 (0.6 TBq)

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United States Nuclear Regulatory Commission

National Source Tracking - Elements

- Licensees will be required to report
  - Manufacture of new sources
  - Transfer to another licensee
  - Receipt of sources
  - Disposal of sources
- Report by the close of the next business day

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United States Nuclear Regulatory Commission

National Source Tracking – Transactions - Manufacture

- Company identification information
- Radioactive material in source
- Initial source strength at the time of manufacture
- Manufacturer, model, and serial number
- Manufacture Date

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United States Nuclear Regulatory Commission

National Source Tracking – Transactions Transfer/Receipt

- Company identification information of shipping and receiving company
- Source information
- Shipping date - transfer
- Estimated arrival date - transfer
- Receipt date – receipt
- Waste manifest number and container identification, if applicable

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United States Nuclear Regulatory Commission

National Source Tracking – Transactions - Disposal

- Company identification information
- Manifest number
- Container identification
- Date of disposal
- Method of disposal

11

United States Nuclear Regulatory Commission

National Source Tracking - Submittal

- Reports submitted by the close of the next business day after the transaction
  - On-line
  - Electronically
  - Facsimile
  - Mail
  - Telephone with follow-up by facsimile or mail

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United States Nuclear Regulatory Commission

National Source Tracking – Initial Inventory

- Licensees shall report initial inventory
  - Category 1 sources by December 31, 2006
  - Category 2 sources by March 31, 2007

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United States Nuclear Regulatory Commission

National Source Tracking - Verification

- Reconcile inventory
- Process to include resolving discrepancies by completing/correcting reports
- Verify information correct
- Conducted during the month of June of each year

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United States Nuclear Regulatory Commission

National Source Tracking - Serialization

- **Sources tracked by combination of make, model, serial number**
- **Manufacturers required to assign a unique serial number to each source.**
- **Serial numbers may be composed only of alpha-numeric characters.**

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United States Nuclear Regulatory Commission

National Source Tracking - Schedule

Schedule:

- **Rulemaking**
  - Proposed rule to Commission May 2005
  - Public meetings Summer 2005
  - Final rule to be in place by July 2006
- **Phased implementation of NSTS to begin Fall 2006**
  - Stakeholder workshops Fall 2006
  - Category 1 by December 31, 2006
  - Category 2 by March 31, 2007

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United States Nuclear Regulatory Commission

Thanks for your attention!

Questions?

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