

UNITED STATES OF AMERICA

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NUCLEAR REGULATORY COMMISSION

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WORKSHOP ON SPENT FUEL TRANSPORTATION
CASK TESTING PROTOCOLS

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WEDNESDAY

MARCH 19, 2003

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ROSEMONT, ILLINOIS

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The Package Performance Public Meeting at The
Embassy Suites at O'Hare, 5500 North River Road, Rosemont,
Illinois, at 8:00 a.m., Chip Cameron, presiding.

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P R O C E E D I N G S

(8:25 A.M.)

1
2
3 MR. CAMERON: Good morning, everyone. My name
4 is Chip Cameron. I'm the Special Counsel for Public
5 Liaison at the Nuclear Regulatory Commission. And I'd like
6 to welcome all of you to our meeting today. And today's
7 subject is the NRC, the Nuclear Regulatory Commission's
8 plans for doing full scale testing of spent fuel
9 transportation cask. And that plan is embodied in a
10 document that I think you all have called the Package
11 Performance Study Test Protocols. And it is a draft. And
12 I have been facilitating the meetings, the round table
13 meetings that we've had on this. And it's been my pleasure
14 to serve as the facilitator for those meetings.

15 I've also been assisted in the convening by Mr.
16 Chet Poslusny, who's right here, and after I go through
17 some brief meeting process comments for you, I'm going to
18 turn it over to Chet to facilitate the rest of the meeting
19 today.

20 And in terms of meeting process, I wanted to
21 cover basically three things. Why the NRC is here today,
22 what the format and ground rules for the meeting are and to
23 just briefly go over the agenda for today's meeting so that
24 you know what to expect and also so that we can check in
25 with you, do an agenda check so that we can make sure that

1 we have all the issues that you want to see covered
2 actually covered in the agenda.

3 In terms of the purpose, the first objective
4 today is to have the NRC clearly explain what its plans are
5 in terms of full scale testing, why we are doing this, what
6 is planned and how we propose to accomplish it. The second
7 objective and the most important one is to hear your views
8 and recommendations on these draft plans. The ultimate
9 goal will be to use the commentary that we hear from you
10 today as well as in the other workshops we've done and the
11 written comments that we're asking for. To use all of that
12 to illuminate our final test protocol and final test plans.

13 In terms of the format you can see that we're
14 in a so called round table format today. And we're
15 fundamentally interested in each of your views, your
16 individual views. But the purpose of having a round table
17 is to not only hear those individual views but to engage in
18 a discussion from your colleagues around the table on what
19 they think of those particular views. And we hope that
20 that gives us another perspective on the issues than we
21 would get just by having the written comments come in to
22 us, which reflect the individual views but they're never,
23 never get the benefit of hearing from any of the other
24 peers on those particular views. So, we have
25 representatives of the broad spectrum of interest around

1 the table and may be affected by spent fuel transportation.
2 And we're looking forward to this discussion.

3 In terms of ground rules, I guess the most
4 important one might be to try to be focused and concise in
5 your comments. Today the round table affords us a richness
6 of views but the downside is is that it doesn't give us all
7 the time we would like to hear a full explanation of
8 individual views. So, I would ask you to focus on the high
9 points, to listen to what your colleagues around the table
10 are saying and respond to those views and to allow your
11 written comments to give us the full details on that. I
12 would also ask you to give us the reasons for any
13 conclusions or statements that you make, give us the
14 rationale for that.

15 You do have name tents in front of you and when
16 you do, when you want to talk if you could just put this up
17 like that and then Chet will know who wants to say
18 something and you won't have to keep raising your hand. He
19 may not take all the cards in the order they're raised so
20 that discussion threads can be followed. We are taking a
21 transcript of the meeting. And our transcriber, Ron, knows
22 who you are so that you won't have to keep saying your name
23 every time. And I would ask that only one person at a time
24 speak so that we can get a clean transcript and also so
25 that we can give our full attention to whomever has the

1 floor at the moment. And we won't ignore the audience. We
2 realize there is interest and important comments out here.
3 And at various times during the day Chet will go out to see
4 if anybody has any questions or comments. And when he does
5 that, if you could just give us your name and affiliation,
6 if appropriate here.

7 We have a mix of experience at that table.
8 Some of you have been at all of the meetings. We did one
9 in Rockville two weeks ago. We did one in Las Vegas last
10 week and this is the final one here in Chicago. We've
11 gotten some excellent input from the State of Nevada, Bob
12 Halstead down there. And also Fred Dilger is with us from
13 Clark County. We have mostly new people at the table and
14 we'll want to hear your views and we'll get the benefit of
15 hearing from those who have been with us before, John
16 Vincent also. He was at the Rockville meeting.

17 So, with that I think what I'll do now is go
18 through the agenda quickly and then I'm going to turn it
19 over to Chet. And we want to give you some context to
20 start off with on the NRC's responsibilities and what are
21 plans are. And we're going to start with that, with Bill
22 Brach, who's down here and Andy Murphy next to him and Ken
23 Sorenson from Sandia and Chet will be introducing them in
24 more detail. We're going to do those presentations right
25 in a row, hopefully not keep you sitting too long with

1 those and then go to you for questions.

2 Next, we're going to around the table and hear
3 a couple of minutes from each of you on what your interest
4 and concerns are on this issue. And we found that this
5 provides a good backdrop for the rest of the day's
6 discussion and also helps us to hear issues that we might
7 not have thought of and put in the agenda that we will make
8 sure we get on the agenda. After that we're going to go
9 our first discussion area which is over arching issues.
10 What objectives is the NRC trying to accomplish in doing
11 this full scale cask testing? What are the advantages and
12 disadvantages of full scale cask testing? How do you
13 define things like public confidence? What role should it
14 play in the testing program?

15 Then we're going to take a break. We'll go to
16 general testing issues. You'll see them listed on your
17 handout. And then lunch. Then in the afternoon we're
18 going to get specific. We're going to take a look at the
19 test protocols in terms of the fire test. And Amy
20 Schneider, who is right up here, is going to give us what I
21 call a tee-up on those issues. And then as part of that
22 discussion we're also going to hear from Chris Bajwa from
23 the NRC staff who is going to tell us about the Baltimore
24 tunnel fire. And after that discussion on fire we're going
25 to go to the impact test and close up with other issues.

1 In terms of the over-arching issues discussion, there may
2 be process points that you want to make in terms of how the
3 NRC should be guided in completing this program. So that
4 might be a good time to talk about that.

5 And I guess I would thank you all for being
6 here with us today and I'm going to turn it over to Chet.
7 It's hard for me to relinquish this talking stick but I'm
8 going to do that and sit and enjoy your discussion today.
9 Chet?

10 MR. POSLUSNY: Thanks very much. And again I
11 welcome you all to this very important meeting. And
12 before, let me go over a couple of admin issues before we
13 start. We've got a sign out sheet out front. I hope
14 you've all signed it. Also, there's an NRC feedback sheet.
15 This is something that's, although it's pre-printed, please
16 use it to let us know what you think, you got out of the
17 meeting today. Did we do things right? How could we
18 improve in our next forum that we might do? If you feel
19 uncomfortable filling it out, send us some comments,
20 written comments on the report or talk to us on the side.
21 That's another option. But we'd like to know what you
22 thought about the meeting. We hope it's positive.

23 Today I want to emphasize that the NRC is in a
24 listening mode. We expect to hear some good comments on
25 the report. Some new things we haven't thought about. We

1 found that out at the last meetings we've done over the
2 past couple of weeks. So, we are in a listening mode and
3 don't expect we'll say, hey, that's a great idea. We're
4 going to do it. Because we need to let everybody take a
5 turn providing comments either in meetings, electronically,
6 or in writing by May 30th. So every comment has equal
7 weight. In addition, if you can't tell us everything you
8 want to tell us in limited time today, please do it in
9 writing. And we, again, will look at it.

10 Before we get started into the real agenda,
11 let's quickly go around the table and let us know who you
12 are and where you work. Don, could you start?

13 MR. FLATER: Don Flater with the Iowa
14 Department of Public Health.

15 MR. WRIGHT: Ned Wright with Lynn County, Iowa,
16 home of -- Energy Center. That's Iowa's Nuclear Power
17 Plant.

18 MR. CAMERON: Can you hear that? Okay, fine.
19 Yes, George.

20 MR. CROCKER: George Crocker, North American
21 Water office out of Minnesota.

22 MR. VINCENT: John Vincent, Nuclear Energy
23 Institute out of Washington, D.C.

24 MR. BENNETT: David Bennett with Tri State
25 Motor Transit Company but I'm representing the council, the

1 U.S. Transport Council.

2 MR. DOIG: Scott Doig with the Prairie Island
3 Dakota community

4 MR. RESNIKOFF: Marvin Resnikoff, Radioactive
5 Waste Management Associates in New York City on behalf of
6 the State of Nevada.

7 MR. HALSTEAD: Bob Halstead, Transportation
8 Advisor, Agency for Nuclear Projects, State of Nevada.

9 MS. SNYDER: Amy Snyder, NRC, Spent Fuel
10 Project Office.

11 MR. BRACH: Bill Brach, NRC, Spent Fuel Project
12 Office.

13 MR. MURPHY: Andy Murphy, NRC Research Office.

14 MR. SORENSON: Ken Sorenson, Sandia National
15 Laboratories.

16 MR. CONROY: Michael Conroy, Department of
17 Energy, Office of Environmental Management, Office of
18 Transportation.

19 MR. STRONG: I'm Thor Strong, I'm with the
20 State of Michigan at the Lowell Radioactive Waste
21 Authority.

22 MR. RUNYON: I'm Tim Runyon with with Illinois
23 Department of Nuclear Safety in the Midwest Radioactive
24 Materials Transportation Committee.

25 MR. LARSON: I'm Dean Larson with the Lake

1 County, Indiana, LAPC.

2 MR. CROSE: Dave Crose, Indiana State Emergency
3 Management, also a member of the Midwest Radioactive
4 Materials Transportation Committee.

5 MR. ERIKSON: John Erikson with the Governor's
6 Policy Research Office for the State of Nebraska.

7 MR. WERNER: Jim Werner with the Department of
8 Natural Resources in Missouri.

9 MS. SUPKO: Eileen Supko, Energy Resources
10 International Consultant on Spent Fuel Storage, Transport
11 and Disposal.

12 MR. LEVIN: Adam Levin, Exelon Generation.

13 MR. CAMERON: Thanks again. Okay, let's get
14 started into the agenda. First discussion will be made by
15 Mr. William Brach from the NRC. I'll tell you a little bit
16 about his background. Bill has been the director of the
17 Spent Fuel Project Office since 1999. He has 30 years
18 experience with the AEC, which became the Nuclear
19 Regulatory Commission. He began as an inspector in 1971 in
20 the Oakridge, Tennessee field office and that was followed
21 by a wide range of activities through management at the
22 NRC. Some of the activities included safeguard licensing
23 issues, vendor inspection, reactor license performance
24 evaluation, low level waste and decommissioning, medical
25 and industrial use of nuclear materials. As I said, he's

1 been with the Spent Fuel Project since 1999 and his office
2 is responsible for the certification of casks for both
3 storage and transportation of spent fuel.

4 With that, Bill?

5 MR. BRACH: Good morning. On behalf of the NRC
6 I, too, want to welcome you to the round table discussion
7 and workshop today. I noted to Chet last night, I believe,
8 this is the fourth meeting and this is actually the first
9 one we've had a round table at the meeting. So, I just
10 note that.

11 As Chet mentioned, I'm Bill Brach and Director
12 of the Spent Fuel Project Office. And our office has the
13 responsibility for licensing and inspecting and developing
14 inspection program for spent fuel storage facilities and
15 also for the certification of packages used for the
16 transportation of radioactive material including the
17 transportation of spent fuel.

18 NRC's principle and guiding mission is
19 protecting the public health and safety, common defense and
20 security, and the environment. NRC's primary role in
21 transportation of spent fuel to a repository would be in
22 the certification of packages used for the transport. NRC
23 is well positioned, I believe, to maintain its independent
24 focus on maintaining safety in this important activity.

25 The NRC staff believes that shipments of spent

1 fuel in the U.S. are safe using the current regulations and
2 programs. This is an important point. Let me restate that
3 and then explain why I think it's so important. The first
4 point I'm stressing is that the NRC staff believes that
5 shipments of spent fuel in the U.S. are safe using current
6 regulations and programs. Today we're going to be talking
7 about the Package Performance Study, a study we're looking
8 at to test the robustness and capability of spent fuel
9 packages to withstand accident conditions significantly
10 beyond the regulatory limits.

11 From that questions have come up at previous
12 meetings and workshops. From the study, and the same as in
13 other parts of the NRC's regulatory activities, information
14 that the staff learns clearly is considered in those
15 programs, and that is the case as we're looking at the
16 safety of transport of spent fuel. If from the Package
17 Performance Study we learn information that should make us
18 and does make us question the adequacy of current programs,
19 adequacy of our processees, we clearly will consider that
20 information as we're moving forward.

21 Now, let me continue. The belief, if you will,
22 we have in the current safety of transport of spent fuel is
23 based on NRC's confidence in the robustness of the shipping
24 containers that we certify and the ongoing research in
25 transportation safety. Also, as noted in the third bullet,

1 this confidence is based on industries compliance with the
2 safety regulations and the conditions of certificates
3 that's resulted in an outstanding transport safety record.

4 The NRC has been studying the issues of
5 transport safety, transportation safety for more than 25
6 years. And we continually find that the likelihood of
7 release from an accident and the associated risk to the
8 public are extremely low. Even so, the NRC continues to be
9 vigilant about transportation safety as an essential part
10 of our mission. The NRC follows an extensive program to
11 investigate and assess the continued safety of spent fuel
12 shipments, including analyzing spent fuel transportation
13 experience and records to better understand safety issues,
14 evaluating new transportation issues such as the potential
15 for increased shipment levels, increase in changing cask
16 contents, populations along the routes and other factors as
17 well as using new technology such as enhanced modeling and
18 analysis tools to estimate current and future levels of
19 potential risk to the public.

20 The Package Performance Study, or the PPS, and
21 I'll offer that's an acronym that we'll be using quite
22 frequently today. We try to avoid acronyms but PPS is one
23 many of us will slip into frequently. The Package
24 Performance Study is an important part of NRC's
25 confirmatory research program for spent fuel transport.

1 The Office of Nuclear Regulatory Research has the NRC lead
2 for the study with assistance from the Spent Fuel Project
3 Office for programmatic direction and public outreach
4 activities.

5 Now, we recognize that some stake holders do
6 not share NRC's confidence in its regulatory programs. We
7 believe the Package Performance Study can be an appropriate
8 means for others to understand and to hopefully gain and
9 share our confidence in transportation safety.

10 Now I want to provide just a brief overview of
11 the Package Performance Study from its inception leading up
12 to today's meeting. The Package Performance Study began
13 with a series of public meetings to collect views on
14 possible future work on shipments of spent fuel and to
15 identify possible follow on work if following our issuance
16 of new Reg 6672, that was a report we issued in March of
17 2000, which was a report on the re-examination of the risk
18 of spent fuel transportation.

19 In 1999 we held a first series of public
20 meetings. After this first set of meetings, NRC published
21 the issues report in June of 2000. This report compiled
22 state coder input obtained from four public meetings held
23 in 1999 and letters and e-mail comments we received.
24 Commenting stake holders included nuclear industry groups,
25 transportation industry groups, the Department of Energy,

1 Department of Transportation, state and local and tribal
2 governments, public interest groups and members of the
3 public.

4 Now to discuss whether the Issues Report
5 accurately captured the comments and suggestions and to
6 discuss recommendations to resolve these comments, four
7 additional public meetings were held in the year 2000.
8 After these meetings, the NRC took the Issues Report
9 recommendations and comments and began an extensive
10 planning phase for the Package Performance Study.

11 The first major product of this phase of the
12 Package Performance Study is the topic of today's meeting.
13 And that is to present the draft test protocols and to
14 receive your comments, your views and recommendations.
15 I'll note, as Chet's mentioned as well, we've had three
16 previous meetings and we've received an extensive and wide
17 ranging number of comments.

18 We've also just recently received eight letters
19 from Congress. Senators Reed and Epsen sent a letter to
20 the NRC just last week identifying comments and suggestions
21 for consideration in the Package Performance Study. And
22 just last night I was informed by our office that Senator
23 Durbin of Illinois, the state we're meeting in today as
24 well, has also sent a letter dated yesterday, March 18th,
25 to the NRC as well identifying, suggesting considerations

1 for our consideration in the Package Performance Study.

2 A topic of discussion at all three of the
3 previous Package Performance Study meetings is what is it
4 we're trying to do with the Package Performance Study, our
5 outreach activities and our efforts to, if you will, to
6 instill confidence or gain public confidence in what we're
7 doing with regard to transportation and safety.

8 I've identified on the overhead a few points
9 that I want to give a little bit of back drop as far as
10 what we, in this effort today, in our previous efforts and
11 our following efforts will be attempting to do to more
12 greatly involve the public in our activities. First, let
13 me mention the Package Performance Study is the first large
14 NRC research project with significant public input;
15 participation in the scoping, the planning in a protocol
16 development as well as the follow on activities we're
17 planning.

18 We're attempting to provide information to the
19 public on how the tests relate to current regulatory
20 requirements and will demonstrate further how the NRC, how
21 the robust NRC certified and approved designs perform under
22 conditions that exceed regulatory design requirements.
23 It's important that we consider the test conditions and
24 insure that we can relate them to real accidents, real
25 world conditions so that all of us can understand what the

1 tests represent and what they don't represent.

2 We need to convince ourselves as well, as stake
3 holders, that the program is an appropriate use of
4 taxpayers and rate payer's money. That is the tests are
5 useful and meaningful. In the conduct of the study we've
6 provided feedback on public inputs and we've modified plans
7 based on comments and suggestions from stake holders. We
8 as well, as part of the study, plan to invite stake holders
9 to witness the test, to see firsthand and better understand
10 the conduct and the results. Reports and other
11 communication tools will be used to inform stake holders
12 about the results, what we'll do with them as a regulator
13 and how they will affect the safety of future shipments of
14 spent fuel.

15 And let me summarize what our efforts in public
16 confidence and outreach activities to the point that was
17 stressed on an earlier slide. That we recognize that some
18 stake holders, some of you here, do you not share NRC's
19 confidence in its regulatory programs for transportation
20 and safety. We believe that the Package Performance Study
21 can be an appropriate means for others to hopefully
22 understand, share and gain our confidence.

23 Now, what do I see as a success for today's
24 meeting? The Package Performance Study, draft Test
25 Protocol Report summarizes the field test that NRC proposes

1 to perform in the study as well as the analysis performed
2 to develop the test summaries. The test we propose involve
3 previously NRC certified designs and are not directed to or
4 are not related to the NRC current certification of any
5 specific cask design.

6 We've issued this report for a 90 day public
7 comment period ending May 30. The report and comment
8 period were announced via a federal registered notice dated
9 February 21st of this year along with meeting notices, a
10 press release, a mass mailing of over 500 copies to the PPS
11 mailing list and the report's available on the Package
12 Performance Study web site. If anyone here is not on the
13 mailing list and would like to be added, just let one of us
14 at the NRC know or if you will, you can note that on the
15 sign up sheet that was on the table outside the room.

16 Now, the purpose of today's meeting is to
17 obtain comments on these proposals. I want to emphasize
18 that no decisions have been made yet. As Chet has
19 mentioned, we're here to listen, understand your comments
20 as we consider and move forward with regard to our
21 finalization of a draft test protocols. I'm happy to see
22 such a large group of qualified participants at the round
23 table and in the audience. And I'm confident and hopeful
24 that your comments will help the NRC develop the best and
25 most appropriate test plan for the Package Performance

1 Study.

2 And finally let me note, as Chet did, that
3 we're interested in hearing from you if you find this
4 meeting in its format useful or productive. A meeting
5 evaluation forms are at the back table outside the room
6 with the other handouts. And as Chet had mentioned, I want
7 to emphasize we are looking for feedback not only on the
8 conduct of the Package Performance Study but also in the
9 broader context of our efforts and outreach activities to
10 communicate, have meetings such as this in the forum we
11 have for this communications. So, we're interested in your
12 feedback there as well. So, on the meeting evaluation
13 forms or as Chet has mentioned, as you're providing
14 comments to us, written comments that are due by May 30, if
15 you prefer to incorporate or include those comments there,
16 we'd appreciate it.

17 I look forward today to a very productive
18 dialogue and discussion. And I thank you very much.

19 MR. CAMERON: Thanks, Bill.

20 Let's move on to our second speaker, Andrew
21 Murphy, who works for the Office of Nuclear Reactor
22 Research. He's the project manager for the Package
23 Performance Study. And most recently he's been working on
24 the development of the Protocols Report that we're talking
25 about today. He's got about 24 years of service with the

1 NRC working in the areas of earth science, seismic areas
2 and structural engineering areas. He's worked on the
3 seismic hazard estimates for nuclear facility site. And
4 he's managed large scaled testing programs for nuclear
5 power plant structures and systems. Before joining the NRC
6 he served as a research scientist at Clemon University
7 Laman Dority Earth Observatory. He has a Bachelor's in
8 Geophysical Science, Engineering, rather, and a graduate in
9 Seismology.

10 With that, Andy.

11 MR. MURPHY: Thank you, Chet, for the
12 introduction.

13 On this first slide we indicate the folks that
14 work with me in the NRC's offices on the development of the
15 Package Protocols. Shortly, Ken Sorenson will show you a
16 list of the folks that work at Sandia, providing
17 considerable help for us to get this document together.

18 The next one?

19 In the documents out front, particularly the
20 federal registered notice, there are a number of web sites
21 and individuals listed for particular portions of the
22 document and feedback information. But I'm giving you
23 this, my name, as a point of contact with the appropriate
24 attributes there so that you do have specifically a single
25 point of contact if you have any difficulties getting a

1 hold of us to provide comment or to ask questions.

2 Next, please?

3 What am I going to talk about this morning?

4 I'll say the objectives of the Package Performance Study,
5 the expectations for this meeting, the status of the
6 project at this time. A very brief discussion of the
7 staff's proposal. And that's what it is at this stage, a
8 proposal. And as Bill warned you about acronyms, we, me in
9 particular, may be slipping back and forth and telling you
10 things. We've decided to do this. We've decided to do
11 that. What we have done is decided to propose these
12 things. And if I make that -- that's what we're talking
13 about. This is a proposal from the NRC staff on how to
14 conduct these physical testing.

15 And then we'll very briefly touch on some of
16 the specific comments, specific items that we would like
17 you to comment on at the end of this presentation.

18 Next one.

19 The objectives, we've listed basically three
20 objectives and how many do you see up there? Four. The
21 principle objectives have been to enhance public
22 confidence. We've had considerable discussion at the other
23 three meetings as to what this means. Some folks have
24 suggested that we should be talking about public trust and
25 public understanding. And that if we wanted to do

1 confidence, that would grow from the trust and
2 understanding.

3 Second item is that we're interested in
4 validating, this is the engineering part of it, we're
5 interested in validating the computer codes and models that
6 we have for the response of the casks during transportation
7 accidents. We are also interested in obtaining data
8 information to refine the risk estimates that we have done
9 and have published recently a new Reg CR6672, which is a
10 document that outlines a risk study associated with the
11 transportation of nuclear fuel, spent nuclear fuel.

12 The extra item that we've added on here is that
13 we're trying to obtain a level of realism in the test
14 program. It has been very interesting on how folks look at
15 this word realism again. Some of our folks have been
16 looking at that as a particular frequency or probability of
17 occurrence. One individual at our Las Vegas or Nevada
18 meetings has indicated that realism, doing a realistic
19 testing meant for the fire test on the rail cask to select
20 a fire that was fueled by the hottest burning material that
21 is shipped in bulk on the U.S. railroads. So, there's a
22 little bit of difference on what realism means. And we'd
23 be interested, obviously, on your thoughts on this.

24 The next one, please?

25 Status; right now we're out for public comment

1 on what we've been calling the Test Protocols. In very
2 simple terms, these are simply the staff's proposal as
3 preliminary or draft plans for conducting the physical
4 testing of the rail and truck casks that are used for
5 transporting spent nuclear fuel.

6 The next important thing here, I'll say the
7 second important thing out of this talk, is the point of
8 contact and this web site address as the location for you
9 to find a copy of the test protocols. And also there is a
10 link to a web site where you can leave your comments. As
11 Bill has just said, it's out for 90 day public comment
12 period and that ends at the 30th of May this year. And
13 after we have received the comments and digested them, we
14 will be developing the detailed test plans for the actual
15 conduct of the tests.

16 Next one, please.

17 Okay. Now, I'll give you a real quick run
18 through on the staff's proposal for the rail impact test.
19 I'll start by saying in order to carry out the preliminary
20 calculations and so forth, we had to make a decision on
21 particular casks in which to work. And for the rail we
22 picked the Holtec. This is no kind of a commercial or
23 public endorsement of the Holtec. It was simply a cask was
24 available and fit our criteria of being a certified cask
25 with some likelihood of actually being used for the

1 transportation of spent nuclear fuel.

2 We proposed a carry out full size or actual
3 cask testing. We're proposing to drop the cask from a
4 tower to obtain the velocity of 75 miles an hour. We will
5 be dropping it, as it says, onto an unyielding target.
6 This will be a mass of some three million tons of concrete
7 at the right dimensions. The orientation that we're
8 proposing is a center of gravity over a lid corner so it'll
9 be coming down at an, if driving vertically but it'll be
10 coming down at an angle. Again, the speed that we're
11 proposing is 75 miles per hour. We'll get into a little
12 bit of discussion of that later on in one of the specific
13 sessions.

14 We're proposing to have a surrogate fuel
15 assembly in the cask. For the Holtec, this would mean 24,
16 it will hold 24 pressurized reactor fuel assemblies. We
17 will have one of those assemblies replaced as a very close
18 surrogate. You'll basically not be able to tell the
19 difference between the real thing and the surrogate with
20 the exception of the radiation. We will not be using
21 radioactive materials in this test. The other 23 fuel
22 assemblies in the canister will be dummies. This simply
23 means that they will be weight and mass equivalents of fuel
24 assemblies. But they will not be real fuel.

25 Next, Chris?

1 Just a quick figure sketch of the Holtec Hi
2 Star 100 real cask. On the right we have a drawing sketch
3 of the cask itself. And on, excuse me, on the left we have
4 the cask and on the right we have the cask with the
5 partially inserted multi purpose canister.

6 Next, Chris.

7 This is a picture of the Holtec Cask on a rail
8 car. The carriage that is there is not actually the one
9 that will be used for long distance transport. But was
10 available from Holtec.

11 Next.

12 For the truck cask we selected the General
13 Atomic GA-4 Cask. Again, we'll be using an actual cask,
14 again, dropping it from a tower. The orientation we're
15 proposing at this time is a back breaker. So, imagine the
16 cask as a dumbbell. It'll come down and hit an unyielding
17 target as a semi-circle that would represent a, something
18 like a bridge abutment. One of the reasons for selecting
19 this particular orientation and experiment was that there
20 was considerable comment in earlier public meetings about
21 an experiment in which the impact limiters, the shock
22 absorbers on ends of the cask, were bypassed. And this
23 back breaker orientation will do that. Again, we're
24 proposing 75 miles an hour onto an unyielding target. The
25 GA-4 holds four assemblies. And one of those assemblies

1 will be a surrogate and the other three will be dummies.

2 Next, we have a drawing of the GA-4 cask with a
3 number of the important elements identified. The thermal
4 testing will follow sequentially from the impact test.
5 We're proposing, again, tests on both casks. We're talking
6 about fully engulfing optically dense hydrocarbon fires
7 with a duration of more than a half an hour. To explain
8 the full engulfing, I think you could understand. It just
9 means that the fire will fully engulf, fully surround the
10 cask. The optically dense means that you cannot see
11 through it. And the importance of this is that the cask
12 cannot see outside of the fire. So, it is, the fire is
13 physically inputting heat directly to the cask and that
14 there is not a source of relief from that heat input.
15 Hydrocarbon fire means we'll be using something like jet
16 fuel for the fire. And the duration, we have proposed to
17 have it longer than the half hour certification fire. But
18 at this time we have not picked a specific duration for
19 that.

20 Next, please.

21 We've identified a number of specific issues
22 that the NRC staff was looking for comment on. These are
23 listed in the Executive Summary of the Protocol Report. We
24 had in mind 11 items that we were specifically interested
25 in. They're not all listed here. But based upon the

1 comments from the last two meetings, the last three
2 meetings at two locations, we've added the one about test
3 of failure. There was considerable comment at the previous
4 meetings that we should be testing the failure. We've
5 added that item to this list at this time and we would,
6 again, specifically we would like to have comments on
7 whether or not it's appropriate to test to failure.

8 Okay, and that concludes my presentation this
9 morning. Thank you.

10 MR. POSLUSNY: Thanks, Andy.

11 I think one point to reemphasize is the fact
12 that this is a proposal and nothing is in concrete at this
13 point in time.

14 Okay, the next speaker is Ken Sorenson. Ken is
15 the manager of Transportation Risk and Packaging Department
16 at Sandia National Laboratories. He's been there for about
17 20 years. He's worked in the area of transportation of
18 nuclear materials, computer analysis on cask responses to
19 accidents, testing of tanks and risk assessment. He's
20 currently the chair of the Package and Transport Division
21 of the Institute of Nuclear Materials Management. He also
22 is on the Editorial Board of the Institute International
23 Journal of Radioactive Materials Transport. He's earned a
24 Bachelor's in civil engineering at the University of
25 Arizona, a Master's in Civil Engineering at Colorado State

1 and an MBA at the University of New Mexico.

2 With that, Ken?

3 MR. SORENSON: Thank you, Chet. And good
4 morning, everybody. Let me say on behalf of Sandia it is a
5 pleasure to be here this morning. As Bill Brach mentioned
6 earlier, this is the fourth meeting that we've had. The
7 previous three I think we got a lot of really good comments
8 and had a lot of good discussion. And we look forward to a
9 similar day today.

10 Sandia is the technical support organization
11 for the NRC on the Package Performance Study. So, the
12 analysis that you see and the discussion of the testing in
13 the protocols was basically done at Sandia National
14 Laboratories.

15 I would like to recognize the analyst at Sandia
16 who actually worked on this program, done the analysis.
17 They are shown here; Doug Ammerman, Robert Kalan, Carlos
18 Lopez, and Jeremy Sprung.

19 I want to reiterate really what the protocols
20 that you have before you are really all about. They are a
21 snapshot of proposed, proposed path forward for the Package
22 Performance Study with the caveat that we really are
23 looking for comments on these in terms of how best to
24 proceed on this. We do identify casks in the protocols.
25 But as Andy mentioned in the last talk, we really use these

1 candid casks as a vehicle to do preliminary analysis so
2 that we can provide a benchmark, if you will, or a
3 calibration of how these casks are going to respond in
4 these different severe mechanical and thermal accident
5 environments.

6 And we also use these casks to do these
7 preliminary computer code analysis in a mechanical
8 environment and the thermal environment to see really what
9 levels of severe accidents that we're postulating and how
10 the casks would respond to those types of accidents.
11 Again, you'll see in the designs that were chosen,
12 depending on the different designs, you really do get
13 different responses out of these casks to these severe
14 environments.

15 And then, thirdly, the protocols really are
16 provided to solicit public comment and feedback. I think
17 it's important, too, to say what they're not. And
18 basically they are not a prescriptive definition of what's
19 going to be done through the Package Performance Study.
20 They really are a snapshot to give the public a chance to
21 review and comment on the proposal.

22 So, Andy, I think, gave a very good background
23 on the protocols. Let me, just to stimulate a little bit
24 of your creative juices a little bit for discussion, talk a
25 little bit about some of the basic analysis, computer

1 analysis that were done. The first picture here is a
2 computer analysis of the Holtec Hi-Star 100 rail cask.
3 Andy mentioned this analysis that you see here is a center
4 of gravity over a corner impact at 75 miles per hour. And
5 the center of gravity over corner is really an orientation
6 like this where the cask is falling. And the entire weight
7 of that package is going right through the impact point,
8 shown up there in the upper left hand corner of the cask.
9 So, it really is a very severe orientation.

10 There are other orientations for different cask
11 designs that could create higher G-loadings, for example.
12 But this really is a very severe orientation that is really
13 focused on potential pathway leakage for the containment,
14 which is at the closure end of the cask.

15 The other important point to note about this is
16 that this analysis was done on what we term an unyielding
17 surface. And the point about that is that all of the
18 energy developed during that drop goes into deformation of
19 the impact parameter on the cask, that big donut, ripple
20 structure there on the cask, and it does not go into
21 deformation of the target that it hits. There's been a lot
22 of discussion in the past three meetings about the realism
23 of the test. And talk about impacting the cask into a
24 roadbed, for example, or a granite outcropping, a bridge
25 abutment, things like that.

1 And those are good comments in terms of realism
2 of the test. This, from a technical standpoint, provides
3 really the hardest target that you could impact this
4 package into. And for a cask that's 140 tons, it's very
5 difficult in the real world, really, to find a perfectly
6 unyielding target like what we're suggesting in the Package
7 Performance Study and the protocols.

8 The graph on the right shows the acceleration
9 or deceleration of the cask. And this particular analysis
10 for the Hi-Star 100 has a function of time, which is on the
11 X axis there. And you can see it peaks out at about 100
12 g's. And we did a similar analysis on this cask for this
13 orientation at the regulatory nine meter drop. And that's
14 the bold horizontal red line. And you see that resulted in
15 a deceleration of that cask of about 30 g's, a little bit
16 over 30 g's. So, for this particular analysis, the 75
17 miles per hour onto an unyielding target, the 100 g's is a
18 severe test relative to the nine meter drop test in the
19 current regulations.

20 The second picture we have here is the Back
21 Breaker Test that Andy talked about on the GA 4 cask.
22 Again, this was an orientation that we thought about when
23 it was decided to look at both the rail truck and a truck,
24 excuse me, a rail cask and a truck cask drop test. We're
25 thinking how could we do a different test on the truck cask

1 that would provide us new information other than what we're
2 gleaming from the rail cask test.

3 And a lot of the public comment we got two
4 years ago in 2000 was to look at an orientation where you
5 would bypass the impact limiters and you would hit the cask
6 containment boundary directly. And that's what this,
7 excuse me, Back Breaker Test simulates. And you could
8 think about this as a truck cask going down the road and
9 they have an accident. And possibly the cask goes into a
10 bridge abutment like you see here.

11 And as you can see, this results in a lot of
12 deformation on the cask body itself. Again, we have the G
13 loadings versus the time and this one, for this analysis,
14 the GA4 cask, you're getting a 75 miles per hour. It peaks
15 out at about 150 g's and you have an averaged deceleration
16 of about 100 g's. As Bob Halstead mentioned earlier, this
17 really is a test that looks at a lose of shielding as
18 opposed to lose of containment. This is a depleted
19 geranium gamma shield. And you would definitely get
20 cracking of the gamma shield. Although we don't anticipate
21 that you would get lose of containment in this particular
22 orientation and speed.

23 The other thing I think is important to
24 recognize between these two casks, the Holtec Hi-Star cask,
25 the rail cask, has an internal canister that canisters the

1 spent fuel. The GA-4 cask is what we call a bear fuel cask
2 shipment. So, the fuel assemblies inside the GA-4 cask are
3 not canister.

4 This is some analysis done of the rail cask,
5 the Holtec rail cask thermal analysis. On the left was
6 show some analyses of a pool fire test. And what we're
7 looking at here on the bottom is if the cask was at the
8 level of the pool, the fuel, the middle picture there is
9 that the regulatory one meter distance above the pool fire.
10 And then the top picture is at three meters above the pool.

11 And what we're looking at, if you look at the
12 top picture there's a relative dark area underneath the
13 cask and in the middle picture as well. This is what we
14 call the Vapor Dome. You don't get complete combustion of
15 the fuel mixture there because of lack of oxygen. So you
16 have a relatively cool area underneath that cask surface.
17 And so we're looking at the affect of that vapor dome
18 relative to the position of the cask to see how that
19 affected the surface temperatures of the cask during the
20 test.

21 The big picture of the cask in the middle is
22 the, again, the rail cask. And that shows a picture of the
23 cask at the one meter above the pool fire orientation. And
24 you can see the, that's a plot of the surface temperatures
25 on that cask. And you can see there's a relatively cool

1 area in the bottom of the cask relative to the rest of the
2 cask because of that vapor dome. Again, the plot here is a
3 plot of surface temperature of the cask at various points
4 in the cask relative to time.

5 So, this is a snapshot of what we're looking at
6 from the thermal analysis for the protocols. There's been,
7 I think, some good comment on protocols in terms of balance
8 between the discussion in the protocols and the mechanical
9 testing versus the thermal testing. One of the issues with
10 the thermal testing is being able to properly define the
11 actual fire environment. In a mechanical test environment,
12 it's really quite easy to define that environment.
13 Dropping the cask, it follows the first laws of physics and
14 it's really not difficult to construct a test in the
15 mechanical regime. In the fire regime, it's much more
16 difficult with the fire itself. The phenomenon of the fire
17 physics make it a much more difficult problem. And so we
18 really are looking for your comment and feedback in terms
19 of how best to capture this environment and due the proper
20 type of test that will get us the most information on how
21 these casks respond to the thermal environments.

22 So that concludes my talk. Thank you.

23 MR. POSLUSNY: Thank you, Ken.

24 A couple of observations. Andy talked about
25 the fact that one of the objectives of the program is to

1 update or revalidate our analysis for accidents that go
2 beyond the regulations. And I think Ken's graphs clearly
3 showed 130 g's versus 30 g's under regulatory analysis is a
4 big difference in the forces that would be seen in the
5 test.

6 I'd like to take a few minutes to address some
7 comments from the folks at the round table. And then we'll
8 go into a brief discussion from each person as to what
9 issues you think are most important. We'll spend a couple
10 of minutes there and we'll go around again. And then get
11 into the over-arching issues.

12 So, are there any comments or questions on the
13 discussions we just had? Yes, Bob?

14 MR. HALSTEAD: Thank you, Chet. I'm Bob
15 Halstead and I'm speaking on behalf of the State of Nevada
16 this morning. I'd like to make three comments on these
17 opening presentations, Chet.

18 First of all, the State of Nevada is deeply
19 appreciative of the fact that the NRC is conducting this
20 proceeding. Those of you who know, when we disagree with
21 the NRC we're not shy about saying it. And in this case we
22 think the NRC has correctly identified probably the single
23 most important transportation safety issue in the fact that
24 they're conducting this proceeding on a topic that we've
25 been asking for action on for, to my knowledge, at least

1 since 1990, is very important. And because of the
2 peculiarly heavy transportation impacts that occur at the
3 end of the funnel, as transportation planners describe it,
4 Nevada has a special interest in these transportation
5 safety issues.

6 So, point number one, kudos for holding this
7 proceeding and deep appreciation from Nevada, who frankly
8 has a competing proposal for cask testing. And the
9 gracious and generous way that the NRC has allowed this
10 proceeding to allow a very open ended debate is probably
11 the first time in the 25 years that I've personally worked
12 on nuclear issues and been in a lot of NRC proceedings in
13 that time. That's probably the best thing you've done to
14 promote public confidence in my memory.

15 Point number two, validating the NRC's
16 willingness to listen to input. Now, I've had the benefit
17 of listening to the last four rounds of these opening
18 presentations. I believe you've done a good job listening
19 to the input on those presentations because this
20 presentation's very different than the one in Rockville.

21 I particularly appreciate three points. First
22 of all I appreciate the addition of test to failure as a
23 consideration brought before the group at the beginning of
24 the meeting. And the second point here is that the NRC has
25 streamlined their discussion, thrown out some of the

1 important but sidetracking issues. For example, this
2 morning we don't have to have a debate over the use of
3 probabalistic risk analysis and the State of Nevada's
4 concerns about new Reg CR6672, which we would argue is the
5 foundation document for a lot of the current risk analysis.
6 But it's highly controversial. And I don't believe it
7 necessarily advanced our discussion last week to spend a
8 half an hour debating it. And I appreciate the fact that
9 the NRC responded to our concern that that should be dealt
10 with separately at another forum so that we wouldn't have
11 to sit here talking about public confidence as it relates
12 to the last couple of proceedings that we've been involved
13 in.

14 And finally, I want to thank the NRC. It may
15 be a thoughtful site selection on their part or
16 serendipity, but while Nevada asks for most of these
17 meetings to be held in Nevada so that our people can attend
18 them, we've also argued it's important to have it in the
19 most appropriate transportation corridor states. According
20 to the Department Energy's maps, which we've brought with
21 us for those who want to look at them, about 70 percent of
22 all the shipments to Yucca Mountain, regardless of which
23 motor mix and transportation scenario is used, go through
24 the State of Illinois.

25 We are here about three miles north of the

1 Union Pacific's Proviso yard. Under DLE's calculation,
2 about one out of every three rail cask would go through the
3 Proviso yard. And on a good day, Tim, I suppose we're 30
4 minutes north of the I-80, I-90 corridor. It's not a lot
5 of miles but some days it's a lot of minutes. And that
6 corridor would likely receive about one out of every three
7 truck shipments to Yucca Mountain under either the -- rail.

8 So, without wanting to sound too polyanish, the
9 State of Nevada is very appreciative of the way you've
10 conducted this proceeding. We're appreciative of the way
11 that you've been listening as you go along. And we're
12 really happy to be here today to focus on the very specific
13 issues now of what the technical inputs to these test
14 protocols should be.

15 Thank you.

16 MR. POSLUSNY: I promise we will get to the
17 audience just before lunch. So, hold your questions till
18 then.

19 MR. WERNER: Chet, I just have a process
20 question. I look at the agenda and it looks like we have
21 9:15 is participant interests, over-arching issues. And
22 you said there was a time to go around the table --

23 MR. POSLUSNY: We're going to do that right
24 now. So, right now I'd like to basically talk about, you
25 know, hopefully you've read the report and what are the

1 things you'd like to bring to the table today, very
2 briefly. So, we'll start with each person starting with
3 you, again, Don.

4 MR. FLATER: My main purpose for being here is
5 in the State of Iowa, like the State of Illinois, is a
6 primary corridor state where the material is going to
7 cross. And what I'm looking for is what I can take back to
8 our folks to tell them that, you know, we really don't have
9 a problem relative to the transport of this material. In
10 the State of Iowa we have a lot more things that are a lot
11 more problems than this kind of material going across the
12 state. I mean, you speak about ammonia and things like
13 that that cross our states, go through the middle of our
14 large towns.

15 So, what I'm looking for is the testing that's
16 going to be done, how it's going to be different from what
17 was done previously. In looking at the casks, they look
18 pretty much the same. Are we just re-proving what we have
19 already proved back on the earlier tests? I would be
20 interested to know how the casks are going to be different,
21 if they are going to be different. Or do we have a good
22 design? That kind of thing.

23 So, basically what I'm here for is to see
24 what's going to happen, see what the tests are going to be
25 and try to convince our folks that we don't have a problem

1 with this stuff coming across the State of Iowa.

2 MR. POSLUSNY: Thanks, Don. I think you'll
3 hear answers to all those questions.

4 MR. FLATER: Thank you.

5 MR. WRIGHT: Ned Wright with Lynn County, Iowa.
6 We also not only have the power plant but we also have the
7 transportation routes come through our community. I also
8 have the two haz-mat teams that would respond to
9 emergencies in the eastern part of the state. So, a lot of
10 the things that you guys are talking about, my guys have to
11 respond to it. So, I have a responsibility to them to make
12 sure that they know what's out there. And part of the
13 problems that we're getting is the information that's
14 coming out, I have far left and far right. Either it's not
15 a problem or, you know, don't even respond because you're
16 dead before you get there.

17 And one of the problems that I have is trying
18 to use the material that we're getting here so I can go
19 back and show my people and confirm to them that they know
20 what they're doing and stuff like that. Part of what we're
21 looking at is our haz-mat teams and the first responders
22 rely very heavily on the DOT guidebook for hazardous
23 materials. And they know what to do with all this other
24 junk that comes through here, and I have more than my fair
25 share coming through the community, so our responders know

1 what that is.

2 We're also getting conflicting information that
3 either, and I always ask our technicians, if I take a
4 bundle and drop it on the ground, forget all the shielding
5 and stuff like that, how bad is it? And I've got
6 everything from, you know, the safe distance is a hundred
7 yards. Then I have other report says five miles. I say,
8 all right, guys, we've got to get tighter shot group on
9 this.

10 And that's what I'm looking at is making sure
11 that the information we have here is important. And I also
12 have to address the public concerns because my other
13 problem in the fact that of all the other emergency
14 management things we do because of the nuclear power
15 plants, that we have any concern that happens in any place
16 of the 103 facilities, I have to respond to that because
17 someone keeps faxing all this to the media about how bad it
18 is. If it's bad in Point A, obviously your community has a
19 problem. So, I spend a lot of my time explaining to the
20 public, we do not have a problem. And if we do have a
21 problem then a whole lot of people have been lying to me.

22 So, I've got a lot of confidence in what has
23 been going on. And I need to be able to, from my own self,
24 confirm that confidence so that I can, again, because I'm
25 responsible for the people that's actually going to go out

1 and touch it.

2 MR. POSLUSNY: I'm not sure we're going to be
3 able to answer that second question during this discussion.
4 But I think maybe myself or some folks from the region
5 could chat with you about that off line. But the one on
6 safe distance, given a reach task, we'll talk about that
7 later.

8 MS. SNYDER: We can address that later.

9 Thanks.

10 MR. WRIGHT: Sure.

11 MR. POSLUSNY: Fred?

12 MR. DILGER: Good morning. I'm Fred Dilger,
13 I'm here from Clark County, Nevada. Clark County, Nevada
14 is where Las Vegas is and virtually all of the shipments
15 will have to pass through Clark County in route to Yucca
16 Mountain, should Yucca Mountain be actually constructed.

17 We're very glad for the opportunity to be here
18 today. I want to echo Bob Halstead's comments and say that
19 it's been a very, very good experience to come to all of
20 these meetings and listen as the NRC has refined its own
21 presentations and adjusted, I think, to the comments that
22 they've heard as these meetings have gone on. And what I
23 see now is that we're focused in a very, is that the
24 earlier meetings were useful because today we're focused on
25 really some of the essentials or we'll be able to do that,

1 to get really the heart of the matter in a number of
2 different areas and to touch on some of the technical
3 problems or the technical questions that still remain.

4 So, anyway, I think that this process and the
5 way it's been implemented have been really, really very,
6 very positive and we look forward to today's work.

7 MR. POSLUSNY: Thanks, Fred. George?

8 MR. CROCKER: Thank you. My name is George
9 Crocker, again, from Minnesota. I, too, am very
10 appreciative of this opportunity to be here. I thank you
11 kindly for that.

12 You kind of stole my thunder already, though,
13 when you go talking about testing to failure, which is
14 really one of the key things on my agenda to help that
15 happen. Almost any widget you care to look at in order to
16 find out what's wrong with it or where will it break or how
17 to make it better, the engineers test it to failure.
18 There's whole protocol in almost anything on how to do
19 that. It seems to me absolutely critical when we're
20 talking about this kind of material that we do, in fact, to
21 failure in as many failure modes as we can possibly
22 conceive of.

23 So, that, that's a real important point on my
24 agenda. And to see that it's already on yours, I didn't
25 notice it in the draft that I had. So, I'm very

1 appreciative to see that there is that kind of
2 responsiveness even going into this meeting today. So,
3 thanks for that.

4 There are a number of other concerns that I do
5 have. One of them has to do with the fact that when we are
6 actually shipping waste, why we will not have placebo
7 material, we'll have material that has a thermal load to it
8 in particular. How do we account for the thermal load, the
9 interior thermal loading as we find ourselves in these
10 extreme environments? In other words; I don't know the
11 answer to that but I haven't heard any discussion of it.
12 And that is deeply troubling to me.

13 Likewise, there's sort of a similar problem
14 with, there was some discussion in the draft having to do
15 with the cask atmosphere. Of course, these things are in a
16 helium or -- atmospheres as they're shipped. And there's
17 reasons for that. What happens when we lose that
18 atmosphere due to an extreme environment it comes into?
19 And what does that do in terms of the potential for
20 internal degradation to happen that wouldn't happen if you
21 didn't lose the internal atmosphere. So, that's an issue.
22 And I think the test protocol has to do a better job of
23 coming to grips with that particular problem with it.

24 Another problem, which is sort of more of a
25 generic one is that we're moving or at least there are

1 forces that want to move quite willy-nilly into a massive
2 casking operation. That means we're going to make a lot of
3 them. Right? It's going to be a lot of people fabricating
4 casks. Now, you've tested your casks. But how do you know
5 the one that gets the hit meets spec, right? Where is your
6 quality control? Where is your quality assurance that the
7 material that's rolling down the rails and down the
8 highways actually is capable of performing at the level
9 that your test protocol says it will? And there I think
10 we're screaming down a black hole. I don't see anything
11 that allows any assurance. And I'm looking for reassurance
12 that there is, in fact, something there. But I don't see
13 it and I want to see it before we go too much farther.

14 Then the final thing that is on my mind, of
15 course, is something that ought to be on all of our minds a
16 lot more, and that is the potential for sabotage. I don't
17 know. You can go into any library and take out Jay's
18 magazine and take a look at what anti-tank ground warfare
19 weapons do. You know. They're the shoulder fired rockets,
20 single person. You don't need line of sight. You can
21 guide them in with a joy stick. Now there's even drowns.
22 You can fire them off from a hundred miles away and they'll
23 track.

24 I mean, these are very sophisticated weapons.
25 And they'll go through three feet of tank armor, chubba

1 minor, layered steel, in one side and out the other of
2 anything you've got. Anything. And there's no response to
3 it. That's not appropriate. We're going to have to get
4 serious. If we're serious enough to do this green, red,
5 orange, blue stuff, you know? If we're so concerned about
6 our security to do what W's now doing, let's make it real
7 on this side, too.

8 So, that's a challenge. How to robust
9 superstructure over these things so that incoming detonates
10 on the superstructure rather than the target. And if you
11 don't do that, if you don't figure out how to do that,
12 you're not serious about what I heard in your opening
13 presentation, which wasn't on the slide but you did say
14 something about in addition to safety. You said something
15 about defense and security. So, let's get serious about it
16 rather than just the bodyguard of lies.

17 Thank you.

18 MR. POSLUSNY: Okay, thanks, George. Would the
19 staff want to address either QA or sabotage at this point
20 or do you want to wait till later?

21 MR. BRACH: I'd suggest we go around. There
22 are a number of topics. I think we may spend a good part
23 of the day in that interaction --

24 MR. POSLUSNY: Okay, all right. Either later
25 or -- okay. John.

1 MR. VINCENT: I think as I've said before at
2 previous meetings, the nuclear industry does not believe
3 that full scope testing is required to ensure public health
4 and safety either as a pre-condition to the designing and
5 licensing of the casks or for the purposes here. In fact,
6 we know in one of the suggestions that's been received
7 already is that in some of the data collection that the NRC
8 wants to do, part scale testing will do very nicely for
9 that. And, in fact, for the certification process the
10 industry uses part scale testing, actual component mock up
11 testing and computer evaluations using our vastly improved
12 computer evaluation techniques to accomplish this goal.

13 We've been doing that for a number of years now
14 and our ability to predict the performance of the cask to
15 be a computer simulation is much improved over what it used
16 to be. In fact, we can do things now and measure
17 particular parameters in those computer evaluations. It
18 would probably be very difficult to monitor and measure as
19 an actual fact of the testing. And we can do those things
20 over and over and over again until we understand the exact
21 performance of the package.

22 Another thing that's important here I think is
23 that the exemplary transportation history that we have
24 illustrates that we must be doing something right. We were
25 doing what we need to do to ensure the safety of the

1 packages by first guaranteeing their robust nature. And
2 then secondarily, moving them appropriately in commerce.

3 Now, having said that, the industry does
4 believe that there's probably some benefit in doing the
5 full scaled testing for the business of improving public
6 confidence in the regulations and the actual transport of
7 these materials and the casks themselves. The PPS or the
8 Package Performance Study, stay away from the acronyms, can
9 be very helpful in that regard if it's done properly.

10 However, it's not clear that it's satisfying
11 both of the goals, that is the scientific data collection
12 and the public confidence building are not mutually
13 exclusive in a large way. The technical data collection is
14 one that requires that you understand very precisely what
15 the conditions of the testing are in order to be able to
16 relate the measurements you're making to the physics
17 involved. Whereas on the public confidence side, we're
18 not sure that doing something that is not specifically real
19 world type of scenario improves that circumstance.

20 So, we would argue that maybe you need to look
21 at that. It may have a possibility for bifurcating the
22 process of the testing. You may need more testing or some
23 part scaled testing as well. But that needs to be
24 investigated.

25 Again, I want to emphasize that we think the

1 real world testing scenarios will support improvements in
2 public confidence, especially if they have an input into
3 what those should look like. But they may not provide the
4 scientific rigor that is needed to support the evaluation
5 of the materials and the design properties that you're
6 trying to do. And it's entirely possible that the NRC on
7 that score could end up satisfying neither group, that is
8 the engineers or the public sufficiently to accommodate
9 what their goals are as stated in the Package Performance
10 Study protocols.

11 Whatever testing is done it should be risk
12 informed. And particularly that should involved a cost
13 benefit analysis. And we're also moving into an
14 environment where much more of our regulations are going to
15 be risked informed and these tests, in some fashion, should
16 serve to promote the NRC's moving in that direction.

17 Again, as I said previously at the meeting in
18 D.C., the industry does not believe testing to failure or
19 destruction proves anything. You have to define what it is
20 you're trying to test, figure out how you're going to do
21 that and then figure out how you're going to measure it and
22 make sure you were able to get the measurements once you
23 design the test. So, just saying you want to test to
24 failure or test to destruction doesn't necessarily prove
25 very much. And I'm not sure that it would be helpful.

1 We need to have the test design criteria
2 established very specifically and we need to have the data
3 acceptance criteria established before you even do the test
4 so you understand what it is you're collecting and why
5 you're testing it. And how you're going to expect the data
6 as doing what you were trying to do, especially if it is,
7 as you eluded, the mode of trying to validate computer
8 simulations in the areas for the cask information and its
9 primary issues.

10 It was mentioned at some other meetings and
11 hasn't been mentioned here yet, but at the completion of
12 the Package Performance Study should be done prior to the
13 beginning of any future shipping campaigns. And the
14 industry believes this is totally not justified. It should
15 not be a necessary pre-condition to DOE beginning its
16 shipments to the Federal Repository, wherever that turns
17 out to be, or to those, the private fuel storage project.

18 MR. POSLUSNY: Okay, thank you. David?

19 MR. BENNETT: Yes, my name is David Bennett. I
20 represent one company but in essence a consortium of an
21 axle of people transport, build, use and have stakes pretty
22 high in this project. We fully support and appreciate
23 NRC's openness. I think it's wonderful to get such valid
24 feedback and input both ways. I think it's helpful. I
25 think it's helpful from the standpoint of the public's

1 security. However, we as an industry have been moving this
2 material since 1954, the Tri-State in particular, and we
3 have found so far NRC has done more than its job because
4 the public has become so unaware of what's going on because
5 it was done so well.

6 So, we're here to support that, sort of be an
7 alley, a reference, a resource. We believe the cost
8 benefits should be a consideration versus overkill. Not to
9 exempt the statement of overkill to be unsafe but just, as
10 John referred to, full scale testing has not been done and
11 yet there has been no incidents. That doesn't say it would
12 not help. But we are concerned about how much you do and
13 what benefits you actually get because in essence we come
14 from the standpoint, a little bit, someone's got to pay the
15 bill. And when it comes to being safe versus overkill, we
16 think dollars should be spent wisely.

17 We appreciate this and we're here to help and
18 really as a reference and listen more than raise any
19 issues.

20 MR. DOIG: My name is Scott Doig and the
21 community I work for is Dakota Community, has become
22 something of a storage site unwittingly. We currently have
23 17 dry storage casks and there's legislation for increased
24 storage. And the community is about 600 yards from that
25 spent fuel storage facility. So Prairie Island is

1 interested in removing that fuel to a more secure site,
2 wherever that might be. Part of the problem is that the
3 existing rail line that presumably that fuel would use
4 crosses the only evacuated route off the Island. It is
5 indeed an island that we share with the nuclear power
6 plant.

7 With that said, the safety of that fuel coming
8 off the island, there are a few issues that hopefully
9 through the day some of the engineers could help out in
10 terms of the integrity of the containers that they're going
11 to be held in. A couple of the questions that the
12 community has are the affects of multiple incidents on
13 these containers. It doesn't seem to be too far of a reach
14 that an impact could easily be followed by a long, a
15 sustained fire on the same tank. I'm wondering if you're
16 going to be looking at those.

17 Also, on the subject of testing to failure,
18 although I haven't done works in that type of modeling, I
19 have done some in natural resource predictive modeling and
20 regression curves. And the one thing that is commonly
21 known in those types of models is that in order to do
22 predictive modeling of what occurs, you have to have
23 samples at the beginning and the end of the curve or the
24 model to determine what happens in between. Anything that
25 occurs outside of those, that sampling range, your

1 confidence or R squared is quite low. So, we do believe
2 the testing to failure is important.

3 Also, George had mentioned the impact of
4 terrorist event, a shoulder to fire missiles, those kinds
5 of things. The Prairie Island community is surrounded by a
6 number of blow offs which give, which open it more so than
7 other facilities maybe to that kind of impact.

8 So, hopefully those are some of the questions
9 that we can get answered today.

10 MR. POSLUSNY: Marvin?

11 MR. RESNIKOFF: My name is Marvin Resnikoff and
12 we're consultants to the State of Nevada and also to the
13 State of Utah working on transportation and dry storage
14 issues, accident analysis and environmental impacts. I
15 have to say my view of, I'm glad that things have changed
16 over time. But my view stretches way back almost as far
17 back as Bill Brach's view, back to 1975 when I worked for
18 Attorney General Lefcowicz on transportation of plutonium
19 nitrite, liquid plutonium out of West Valley Nuclear Fuel
20 Services out of Kennedy Airport in containers that couldn't
21 withstand a 30 foot drop.

22 And we were resisted by the NRC in court until
23 finally the U.S. Congress simply said in an appropriations
24 bill that these containers have to withstand an air crush.
25 And subsequently the NRC did -- these containers. So, my

1 view of the NRC is colored by those past events. But they
2 also reach now into present day. And it arose again when
3 one of the previous speakers spoke.

4 One issue I have is how is, the data is going
5 to be used to refine the risk estimates. Then what? Then
6 those risk estimates what? Will change how rad trend is
7 used perhaps? On how we estimate the likelihood of an
8 accident along particular transportation routes. But would
9 that information go into environmental impact statements
10 and will they affect licensing proceedings?

11 At the PFS licensing proceeding they were using
12 Table S4, which is based on Wash 1238, which is 1972
13 document. I think the NRC really has, if they're going to
14 refine the risk estimates, that information has to be
15 brought into environmental impact statements, today's
16 environmental impact statements. You cannot use 1972 data
17 and 1972 reports. So, that's the first point I wanted to
18 make.

19 The second is I realize that you're not looking
20 at what happens to a fuel assembly. You're only looking at
21 what happens to a cask in this proceeding. But let me just
22 say quickly, what happens to a fuel assembly is very
23 important in these risk estimates. And I know this is
24 going on separately in a separate proceeding that you're
25 going to handle. But let me mention just two quick points

1 about it. It's very important that in a radiated, radiated
2 fuel cladding be used up to the burn ups that are expected
3 now a days, not up to 25,000 megawatt days per metric ton,
4 but at least 40,000 megawatt days per metric ton.

5 It's very important that one test, what cesium,
6 what 137 is in the gap. That one not relay on Lorenz and
7 Parker Studies of 1960's and early '70's to do that. You
8 should have new studies which actually measures cesium in
9 the gap, which those studies did not do. So, I just want
10 to mention that, that that needs to be factored into the
11 risk estimates, which you're now handling here at this
12 time.

13 Finally, it's important that the NRC bring to
14 the public the information that it has and do it in a
15 timely manner. The NIST Study, which the NRC contracted
16 for, was done in August of 2002 and it was not released,
17 you know, until several months later. And it would have
18 been useful for the public to have those results.
19 Similarly, the fire studies that have been mentioned here
20 today, it would be useful for us to actually see a write up
21 of the inputs and, you know, what the assumptions are so
22 that we can make informed comments, you know, in this kind
23 of proceeding.

24 MR. HALSTEAD: Bob Halstead, State of Nevada.
25 let me quickly overview for you six reasons why the State

1 of Nevada has made such a big deal out of the absence of
2 full scale cask testing and why we think it should be done.

3 First of all, most of us who are familiar with
4 this field know that the codes have become more elegant
5 over the years, our analytical abilities have grown greatly
6 but we're still, because we're not testing cask full scale,
7 have opacity of measured physical data on cask performance
8 in severe accidents. We need to do the full scale testing
9 to get the physical data that we need to put into these
10 elegant new computer codes.

11 Secondly, the new cask designs are dramatically
12 different from past and current designs. They differ in
13 their size. They differ in their weight. They differ in
14 the configurations and materials used for the construction
15 of the walls, the radiation shielding, the closure
16 mechanisms and so forth. The very fact that these designs
17 are different from the designs that the fabricators are
18 used to making, that the carriers are used to handling are
19 that the NRC is used to regulating underscore the need for
20 full scale testing here.

21 Third point; the radiological hazard goes up as
22 the payload of the cask goes up. The new cask designs have
23 four to six times the payload of current designs. What
24 that means is if you assume average cooling time for the
25 shipments to Yucca Mountain, every rail cask contains more

1 than 800,000 curries of cesium 137 alone. Every truck cask
2 contains more than 175,000 curries of cesium 137 alone.
3 It's an enormous potential radiological hazard.

4 Point number four; the modes and numbers of
5 shipments to Yucca Mountain and understand, Yucca Mountain
6 shipments, if the project is licensed, will represent
7 probably greater than 95 percent of all the spec nuclear
8 fuel shipments in the United States over the next 50 years
9 or so. So, that's why we're focused on the Yucca Mountain
10 shipments.

11 Because there is no rail access to Yucca
12 Mountain and because rail access to Yucca Mountain will be
13 extremely difficult and expensive to achieve, and because
14 the Department of Energy is lately telling us they've
15 abandoned their backup plan, which was to use heavy haul
16 trucks for inter mobile transport from a rail in Nevada to
17 Yucca Mountain in the event that they couldn't build the
18 rails for it. We must consider the possibility that there
19 will be 100 percent truck shipments as well as the
20 possibility that there will be about 98 percent rail
21 shipments.

22 So, the Department of Energy has actually
23 appropriately bounded what might happen from the
24 transportation planner's standpoint. Over the next 38
25 years assuming, that is over 38 years from 2010, which is

1 the opening date, you could very well have 109,000 or more
2 truck shipments with an average of about 2900 per year over
3 the next, over the four decades of operation.

4 If the Department is lucky, and I don't think
5 they'll be this lucky in hitting their target, they might
6 have a much lower number of large rail cask. The number
7 now looks to be somewhere in the neighborhood of 19,000
8 rail cask, about 3,000 truck shipments over 38 years. The
9 point here is in the NRC's planning for the types of casks
10 that are tested, and in all of our understandings about the
11 transportation risks we'll meet in the future, you cannot
12 say, as the Department of Energy has said, that there will
13 only be 175 shipments for year. I wish that were the case.
14 I've been advocating maximum use of rail for 25 years. I
15 don't see any evidence that it will happen.

16 Point number five; while the industry has a
17 good accident history in terms of not having massive
18 failures, the last release from the transportation accident
19 that we're aware of was in 1964. On the other hand when
20 you look statistically at their record in terms of
21 incidents per million miles travelled, it's not an
22 establishly enviable record. The accident rate since 1964
23 for commercial spent fuel shipments is greater than one
24 reportable accident per million miles travelled. And for
25 rail shipments it's greater than five per million miles

1 travelled. So, it's a good record in terms of not have
2 catastrophic events. Let's not assume that it's a better
3 record than it is in terms of the need for more accident
4 prevention.

5 Point number six; Nevada is very concerned
6 about terrorism and sabotage. But we've chosen to address
7 this issue separately in a petition for rule making filed
8 with the Nuclear Regulatory Commission in June of 1999.
9 And the fact that we're not spending a lot of time raising
10 those issues in this proceeding does not mean we're not
11 concerned about them. It's just both for legal and
12 security reasons we stay with the original approach we took
13 of addressing those issues under Part 73 of Chapter 10 in
14 the Federal Code of Regulations.

15 Finally, a seven point will seem strange to you
16 that Nevada has a concern about barges, but it's very
17 important to understand that 24 of the shipping sites in
18 the country have no rail access. And DOE has talked about
19 the possibility of 17 of those sites shipping by barge,
20 including four sites on Lake Michigan. There's no
21 consideration in this proceeding for looking at the
22 emergence standard either as occurs under the sequential
23 test nor is there any attention to physical testing to see
24 if these casks meet the IAEA standard, which is that an
25 undamaged cask must survive the pressures equivalent to a

1 200 meter ocean submerging.

2 Now, we would note that there are a number of
3 locations in Lake Michigan that exceed the international
4 safety standard as there are canyons that run in the 200 to
5 280 meter depth level that would significantly exceed the
6 safety standard in the international regulations.

7 Thank you.

8 MR. POSLUSNY: I know it seems like this is
9 taking a long time but these are good issues. I'm sure
10 they're going to make the discussions very useful.

11 Mike?

12 MR. CONROY: Thank you. Again, I'm Michael
13 Conroy from U.S. Department of Energy. We concur with the
14 NRC's statements that are in the Test Protocols Report that
15 the current regulations and programs for transporting spent
16 nuclear fuel do result in a high degree of safety. NRC
17 certification of the cask has contributed to an excellent
18 safety record for transporting spent fuel. And that safety
19 protection is well established. Over the past 50 years, as
20 some of the speakers have mentioned, there's been a good
21 deal of experience gained in the transportation of spent
22 fuel. In the U.S. there's been over 2700 shipments of
23 spent fuel that have travelled over 1.6 million miles.
24 None of those shipments have resulted in the release of
25 radioactive contents. Also, there's been thousands of

1 other shipments that have been made safely throughout the
2 world.

3 NRC's risk studies have concluded that the risk
4 of spent fuel transported under the regulations is low.
5 What we're talking about here in the Package Performance
6 Study is examining the adequacy of the analytical methods
7 and the data that are used to estimate the response of cask
8 to improbable extreme accidents that might cause a release.
9 We should point out that in a fellow register notice NRC
10 notes that their previous risk studies have estimated that
11 their certifications standards encompass well over 99
12 percent of possible transportation accidents. So, what the
13 package performance study is doing is looking at those
14 things out on the far end of probability.

15 What the Package Performance Study is not
16 intended to involve the development of new standards for
17 transportation casks, although I'm sure NRC will keep an
18 open mind on that. But we do anticipate that the tests
19 that are described will demonstrate the validity of
20 computational methods used for both impact and thermal
21 test. And what we would like to see is that NRC make clear
22 that the tests described in the test protocols are not
23 being proposed as new standards for package certification.
24 We'd also like to see that the test conditions used get
25 correlated to real world conditions so that people have an

1 understanding of what an impact on an unyielding surface,
2 how that corresponds to something you'd see in a real world
3 accident.

4 MR. POSLUSNY: Okay, thank you. Thor?

5 MR. STRONG: My name is Thor Strong. I'm with
6 the State of Michigan and I've been Michigan's
7 representative to Midwest Council of State Government's
8 High Level Waste Transportation Committee for about 12
9 years.

10 I'm not a nuclear engineer, I'm not a nuclear
11 physicist. I'm kind of a simple bureaucrat. And so some
12 of this is far over my head in terms of the very technical
13 issues being discussed. But I'm one who's been very
14 interested, involved in issues of risk assessment and risk
15 communication and relative risk issues. I've been in
16 support of full scale cask testing since our Midwest
17 Committee took up the issue and voted on a resolution
18 encouraging full scale cask testing way back in 1993.

19 Not that I have a great deal of skepticism
20 about the value of computer modeling and scale testing and
21 this sort of thing. I've traveled across the Mackinaw
22 Bridge a couple of weeks ago and realized that before that
23 was built there was no full scale testing done on that
24 structure.

25 In terms of the issues that I'd like to bring

1 up or advocate I guess relate to the issue of drop tests
2 versus horizontal impact tests. And I know that's one
3 issue I guess that's being discussed more specifically
4 later in the afternoon. So, I'll just wait and comment on
5 it then. Thank you.

6 MR. RUNYON: I'm Tim Runyon with the Illinois
7 Department of Nuclear Safety and I'm also representing the
8 Midwestern Radioactive Materials Transportation Committee,
9 of which I've been a member now for about ten years as
10 well. And as Thor indicated, we've developed a resolution
11 supporting full scale cask testing back in about 1993. And
12 I think the midwest along with the rest of the regional
13 groups have supported the concept of full scale testing for
14 at least a decade now.

15 Putting my Illinois hat back on, we in Illinois
16 have been home to the only private fuel storage facility at
17 GE Morris. We have more operating electric generating
18 reactors than any other state in the United States. We
19 realize, because of our geographical location, that we will
20 be intimately involved in dealing with transport of spent
21 fuel by whatever mode. But we also have a considerable
22 history with it already by virtue of the existing
23 facilities.

24 A lot of our programs that we have right now
25 within the State of Illinois were developed in response to

1 public input and public concern about the transport of
2 spent fuel. As such we have used some of the existing test
3 protocols, some of the historical video from the early
4 Sandia tests. I can't tell you how many times I have shown
5 those films to the public, to first responders, to
6 interested parties as a reflection of the level of testing
7 of casks are subject to and in our own efforts to, I guess,
8 develop some public confidence.

9 I think we do support the updating, if you
10 will, some of the protocols; validating some of the codes
11 or some of the physical information that will be used to
12 drive the codes. Along with Thor I think I value the more
13 real world tests. I think I value those types of tests
14 that reflect real world accidents. And I'm looking forward
15 to some additional discussion and hearing some additional
16 opinions on relative to the fire testing and also why the
17 preference for drop testing versus horizontal testing.
18 Those, a little more technical detail on those issues.

19 To sum degree, one might consider a lot of the
20 discussion that's going on right now, move in terms of the
21 current world condition, in terms of the post 9-11 world.
22 I would agree that if you want to put a hole in a spent
23 fuel cask, you could probably do it. I would agree that
24 you could probably build a cask that would withstand a
25 terrorist attack. I would agree that you could probably

1 build a cask that would withstand a shoulder launched
2 rocket. But once you've built it, could you pull it
3 anywhere?

4 I can look at those as somewhat separate issues
5 and I feel like there still needs to be a lot of work done
6 in terms of physical security and development of those
7 aspects of transportation. But I don't necessarily think
8 it relates directly to this particular performance study
9 meeting.

10 MR. POSLUSNY: Dean?

11 MR. LARSON: My name is Dean Larson, I'm
12 representing Lake County, Indiana, LAPC, and I thank you
13 very much for the invitation.

14 One of the things that I would commend to you
15 is when you are completed with this test and you revise the
16 risk, that you spend a fair amount of time figuring out how
17 you're going to communicate that to the public. Our county
18 sits in northwest Indiana. I-80 goes right through our
19 county so we're very concerned about the truck shipments
20 that would come through there and the rail shipments when
21 they come through here.

22 We're also a county that has had significant
23 experience with a bureaucracy when they attempt to do
24 something like recycle napalm and if you don't spend the
25 right amount of time in the risk communication it's going

1 to blow up in your face. And I don't mean this, the napalm
2 blew up in their face but when the Navy attempted to
3 recycle napalm in our county, there was a huge human cry
4 that was raised. And it goes back to Bill, and I thank you
5 for, you said the precursor of public confidence is trust
6 and understanding.

7 When people said the words napalm, there was
8 people that had a completely unjustified response just
9 because the word napalm. I would suggest to you that
10 you're going to have exactly, and we've all experienced
11 that same type of response, anything we talk about risk of
12 radioactivity, any contamination risk, anything to do with
13 transportation.

14 So, I would say when your tests are done, you
15 spend the time explaining it to the public and explain that
16 we can't protect for every risk. I echo the comments about
17 why aren't we testing to the point of finding out would
18 these sub-stand anything of a terrorist activity. I
19 understand that and I understand that that should not slow
20 us down in doing what you're doing now.

21 Again, I thank the NRC for this invitation.

22 MR. CROSE: My name is David Crose. I'm the
23 Governor's appointee to the Midwest Radiation Group. Also,
24 I am the appointee to the Southern States Energy Board.
25 I've held those positions since 1991. I chaired the

1 Midwest Group in '96 and '97. Mr. Runyon is the current
2 chair of that group. Mr. Thor Strong is the vice chair. I
3 appreciate the opportunity to be here. I've had occasion
4 over the few years I've been involved to have interaction
5 with Mr. Resnikoff, Mr. Halstead, a lot of the people
6 around the table.

7 I think one of the main issues we need to think
8 about here is public confidence is the number one issue.
9 The second issue is confidence in responders. As far as
10 testing to failure, we've not, since this is the first time
11 we've really been exposed to this, we don't have a current
12 position on test to failure. We will make written comments
13 on that.

14 I think the other big concern is a breach of
15 the cask and also release. That's the two major concerns,
16 if there is going to be a release that would affect the
17 public or responders. Another thing I think's interesting
18 is the issue of a full cask testing. And we do advocate
19 that. As Tim mentioned, we sent a resolution to that
20 affect to the Department of Energy in 1993 and to NRC. I
21 think we need to take a look at, with the younger
22 generation, of the computer modeling. It probably would be
23 interesting to do some kind of a survey, especially with
24 the younger people, which they would have the most
25 confidence in. Whether they would have the most confidence

1 in the full scale testing or whether they would have more
2 confidence in computer modeling. And I think if that has
3 not been done, it might be interesting to take a look at.

4 We generally agree with what we've seen here
5 and what's been presented in the past on full scale testing
6 protocols. The other thing that's been brought up that I
7 agree with is I think you're going to have to have some
8 kind of a quality control. When you start doing mass
9 production of cask, you need to have some kind of a really
10 good quality control on those casks.

11 Another thing is in the real world now is the
12 sabotage. Also we refer the Emergency Management Committee
13 on a lot of other areas. Is like what we call the worse
14 case scenario. And I think that's what we've talked about
15 a lot around the room here and it will continue to be an
16 issue. So, you do have to take a look at that.

17 The other thing is, I think you just need to be
18 sure, as Mr. Larson's mentioned, the most important thing
19 we've found in the State of Indiana is to educate the
20 public, make sure they get the real facts, not different,
21 you know, people trying to just stress what their point is.
22 But get the facts and then they'll make the decision. And
23 also, they're going to depend on what your emergency
24 management, what your Governor's Office, the other elected
25 officials, response people put out. That's who they're

1 going to listen to.

2 A quick example of that. We've had shipments
3 coming from Fernaldo, Ohio, for several years now. 60 cars
4 dedicated trains that run every two weeks the full length
5 of the State of Indiana. What we did prior to those
6 shipments starting, we had people from that facility come
7 with us, we held public meetings. And after those public
8 meetings we have not heard anything else about that issue
9 at all. What was interesting, the person they listened to
10 at those meetings was the fire chief in that community.
11 You can sit there and debate back and forth. And we had --
12 officials in there. But the person that they listened to
13 was that fire chief and those local responders in that
14 community. And that's who they'll listen to.

15 One other thing our state has experience with
16 looking at worse case scenarios and also protecting the
17 public. We have one of the seven chemical storage sites in
18 the country. We have 1200 tons of VX nerve agent stored in
19 New Port Chemical Depot on the, close to the border with
20 Illinois. In fact, we work the State of Illinois. And
21 we've found that educating the public has been the answer
22 there and especially the young people and in the schools.
23 And that's the same thing we need to address the issue
24 right here. You need to address the issue with the young
25 people and let them know what the facts are and go from

1 there.

2 Thank you.

3 MR. POSLUSNY: John.

4 MR. ERIKSON: My name is John Erikson, Policy
5 Advisor to the Governor of the State of Nebraska, also a
6 member of this Midwest Radioactive Material Transportation
7 Committee.

8 My purpose for being here and what I'm looking
9 for is to ensure that there is adequate state involvement.
10 I appreciate the NRC and we, in our regional groups, work
11 with federal agencies, we continually have to stress the
12 importance of state involvement. Not only individual
13 states but regional perspective.

14 One of the things that concerns me, and it's
15 already been mentioned, is the concept of risk
16 communication, how you do that, how you temper those with
17 the scientific engineering mind that have a very high
18 confidence in their facts compared with the public
19 perception to it, who would rather see a video that's very
20 dramatic, visual presentation. And so I would tend to
21 agree with the question raised about the need for
22 horizontal testing versus a vertical drop. It's much more
23 of a visual presentation.

24 Test to failure is a concern. One of the
25 things that concerns me about the whole idea of test to

1 failure is what is the signal that you're sending by
2 proving that you can break something. It could easily give
3 those that are opposed to nuclear power and the whole
4 transportation of nuclear waste more ammunition to say,
5 well, obviously it's not safe because we haven't designed a
6 container that's full proof or that's unbreakable.

7 So, I guess there has to be some middle ground
8 of looking at where, what's the rationale for the test to
9 failure? Does it actually give us the in point data,
10 that's been mentioned before. And if we're going to do
11 that, then how do we communicate what we've done in test to
12 failure so that we're not just saying, yes, it can be
13 broken.

14 MR. POSLUSNY: Jim?

15 MR. WERNER: Good morning. I'm Jim Werner with
16 the State of Missouri. I'm the Director of the Anna Land
17 Protection Division. And I guess I, I come to this with a
18 little bit mixed perspective. I guess the first question I
19 had is why are we even here today? And I think there are
20 two equally valid answers to that. And one is to work on
21 this PPS and the technical protocols and determine what the
22 best technical answer is to ensure safety. But the second
23 that I think is at least equally important is to help build
24 sufficient public trust and confidence. And when Bill
25 Brach spoke this morning it sounded like logically that's

1 the only reason for NRC to be here is because NRC asserted
2 that they already have, there is, you know, confidence in
3 the existing system, that technically it's sufficient.

4 And so if it is currently technically
5 sufficient then there could be no other reason but to build
6 sufficient public trust and confidence. And I do think
7 that is a valid reason for you to put this effort together
8 and I applaud you for doing that. And I specifically
9 applaud NRC for going forward proposing the full scale cask
10 testing. And with the investment of money, money being
11 short, hopefully get the best bang for our buck there in
12 going forward with those sorts of tests.

13 Missouri, of course, is another corridor
14 community but has a couple of other unique things about it
15 besides being at the cross roads east and west and north
16 and south. One of the things I live with every day is I've
17 got a staff that, like you, has the emergency response. We
18 have a less robust local county system, such as Lynn
19 County, and ours is more on a state level. So, I've got my
20 staff located in six regional offices. So, we need to make
21 sure that they are adequately prepared for the issues. But
22 also have an adequate trust and confidence in the whole
23 system.

24 Part of the reason maybe we have such a large
25 emergency response system is we have the unique blessing of

1 being the methylamine capital of the world, which might be
2 irrelevant normally to this proceeding but we have 2,100,
3 who's counting, last year meth cases. So, we get like half
4 a dozen meth labs discovered a day. So, we have a very
5 large population of people who are accustomed to dealing
6 with hazardous explosive chemicals and hydros ammonia. The
7 number is larger than all of New York and all of
8 California. So, in a per capital basis it's 20 times
9 larger than any other state. And so we do worry about the
10 ready availability.

11 And one of the, in a way of a recommendations I
12 always make is, let me start with the fundamentals. I
13 would urge the NRC to look at this not as cask testing and
14 isolation but really part of a larger transportation
15 system. And I know you're doing that to some extent but
16 make sure that connections are made so that you're looking
17 at the overall system and then the role of the cask
18 technology plays in that overall transportation system.
19 And you're spending your money on cask testing to look at
20 the circumstances that might be real world appropriate
21 things. And that might include an inventory of the issues
22 with each of the states.

23 And in coming through our state, if you came to
24 us, we might throw out things like the readily availability
25 of these chemicals in a large population of people, ready

1 to use them and having them at hand; the large number of
2 shaped charges, explosive charges and, you know, other
3 unique things about our state. Also the ability to deplete
4 uranium materials in Missouri. My deal on that is I
5 understand there's a separate proceeding on that but,
6 again, to look at this in an overall system.

7 And I guess my comments come not just from my
8 experience and responsibility managing the programs in
9 Missouri, but also from my experience at the Department of
10 Energy where for eight years I was the Director of
11 Environmental policy and I'm pleased to have one of the
12 representatives from the, it used to be our transportation
13 office. We created the Transportation Office. I'm glad
14 it's still going and they're still employing people there,
15 back in the early '90's when we established that.

16 And we had the experience of running the
17 foreign spent fuel shipments. And we learned a lot about
18 both the technical issues and transportation, all the
19 practical things that have to go into it. The transfers,
20 the communications, the advance response, the planning, the
21 cask, the journal, but also the public communication. And
22 we initially, I think, we learned a lot of lessons from
23 that, we being the Department of Energy. When I was
24 running that program I was responsible for the foreign
25 spent fuel shipment program before we turned it over and

1 made it more routine. And again we did not have any
2 accidents. And that was our experience. It has become
3 routine. It's happening all the time. People don't even
4 know it's going.

5 But it was born of a lot of experience and some
6 hard lessons learned. And one of the lessons managerial is
7 we had a group that was very technically capable of
8 evaluating casks. We used Sandia and Sandia, by the way
9 was terrific. And I would urge you to use all of their
10 technical skills, their creativity, the practicality that
11 they have to offer.

12 But we regarded that technical community as
13 just an element in the overall planning management and that
14 there was an equally important non-technical public
15 participation, public involvement segment that had to be
16 brought to bear and actually managing it to accomplish the
17 task because it wasn't just a technical task. If it was a
18 technical task it would have been a lot easier, it would
19 have been a lot faster. It wasn't. That was not the big
20 thing.

21 I should congratulate you also in having such a
22 small little forum. I've spent a lot of time in front of
23 forums of 250 people who are concerned, to make it an
24 understatement, about the shipments of foreign spent fuel
25 and whether our casks were robust enough. And as you may

1 know, the casks used for shipping foreign spent fuel were
2 never tested at full scale. And that became an issue. But
3 it was not, I won't say just a hiccup in the process, but
4 it was the one we were able to overcome partly because the
5 technical was only part of a larger system and part of the
6 public participation, public involvement process. Not
7 being disrespectful to the technical element but the
8 technical people are only one part of the larger management
9 system to really have success in it.

10 I would urge you to go back to some of the work
11 that was done by the Nuclear Waste Technical Review Board
12 on public trust and confidence. It really is sort of an
13 in-house work, to look at the important role, Paul
14 Slovack's work up in Oregon. And to really think about the
15 question not as to how do we increase public trust and
16 confidence. But if your goal is to accomplish a mission,
17 how do you provide sufficient public trust and confidence?
18 You know, it's not just you increase it one percent and,
19 hey, we increased it so we succeeded. It is what is the
20 threshold. And it's not an easily quantified thing. And,
21 you know, as an engineer it's hard for me to, you know,
22 even say I have expertise, but just to think in terms of
23 your accomplished mission. You don't just increase it and
24 say that's good enough. You've got to figure out what is
25 that but what is sufficient? What line do we cross? It's

1 not a clear line. It's not a black and white, easily
2 measurable thing.

3 I would ask, and perhaps this is going on,
4 whether there is some other forums going on addressing
5 classified issues. There's a number of issues regarding
6 Missouri that is inappropriate for me to raise here.
7 Presumably there is a classified discussion going on with
8 the appropriate people with the appropriate clearances who
9 can discuss the unique potential threats and issues so
10 that's being evaluated. I don't know if that is going on.
11 I would urge that you consider it and do so. It was
12 relatively easy for the Department of Energy because we all
13 had Q Clearances already. We could have access to the
14 information to the at the facilities to have a discussion.

15 And with regard to the question of test to
16 failure, I guess I would ask, why not technically do a test
17 of failure? If you're going to spend the money and if it
18 does provided additional technical data, why not do it?
19 And one concern was raised from a public relations point of
20 view because it may give some anti-nuclear people
21 ammunition. Well, that puts it back into the
22 communication. I think he said that. If you do it, make
23 sure you communicate it effectively.

24 And finally, for states and first responders,
25 for my people who I worry about, I've got to look them in

1 the eye every day, for us to be able to participate
2 effectively in all these various forms, we really are going
3 to need the resources to do so. We're facing added burdens
4 to deal with a whole lot of issues including meth labs and
5 home land security and different terrorism surveillance
6 that we do and we're not getting the resources to do it.
7 So, I hope you would make sure that you're responsive to
8 the state and local planning needs for this.

9 Thank you.

10 MR. POSLUSNY: Eileen.

11 MS. SUPKO: I'm Eileen Supko from Energy
12 Resources International. I'd like NRC to focus on the
13 metrics that they've discussed in Appendix A1. Maybe not
14 necessarily during the meeting but after looking through
15 all the comments to determine whether you need to revise
16 your metrics. I'm just briefly going to go through them
17 and give you a little bit of comment on what I think about
18 them.

19 The three metrics, the first one is associated
20 with the probability of the actual occurrence of the test
21 perimeters. And what you basically say is that staff would
22 determine a speed that would represent beyond design basis
23 accident. But would not select a higher speed that has
24 essentially no realistic probability of occurring.

25 I would suggest to you that you selected the

1 wrong perimeter. Speed is not the issue. I think I've
2 said this from the peanut gallery at the meeting in
3 Rockville. The question that you should be asking is what
4 is the appropriate force that is not, that essentially has
5 no realistic probability of occurring. And I would suggest
6 that a 75 mile an hour into an unyielding surface has no
7 probability of occurring in a real world accident. The 75
8 mile an hour speed may be probable. But the force involved
9 in that impact is way beyond design basis, not just beyond
10 design basis.

11 The second metric that you talk about is the
12 Package Performance Study objectives associated with
13 analysis or validation of your codes, computer codes and
14 the fact that you want to achieve plastic deformation.
15 Well, if you do indeed select, associated with your first
16 metric, a force that is within the realm of realism, you
17 probably cannot get plastic deformation in the container
18 test that you've designed and that you've proposed to us.
19 So, I would say that your first metric and your second
20 metric are mutually exclusive and you can't meet both of
21 them the way you propose the current tests.

22 And then the third one, your third metric
23 involves public confidence. Bill Brach's presentation
24 earlier talked about NRC's mission being providing public
25 health and safety and the environment; safety for public

1 health and the environment. And I think you should focus
2 on your regulations. You know, what is it that you want
3 confidence in? Is it confidence in your regulation for
4 spent fuel packages? Part 71? Part 73? How will you
5 measure this? If you're calling this a metric that tells
6 me, that means you must have some value. As Jim was just
7 implying for how it is that you're going to measure whether
8 you've achieved public confidence. And I don't know, I
9 haven't seen that you know how to measure that. And it's
10 something you really need to look at and decide what it is
11 that you, what is it that you want confidence in?

12 I think there's some people in this room that
13 have confidence. You stated that you have confidence that
14 your current regulations are adequate. There are people
15 who don't believe that they're adequate. And you need to
16 figure out, you know, what is it that you need to
17 accomplish in order to gain confidence in your regulations.
18 One of the things might be transparency. And I think these
19 meetings help with transparency. You know, public
20 participation at the actual tests will provide some
21 transparency. On the extent to which you provide
22 information after the tests and access to the information
23 will provide transparency.

24 And, again, that may or may not. It depends on
25 who the public is. There are very many different publics.

1 And all of the different publics that you're talking about
2 aren't going to agree necessarily on the outcome. And I
3 think that's going to be a very difficult metric for you to
4 measure and I'd just like you to think about that. Thank
5 you.

6 MR. POSLUSNY: Adam.

7 MR. LEVIN: I'm the last one here so I'll stick
8 to my scripted words so we can get this done quickly. My
9 name is Adam Levin with Exelon Generation.

10 Since this is our home state, let me start by
11 saying that Exelon firmly supports absolutely safe
12 transportation of radioactive waste, including spent fuel.
13 And we recognize our obligation to the public to maintain
14 our exemplary safety record.

15 I'd like to make three very important points.
16 The first is that we agree to, excuse me, we agree with the
17 need to demonstrate compliance with NRC safety regulations
18 as they apply to spent fuel shipping casks and with the
19 need to provide the public with the sound understanding of
20 the ruggedness of these packages. However, we believe that
21 the only technical goal of the Package Performance Study
22 should be to provide experimental benchmarks for the
23 computer stimulations used in cask design.

24 My second point is that I believe the NRC must
25 be clear with its communication with the public. That is

1 its intent is to provide an extra-regulatory test sequence
2 expected to have a small probability of occurrence in which
3 a package seal may fail and which, frankly, you may not
4 actually have a release. It should also be made clear to
5 the public that the reason for conducting tests of this
6 nature is to validate the computer simulations used to
7 predict package performance and not to demonstrate any
8 margin of safety which already exist in the test
9 requirements for hypothetical accidents, 10C471.

10 My final point is that the Package Performance
11 Study input and output data including design and
12 measurement data must be made available to all concerned
13 parties adhering to sensible security arrangements. All
14 vendors must be allowed the ability to perform benchmark
15 calculations with their own computer simulations or with
16 new simulations they wish to use in future applications.
17 This negates the need for full scale testing of other
18 designs or future designs and forms a leveled playing field
19 for cask vendor competition, which can only give rise to
20 even better designs.

21 Thank you.

22 MR. POSLUSNY: Thank you very much. I see a
23 thread of a number common ideas, many of which are real
24 comments on the proposal itself and we'll address that in
25 the process. But there are some things here perhaps the

1 staff would want to address very briefly. Perhaps the QA
2 QC question. I think two folks brought that up.

3 Bill, would you like to deal with that one?

4 MR. BRACH: Chet, I think I have maybe a few
5 more issues --

6 MR. POSLUSNY: All right, sure.

7 MR. BRACH: -- on the overhead. But there's
8 one comment, let me, a couple of comments I want to make.
9 One, I want to offer, and I should have included this in
10 the opening comments but I didn't. Bob Halstead made
11 reference to our meeting here in the midwest and Tim and
12 Thor and others made reference to their participation in
13 the Midwest Council of State Governments. About a year
14 ago, the Midwest Council State Governments asked NRC that
15 as we're planning the Package Performance Study and our
16 series of meetings that we're conducting right now that we
17 consider holding a meeting in the midwest.

18 And one, I want to thank Lisa Statler from
19 Midwest but also Tim and Thor and all the representatives
20 here as far as their assistance in, if you will, preparing
21 for the meeting as well as participation here today. And I
22 agree very much. It's important that we have a meeting in
23 the midwest. I've mentioned a number of folks. The
24 quarter state matter, if you will, and the States of
25 Illinois, Missouri, and many other states in the midwest

1 to the extent Yucca Mountain were to become licensed and
2 operating facility, private fuel storage, if that also were
3 to become an operating, licensed and operating facility,
4 there would be quite a bit of spent fuel transport
5 occurring from the east to the west through the midwest. I
6 apologize for not having recognized the earlier request
7 from the Midwest Council of State Governments to the NRC as
8 being a primary driver for our meeting today.

9 Now, back to, Chet, some of the issues you've
10 asked us to discuss. One, the comment on quality assurance
11 and quality control is an extremely important comment.
12 One, NRC, whether it be for spent fuel storage or spent
13 fuel transportation, one has regulations in our
14 regulations, Part 71 for transportation, Part 72 for
15 storage, that specify the quality program requirements that
16 must be applicable, and I'm using the word must. These are
17 not optional considerations. That must be considered and
18 applied in the design, fabrication and the use of these
19 packages.

20 And the earlier comment, George, with regard to
21 the manufacturer of casks, those programs are very
22 rigorous. Those that might be familiar with the Appendix B
23 210 CFR Part 50, the quality assurance program that has
24 been in place for many years for power reactor plants;
25 other industry standards in QA 1 and international

1 standards, ISO9000 I believe is the correct references.
2 The standards are very similar. The IEA as well has a
3 quality assurance document out pertaining to
4 transportation.

5 These standards are rigorous. They cover all
6 aspects of material procurement, fabrication, quality
7 control during fabrication and assurance that the package,
8 when it is fabricated, is in conformance with the design.
9 Goes back to the earlier comment about, in our testing in
10 this package, testing the Package Performance Study, in our
11 testing in the certification processes. The NRC, in our
12 certification review activities, we're certifying a design.
13 And it's clearly ambient and it's the responsibility on the
14 user, the licensee, the fabricator, that the fabricated
15 package must be in conformance, full conformance with the
16 design and that the quality assurance program requirements
17 are envisioned to provide that assurance that the
18 manufactured package does comply with and meet with the
19 design specifications and material and methods of
20 fabrication.

21 Other issues; one topic was, that also was
22 raised was a comment on sabotage. And clearly in the era
23 that we're in, not only post 9-11 but also figuratively
24 today or maybe this evening, concerns on sabotaging
25 terrorism are real. Our understandings today are different

1 than they were two years ago, I'll offer, in the terrorism
2 arena. The Package Performance Study and the tests that
3 we're talking about are from an accident standpoint if you
4 go from a safety standpoint. That doesn't mean that we're
5 not, one, paying attention to or concerned about sabotage
6 and physical protection.

7 There are other activities that the NRC
8 currently has underway to be addressing security and
9 sabotage activities. Since September 11th, the NRC has
10 issued a number of advisories and orders to licensees
11 directing additional measures be taken that go above and
12 beyond the existing licenses and the existing regulations.
13 The securities regulations are in -- Part 73, just for
14 reference.

15 I cannot go into the specifics or the details
16 but there was a specific order that was issued pertinent to
17 transport of spent fuel. It addresses issues involving
18 communications, protective measures, coordination of the
19 states that go above and beyond existing requirements and
20 those activities are in place today. And as I mentioned,
21 for security classification reason I can't go into the
22 details. But the agency has taken measures in the sabotage
23 physical protection arena. As well as there are currently
24 studies underway looking at what, I'll have to say tools,
25 but what means might be available to terrorist or sabotage

1 that we need to be understanding and evaluating not just
2 spent fuel cask for transport but all of the activities
3 that we regulate at the NRC, whether it be power plant
4 activities, fuel facilities, materials, et cetera.

5 There are activities they are looking at and
6 addressing to assure from our perspective that we are, as
7 best we can, understanding those issues and then also
8 looking at the protective measures that are needed to
9 provide that level of protection that's needed to assure
10 the continued safety and protection of whether it be spent
11 fuel transportation, other material transportation or other
12 regulated activities.

13 I also want to say with regard to the Package
14 Performance Study, and it's been mentioned by a number of
15 the participants, the test that we have identified in the
16 draft test protocol, one, we've identified an impact, a
17 drop test and a fire test. A number of the comments we've
18 received, some from, I mentioned earlier some congressional
19 correspondence. But also at previous meetings I've raised
20 questions why we're not testing or looking at the other
21 regulatory tests; the puncture test, the emergent test?
22 That's input that we are looking for.

23 Now, I will offer that in the earlier series of
24 Package Performance Study meetings in our preparation of
25 the Issues Report about two, almost three years ago now, we

1 were summarizing what we were hearing at that point in time
2 with regard to off state stake holders, very broadly;
3 members of the public, industry, states, local governments,
4 tribal nations. What were the issues that were being put
5 on the table as those that we need to focus on.

6 The primary earlier focus was directed toward
7 significant extra regulatory impact test. Speed was a
8 major comment. The 30 foot drop test, if you will, that's
9 currently in our regulations, if you were to equate that 30
10 foot drop, it was approximately 30 miles per hour. And in
11 a general context, all of us see trucks and trains going
12 faster than 30 miles per hour. Now, that's 30 miles per
13 hour onto an unyielding surface. And I think Ken or Andy
14 had mentioned that in the real world, an unyielding surface
15 is extremely difficult to find.

16 Clearly there are bridge abutments. There are
17 granite surfaces. There may be tunnels or structural
18 configurations for tunnels. There are all types of earth,
19 sand or soil types of impacts. Those are not unyielding
20 surfaces. So, roughly a 30 foot drop onto an unyielding
21 surface is somewhat equivalent to a 50 to 60 mile per hour
22 impact onto a yielding surface. Now, I'm not defining
23 yielding because we could go everything from a yielding
24 surface to something that has very little resistance to
25 something as a hard rock structure.

1 Maybe I'm rambling a little bit and I
2 apologize. But what I'm leading to is that from the
3 Package Performance Study and what we're looking at, we are
4 anticipating that in the impact test, the fire test, there
5 will be information that we learn from those tests that
6 will be very pertinent to our consideration as we look at
7 other type of, if you will, sabotage or terrorism type of
8 concerns with regard to the robustness and the ability of
9 the cask to withstand a significant impact force or to
10 withstand a significant fire challenge, if you will,
11 whether that be from an accident or whether it be from a
12 sabotage consideration.

13 MR. POSLUSNY: Okay, there's a question on if a
14 cask was breached and the fuel was exposed, safe distances?

15 MS. SNYDER: Excuse me, I have a comment on the
16 QA that I'd like to add.

17 MR. POSLUSNY: Okay, sure.

18 MS. SNYDER: In addition to the stringent
19 regulations that Bill has referred to for quality
20 assurance, we also have inspectors that, in the Spent Fuel
21 Project Office, who inspect the manufacturing of casks and
22 the licensees programs pertaining to spent fuel. We also,
23 the test protocols is a confirmatory research project. And
24 within that project we will have a quality assurance aspect
25 to that. Casks that we were to test, proposing that they'd

1 be certified casks, but they must be manufactured. Also
2 the test, the field testing itself in the field set up, we
3 will ensure that there's a quality assurance aspect to the
4 research project.

5 Thank you.

6 MR. POSLUSNY: Okay, there was a comment about
7 exposure to a breached cask and safe distances. Is there
8 anything you can say about that?

9 MS. SNYDER: Well, what I'd like to say is that
10 spent fuel is highly radioactive and potentially very
11 harmful. Standing there unshielded, spent fuel could be
12 fatal because of the high radiation levels. Ten years
13 after removal of spent fuel from a reactor the radiation
14 doses exceed 20,000 REM per hour. And a dose of 5,000 REMS
15 would be expected to cause immediate incapacitation and
16 death within one week. We're talking about unshielded
17 spent fuel.

18 NRC has stringent design testing and monitoring
19 requirements and a barrier or a shield which is to be
20 placed between the spent fuel and human beings. So, the
21 design of the spent fuel cask is the primary, primary
22 element that will bring protection to the public. And we
23 have an Office of Nuclear Security and Incident Response.
24 And those people in that office deal with these issues and
25 are very knowledgeable in that.

1 MR. BRACH: I just want to add a little bit
2 more to what Amy has just mentioned. Clearly, as she
3 described, spent fuel is a hazardous material. It's an
4 extremely hazardous material. Some of the schematics that
5 I believe Ken, both Ken and Andy had earlier showed the
6 materials that, if you will, that surround the transport
7 package. Those materials are there for shielding and
8 protective reasons.

9 Also, I draw the attention to the one schematic
10 other thing. Ken Sorenson in his overhead where it showed
11 the, from the modeling standpoint, what a, I think it was
12 what a Holtec rail cask impact may look like at a 75 mile
13 per hour impact onto an unyielding surface. And I know
14 Eileen's earlier comment, and we're interested in realism
15 but a number of you all have asked comments from a
16 responder's standpoint.

17 I'd only draw your attention that that modeling
18 of a 75 mile per hour real impact cask showed the
19 deformation, if you will, of the impact limiter. I did not
20 show, and from our modeling, did not a breach of the
21 canister. And I point that out because the safety mission
22 we have is an extremely important mission. And clearly
23 from everyone's safety and also a responder's actions in
24 responding to an event or an accident, the cask will be
25 maintaining their containment. That's an important element

1 of the cask design and the cask testing is to assure that
2 the spent fuel is not laying bare in the public, if you
3 will. But that spent fuel is maintained inside of its
4 containment, inside of the transport package and that there
5 is no breach.

6 But clearly from the standpoint of safety and
7 if there's information we should be aware of and learning,
8 that's a part of what the study is about, what we're
9 looking at and looking to you all for your help in. But
10 we're clearly from the cask designs that we review and
11 approve and the information we have, the material, the
12 spent fuel stays inside of its containment, inside of the
13 transport package.

14 So, from a first responder's, and clearly there
15 are procedures first responders have in responding to
16 events of hazardous material events, nuclear and the other
17 eight classes of hazardous materials. But from our review
18 and information, the spent fuel does not get released and
19 laying bare out where a responder or any other member of
20 the public would be at jeopardy from its exposure or from
21 their exposure.

22 MR. POSLUSNY: George, you had another --

23 MR. CROCKER: Yes, I'm aware, Bill, that, you
24 know, Part 71 is a potential for -- and I'm aware that the
25 NRC has regulations for quality control, quality assurance.

1 I think the thrust of the point that I would urge more
2 attention to is the fact that historically cask
3 fabrication, the rate of cask fabrication is something
4 different than what we are likely to expect if we move
5 forward with this type of adventure. And that means that
6 there will be significant additional pressure and
7 regulatory oversight requirement than anything we've seen.

8 So, just because you have a protocol and have a
9 set of regulations and have some inspectors running around
10 doesn't mean you have quality control, quality assurance.
11 And what I'm looking for is the kind of attention that
12 says, we have the regulations, we have the inspectors and
13 it works. That's the thrust.

14 MR. POSLUSNY: Bob, you're next, I believe.

15 MR. HALSTEAD: Yeah, Chet, a quick comment on
16 the issue of testing failure. Nevada's pushed hard for
17 exploration of the lost of shielding type of accident
18 because our study of historical accidents suggest to us
19 that while we have to be concerned about lose of
20 containment, frankly we're more likely to have a lose of
21 shielding. And in the lose of shielding accident, the
22 exposures to the first responders and, of course, some
23 victims that might be at the scene of an accident, are also
24 an issue.

25 But you're not so much concerned about

1 exposures to the public down wind. You're primarily in the
2 lose of shielding talking about people who are within a
3 thousand meters of the cask. The general guidance that we
4 give our first responders or basically we give our on-scene
5 commanders is in a situation where you think your people
6 might get a dose of up to ten REM, you know, one occurrence
7 rescue operation, that's basically seen as the commander's
8 call.

9 If it is an area where, if the conditions are
10 such that you think your people might get more than a 20
11 REM dose, the on-scene commander is generally advised not
12 to send people in. And, of course, the hard part is that
13 grey area where the expected exposure to an emergency
14 responder is between ten and 20 REM. And that's where the
15 hard calls go.

16 Now, it's true, as Amy said, that to get an
17 expectation of immediate death, you've got to get a really
18 big dose. Generally speaking it's lower than 5,000 but
19 it's generally considered to be higher than five or 600.
20 And that would be a very rare circumstance. But the thing
21 that we train first response commanders is to deal with a
22 more likely accident where a lower exposure is of concern.

23 And without getting, you know, in too many of
24 the details, any time you get an acute exposure over ten to
25 20 REM you are thinking about some blood damage, you are

1 thinking particularly about concerns if you have a woman
2 responder who may or may not be pregnant. There are a
3 whole lot of issues that go into that. So that's why we
4 try to set these probably safe and probably not safe, that,
5 boy, difficult judgment call between levels.

6 Testing to failure for lose of containment
7 doesn't mean we're arguing that these casks have to be
8 tested to see if an assembly drops out on the road because
9 that would be a true catastrophic event and I don't expect
10 to see it in my lifetime or your lifetime or accumulatively
11 all the lifetimes of the people in this room.

12 What we are concerned about is a physically
13 minor but radiologically significant lose of containment,
14 the creation of a pathway out of a cask most likely because
15 of an impact to a lid closure region or a seal failure
16 accompanied by a high thermal environment, particularly one
17 that might cause spent fuel cladding breach and the release
18 of the cesium, what's in the gap between the pellet and the
19 cladding.

20 So, when we say testing to failure, don't think
21 we're talking a big hole in the cask and the assembly jumps
22 out. We're talking about a very small pathway in the
23 containment system coupled with probably a thermal impact,
24 although there certainly is, you know, some thinking that
25 there are some physical impacts that could cause release of

1 this highly volatile cesium 137 from the fuel cladding
2 without a fire. I think those are low probability.

3 So, lost of containment we're specifically
4 thinking about protecting first responders. I'm sorry, a
5 lose of shielding we're talking about protecting first
6 responders. Lose of containment we're, of course,
7 concerned about first responders. But that's the type of
8 accident which we're concerned about the general public
9 getting wind being affected by respirable particulates that
10 might be carried in the flume of a fire.

11 MR. POSLUSNY: Ned.

12 MR. WRIGHT: I think the concern, and I just
13 want to clarify that, my two haz-mat teams are very highly
14 trained not only locally but through the State of Iowa.
15 And part of their concern is the information that they've
16 been getting from all the sources. At the same we're
17 getting other information that's basically saying the
18 information that you've been told is true is a lie. And
19 this is my problem is that now I'm having to address a
20 concern where someone is saying you have been given primary
21 response protocols procedures, et cetera. However, that's
22 not the truth.

23 And that's my problem of the public's
24 perception. And this is what I'm hoping that we'll be able
25 to get out of this is that the information that's getting

1 out to the public through various sources, I spend a lot of
2 my time having to then counter this and whether it's from
3 congressional or special interest or whatever. And I'm
4 basically being forced to say that, you know, whatever the
5 facts, whatever the media's bringing in or who else, that
6 either, I'm basically saying someone's a liar because the
7 information you're putting out is so off the scale and I'll
8 just use it -- I can't think of -- if we want to test
9 something and, you know, we know that the truck can only go
10 so fast. But if we're going to test it to go 500 miles an
11 hour to crash into an immovable object, that can't happen.
12 I mean, today with their technology, we can't get there so
13 why are worried about that?

14 But again, that's adding a level of confusion
15 to say, okay, the testing and everything that you're doing
16 and we've protected everything from A to Z to every
17 realistic thing that you can happen. And then someone
18 says, well, gee, you know, why didn't you add one more
19 degree or one more foot or one more other thing because
20 obviously if you didn't, you're not completely doing it.

21 And I think that's going to be one of the
22 problems talking to the public. And I've never met Eileen
23 before but I think I know her so well because I've seen the
24 videos she's been in over and over and over again. But
25 it's the point where all the things we're trying to do to

1 tell the public that what we're doing is safe is now being
2 challenged. And I've got much more greater things in my
3 community that is an immediate risk. And I'm talking
4 immediate death and destruction that no one cares about.
5 But they're worried about something that may potentially
6 give you cancer in 50 years.

7 And, I mean, those are some of the issues I'm
8 looking at. I'm spending a lot of resources on things that
9 the probability is way off the scale that keeps me and the
10 other responders in my counterparts in Emergency Management
11 from focusing on the things that provide them the immediate
12 risk right now of catastrophic destruction in their
13 communities, chemicals or whatever. And that's the other
14 messages.

15 We fully support what you're doing and we
16 believe, and I'm fully confident in the cask, the dry cask
17 storage and all those other things because I've been shown
18 the tests and stuff like that. But the stuff that's
19 getting out into the public right now is so 180 for
20 whatever reason, that's creating another problem. And I
21 think when we get down to the public's perception, and
22 again, how much is enough?

23 MR. POSLUSNY: Yeah, I think we've heard a
24 number of comments on how do you take the product from the
25 study and translate it into real plain language that

1 anybody can understand. You can always poke holes at a
2 study but we've got to really consider how do we translate
3 the findings both analytically to technically and also in
4 plain understandable bits of information. I think that's a
5 good point.

6 Yes, Amy?

7 MS. SNYDER: I'd like to add a comment and get
8 a clarification. The fact that I'm hearing this morning is
9 that there's layer of confusion as far as testing to
10 failure. Eileen has mentioned, she talked about the
11 objectives that are in the test protocols that the first
12 two were, in her opinion, mutually exclusive, meaning the
13 probability of occurrence of an accident in speed and the
14 second was validation of the codes to plastic deformation.
15 And I think that's an important issue as far as realism.
16 Do we set up a test that's going to be real but will it
17 achieve plastic deformation?

18 And the other point that, the clarification
19 that I'd like to, I think that I heard is that are you
20 saying that it would be helpful in the test protocol, we
21 plan on doing detailed procedures and specifications as Ken
22 Sorenson said earlier this morning that it's just a
23 snapshot. But when you do those details and when we
24 actually do the tests, would it be helpful if we describe
25 it as far as what it means for first responders, real life

1 situations as far as shielding and containment?

2 MR. WRIGHT: Well, I think from the first
3 responder's point of view, especially when they're looking
4 at the other hazardous materials that are out there, the
5 first thing they're looking at is what is, where do I need
6 to set the hot zone and stuff like that, one for the
7 responders to put for the public because we have to make a
8 decision very quickly. Do we need to shelter or evacuate.
9 And that's on any hazardous materials. And one of the
10 concerns that we're getting right now is the test protocols
11 and show, you know, we're okay. And I've said we've got
12 truck shipments and derailments from stuff like that. They
13 know because there's the placarding and whatever that tells
14 me. Okay, until we confirm that we have a release, and I'm
15 talking about a rail car laying on its side, we need to set
16 these protocols up to set safe areas and then we start
17 working towards that.

18 And right now what we're getting is the
19 confusion part of saying, okay, you're safe from this but
20 this other studies that are coming out says, oh, no, you're
21 not. You need to be just far way away. And so that's
22 causing the confusion because they're going to go by, and
23 I'll just use the DOT guidebook. They're not going to be
24 going for 47 scientific studies and doctoral dissertations.
25 They've got one response manual. And they said if I've got

1 a container of X, whatever is placarded, this is what tells
2 me to do until we do the further testing. And that's what
3 they're looking at is that first ten minutes because after
4 that we've got people to come in and do the testing and
5 sampling and all that other stuff no matter what it is.

6 But right now they're being told, okay, go in,
7 go out. You know, run, stop, whatever. And that's the
8 confusing part. It's once we get all of these things done,
9 we need to have it so that the first responder has, if you
10 have a truck transport that has X in it, however much is in
11 it, that you need to be a minimum of this far away to start
12 with. And if it's a rail shipment you need to be this far
13 away to start with. And part of the problem is if they
14 don't have that information, their good friends at OSHA
15 will come in and fine them for responding and getting too
16 close.

17 And we've had incidents in Iowa where the first
18 responders got closer than the DOT guidebook and there was
19 an explosion and there was a lose of life. The fire
20 department was fined because they were 50 feet too close.
21 And part of that is to, you know, instill the safety in
22 whatever. And we're all for that. But right now the
23 responders are so confused because there's so many studies
24 and there's so many, so much stuff out there. We need
25 someone to say this is what you need to start with.

1 MR. POSLUSNY: I've heard this, I sat in this
2 meeting twice already. And from what I've heard from the
3 staff is this study is going way beyond reality in that
4 it's exceeding those conditions that it weren't asked to
5 meet for certification. So, I'm not sure that the products
6 that I've heard about so far would meet your intent because
7 it's so far from it.

8 MR. WRIGHT: A part of it is we'll be talking
9 to the public. And after we get all this done, and like I
10 said right now we're already showing the information that's
11 there. And people, I feel, are relatively confident in
12 what the products that they're looking at right now. The
13 problem is we're getting a lot of other people are coming
14 out and saying what you're now seeing is not correct. And
15 that's what's causing the confusion.

16 MS. SNYDER: So, are you suggesting that for
17 the test protocols that what would, what are you suggesting
18 as far as test protocols and how that might help with the
19 issues that you brought up?

20 MR. WRIGHT: Well, I think part of that is
21 being able to, and we're talking about some of the things
22 when the shielding and stuff like that, and certain things,
23 I think part of it is we don't get to that part. We're
24 saying, okay, the cask is fine and stuff like that. We
25 need to say, what does that mean? Are we talking about the

1 structure of the shipping container and the material inside
2 is still safe or are we, you know, because part of it is on
3 how you watch the films and read the information. If the
4 shipping cask is damaged, that also means that the shipment
5 inside is damaged. And that may just be, you know, you
6 have this set period but the shipment is safe.

7 And I said part of that is the perception is
8 that if it's broken and we're saying this testing to
9 failure and stuff like that, if the container is damaged,
10 we've got to be able to say is the shipment inside damaged?
11 And that's the part that's not getting completely through.
12 And I may not have said that well but if you see a broken
13 container, our guys, you know, if they see a broken truck,
14 there's stuff coming out of it because they know that the
15 chemical shipments are not to the same standard.

16 But we're saying we've got a cylinder inside of
17 a container, inside of a shipping cask. They need to know
18 that even though there's a scratch on the outside of the
19 shipping cask, the interior material is still safe. And
20 that's the part that's confusing. That's the message
21 that's not getting out because we're focusing on, I think,
22 the outer shield of this thing. But we're not telling the
23 public that the inner part's still fine. Now, if that's
24 not true then we need to be able to say that, you know, A
25 leads to B and I don't think that's what you're saying.

1 MR. POSLUSNY: Let me suggest, then, when we
2 talk about the drop test, perhaps, and we try to factor
3 some of this in, what it will do and what it won't do, and
4 what's your analysis as it's projected so far.

5 MR. WRIGHT: Because we're more concerned about
6 what's inside, it's in the middle. And if everything in
7 the middle is still safe, then we're fine. We're okay with
8 that.

9 MR. POSLUSNY: Okay, good. Let's quickly go
10 through these two cards here and then we're going to take a
11 break which we all need.

12 Tim, you were first.

13 MR. RUNYON: I guess I just needed to address
14 somewhat to Bob Halstead. It appears that if the back
15 breaker test is actually going to be a test that you're
16 going to predict a breach in the shielding or at least some
17 of the DU shielding. Would you consider that a test to
18 failure if you're showing a breach in the shielding?

19 MR. HALSTEAD: Well, excuse me, we're the
20 people, Tim, who promoted that back breaking test over the
21 years. Bill Ryan, SAIC and -- came up with the idea in
22 1979. So, on the one hand we think it's good to have that
23 type of a test in so that we can evaluate a potential lose
24 of shielding because we'd have a lose of containment. The
25 concern we have is that we only had to do on impact test on

1 the truck cask. And it may be that it's more important to
2 do the end impact on the lid closure on a truck cask
3 followed by a fire because that would be the accident that
4 we would argue is more likely to result in the lose of
5 containment, which would, you know, be a much, I think is a
6 much greater concern both for safety and for confidence.

7 And frankly, we're trying to figure out how
8 much testing can be squeezed out of these test articles.
9 One of the issues that came up last time is it doesn't make
10 sense, perhaps, to do the regulatory drop test end wise on
11 the truck cask and then possibly as an addend to do a back
12 breaker because that's a previously probably, as Eileen
13 would say, that part of the cask didn't get much force in
14 that.

15 Eileen's is an easy answer but we thought
16 looking at the lose of shielding accident was important.
17 And the same concern Eileen had was raised by Rick Boyle
18 from DOT. It's hard to imagine a 75 mile per hour sideways
19 impact on an unyielding structure. And so that's one of
20 the things I think we'll talk about this afternoon in more
21 detail.

22 I'd just like to respond to the Iowa concern.
23 I think all of us who have worked with states have this
24 concern of training first responders. And I think our Iowa
25 colleague's concern, maybe that's addressed if we had some

1 commitment that after all this testing is done, some or all
2 of us may want to go back and look at the curriculum
3 materials that we use for training first responders. Now,
4 I personally like the -- and Remington Package done back in
5 1984. I think it's superior to every training package
6 that's been done in the last 20 years. So there's some
7 among us who are arguing for old training packages
8 precisely because they error on the side of caution. And
9 when you tell your commander to stop people from going in
10 based on an expectation of the dose that they'll get. But
11 understand if there's not a fire going in, it's a big
12 difference whether there's a fire or no fire in how you set
13 your initial perimeter and how you decide what to do as
14 soon as an on-scene command post is established.

15 But I think we should just defer all that. We
16 ought to agree that if we come up with findings here that
17 the lose of shielding was worse than what we think and,
18 say, creates the potential that a first responder a hundred
19 yards away might catch a dose in excess of 20 REM, that
20 we're going to have to go back and reexamine our training
21 materials and reassess our tactics.

22 So, I hope we could agree that that's one of
23 the things, if you'd write that up, Chet --

24 MR. POSLUSNY: I've got that.

25 MR. HALSTEAD: -- we need to have some real

1 comprehensive follow up translating all this specifically
2 into emergency response.

3 MR. POSLUSNY: And for information, training
4 update, question mark, post BBS. Yeah.

5 Okay, one more.

6 MR. WERNER: First, a follow up thread about
7 emergency training. I would urge you all to get with the
8 states and work with us about how our emergency response
9 actually works. We have a system where we have widespread
10 trained haz-mat people readily available. They may not be
11 the first person on the scene but they are quickly on the
12 scene. And the way we manage it is that they are linked
13 into a larger communication system where they can get
14 access to information about responding to different
15 instances. There's general training that goes on and
16 there's more specific information. And our staff is
17 trained to go from the local to the state to the national,
18 whatever information they need. And that's an important
19 way that we're structured because we can't presume to train
20 for every single incident but we do have linkages. And the
21 broad point is don't presume to know that you know how to
22 do it. I don't even know. I've delegated to somebody who,
23 I've got a director who knows how to do it and I provided
24 the resources and the structure to work in. It's not a one
25 size fits all. Get smart about each state about how it's

1 done so you get that information as soon as it's available.

2 And I would urge you try not to play the what
3 if game entirely as if that's going to be providing the
4 answers. There are lots of what if's that we could keep
5 playing and still not cover them all. And that's why, if I
6 could suggest an answer to the question I posed earlier
7 that I needed an answer to, why not do failure to testing
8 unless there's a good reason not to. One of the reasons to
9 do it is that you have an unique set of circumstances that
10 was not covered by the what if planning, then you'd know,
11 well, that's a situation that was covered through some
12 extreme testing that was never thought to be realistic but
13 it was done and we know that something like that set of
14 circumstances, for example, fire and heating followed
15 immediately by immersion in cold water.

16 I mean, we have a lot of places where we have a
17 lot of railroad tracks together where there could be other
18 materials that burned next to it and it goes off into
19 either the river or the Lake of the Ozarks. It's pretty
20 cold water. Immediately following is you've got a hot
21 brittle material going into the river. I'm not saying that
22 is a specific scenario but some sort of combination of
23 testing and testing to failure could help answer the
24 question.

25 If somebody calls into my office or gets me up

1 in the middle of the night, just when they tend to have
2 these little things, not that we don't love it but, you
3 know, they do tend to go at odd hours. They say, what do
4 we do? Who do I call? I may get to the right information.
5 There is a stockpile of information to anticipate these
6 things that may be on the edges of what if. And with
7 regard to whether things are realistic or not, I urge you
8 to drive across I-70 and see all of the unyielding surfaces
9 on the limestone bluffs about every mile or so where we've
10 had a number of incidents already where trucks going
11 routinely at 75 miles an hour have skidded right into a
12 bluff and snapped in half, routinely. So, if you haven't
13 been on I-70, I thought all interstates were the same. I-
14 70's is an unique interstate with lots of limestone bluffs
15 right on the edge of the road with not the same size
16 shoulders that you would see like on the Beltway or Route
17 270 going out to German Town or something. It's not the
18 same kind of road. It's not designed the same way.

19 And, you know, although I mentioned earlier, we
20 had a lot of experience doing the foreign spent fuel
21 shipments. Those really were different and one has to
22 address the fact that foreign spent fuel shipments were
23 fewer in frequency, smaller in size. So, there's some
24 differences there in terms of, you know, increasing
25 probability of these different what if's.

1 But, finally, it sounds like the meeting we
2 have here today is really not going to address the large
3 laden public crustacea. We have mostly staff who is
4 technical staff. They're not public policy analysts.
5 We're not dealing with that today. And I recognize that's
6 a limitation. We're not going to get into that whole
7 public trust and confidence because that's a whole other
8 set of expertise. I mean, just as an engineer I know I am
9 not qualified. You know, I've dealt with it. There are
10 people who do it. But technical staff, you know, has
11 limitations. We can't necessarily get into that whole
12 public participation area.

13 Nonetheless, the technical testing should be
14 informed by knowledge of this context, this larger public
15 involvement context we're working in about how you feed in
16 and, you know, the inputs and the outputs. So, even if
17 we're not going to address it square on, although the NRC
18 said that they already have confidence in the technical
19 issues, that we need to increase public confidence.
20 There's still an input to it.

21 MR. POSLUSNY: Okay, let me thank you all for
22 your patience and we are running a little bit late. But
23 let's go for like a 15 minute break. And we'll start right
24 on time from 15 minutes and then we'll continue with the
25 agenda.

1 (Off the record.)

2 MR. POSLUSNY: In order to try to keep on
3 schedule, we're going to combine Dr. Murphy's discussions
4 on over-arching issues as well as the general testing
5 issues into one discussion. And clearly we've started to
6 go into the, into other main discussions in the past hour.
7 And that's okay.

8 A lengthy list of issues that people brought
9 up, many of them we really had on the agenda. But there
10 are a few that I'm going to bring to as we go through and
11 try to address here to answer some of those questions and
12 concerns. Some of them are news, others we've heard, I
13 believe.

14 So, let me have Mr. Murphy start. Thanks.

15 MR. MURPHY: I'm going to try to address, I'll
16 say two of the points over there, the ones I just linked.
17 The last one and separate fuel tests and fuel behavior.

18 We have separated, and I think it's come up a
19 couple of times here today. There is a need to have
20 information on how fuel behaves during these impacts. I
21 talked about having the surrogate assembly and the Holtec
22 and the GA4 Cask. Those assemblies will be instrumented so
23 that we can, as the impact or impacts occur, get specific
24 information as to what forces and strains and stresses are
25 being applied to the fuel, to be applied to the fuel.

1 As a separate part of the Package Performance
2 Study, we are working at this time on a, I'll call it a
3 series of experiments. We don't know exactly what shape
4 they're going to take at the moment. So, we'll understand
5 that when these forces and stresses, strains are applied to
6 the fuel itself, the fuel bundles, the fuel elements, the
7 fuel rods and the pins, you'll know, begin to know what is
8 happening to them, whether we can, if you want to say,
9 break them open. And in the case of the whole tank, the
10 caesium escape into the multipurpose canister or what?
11 Just at this time there is very little to almost no data on
12 how the fuel itself behaves in these kinds of scenarios.

13 Okay. That I'll say just as a point of
14 clarification. And then my job an hour ago and 15 minutes
15 ago was to key up the two discussions on the over-arching
16 issues and on the general testing issues. The first I
17 think I'll say with the over-arching issues, I think we've
18 gotten a pretty good start on these without prompting from
19 me. The question about confidence enhancement, I think
20 we've done a lot of discussion on that, particularly, well,
21 today actually and in the previous meetings.

22 The question of actually a definition of what
23 confidence enhancement means, a lot of the folks at the
24 other meetings said, okay, fine. You're staring at the
25 wrong word, maybe, at the moment. Maybe you should be

1 looking at public trust and public understanding of what
2 we're doing rather than enhancement of confidence at the
3 moment. We've talk about validating the current codes and
4 models, the model codes. I think we've acted continuously
5 in that discussion. We haven't added on this slide the
6 question about testing to failure. I think that goes under
7 just before the scale of the stressment tests.

8 We've touched on and probably need to touch a
9 little bit more on provide data to refine risk estimates.
10 I believe Chet's got that someplace over on his right hand
11 board. And I've got right and left straight now. But on
12 the right side, and it's part of what we're going to do
13 with the information after it's been generated, after we've
14 done the physical testing and, you know, take a look at it
15 but what are we going to do with it afterwards? We've had
16 some comments on that today. And also one of the things
17 that's sticking right in the middle right now is the
18 discussion we had of having to turn this into useful
19 information to the first responders. I think the question
20 of combining the fuel test with a cask test is something
21 that's going to go right to the heart of the question that
22 Ned brought up a few moments ago.

23 Let me, this realism thing because we're
24 kicking that around here today. Again, I think a little
25 bit more discussion on what do we mean by realism. I think

1 there's a question of the probabalistic analysis kinds of
2 things and using that to guide us in selecting the testing.
3 Do appreciate Eileen's comments. Yeah, it's something
4 that, as we put our metrics together, this was a work in
5 progress, as the song says, that we're here to get public
6 comment. So, as I've said on some of the other occasions,
7 this is a hard test, it's going to be an expensive test.
8 We're not going to be able to probably get to do it every
9 day. So, at this stage we need to get it right and we need
10 to be able to talk about it in the right framework.

11 Okay, Chris, if you'd switch to the next one.

12 Testing issues; these are the general concerns.
13 And the question about whether or not to do full scale
14 testing or partial scale, and there's an awful lot there.
15 There's no question in my mind that we can do partial scale
16 testing and satisfy our requirements for validating the
17 codes. The little lead in that Chet gave, I come from the
18 Research Office and we have just simply recently completed
19 -- experiments and continuing experiments. They're all
20 down at scale. We can -- them. There is a -- issue
21 associated -- choice issue or public understanding issue
22 associated with the full scale. There are very definitely
23 engineering concerns about doing scale modeling. These are
24 things that we are interested in and would like to get
25 comments on.

1 We've proposed to do a rail and a truck cask,
2 one of each at this stage. Is that the right number? I've
3 got to think Bob Halstead thinks so. Okay, I'll take a
4 shake of the head to mean, yeah, you've got that one right.
5 Types and numbers of field assemblies. This is another
6 question because at some stage we found out, including war,
7 fuel assemblies in the package to see whether or not the
8 placement in the package makes a difference to the stresses
9 and strains that the assemblies and the rods and pins see.
10 So, we would definitely like to see some comment on that.

11 And I'll say with that, finish my teaming up or
12 teeing up the discussion and turn it back to Chet.

13 MR. POSLUSNY: Okay, before we go on in detail
14 discussions, was the issue on the thermal loading inside
15 the cask, could we talk about it here or in the fire --

16 MR. LEVIN: Let's save it for fire.

17 MR. POSLUSNY: Save it for fire, cool. All
18 right. Lose of inert gas, that would be one of the
19 catastrophic affects of a very severe accident, I would
20 imagine.

21 MR. MURPHY: Yeah, I think the late afternoon,
22 the impact, that might be a good place to touch on that
23 one.

24 MR. POSLUSNY: Good. And the comment on the
25 table as to EIS updates, I think it's probably too early to

1 see what we're going to do with the results of PPS.

2 MR. MURPHY: Right. I would say that would
3 make for a good conversation in the wrap up session at the
4 end to what we're going to do with the lessons learned.

5 MR. POSLUSNY: Okay, good. All right, let's go
6 to the first subject of the over-arching issues. A number
7 of folks brought up the issue of public confidence.
8 Clearly there's been a certain amount of effort on the part
9 of NRC from what we've heard today to take a stab at it.
10 It's an earnest attempt. We've heard some suggestions on
11 wrapping this program into a larger public outreach
12 program, which, you know, maybe Bill would want to talk
13 about things that go on generally. But, you know, we would
14 plug that in, I would assume. Those are comments that we
15 should take into hand.

16 But are there other suggestions on how this
17 program could be either translated better either visually,
18 electronically or whatever throughout whatever median that
19 we haven't really talked about?

20 Sure, John.

21 MR. ERIKSON: Two things. First of all, public
22 confidence really starts, as was mentioned earlier, at the
23 lowest level, when you mention the local fire chief,
24 whoever the local leader is that the people really have
25 their trust and confidence in. I mean, just like the joke,

1 the feds, the same thing. The word from the state, we're
2 here to help you. I mean, it's the local person that you
3 get the highest confidence with. So, as we work to get,
4 you know, federal and then state and then local officials
5 and leaders of first responders, that's the target audience
6 for the information.

7 And secondly, it would be helpful, this is a
8 very technical area and I don't know how many other policy
9 people are at this table. But it's important to get kind
10 of the communication, the policy perspective on what you're
11 trying to, the information that you're trying to
12 communicate with the public so that it's even more
13 readable. I mean, this is a great technical document. I
14 can understand it because I have a technical background but
15 I'm also a policy person. And there's some things in there
16 that are very difficult for a lay person to understand.

17 And how do you say we think everything's fine
18 but yet we have to do all this new testing? Well, why?
19 So, maybe some more involvement with policy folks or others
20 that have to try and translate the technical to be
21 understood would be helpful.

22 MR. POSLUSNY: Good, thank you. Fred?

23 MR. DILGER: Thanks, Chet. I want to go back
24 and question the premise. I don't think, I've said this
25 before, I don't think the objective of the testing should

1 be public confidence. I think the NRC's mission is to
2 protect the public's safety and I think that the NRC
3 understands that the reasons for embarking on this program
4 now are pretty substantial. We're on the verge of a
5 massive new transportation program that's 61 times larger
6 in terms of shipment miles than we've done before in the
7 past 40 years in the United States. So, we're looking at a
8 much changed program.

9 We have new cask designs, new computer models
10 and enhanced computer models. And so what we're looking at
11 is different. And so in that, given this changed situation
12 I think that the best way to get to public safety is to do
13 the kinds of full scale testing that you're commenting on
14 or that you're asking us to comment on.

15 Another item is about the expense. According
16 to the DOE estimates, it's going to cost about \$200 million
17 dollars a year to move waste to Yucca Mountain. The most
18 expensive possible program, total, would be about 50 to \$70
19 million dollars testing program. The Yucca Mountain
20 Program total is going to weigh in around 56 to \$60 billion
21 dollars. When you look at those kinds of figures, this is
22 really not an expensive program that we're talking about.
23 And so in terms of assisting NRC and ensuring the public
24 safety I think that that really has to be the justification
25 for this.

1 Will public confidence fall? I think it will.
2 I think that if you do a really good testing program with
3 the kinds of oversight and the kinds of independent review
4 that the State of Nevada and Clark County have proposed,
5 that I think you'll get the public confidence and the trust
6 that you need to move, or certainly what the NRC wants.

7 MR. POSLUSNY: Thank you. George?

8 MR. CROCKER: Thank you, Chet. I'd sort of
9 like to echo, I think, what Fred just said. I mean, do we
10 all know what our confidence man is? You know? What's the
11 objective here? I mean, to have that item at the top of
12 this list indicates to me that there's thinking within the
13 industry and its regulators that the public is stupid, the
14 public doesn't understand what's going on, we're the
15 technical experts. We know. And if only we could convince
16 these foolish people, then they wouldn't be concerned
17 anymore.

18 Now, I think the public's smarter than that. I
19 think that the Nuclear Regulatory Commission and the
20 nuclear industry has a confidence problem because the
21 public has some stuff figured out, not because it's stupid.
22 And I think the fact that this item is at the top of this
23 list ought to give great pause to how we proceed with a
24 testing program. And if a the testing program, I think
25 Fred's right, if the testing program is really designed to

1 get us to the point of demonstrating viability of a
2 technology, you won't have the confidence problem. And if
3 it's not, you will anyway.

4 MR. POSLUSNY: Okay, thanks for your comment.
5 Let's see. Okay, Eileen.

6 MS. SUPKO: John just suggested that documents
7 be written in standard English, not necessarily engineering
8 language, technical language. In addition to doing that
9 with the Package Performance documents, you might also
10 consider explaining the current regulatory standards in
11 common language and explaining what that means. There was
12 some discussion earlier that current regulations cover
13 something on the order of 99 percent of all of the possible
14 accidents that might happen. And I think the Nodel Study
15 that was done in ten or so years ago, it made an attempt to
16 look at actual accidents that had happened and put them in
17 the context of our current regulatory structure.

18 And it was a useful exercise except that it was
19 a technical document. Sandia National Lab has a fabulous
20 web site that takes railroad transportation accidents and
21 tries to translate them into English. They've got pictures
22 and it really is a useful tool. The little video clips
23 that you have on the web site that show a spent fuel
24 package dropping onto an unyielding surface for that
25 package and then a concrete surface, which to you or I is

1 unyielding, is interesting. And then the same video clip
2 is done with a mini van. And to the mini van concrete is
3 unyielding. And I think it's a useful exercise of trying
4 to demonstrate something that everybody says, oh, okay, I
5 understand the significance of unyielding to different
6 types of objects.

7 Another thing that can be explained that tends
8 not to be explained is that there are different, in the
9 current way we do business there are a number of different
10 types of tests that are done. We talked about the scale
11 model tests, component tests. But there are also some
12 other important things that I don't think are discussed
13 enough. The material testing that is done for materials
14 that are used for the structural components of the spent
15 fuel package and the fact that those materials have to be
16 to ASME code and the significance of that and the
17 conservatism in the material properties are all important
18 factors in the conservatism of how these packages are built
19 and the robustness of the package.

20 And trying to put all of that together to maybe
21 tell a story. Whether or not it's a story that is
22 significant, I don't know. Personally I think that it
23 might add something and maybe getting some feedback from
24 others around the table on that would be helpful. But
25 there are a lot of things that we do currently that we

1 don't explain in English. We talk about them in
2 engineering terms and I don't think the public is stupid.
3 But sometimes we don't speak it clearly. We've got
4 terminology that engineers use sometimes that you say to
5 yourself, why did I just say that? Let me translate it
6 into something.

7 There was a comment from the Nevada meeting
8 regarding impact limiters, to talk about, and I don't
9 remember what the suggested term was --

10 MR. DILGER: Shock absorbers.

11 MS. SUPKO: Shock absorbers. But, you know,
12 that kind of feedback is very important. And in helping in
13 how it is that we explain and how it is that people
14 understand what it is through the engineering and the
15 technical documents. Across the board the industry doesn't
16 do as good a job as they should. The Nuclear Regulatory
17 Commission doesn't do as good a job as they should in using
18 terminology is much more common and that people will
19 understand without a very detailed explanation.

20 MR. POSLUSNY: Thanks. We'll go to Ned, Bob
21 and then Bill.

22 MR. WRIGHT: George, I'd hate to tell you but
23 in some cases the public is stupid.

24 MR. CROCKER: I knew that, I knew that.

25 MR. WRIGHT: And part of that is, and I'll just

1 use a couple of examples. Going back to our Y2K
2 preparation, the biggest doomsday people, I mean, and I'm
3 wondering why they didn't commit suicide, were our
4 engineers. Rockwell Industries, we have a lot of other
5 high tech industries in my community. My biggest problems
6 with the damn engineers who, in their mind, could
7 understand that the flow path that could actually
8 systematically create the destruction that everybody was
9 worried about. But the common person couldn't figure that
10 out. So I had a lot of my engineers that I couldn't get to
11 understand that they were okay.

12 The other thing we're getting, anytime you
13 mention nuclear, the first thing they think about is
14 Hiroshima. All I heard was on September the 11th was when
15 that 757 crashed into the Dwayne R. Energy Center there
16 would be flash from the fuel followed by a mushroom cloud.
17 Now, no matter what I did to tell them, I said, physically
18 it can't happen. I didn't get through to them.

19 And then we talk about Trinobal. I've got a
20 lot of stuff in there about having to do things in here in
21 the United States because of Trinobal. We don't have the
22 same things Trinobal did, whether it's alerting the public
23 or the enrichment of the fuel and stuff like that. So
24 right now the public gets most of their information from
25 either the old movies, the sci-fi flicks, or things that we

1 don't have.

2 And that's part of the problem that I'm finding
3 is that I'm trying to re-educate the public. And there,
4 you know, while you try to put the facts out to them,
5 they're all saying, but at Trinobal this happened. I said,
6 the damn Russians screwed it up. Or, you know, they said,
7 well, looked what happened at the films after Hiroshima. I
8 said, do you understand the difference between three
9 percent enrichment and 98 percent enrichment? In my
10 previous life in the military I was a nuclear target
11 analysis. I used to draw little circles around places.
12 And then what happens if they do it to us?

13 So, you know, I mean, that's where my
14 background is from. And it used to be that we had to tell
15 our commander, we can only provide you ten percent
16 destruction. I said, if I told that to our army leaders
17 that said, gee, I can only give you ten percent, he'd fire
18 me because it was massive destruction.

19 So, you know, there's a lot of things that
20 people are so confused over. When you mention the word
21 nuclear, you know, they start going all over the place.
22 And I can't tell them about how my other chemicals that are
23 coming through my community is ten times worse, immediate
24 problems. But they don't worry about that. But they
25 mention nuclear and right after September the 11th,

1 whatever was on Good Morning America, I answered that
2 question whether it was nuclear, biological or chemical
3 because that's what got the public stirred up.

4 And I appreciate the information I get from NEI
5 because I've used a lot of that information. But in some
6 cases the nuclear industry does a pretty poor job of
7 defending itself. And I don't mean from the engineering or
8 the technical. We've got enough of that stuff out there.
9 It's telling John Q. Public what they need to know.

10 And a lot of it is they are just so enamored
11 with that the weapon's grade stuff but they can't separate
12 what is weapon's grade and the effects of weapon's grade
13 events to none weapon's grade. And, you know, we even
14 showed the examples of we have probably a greater security
15 problem with their medical stuff in our hospital that you
16 can get to for the dirty bombs and whatever.

17 And I get these people worried about how the
18 ninjas are going get in to steal the fuel rods out of a
19 power plant. I said, let them. We'll get to them in about
20 a week because that's how long it'll take them to get into
21 it. But these are some of the problems. The public's
22 perception which when the word nuclear's put in there, they
23 automatically flash back to some other time. And that's
24 going to be a hard one to do and, again, there's a lot of
25 good materials out there. And really, it's going to be our

1 smart people, our engineers, our technical people are going
2 to be hardest one to sell versus just the, you know, the
3 average John Q. on the street.

4 MR. POSLUSNY: That's a big challenge, thank
5 you.

6 Bob, you were next.

7 MR. HALSTEAD: Yeah, Chet, I want you to write
8 two things on the board. Test all cask design; I'll
9 explain why it's there, test all cask design. I want to
10 see it go up there.

11 MR. POSLUSNY: Okay.

12 MR. HALSTEAD: Then demonstrate adequacy of
13 regulations. And that's in shorthand, of course, because I
14 don't want to make you write a paragraph.

15 First of all, I could not disagree more about
16 the public and I think it's really bad to denigrate the way
17 the public reacts to these things. But I agree with
18 Eileen, among other people, that this agency has no mission
19 to pursue public confidence. This agency has a mission to
20 pursue protection of the public health and safety and the
21 environment. And if you do that, in a demonstrable way,
22 public confidence will follow. But there is no way that
23 you can set out public confidence as an objective and get
24 there. It won't happen.

25 But you can do two things that I think are

1 reasons why the approach that Nevada's suggested is both
2 better for public safety and the result in public
3 confidence. First of all, we're asking that all the cask
4 be tested physically to demonstrate compliance with the
5 hypothetical accident conditions of 10CR471. And that's
6 not a worse case accident. My friend, John Vincent, will
7 tell you, it's one hell of a real world accident. You
8 know, 55 mile per hour impact with cement followed by the
9 30 minute fire. We've got the 40 inch drop on the spike
10 and there followed by emersion.

11 If you demonstrate that all the casks designs
12 meet that standard, you've gone a long way towards public
13 confidence. Conversely, no matter how rigorously you test
14 them, if you only test two casks and the cask going
15 somebody's community isn't one of those two, you're out of
16 the room. You might as well cancel the meeting. You will
17 have no public confidence.

18 Secondly, demonstrating the adequacy of the
19 regulations. I don't know if Dr. Chen is here but at some
20 point we're going to -- is Dr. Chen still here?

21 MR. POSLUSNY: He left.

22 MR. HALSTEAD: Oh, okay. Well, he was the
23 person, he is the person who's worked on the Grison code
24 and had some very important insights to offer. The long of
25 the short of it is this. If we agree after the discussion

1 of the Baltimore fire, that it's reasonable to assume that
2 a cask could be caught in a three hour engulfing fire for
3 1,000 degree C, followed by, say, four hours, 800 degrees
4 C. And you can't get up and say that you tested your cask
5 to that level and then prepared the results on that cask to
6 the regulatory standard. You're not going to be able to
7 argue that you demonstrated that the regulations reasonably
8 encapsulates somewhere like 99 percent. We could argue
9 what fraction, Eileen, of that remaining one percent has to
10 be shown.

11 And like if you're in a meeting up at Keywana
12 or Manitoba talking about barge shipments out of Keywana or
13 Point Beach and you get up and talk about how rigorous the
14 International Atomic Energy Agency's standard for
15 submersion is undamaged cask at 200 meters. And you get a
16 fisherman who says, yeah, but what about those canyons
17 where it's 280 meters deep. Then you're out of that room
18 and you don't have to worry about public confidence. You
19 won't have any.

20 So, you've got to figure out how to demonstrate
21 public safety. And then hopefully love will follow. But
22 if love doesn't follow that can't bother you, man. That's
23 not the agency's mission. If you've demonstrated safety
24 you've done what you have to do. And I will say this about
25 the public, it's fickle. And my greatest concern is that

1 all the body of work that people of the State of Nevada
2 have done might actually be adopted. All the extra
3 regulatory things we've asked for I might see them in
4 statute and regulation. And public still isn't going to be
5 convinced. That will hurt me in my heart but my head will
6 feel just fine going home from that meeting with people
7 probably throwing stuff at me because they'll say we've
8 been sold out. He agreed to something.

9 But we can't worry about public confidence.
10 We've got to worry about public safety and if the
11 confidence follows, fine. And I know that's hurtful to the
12 people who want to do public relations campaigns and want
13 to be loved. But you shouldn't expect that to happen.

14 MR. POSLUSNY: Thank you. Bill?

15 MR. BRACH: Just a few comments. Interestingly
16 enough the first comment I want to make Bob Halstead also
17 is making. The NRC's mission is protection, public health
18 and safety, common defense and security and protection of
19 the environment. We do not have the mission statement
20 increasing or educating the public.

21 But I also want to mention that we recognize
22 that interactions and communication and understanding on
23 the part of the public, very broadly I say all of our stake
24 holders, on what we do, why we do it and how we use the
25 information from what we do is extremely important. I want

1 to step back. The meeting today, at the very outset we had
2 mentioned we had developed a draft test plan for testing
3 spent fuel transportation packages. The purpose of today's
4 meeting is to interact with stake holders and members of
5 the audience on what we have laid out as a draft test. I
6 mentioned before no decisions have been made yet.

7 We're looking to stake holders, to the public
8 for input and comment and we will be considering and using
9 that input and comments. And I'll use, if you will, where
10 we are currently in the Package Performance Study. This is
11 a third series of public meetings, a series of outreach
12 meetings, public meetings we've had in the Package
13 Performance Study.

14 The formulation of the draft test protocols
15 built on, if you will, the Issues Report that was issued
16 back in June. The Issues Report was built on the public
17 input and comment, stake holders comments we had in our
18 very first series of activities. We're not sitting with an
19 assumption that we have the answers or know all the
20 information. We don't. The information we've heard today,
21 the information we've heard at the previous meetings in Las
22 Vegas and Prupt, Nevada and also in Rockville. I attest to
23 that. There's significant information that we are
24 listening to and considering as part of this process.

25 So we genuinely do want to hear from the public

1 and stake holders. We're not sitting with all the
2 information or answers. On the one hand we feel that we
3 have technical competence in what we're doing. We have
4 confidence in our regulatory programs and activities. But
5 we also recognize that there is more on our part, all of
6 our parts to learn and understand. And looking for
7 building, if you will, of the public trust and the public
8 understanding, and I very much agree with Bob Halstead's
9 comment and also was offered at the meeting in Las Vegas by
10 at least one county representative and a number of other
11 people that we, NRC, need to keep our focus on our mission,
12 if you will, and that the public's understanding, the
13 public's, if you will, confidence, the public's trust will
14 come from our doing our job.

15 And that's what we're trying to. But we also
16 recognize in doing our job we need to be, one, accessible
17 and then open to and communicating with, and listening to
18 all of our stakeholders to help us learn as well as others
19 understand perhaps what we're doing and why we're doing it
20 and how we're trying to move forward.

21 MR. POSLUSNY: Somebody mentioned transparency
22 earlier this morning and I'm hearing that's an example of
23 what's going on here.

24 Let's see, Mr. Strong and then Mr. Resnikoff.

25 MR. STRONG: Well, I'm just going to reiterate

1 comments first at Bob and then Bill made. In terms of the
2 public confidence and trust is not a goal for this Package
3 Performance Study. It will be one tremendous benefit if it
4 is done properly and done right. And the job of, then,
5 translating the results of this Package Performance Study
6 into something that is understandable to the public will be
7 the job of those of us who deal with that, serve that
8 particular arena.

9 I mentioned earlier that one issue that I
10 wanted to address was the issue of horizontal versus drop
11 test. And I'd still like to discuss that but from the
12 standpoint of public perception, I believe that horizontal
13 impact tests are much more dramatic. Pictures are worth a
14 thousand words. And those videos, even still shots, are
15 very dramatic.

16 But if from the technical aspect of verifying
17 the computer codes and this sort of thing, if drop tests
18 are more technically adequate for getting you that, that
19 part of the job done, to verify the codes then I'm willing
20 to seed the issue of the horizontal test because the issue
21 of assuring safety, assuring the ability of further
22 testing; getting back to one of Bob's comments about the
23 issue of conducting full scale casks tests on all casks,
24 all prototypes versus a limited few. I'm not sure I
25 support the idea of tests on all casks. If indeed this

1 study can show that the computer codes are accurate, are
2 verifiable, then I think the public can understand that
3 those testing protocols and the computer codes, computer
4 simulations can assure safety of casks even if full scale
5 tests are not done.

6 MR. POSLUSNY: Thank you.

7 MR. RESNIKOFF: I wanted to get one of the
8 issues you raise, which is the type and number of casks
9 that should be used.

10 MR. POSLUSNY: Can we see if there's anything
11 else on confidence and then I'll shut that one off.

12 MR. RUNYON: I think I would, not to beat a
13 dead horse here, but I would reiterate some of the things
14 Bob said. I almost see two parallel paths here. I don't
15 think we can confuse public perception or public confidence
16 with risk assessment, which is, I think, the objective
17 here. And, you know, in the test design, one form may
18 function much better than the other in terms of, you know,
19 one of the alternatives was including the conveyance as
20 part of the test.

21 Well, you know, personally I think if you see
22 the conveyance, you evaluate the couplers, you evaluate a
23 lot of other aspects. But is that really the data? And is
24 that going to be the accurate data that you need to
25 validate your computer model? You know, I'm not an

1 engineer either but I would guess it's probably not. I
2 would guess the drop test with just the impact limiter
3 would be a more valuable test in validating the computer
4 model than, you know, a rail car with the couplers, with
5 the cask, with the, you know, the jet slag.

6 I still think even though there's a need for
7 the more technical engineering type of tests, I still think
8 these other types of tests would go a long way towards
9 public confidence. And, you know, do I think that it will
10 automatically follow? I don't think it will automatically
11 follow. I think it takes some work to build public
12 confidence. And you have to convince us first, for those
13 of us who have to work with the public and have to answer
14 questions, have to deal with these issues at the state and
15 local level.

16 MR. POSLUSNY: Thanks. Any issues on
17 communication?

18 MR. VINCENT: Yes. One of the things we try to
19 do at the NEI is to improve public confidence in what we do
20 and why we do it and how we accomplish safety. And we
21 understand from our continual discussions with people on a
22 daily basis that how you communicate that is the key to
23 doing that. We do not characterize the public in any way
24 prior to making answers to people's questions. We try to
25 answer the questions as they are drawn to us. I do it

1 routinely three or four times a day. And I get calls from
2 people who are retired. I get calls from fifth graders or
3 ten years old who are trying to do a class report. And I
4 clearly cannot talk about diffusion equations and answer
5 his questions. So, we make a distinction.

6 We try to do the best we can in trying to
7 provide the information in an understandable format,
8 recognizing at the outset we get requests for information
9 at different levels throughout the organization on a daily
10 basis. We do not, I repeat that, we do not try to make any
11 kinds of characterizations about what the public does or
12 does not think or whether they all have PhD's. That is not
13 the thing you need to do. You need to answer their
14 question in the way they've asked it.

15 And that's the primary concern of getting
16 information to the public and so that they understand and
17 they can make use of it for themselves and then develop
18 their own confidence or reliability or trust or
19 understanding in what you're saying. And then they'll come
20 back to you to get more and more information. Once you
21 succeed in doing that, then you've helped the situation.

22 MR. POSLUSNY: Thank you. I suggest we talk
23 about casks, the number of casks.

24 MR. RESNIKOFF: Right, I thought that was one
25 of our subjects this morning. First of all, I just want to

1 say one word about conveyance. The conveyance is important
2 so far as the weight is concerned and whether bridge
3 capacities can handle that weight. And that affects the
4 probability of accidents. So, I just wanted to throw that
5 out incidentally.

6 This is my understanding. You have these
7 various casks. You have some steel, lead steel. You have
8 some that are monolithic steel. You have some that are
9 steel depleted geranium steel. You have some that serve as
10 over packs for canisters that fit inside and you have some
11 that don't have over packs. You want to do a thermal test
12 and benchmark some computer codes. But then you need to
13 have some, you need to understand how you can apply that
14 same computer code to these other different casks. And you
15 have to some how bound the error in going from one cask to
16 the next and what is an acceptable error as you go from one
17 cask to the next. This is why the State of Nevada is
18 asking that all casks be tested at least thermally. I
19 think that's an important issue unless the NRC is going to
20 be able to take these computer codes and bound the error in
21 going from one cask to the next.

22 MR. POSLUSNY: So, this is a suggestion.
23 There's a modeling issue in the models that are used today
24 if you try to apply two different cask design. Okay.

25 Any other comments on the types and numbers of

1 casks?

2 MR. RUNYON: I have a question about the number
3 of tests or the number of times the test would be repeated
4 to create some statistical validity. I mean, you know,
5 when you make measurements you don't typically take one
6 measurement, you can't graph one measurement. You can't
7 put error bars on one measurement. How would you propose
8 how many times could you drop a cask or how many casks
9 would you have to use to develop, I guess, a probability or
10 an accuracy on your measurements?

11 MR. MURPHY: Give me 20 seconds here to pull
12 out my key up slide for the impact tests. At this bottom
13 line, at this -- we're proposing to do one rail and one
14 truck cask by way of impact. And we're talking about one
15 rail and one truck cask for fire. Obviously, if you have
16 any question, we're open to comment. But we also got to
17 think about what we're doing.

18 The rail cask has an MPC in it. The truck cask
19 does not. And the other thing we're looking, I'll say, at
20 the orientation, I'll call it orientation, when we're
21 dropping CG over corner, center of gravity over the corner
22 on the lid. The other one we're doing a back breaker drop.
23 We're looking at carrying out the diversity of the
24 challenge to the code by working with the material that we
25 have available at the moment or planning on the moment.

1 I'm a physical scientist. I'm a sizemologist.
2 If we could test more casks, that would be fine. That
3 would be a good thing. We could do a better job in
4 bounding the uncertainties and the perimeters, the results
5 of the perimeters that we apply. If we did small scale
6 testing, potentially we could no more and we could answer
7 the questions associated with the potential diversity in
8 the actual physical characteristics of the cask.

9 We don't think, because of the quality of
10 control programs that are in place, the quality of control
11 that is done at the manufacturer, the vendor, the purchaser
12 and so forth, that we have confidence, trust and
13 understanding that these guys have done their job
14 correctly. We have folks like Amy keeping an eye on them,
15 inspectors looking to make certain that they have done
16 things according to the rules. And within the nominal
17 physical characteristics of the metals, the materials that
18 are used, we think that we can do a very good job of --
19 these are going to behave.

20 We'll tell you that we are going to be putting
21 our necks on the line, that before the tests are done we
22 will have the analysis, the predictions made of what's
23 going to happen to these casks. We will predict the trend
24 in the fire, as Ken showed you an hour or so ago on the
25 board. We are going to be predicting the deformation, the

1 plastic deformation, if we go that route, what is going to
2 occur in those casks.

3 We are going to put that out in the public and
4 make that available to you. And in addition to that we
5 will put uncertainty bounds on it. We'll tell you whether
6 or not we're going to be able to get our plastic
7 deformation prediction right to plus or minus five percent,
8 ten percent. And we will be, I'll say, staking out our
9 territory with what we think we can do with these. Like I
10 said, we're doing two different casks, two different
11 orientations, two different, oh, MBC or not MBC.

12 And there is some level of diversity. And I
13 think within the engineering community, anyway, if we have
14 done a good to excellent job with those predictions, you
15 know, we will be in very good territory. If we don't, it's
16 a oops.

17 MR. SORENSON: I'll just add on real quick to
18 what Andy said. One of the things that's talk about in the
19 protocols also is to do deponent testing, for example.
20 This is an opportunity for us to learn about material
21 behavior outside of the cask system in the drop test. And
22 this is not unlike what a cask applicant would do as well,
23 using a combination of scaled testing and component testing
24 with analysis to evaluate the response of the cask under
25 regulatory condition. And so that's part of the PPS as

1 well. So that we use that combination of component testing
2 and analysis to be able to do the pre-test analysis before
3 the actual test.

4 MR. POSLUSNY: Yes, Bob.

5 MR. HALSTEAD: How would this problem occur
6 with all these different casks designs? One of the smart
7 things via we did back between 1988 and 1991 is they had a
8 design competition. And the original plan was to pick the
9 best, the second best truck cask design; the best and
10 second best rail cask design and some procurement decision.
11 You know, in the graveyard of DOE ideas, you can look back
12 and see three or four times when they really had it right.
13 But then I don't know exactly what happened with the policy
14 change. They gave up on that idea.

15 And so first of all, Nevada started thinking
16 about this testing issue in time when we thought we'd have
17 a design competition that probably would involve scale
18 model testing to pit the cask designs for the project. And
19 secondly, we've advocated the principle of uniformity in
20 design. I haven't heard any of you nuclear guys talk about
21 how impressed you are about the standardization of French
22 reactor designs. But that's where all this came from in
23 the '80's. We said it's stupid to have five or six or
24 seven or eight designs out there. It's stupid economically
25 and it's stupid when we have to train ER responders to

1 recognize one from another and everything in between is
2 stupid. But that's the course we've taken.

3 So, now, right now in the pipeline the NRC has
4 certified four different rail cask designs. The Holtec,
5 the Transnuclear, the Napp Dual Purpose Cask and the New
6 Holmes Pack. Thank goodness the GA Truck Cask design,
7 which is not that different in its boiling water and
8 pressurized water reactor fuel configuration. So we
9 probably, I don't see anybody here at the table arguing
10 that if you test the GA 40, you've got to test the GA 9.
11 So, that's progress there.

12 The real problem is these casks are
13 significantly different from one another. Now, I'm not
14 real familiar with the Transnuclear 68. But I know that
15 the Holtec design, which is a steel design, is very
16 different from the Napp Dual Purpose cask, which has more
17 of a traditional steel lead on it. And it's very different
18 from the New Holmes steel lead steel -- approach.

19 And there are differences in the neutron
20 shields, at least three major different approaches. At
21 least three different approaches in materials use for the
22 impact limiters and some different approaches in the lid
23 closure mechanisms. I don't believe, Andy, that if you and
24 I have a debate in front of the public in Nevada about
25 whether you can do one test on one of those casks design

1 and confidently predict that that model equally predicts
2 the acts and performance of three or four of those casks
3 design, I bet that crowd's going to walk out not having
4 confidence.

5 Now, confidence should not be the issue so
6 let's take that off the table. Your big problem is that
7 the technical people who live, eat, sleep and breath this
8 stuff like us, also have that concern that you can't model
9 those differences in cask design to our satisfaction. So,
10 we're going to argue that you've got to test each one of
11 those cask designs to show compliance with the regulations.

12 I wanted Dr. Chen to be here because the big
13 concern is with the impact test you've got one dang data
14 point. That's not much to work with. And we'll talk about
15 it some more with the extra regulatory test. One of the
16 advantages of testing these four different rail casks to
17 the regulatory standard is you've got four chances to see
18 how well your model predicted the impact that's the
19 equivalent of the 30 foot drop and the 40 inch drop on the
20 spike.

21 Without belaboring the point, I have a real
22 burden if you end up only arguing that you're going to do
23 one truck cask and one rail cask. You have an enormous
24 burden of proof to show that testing one rail cask gives
25 you the basis of confidence that your models adequately

1 predict those other rail casks. And frankly, that's where
2 you're going to fall down in the court of public opinion.

3 You can't get to public opinion necessarily
4 with this testing program. But you can sure cause problems
5 with public confidence if you've got a lot of different
6 designs out there. And frankly, there may be two or three
7 more. I mean, right now the NRC has identified these four
8 rail cask designs and the one truck cask design as most
9 likely to be used either for Yucca Mountain or PFS. But
10 probably there's a couple of people, maybe some people in
11 this room from the industry thinking about another design
12 or two. But that is real issue. And that's why our
13 argument is you ought to do the regulatory test on all of
14 them.

15 And we don't think it adds that much cost. The
16 only reason not to do this is cost. And if the cost of
17 your program looks like 20 to \$30 million dollars to us to
18 do two casks and we think for 40 to \$70 million dollars you
19 can do five to eight casks, regulatory and extra
20 regulatory. Thank you.

21 MR. POSLUSNY: Thanks, Bob. Any other comments
22 on the need to do multiple design test. Fred?

23 MR. DILGER: This is not directly a multiple
24 design tests, although we do advocate that. We think
25 that's important. One of the things that is related to

1 this, however, and came up in the Washington meeting was
2 that there's a marginal cost of doing additional tests. So
3 that you don't necessary want to just drop it once and go
4 home.

5 One of the people who has done a lot of scale
6 model testing mentioned that their first test run was a
7 successful failure. It was successful failure because they
8 got every wrong on the first test. But it told them all
9 they needed to know to make the second test completely
10 successful. And given the way the capital improvements are
11 going to be made to have to construct a facility capable of
12 doing these tests, a lot of those costs, a lot of the costs
13 for an additional test are already gone, are already been
14 paid anyway. So, you might as well, so, I don't see that
15 the marginal cost of additional tests would be all that
16 great.

17 And the model for this, I think, was the Whip
18 Program. And we heard Jim Chennel in Las Vegas talk about
19 how he'd seen the Tru Pack 2 bounced and dropped and
20 punctured multiple times. And that was a good testing
21 program and I would commend it to you as a model to think
22 about when you draft your own protocols is to look at that
23 and see, see how they did it. See what they learned. See
24 what the marginal cost of additional tests look like to
25 give you some idea of what your budgetary requirements will

1 be.

2 MR. POSLUSNY: Thank you. So, we've heard
3 comments on the suggestion to do multiple tests, to address
4 the differences in the design and whether or not the models
5 can be applied to different designs.

6 Any other comments? I'd like to give everybody
7 a chance to get all these issues, if so needed. Any other
8 comments on the number and types of tests? Sir, David. MR.
9 BENNETT: The experience in industry has been the multiple
10 testing of different styles or types of cask. My
11 understanding, and I am an engineer, my understanding is
12 NRC sets a regulation, a benchmark that has to be met. And
13 builders of the cask, builders of the transportation
14 trailers, et cetera, have certain criteria that are ASTM or
15 higher. It seems history has dictated, and we have been in
16 the industry many years, the type and look of a cask has
17 changed greatly. But that benchmark criteria requirement
18 has not changed unless it's been elevated.

19 Now, I guess being from southwest Missouri I
20 can relate to a, more of a country type assessment. From
21 an engineering standpoint the automobile industry has a
22 benchmark standard for safety. But everything that comes
23 out of the industry isn't the same looking. But it
24 protects the public the same way because of that benchmark.
25 And I've been involved with the NRC regulations. I'm on

1 several ASTM committees for specifications of highway
2 transport of heavy objects, which is spent fuel cask.

3 The regulations, if they're set at the right
4 level and the public understands they're at the right
5 level, I'm protected. I'm not sure the public has so much
6 concern about whether it's black, white, four feet long, 12
7 feet long, two feet around. If I know that material is
8 going to be contained by this regulation and this standard,
9 you lose some of your effectiveness of intelligent and
10 advanced design work from the industry manufacturers if you
11 limit them to a particular item that may or may not be the
12 cadillac jaguar of the industry.

13 So, I think NRC's job is well done by setting
14 the standard to protect the public. And if the public can
15 read I'm protective of this benchmark. It looks like this
16 but it looks like this but they all met that same benchmark
17 criteria for safety, I'm not sure that's all bad.

18 MR. POSLUSNY: Thank you, Bob.

19 MR. HALSTEAD: I think that's the point. We're
20 arguing. We want to test the casks see if they meet that
21 standard. I do not think a lead wall cask performs the
22 same way in the six hour 800 degree C fire as a cask that
23 doesn't have lead in the walls. I want to experimentally
24 find that out. For the most part I haven't heard a lot of
25 criticism of the standards here, although a lot of us, some

1 of us particularly in Nevada have been concerned that the
2 30 minute fire at 1,407 degrees Fahrenheit may not
3 adequately reflect the level of defining a severe accident
4 given the types of materials that are out on the road.

5 But, you know, for the most part even the State
6 of Nevada has accepted the NRC's standards and said what we
7 want to do is have you demonstrate the different casks of
8 different designs of different materials meet those
9 standards. And then what we want to do with some
10 combination, some combination of computer simulations, full
11 scaled tests, component tests and scale model tests is
12 figure out if the cask failure thresholds are enveloped by
13 the regulations or on the other hand be able to say in
14 order for an accident to exceed these regulations and fail
15 the cask, it's got to have such a low probability that
16 we're not going to be able, we're not going to worry about
17 it even though some of us will worry about it.

18 But I think it is a good point. What you're
19 talking about here is taking six different cask designs and
20 testing them to demonstrate that they comply with these
21 regulations and at the same time acquire very, very useful
22 measured physical data that we're going to feed back into
23 the codes. And then, frankly, also use that as a basis in
24 our extra regulatory tests.

25 MR. POSLUSNY: So, yours is sort of a hybrid

1 suggestion. And you're going to give that to us in writing
2 as well?

3 MR. HALSTEAD: Well, I'm just saying, we don't
4 want to confuse the standards with --

5 MR. POSLUSNY: This test.

6 MR. HALSTEAD: -- a test, benchmark or a target
7 maybe is a better way to say some target condition that we
8 want to test the cask to. But so far you haven't heard
9 anybody come in and say, I know that fire standard is
10 wrong. I know that impact standard is wrong. I know that
11 puncture standard is wrong. I sure haven't heard that
12 although we've raised questions about whether the fire
13 standard should be re-examined.

14 MR. POSLUSNY: Yeah, and we'll bring that up
15 later, I'm sure.

16 Okay. Any other comments on cask numbers and
17 types? With that, I will cross that one off.

18 Just going from the top of the list, anything
19 on the codes and standards in the validity of us or the
20 validity of the NRC suggesting that those be revalidated?
21 Yes, Fred.

22 MR. DILGER: I just have a question there. You
23 know, you've proposed these two extra regulatory tests. Is
24 there, do you expect to learn something new that is not
25 already understood by your computer code or you can't

1 already model by your computer codes by proposing these two
2 specific tests?

3 MR. MURPHY: I think it's a question of we are
4 challenging the capabilities of these tests, of those codes
5 with the test. Yeah, I expect to learn something new from
6 them. At the very least that the codes are valid or
7 invalid in these applications.

8 MR. HALSTEAD: Could you explain what codes are
9 used by designers who come in to meet the requirements of
10 the 200 meters submersion test for IA? My understanding is
11 it isn't really a submerging pressure test. It's more of a
12 -- under pressure test. Can you briefly, just for the
13 record, say it?

14 MR. SORENSON: I could say it for the
15 structural part of it because you do have to look at the
16 buckling and those sorts of things. It is a boundary
17 condition, hydra static sort of pressure that you put
18 around the code. And you use standard structural codes to
19 do that type of analysis.

20 MR. HALSTEAD: Well, my understanding was the
21 for the emersion survivability for the intrusion of water
22 into the package, the particular, and that's done for the
23 sequential, for the fourth part of the sequential test, the
24 tendency of Bar 71, that that's, but that's a criticality.
25 I don't know, John or somebody who's taken a package

1 through certification. I'd like to put that on the board
2 as a question that somehow needs to be addressed in this
3 proceeding. You know, I don't believe I'll live to see
4 large scale barge shipments for a lot of obvious reasons.
5 But since the department has put it on the table, it's
6 something that has to be addressed. And so that whole
7 issue of how a package designer demonstrates compliance
8 with the two emersion standards is something that needs to
9 be addressed in your report, if for no other reason than to
10 justify why you decided not to consider it in testing.

11 MR. VINCENT: Bob, are you asking whether we
12 think it's a moderator exclusion test? Is that what you're
13 saying?

14 MR. HALSTEAD: Well, I just want them to give
15 an explanation for the record of why they decided that
16 either the one hour, one meter emersion at the end of the
17 sequential test or the two, why that shouldn't be addressed
18 in this testing program. If it's because they agree with
19 me that we won't see those barge tests and they don't find
20 the required shipments, then we can -- but I think they
21 need to give some rationale for why they fenced that off as
22 a topic that they're not addressing because when we went
23 through the 10CFR71 revision last year, a really big issue
24 was the formal adoption of the IAEA 200 meter submersion
25 test. So, if it was important last July, why isn't it

1 important today?

2 MR. POSLUSNY: Yeah, we should address that
3 now.

4 MR. SORENSON: Yeah, Bill touched on it, I
5 think, a little bit earlier in terms of the public meetings
6 that we had two and-a-half years ago. And a lot of the
7 issues really did focus in the comment period on the
8 severe, the severe thermal test. In terms of containment
9 of the material in these sorts of environments, that was
10 deemed as being really the important sorts of tests to look
11 at. In terms of the emergent from a containment
12 standpoint, we didn't see that as a severe environment as
13 the high speed impact test and thermal test.

14 That's why we didn't necessarily fence it off
15 but looking again at the resources and those sorts of
16 things, we saw those two tests as being the most important
17 in terms of being able to really understand --

18 MR. HALSTEAD: Well, I read the environmental
19 assessment that you prepared. And it was totally
20 inadequate because it assumed that the maximum depth you
21 would ever lose a cask at would be someplace on the
22 continental shelf where it would be, say, 50 meters. And
23 the argument was if it was in deeper water, if you couldn't
24 recover it, who cares. You didn't think it would be a big
25 problem.

1 I don't necessarily agree with that. But if
2 you lose a cask in Lake Michigan or some other body in
3 fresh water, you're not going to have the option of letting
4 it sit down there at the bottom of the cask. That's going
5 to be a horrific situation, people shutting off municipal
6 and industrial water intact systems. And so as long as
7 there is a real threat that the Department of Energy
8 thinks, and frankly, some of those reactor sites on Lake
9 Michigan, very difficult to access with heavy haul trucks.
10 I happen to know the bridge ways into the Port of
11 Keywanies. There's some places I don't think you could
12 service except by -- truck. But as long as they have that
13 out there, I think you have to revisit it.

14 And I can tell you that the way that it was
15 deposited it in the environmental assessment in support of
16 the rule making last year, only looked at a few types of
17 movements. It did not look at movements on the inland
18 waterways. So, at some point you're going to have to deal
19 with it in some detail, I think.

20 MR. POSLUSNY: I think we had that comment that
21 needs to be addressed in our final deliberation.

22 MR. WERNER: Chet, can I make --

23 MR. POSLUSNY: Yes.

24 MR. WERNER: I just wanted to offer a
25 suggestion for a process here. We heard earlier the need

1 to have things written in plain English, if possible. I
2 would suggest also that there are audiences, too, who would
3 value and appreciate in more detailed codes. I think we
4 just heard that, frankly, from Bob and other people. But
5 that seems like something that ought to be available, the
6 detail. I mean, it seems like we have sort of a one size
7 fits all. You know, here's the document, whether you're an
8 English speaker or a mathematic speakers. Here's what you
9 got. And, you know, maybe it's appropriate to survey your
10 audience and think, okay, there's some people, most people
11 are just going to be able to cope with a one page summary
12 of what's going on overall. And there are other people who
13 are going to want to download the codes and play with them
14 and validate and kind of that transparency.

15 It goes back to what I think we've been saying
16 in different words that it may not be a goal of this whole
17 process necessarily for a public relation -- it leads to
18 public acceptance. But perhaps rather simply a
19 transparency of the overall system that leads to
20 understanding so that to the extent you've got a
21 technically valid test, there's understanding and
22 acceptance of that. But one has to lead to another. And
23 we don't seem to, again, be looking at the systems approach
24 to enable that to occur.

25 Again, all the money we're, as a country,

1 investing in this is well spent and if we don't make sure
2 that it really leads to meeting some kind of an objective,
3 you know, begin with --

4 MR. POSLUSNY: Yeah, I'm hearing multiple
5 versions, depending on the user, experience type, plain
6 language all the way up to the most technical, perhaps.

7 MR. WERNER: Yeah, I know some of the codes may
8 be proprietary and its an issue of at least know where they
9 are and get access and things like that.

10 MR. POSLUSNY: Good comment. Sir.

11 MR. RESNIKOFF: I wanted to issue the issue of
12 codes. Maybe I read the draft test protocol too rapidly
13 but I noticed that, and you can correct me, I notice that
14 in fire tests there were several codes that the NRC was
15 considering. And I think that's a good idea because the
16 actual physical test is what costs the money. Actual
17 setting up these codes is much less expensive. And if you
18 can test a few codes at the same time and one more
19 accurately predicts what the actual results will be, why,
20 you know, that sounds like you get a lot more for your
21 money.

22 But for impact I noticed that you only seem to
23 be using one code, the code developed by Sandia and I think
24 you should use several different codes for that.

25 MR. POSLUSNY: Any comments on that?

1 MR. MURPHY: Just a quick comment on that. We
2 are taking into consideration or planning, if we can get it
3 going, what we call a round robin code exercise. We're
4 considering putting the materials out into the public
5 domain, if you want, and then inviting different
6 engineering firms, different countries, different
7 organizations to run their calculations and check and see
8 how they compare with the actual experimental results. A
9 little like a lottery. The winner gets to do the
10 calculations for everybody. I don't think so. We're too
11 diverse and the question of what the winner is or what is a
12 good prediction is obviously something to be considered.

13 And I'll say it goes actually the same thing
14 that Bob was talking about a few minutes ago and that is
15 the diversity in the number of the casks and the diversity
16 in the calculational tools to look at how the cask performs
17 whether it's a fire or an impact code.

18 MR. POSLUSNY: Okay. Any more comments on
19 codes? I'd like to wrap up for lunch around 1:00 o'clock
20 if we could.

21 Test to failure has been mentioned at least
22 three or four times. Any comments on that concept or
23 questions on it? Yes, Fred.

24 MR. WRIGHT: We've been advocating test to
25 failure for some time and I just want to offer kind of a

1 compromise for the purposes of this proposal. And that
2 might be a cask that is tested like this full scale is
3 failed in the sense that it will never be used to ship
4 waste. So, it seems to me that it might be useful to
5 perform the drop test but then test the, do the final test,
6 the fire test to failure. As I understand it a rough
7 estimate is that it costs about \$10,000 an hour to continue
8 a fire test or to perform a fire test, somewhere in that
9 ball park.

10 And testing, running that out for say an
11 additional six hours, seven hours, whatever it takes until
12 we have a failure in the cask, whether it's an open pathway
13 to the environment or some other definition, probably
14 wouldn't be that expensive and would give us useful
15 information to validate the model and could be translated
16 into useful information for first responders. I mentioned
17 that in the Las Vegas meeting.

18 But I think that might be a way to proceed
19 usefully on test to failure.

20 MR. POSLUSNY: Good comment. Anybody else?
21 Bob.

22 MR. HALSTEAD: Yeah, there's not a definite
23 answer on this and I'd like to talk about it more after
24 lunch. But one of the things that we're looking at is for
25 the test to fail is the combination of the impact of the

1 cast and the impact of the spent fuel. I have to credit
2 Charlie Pendington, who's working for Nuclear Assurance
3 Corporation, he was at the Rockville meeting, who raised a
4 good point of saying, well, instead of defining failure as
5 a gap of so many centimeters in the lid or the failure of
6 the seal or a certain degree of strain on the bolts, that
7 you pick some measure that's related to a consequence.

8 For example, what would have to happen to rail
9 cask to get a one percent release of the inventory
10 radioactive cesium in there. In that case you're looking
11 at some measurable condition that causes the fuel to fail
12 coupled with some measurable condition that causes the lid
13 -- so, for example, one of the things you guys might be
14 thinking about for after lunch is we've worked under the
15 assumption that if the fuel gets heated up to 750 degrees
16 C, we can assume that it all fails. There's burst rupture,
17 the ceramic is largely reduced to a fine powder and
18 certainly, while we may not look at the rest, but certainly
19 we assume that all cesium 137 that's in the gap between
20 what was the pellet and the cladding. And there's a big
21 debate over that with the range of, you know, we said 0.3
22 percent or 9.9 percent.

23 But to try and make this whole thing
24 manageable, we need to try and find some target conditions
25 that we can measure the test. And one of the things we're

1 looking at is what causes the fuel pellet, what kind of
2 exterior fire engulfing the cask causes the fuel pellet to
3 reach 750 degrees C. If it reaches that level you can
4 assume that the seal failed, you know, two, three hundred
5 degrees C earlier.

6 The harder thing is with the impact, to say,
7 you know, when Marvin comes back we're getting, you know,
8 you hear values as low as 50 to 60 G's, or you hear
9 loadings as high as 70, 80 or 100 G's that are necessary to
10 cause the same degree of fuel failure that that elevated
11 temperature would cause. So, it would help the discussion
12 if you guys could be thinking from your standpoint the
13 modeling work to be done as we try to help you with input
14 on how to define these failures thresholds. You could be
15 thinking in your own mind particularly what impacts and
16 fires cause seals to fail and what impacts and fires cause
17 the fuel to fail.

18 MR. POSLUSNY: Thank you. Anything else on
19 test to fail? Yes.

20 MS. SUPKO: I guess my biggest concern in
21 talking about test to failure, and there's been a little
22 bit of discussion about this already today, is how do we
23 define what is failure and keeping in mind with regulatory
24 standards for accident conditions are regarding 10A2
25 release, et cetera, that that is allowed, potentially

1 allowed under an accident condition so that, you know, any
2 release isn't necessarily failure from a regulatory
3 standpoint and trying to put that into perspective.

4 The other thing is the test that was proposed,
5 the thermal test that was proposed was fully engulfing
6 optically dense fire. I find it difficult to believe that
7 you're going to have a fully engulfed optically dense fire
8 in a real world situation. And I understand that from a
9 scientific point, that's the type of test you want to run.
10 You take a lot of the uncertainty out of the analysis that
11 you're doing in terms of, you know, whether heat sinks and
12 how do you model that and all of that.

13 But, again, I go back to what I said earlier.
14 Translating what you're doing into real world situations so
15 that we all understand how it is that the test that you're
16 doing, if indeed the objective is causing some sort of
17 failure, however it is one might define failure,
18 translating that so that there's an understanding of this
19 is a physical situation that can occur or we're outside the
20 bounds of it. And we're doing that on purpose so that we
21 have confidence that our models can handle everything in
22 between what is realistic and probable and what's out here
23 on the bounds and we're not just extrapolating, that we
24 have a real data point and that's the reason we did this
25 test. And it's really important that you put that into

1 context if you're going to go to what I would call way
2 beyond design basis.

3 MR. POSLUSNY: Thank you. It seems like the
4 challenge to define what failure is is going to be, would
5 not make everybody happy but it has to be well justified,
6 is what I'm hearing, you know, a lot of assumptions to be
7 made.

8 Fred.

9 MR. DILGER: I've provided this example before.
10 For those of you that heard it, I apologize, but I just
11 want to explain where I'm coming from in terms of why we
12 think a thermal test to failure makes sense. And it
13 relates more to first response than it does to the design
14 basis.

15 And that is, just to give you an example, on US
16 95 in Las Vegas, the wheel came off a break truck and
17 caused a collision that had a semi truck hauling two
18 trailers filled with gasoline to crash and ignite and burn
19 into flames. The heat was so intense it ruined an overpass
20 and it burned for about four and-a-half hours, I think it
21 was and closed the freeway, of course.

22 But the first responders let it burn out of
23 control and let it burn itself out because the damage that
24 would come from their using their foam and their other gear
25 to put out the fire would have exceeded the cost of

1 replacing the bridge and keeping the highway closed and
2 that sort of thing.

3 So, in that kind of an unlikely but realistic
4 scenario, it would be of assistance, I think, to first
5 responders for them to know when the cask might fail or
6 where there might be a problem like this so they can adapt
7 their tactics to a particular situation. Had there been a
8 cask inside that fire they might, they might have been
9 willing to incur that damage caused by the foam running off
10 into the drains and that sort of thing rather than run the
11 risk that the cask seals might fail somewhere down the
12 line.

13 So, it seems to me to be a reasonable thing to
14 do.

15 MR. POSLUSNY: That's a good time between a
16 couple of issues brought up earlier this morning and what
17 the test could possibly do.

18 Anything else on test to fail? Okay.

19 We've already talked a little bit about rules
20 only a few minutes ago. Any thoughts on that and a test
21 design aside from what we've already said. And I'm sure
22 we're going to bring it up later this afternoon as well.

23 MR. HALSTEAD: Yeah, I just wanted to remind
24 the folks at Sandia, we submitted a list of 20 plus real
25 world accidents including some that involve military

1 explosives, which is a special concern to us in Nevada and
2 maybe some states where you have a concentration of
3 literary weapons, depots and storage for test practice
4 bombings and so forth. I know those are rare but certainly
5 many of you know that's an issue in Utah that may indeed
6 have killed the private fuel storage facility. Certainly
7 an issue that of test sites.

8 So, we've put in a list down of what we
9 consider to be credible, well, we've put in a list of
10 historical accidents that we believe suggest credible
11 accidents that might exceed the regulatory -- conditions.
12 And I just want to say for the record we hope at some point
13 that we understood one of the tasks was to rework the
14 entries and reassign probabilities. And I'm hoping that as
15 part of that you will get back to us on those accidents but
16 if not you'll force me to write another 200 page report,
17 you know, discussing to those accidents. And I'll lose my
18 eyesight if I do that.

19 MR. MURPHY: We'll try to accommodate you.

20 MR. HALSTEAD: Because the whole issue of
21 defining risk here, and I don't mean the -- people who
22 aren't here, but, you know, there's like a two, three year
23 process here. Some parts of it, I think, are going to be
24 admirable job in following through on comments that we made
25 a couple of years ago. And there are other areas, frankly,

1 we're still waiting for a response from you and one is in
2 this issue of if you look at real world historical
3 accidents, how does that compare with the forces that
4 you're looking at in, particularly in the test protocols.

5 Although, I will say, if you look at the G
6 forces and the impacts, for example, you know, you get into
7 100, 150 T impacts, you know, those are mighty severe
8 accidents. So, it's possible that you might envelope them.
9 I just want to see that you're looking at an answer for us.

10 MR. MURPHY: Let me cut in on Ken's behalf.
11 One of the specific tasks in the Package Performance Study,
12 not in the experimental pieces that we're talking about
13 here today, there is a task specifying an evaluation and a
14 study of severe historic accidents, not just fuel accidents
15 but general rail and truck accidents. That study is going
16 on as part of the update of the entries and scenarios that
17 you just talked about.

18 MR. HALSTEAD: And I'm going to add on, Andy,
19 can I ask you to make sure you issue it in draft so we get
20 a chance to give you the benefit of our comments before
21 that study is finalized. That would be very important to
22 us.

23 MR. MURPHY: We will take your comment into
24 consideration.

25 MR. POSLUSNY: Okay, anything else on realism?

1 Jim.

2 MR. WERNER: I just had a question as I read
3 through your protocol. It appeared that various tests were
4 occurring independent of each other, that there wasn't sort
5 of sequencing and mixing it up of say you'll puncture
6 followed by fire, fire followed by emersion. I guess it
7 falls under the category of real world, and maybe I didn't
8 understand it, you know. My real world experience, things
9 don't happen in isolation. Of course you have fulling
10 emerging fires. That's obvious. -- today, next to the
11 rail tracks, they call it JP4 and JP8 -- ammonia and
12 gasoline and you have it spill out every once in a while
13 and you have a major fire. I mean, that's an easy one.
14 You obviously had full emerging fires. That's, you know,
15 an easy real world.

16 The harder one is how you mix up a combination
17 and maybe there's codes that can help you deal with that.
18 I just don't understand it clearly. And, again, the real
19 world example I bring is, you know, having to work in the
20 World Trade Center, when I worked there we had fire drills
21 where you had to go down like five floors and that was
22 considered real world because nobody imagined the whole
23 building would fill with smoke. And after I left work
24 there my buddies had the experience of the '93 explosion
25 where you had smoke throughout the building and people had

1 to walk down, most of the people in my office, it would
2 have been for me, I worked on the 72nd floor of the World
3 Trade Center, walking down 72 floors is pretty tough.

4 So that was real world. You can't have just
5 assume fires are contained within ten floors is what our
6 port authority colleagues did. And then the port
7 authorities said, well, we have to actually practice it.
8 You know, how many people could really walk down 72 floors,
9 well, 110 ultimately, but I was being parochial. I was
10 worried about my office, who's on the 72nd floor. But
11 nobody then imagined that you'd have fire and smoke in
12 combination with structural damage that occurred,
13 obviously, September 11th where you cut off three of the
14 floor's stairwells.

15 And had we imagined that combination more
16 people would have been saved because they would have
17 understood that there were three or four independent
18 stairwells and if you got around to the other one, a lot
19 more people could have gotten through. But, again, we
20 didn't anticipate that combination of circumstances. But
21 because we at least had some practice of combination of
22 fire and smoke throughout by the H-fax system, you know, a
23 lot of people got saved that might not have otherwise been
24 saved because we had the experience of practicing getting
25 everybody out.

1 But how do you deal with the combination of
2 insults in the protocols.

3 MR. MURPHY: At this time, understand, we are
4 only doing, no, we are two insults to the package. We're
5 doing them sequentially. We'll do a, at this stage the
6 plan is to do a rail impact and then a rail cask fire. So,
7 it will be the same cask. If it is damaged in the impact,
8 that will be the cask that will still be used and the
9 analysis will take into consideration the damage.

10 MR. WERNER: Okay.

11 MR. MURPHY: And if we, you know, the very
12 definite suggestion has been made here of doing the full
13 sequence of impact, puncture, fire and --

14 MR. WERNER: Emersion.

15 MR. MURPHY: -- emersion. And the very likely
16 case would be that if that is an excepted, if the NRC
17 decides to go that way, if you want, is very, very likely
18 that it will be done sequentially. So, yes, a valid point.

19 MR. WERNER: I would just offer you to look at
20 the experience of the Department of Energy's analysis of
21 the Feather River Canyons scenario. There again, it's a
22 matter of looking at your routes and what each state and
23 route do, and we went through that analysis. What are the
24 things we might have to anticipate? And to actually allow
25 us to throw things out, well, it's not just something that

1 could occur along the way. But then Feather River Canyon,
2 we were -- and we had to look at that condition.

3 MR. MURPHY: Right, I mean, we had comments at
4 the Nevada meetings of doing, on the question of realism,
5 of doing an impact, what sort of impact of the truck cask
6 coming off and then either a fuel load from the truck
7 itself or from a tanker becoming involved as well. So
8 that, yes, we are very definitely looking at the sequence
9 issue. And if we do anything with the additional, want to
10 do something potentially with the additional comments about
11 the puncture and the emersion as well but they're likely to
12 be sequential as appropriate.

13 MR. POSLUSNY: And that's consistent with the
14 regulatory structure.

15 MR. MURPHY: That's correct.

16 MR. POSLUSNY: Okay. The comment about the
17 fully engulfing fire, I think Chris will talk about that
18 later so let's leave that as an action item.

19 MR. DILGER: I think what we've heard is it
20 strengthens the argument for a full scale regulatory
21 testing. I mean, everyone agrees that the regulatory tests
22 are extremely tough and we don't get lose in the maze of
23 arguing, well, how likely is one accident or another
24 accident. And I think that that's why this is one reason
25 why we can, if we do regulatory tests, we can get a

1 demonstratively tough cask out of it.

2 MR. POSLUSNY: Thank you. Scott?

3 MR. DOIG: Kind of a question. I'm sorry I
4 don't have the insight. I'm just wondering, when you talk
5 about the realism, now are any of these casks that are
6 stored, my understanding is that, first, at Prairie Island
7 we have casks that have been sitting there for a number of
8 years and have that thermal load that's put on the metal
9 there. Now, is that going to be simulated in terms of the
10 cask that is tested or does that have any significant
11 impact on how it performs? Does that make sense? That
12 question?

13 MR. MURPHY: Let me answer the question by
14 telling you what we're planning to do. At this stage we're
15 not planning to have initially the thermal load from the
16 stored fuel in the fire test. Okay. At this stage, that's
17 where we are. We anticipate that by carrying out the
18 thermal code foundation analysis that the addition of the
19 thermal load from inside of the cask from the fuel will be
20 an item that we will be able to handle by analysis.

21 MR. BENNETT: I think he's asking maybe another
22 question, though, too.

23 MR. MURPHY: One second. Where was I? Yeah,
24 the question has come up at previous sessions of these
25 public meetings. And it's a question or comment that we

1 will be taking into consideration, whether or not the
2 thermal test should involve a fuel thermal load in
3 addition.

4 MR. BENNETT: I think he was, maybe I'm putting
5 words in your mouth but I thought he was also asking
6 whether a canister, as it sits for ten years or so, suffers
7 some metal fatigue. And are you then going to put that
8 into a transportation over pack and take that into account?

9 MR. BRACH: Let me try to address that. As a
10 separate matter, one, we're talking spent fuel storage type
11 activities. And as a separate matter we've had ongoing
12 research looking at the potential for any long term real
13 materials degradation from spent fuel storage for an
14 extended period of time. And to date we have not found
15 that there has been any degradation in the materials.

16 We've done some reviews. We have fuel that has
17 been stored at the Idaho National Engineering Lab as part
18 of a research activity looking at the affect on fuel,
19 affect on materials in a long term dry cask storage
20 environment. And that information has revealed or
21 identified to us that there's been no detrimental or no
22 degradation on the materials or the spent fuel in the long
23 term extended storage.

24 One other comment I will just add, Prairie
25 Island, I believe the fuel cask that they're storing on

1 site I believe are storage only casks and configurations so
2 that if they were somewhere downstream to elect to transfer
3 that spent fuel to another facility or to another facility,
4 that fuel would have to be unloaded out of its current
5 storage cask and transferred into a transfer or transport
6 configuration.

7 MR. DOIG: That's correct. Although I think
8 that after the 17 casks, it's going to be a dual purpose
9 cask.

10 MR. BRACH: Okay.

11 MR. POSLUSNY: Okay, good. I'm going to
12 suggest and see, any cards up yet? Okay, I'm going to
13 suggest that we save risk estimates. I'm going to suggest
14 we leave full scale versus partial scale. We've touched on
15 a number of time. I think we can revisit it during the
16 technical discussions this afternoon as well as the fuel
17 assemblies. You're going to get into that, more
18 discussions on the surrogates? Will that --

19 MR. MURPHY: The topic is still on the board
20 but I'll say I'm not going to key it up again.

21 MR. POSLUSNY: All right. I'm going to leave
22 it. And think about those remaining during lunch. I think
23 we need a break. I would provide, I would like to provide
24 right after lunch, an opportunity for those in the
25 audience. So think about the same issues, please. I know

1 you're all hungry. So we'll give you a few minutes up
2 front when we return. Let's take, let's come back about,
3 let's see, 2:15, please, on time. Thank you very much.

4 I expected some new ideas and we indeed got
5 some. And before we wrap-up this afternoon, I'd like to,
6 before we get back to the agenda, I promised the audience
7 who is not all back but let me give it a shot. If anybody
8 would like to make any comments or questions, provide any
9 questions on what was discussed this morning, please raise
10 your hand and I'll be glad to give you the mike. And yes?
11 And please state your name and organization so the
12 transcriber can --

13 MR. CAMPS: Hello. Okay. My name is Kevin
14 Camps. I'm with Nuclear Information and Resource Service
15 based on Washington, DC. And I actually was on the panel
16 at the Rockville, Maryland equivalent for today. And I
17 just had a couple of things I wanted to share from the
18 morning session.

19 The first thing was having to deal with
20 something Mr. Wright, I think, talked about films, and
21 maybe somebody else brought it up as well, but the films
22 taken during the Sandia tests in New Mexico in the last
23 70's and how many times those have been shown to members of
24 the public who are concerned, to elected officials, members
25 of the media. And someone mentioned that they had shown it

1 countless times, and it really brings up a concern that I
2 have about this current discussion where in the Package
3 Performance Study draft, and I brought this up in Rockville
4 so some have heard it already, there is discussion of
5 filming the physical tests that will be done.

6 And I'm very concerned about how those films
7 are going to be used because the Nuclear Energy Institute
8 put out a video before the Yucca Mountain vote that was
9 widely distributed to decision makers and I've heard
10 interviewed some of the scientists who conducted the tests
11 at Sandia saying that those films were really a misuse of
12 their studies, that those studies were intended to
13 benchmark computer models. But when you show dramatic
14 fiery tests to the public and say, see, the casks are safe,
15 there's a question of misuse of these films.

16 And so, I asked the question in Rockville to
17 the NRC how would these films be used, and I didn't hear
18 that for lobbying tools on behalf of industry, it was a
19 precluded activity with the film. So, that's a concern I
20 wanted to raise. And another one has to do with the
21 realism discussion. An accident that happened in Michigan
22 just before the Yucca votes again a year ago was a propane
23 train that derailed near Lansing, Michigan, in a small
24 town. And the entire town was evacuated and the situation
25 was very touch and go because there was so much propane on

1 board the train and a lightning storm rolled in. And so,
2 there was a potential for an ignition of a vast amount of
3 propane.

4 And it's another one of the situations. I know
5 that NEI very recently came out with a new transportation
6 policy that advocates dedicated trains. That's been a long
7 time in coming, but our concern is that the Department of
8 Energy which would be in charge of this massive Yucca
9 Mountain campaign does not have that position. And so,
10 there still is very likely a potential under current
11 regulations that high level nuclear waste could be mixed in
12 with a train such as the one that derailed in Lansing,
13 Michigan with this high temperature burning material,
14 highly explosive material. And that's a dose of realism.

15 In that situation, the emergency responders
16 didn't know whether to go in or not. But in the case where
17 high level nuclear waste is on board and the explosion
18 could liberate that radiation into the environment, we're
19 not talking of having, and our organization is very
20 concerned about the safety of emergency responders. But
21 the emergency responders could be faced with the choice of
22 letting a fire burn with high level nuclear waste in the
23 middle of it not knowing what the fallout consequences for
24 a vast area could be if they don't risk their lives to put
25 it out.

1 And another dose of realism is we're going to
2 talk about the Baltimore train tunnel, or you are later
3 this afternoon, the fire in 2001. But the realism of that
4 situation was that the emergency responders, some people
5 feel unnecessarily because there were no people in the
6 tunnel, rushed into a situation that endangered themselves.
7 Perhaps unnecessarily. But at the same time there were
8 hazardous materials on that train. Perhaps a part of their
9 thinking was they wanted to stop the release of those
10 hazardous materials on to the environment because of the
11 fire.

12 And again, the Baltimore train tunnel is a
13 possible route for high level nuclear waste, so I just
14 wanted to bring up those thoughts.

15 MR. POSLUSNY: Thank you, Kevin. Any other
16 comments? Yes? Again, please state your name.

17 MS. GIU: My name is Lisa Giu. I'm here
18 representing public citizen. We're a national, non-profit,
19 public interest organization based on Washington, D.C. And
20 I just had a few comments that I wanted to add at this
21 point.

22 First of all, I really appreciated Amy's
23 response to the question about how dangerous is high level
24 nuclear waste. And I think it's really important for the
25 NRC as well as the industry to be honest in answering that

1 question that what we're dealing with here is an extremely
2 dangerous, in fact, deadly material. To try to conceal
3 that, which has certainly been the practice to some extent,
4 is not only dishonest; it also runs counter to safety goals
5 because it leads to a sense of complacency. And it's
6 vitally important that everybody involved in the transport
7 of high level nuclear waste including the public as
8 bystanders even is aware that this is a material that has
9 to be dealt with with the utmost safety because it is very
10 dangerous.

11 I also wanted, of course, to say a few words
12 about risk. Risk information is a useful tool, but
13 unfortunately, it sometimes appears that the NRC applies
14 this tool more as, or applies this more as a blinder than a
15 tool. And we've heard a lot about the safety record of
16 past nuclear waste shipment. You know, not only are there
17 problems extrapolating based on such a limited history with
18 any confidence projecting on to what's going to be
19 certainly an unprecedented shipping campaign if either the
20 Yucca Mountain or the private fuel storage proposals move
21 forward, but also I think there's some very interesting
22 insights coming out of NASA's investigation into the
23 Columbia disaster where you have some analyst suggesting
24 that NASA erred in mistaking a history of successful
25 shipments with, or missions in their case, with a reduction

1 in risk. And in fact, risk has not been reduced unless
2 something meaningful has been done to improve safety.
3 That's something that we would all do well to translate
4 into the nuclear waste transportation scenario.

5 But in any case, it's certainly no comfort to
6 an impacted community to know that the accident they
7 experienced had a very low occurrence of happening. And I
8 think that's the other side of realism that we have to take
9 into account. That coupled with the fact that some of the
10 most disastrous experiences that the public knows to be
11 real were in fact very unlikely. And that seems to be
12 increasingly the case.

13 So, and then, I guess the other thing is, of
14 course, we all saw last week the decision of the Licensing
15 Board on the private fuel storage application which ruled,
16 in fact, strongly against the NRC staff analysis of
17 probability in that specific instance. I think that does
18 actually cast a shadow of doubt as to the adequacy of NRC
19 staff probability analysis across the board. So, all of
20 this argues in favor of conservative estimates and an eye
21 to understanding the consequences as well as not only
22 focusing on the question of probabilities.

23 So, the final point I just wanted to make is
24 that we are very interested to know that whether and how
25 hopefully the NRC intends to move forward with the

1 information from a package performance study to influence
2 and inform other important licensing decisions both with
3 regard to the adequacy of licensing regulations for nuclear
4 waste transportation casks and in the evaluation of the
5 large scale transportation campaigns that would accompany
6 the Yucca Mountain and private fuel storage proposals that
7 are currently on the table. Thank you.

8 MR. POSLUSNY: Thank you, Lisa. Any other
9 comments from the audience? I promise to give you another
10 shot at the end of the day, thank you.

11 Before we get started, I just wanted to let you
12 know that we have another participant on the panel, Corey
13 Conn. If you'd tell us a little bit about yourself.

14 MR. CONN: Thank you very much. My name is
15 Corey Conn. I've come up from downtown. This is a
16 difficult time at the medical schools across the country
17 and for staffing reasons I was unable to extricate myself
18 until afternoon today. I am here representing the Board of
19 Nuclear Industry Information Service which is based in
20 Evanston, Illinois and I'm acting in lieu of our director
21 David A. Kraft. And I will have some remarks of my own at
22 times today of course. But also, I have an understanding
23 that we are preparing a tape of some additional comments
24 made by public yesterday evening who also could not be here
25 during work hours. Thank you very much.

1 MR. POSLUSNY: Okay. We look forward to
2 getting those. Bill, you had a comment?

3 MR. BRACH: I just wanted to make one comment.
4 Kevin raised a point I think is very important. The
5 comment was with regard to the use, if you will, of the
6 tapes that we're planning to make of the Package
7 Performance Study test. Just to put that in context, if
8 you recall earlier this morning, we had mentioned that in
9 the Package Performance Study, it's NRC's first effort in a
10 major research activity to on our part try to involve the
11 public in its very aspect in all aspects of the, if you
12 will, the planning, the scoping, the conduct of the
13 activities. Today's meeting is an example. We're trying
14 to move forward and develop the test plans for the Package
15 Performance Study to have stakeholders and public views and
16 input incorporated.

17 We made passing reference to it this morning
18 but it might be worth just spending another minute on this.
19 Part of our plans for involving stakeholders and public in
20 the study as it progresses is to have, in the actual
21 conduct of the test, is to have stakeholder and public
22 observation of the test. And I think Andy mentioned
23 earlier that our plans as well is that the prediction on
24 our part, the model of the analysis that would be conducted
25 prior to a test would have all that information available

1 to all the public and all the stakeholders. And then,
2 after the conduct of the test, after it has been, as I
3 mentioned, be observed by the public and stakeholders, the
4 results of the test, the comparison of the results to the
5 prediction, the conclusions we reach, all that information
6 would be available and shared with all the public and
7 stakeholders.

8 We are planning that we would have as well a
9 film or a tape made of the actual conduct of the test.
10 This will be a film or tape of the same test that was
11 observed by all the public and the stakeholders. And I
12 think the point that Kevin was raising is appropriate that
13 it's important on all our parts as we're analyzing and
14 presenting and representing information, whether it be
15 showing of a video, representing results of a study or a
16 test, that we are doing our best to factually represent and
17 correctly represent whether it be in the showing of a video
18 or presenting test results in data and comparisons to have
19 that available to us all.

20 And so, I think, I appreciate your raising that
21 because we hadn't really discussed the filming of the
22 study. But that's an element in our effort on it in an
23 outreach activity to have all what we're doing being as
24 transparent, if you will, to all the stakeholders and all
25 of you out here at the table as far as what we're doing,

1 conclusions were reached and how we reached those
2 conclusions.

3 MR. POSLUSNY: Thank you. Bob?

4 MR. HALSTEAD: Chet, I'd like to ask you to
5 write this up on the board as a specific issue to have
6 public participation and peer review in determining how
7 you're going to do risk communication as a public. Now, we
8 talked about earlier doing this for the ER stuff, this is a
9 particularly sensitive issue for us. Some of you know
10 we've commissioned a couple of reports on the Sandia test
11 films and people have various opinions of how this footage
12 are used. We find it very effective in the data as a
13 fundraising exercise to tape those DOE tapes of the Sandia
14 films, to show them and then critique them. So, that would
15 be my argument, that's the way you don't want to go.

16 On the other hand, there's a very, very
17 effective tape made, I believe by the state of Idaho,
18 regarding the true waste shipments from the Idaho
19 engineering lab down to DeWitt facility in New Mexico, and
20 I believe it's called Safe Way Out. And it's very
21 interesting there because I know one of the concerns people
22 have is the dramatic impact of the rocket sled versus the
23 drop test. And a lot of western people would testify that
24 what doesn't look very exciting when you've seen the raw
25 footage, in fact the multiple drops and fire test of the

1 Trupact 2 container was subjected to not only have good
2 technical validity and of course they're documenting in the
3 safety analysis report, but you really see how tests a lot
4 of critical, skeptical people endorse then presented on
5 video have an impact.

6 And I think that that's one of the things you
7 should be thinking about how to do in your work plan
8 towards the end here is basically to get a group. Anybody
9 who wants to come will all bring different versions of
10 videos and films we have. And a surprising lot has been
11 written on the use and misuse of these communication tools.
12 So, we would definitely like to be part of that and
13 obviously people who, you know, have taken different
14 approaches have got to be part of that, too, so that
15 whatever comes out of the NRC, if it's an official NRC
16 video, has the same benefit of public participation as well
17 as technical peer review to make sure there aren't any
18 inaccuracies in that.

19 MR. POSLUSNY: Okay. Good, we'll take that as
20 a recommendation. Okay. We're going to get back to the
21 agenda. And at this point, we're going to do the --

22 MR. HALSTEAD: Sorry to bother you. Would you
23 please write video or something that says products up there
24 so we capture the point?

25 MR. POSLUSNY: Got it.

1 MR. HALSTEAD: Thank you.

2 MR. POSLUSNY: Got it. Sorry about that. My
3 brain stopped for a minute. Okay, now it's time to talk
4 about the fire aspect of the proposed test. Two folks will
5 be discussing the issues. The first person is Amy Snyder.
6 She's recently enjoying a spent fuel project office. She's
7 been with the NRC since 2000. She's currently the project
8 manager in our office with PPS. Previous work with the NRC
9 included being a project manager for the Less Value
10 Project, and also the lead health physicist on the Panemic
11 Reactor decommissioning effort.

12 Prior to the NRC, she was a health physicist on
13 several decommissioning projects. She was also an officer
14 in --. She's got a Master's in physics from the University
15 of Cincinnati, a Master's in management from Leslie
16 College, and a Bachelor's in geologic sciences from State
17 University of New York. Amy?

18 MS. SNYDER: Good afternoon. NRC appreciates
19 your participation in this workshop and I'm glad to have
20 the opportunity to talk to you this afternoon about fire
21 testing issues.

22 An important part of the process for design
23 testing involves the interpretation of the relationship
24 between potential radiological hazards and real world
25 severe accidents. In the past, NRC has studied real world

1 accidents and we will continue to do that as far as our
2 problems are concerned. In July 2001, the Baltimore tunnel
3 fire occurred and the Commission asked us to look at that
4 and see what it would have meant if a spent fuel cask was
5 in that tunnel. We did that and what we're about to talk
6 about is some very important discussion on what we learned
7 from the Baltimore tunnel fire and how it compares to the
8 Package Performance Study.

9 As an example, we studied the Baltimore tunnel
10 fire, but I want to make it clear that we didn't base, the
11 design basis is not based on the Baltimore tunnel fire.
12 It's just an example of part of our process that we go
13 through; we need to look at real world incidents that
14 happen. The state of Nevada also evaluated the Baltimore
15 tunnel fire and came to different conclusions. And what we
16 have planned, we're in the process of getting together with
17 the state of Nevada to discuss our findings and to talk
18 about the assumptions that we made in the evaluation so
19 that there will be a better understanding of our
20 conclusions, why we came to the conclusions that we did.

21 What I'd like to do this afternoon is first
22 talk to you about the test protocols, the fire test
23 protocols portion, and then review what the staff has
24 proposed in the fire test protocol. And then, Chris will
25 talk about the evaluation of the Baltimore tunnel fire.

1 You saw from Mr. Sorenson's presentation this
2 morning that we're going to be performing fire testing.
3 Well, what is the process that we've proposed? What we'd
4 like to do is calorimeter testing to obtain necessary
5 background data on the fire such as temperature and heat
6 flux so that we will have a better, so we can benchmark the
7 fire codes that we'll be using to, so that we can more
8 accurately model the fire environment. Then, what we'll do
9 is we'll actually do modeling and determine the response of
10 the casks to the fire environment. We'll make those
11 predictions. Then, we'll do the tests and compare the
12 results.

13 In my first bullet, the staff has proposed
14 full-scale testing for the severe fire test. What I think
15 is unique about this is that this will be a real cask, a
16 certified NRC cask so we can get some valuable data. Then,
17 the staff has proposed to do a fully, that the fire be
18 fully engulfing, optically dense hydrocarbon fuel source
19 fire, jet fuel. As Dr. Murphy explained to you earlier
20 this morning, a fully engulfing fire is that the fire
21 completely surrounds the cask. Optically dense means that
22 you can't see in to see any part of the cask or the cask
23 can't see out so that the fire, all the heat goes into the
24 cask. And the hydrocarbon is the source of the fuel; we're
25 proposing jet fuel.

1 Next slide please. There are many ways in
2 which fire testing can be conducted and we'd like to know
3 what you think about how it should be conducted and
4 specifically these two questions: what should the duration
5 of the cask fire test be and what should the cask position
6 relative to the fire be?

7 In the test protocols, preliminary modeling was
8 conducted from zero to 60 minutes. And we did not specify
9 a specific duration for the actual field testing, but we
10 recommend more than 30 minutes, more than the regulatory
11 test. We would like to know your opinion and what you
12 think on that.

13 You saw from Mr. Sorenson's presentation this
14 morning that the cask, he showed the cask on the ground one
15 meter above the ground, the regulatory position, and then,
16 above the vapor dome. What position should the cask be in
17 when we do the testing?

18 Next slide please. Your comments, concerns and
19 ideas, and suggestions are welcome. And I want to make it
20 clear that we're here to listen. We're here to consider
21 your comments. And with that, what I'd like, if you have
22 any questions? And then we can go on to Chris'
23 presentation.

24 MR. POSLUSNY: Yes, John?

25 MR. VINCENT: Amy, you should clarify that the

1 choice of the hydrocarbon fuel also specifies the
2 temperature. At least that in the NRC meeting in
3 Rockville --

4 MS. SNYDER: Correct. That's right. The
5 question was what temperature, the NRC should be specifying
6 what temperature conditions we are going to be proposing to
7 do these tests. We've specified hydrocarbon fuel, and
8 hydrocarbon fuel burns at, was it 1475 degrees Fahrenheit?
9 So, we were remiss in explaining that, but that's what we,
10 that's the temperature that the tests, we're proposing that
11 tests be conducted at.

12 MR. POSLUSNY: Let me just say that we
13 obviously did get some comments on the fire conditions, and
14 indeed we talked about a suggestion that the fire test go
15 to failure for a number of reasons and a number of,
16 obtaining information for different purposes. Are there
17 any other comments besides the ones that we heard this
18 morning on what the fire test should be or not be?

19 MR. WERNER: Yes, I just have a question about
20 that fuel selection. I wasn't at these various other
21 meetings so I missed that whole discussion. Maybe it was
22 answered earlier, but why were you suggesting using jet
23 fuel rather than diesel fuel or gasoline? And what's the
24 difference in temperature? We have relatively little JP4
25 or JPH compared to diesel or other gasoline.

1 MR. SORENSON: Well, we've selected JP4 because
2 most type of carbon fuels burn without the same
3 temperature.

4 MR. WERNER: So, there is no difference in the
5 temperature between regular gasoline and --

6 MR. SORENSON: I'm not saying no difference,
7 but they're all around a thousand degrees C is what they
8 burn at, the hydrocarbon fuels.

9 MR. WERNER: Okay. Isn't gas cheaper? As a
10 taxpayer --

11 MR. MURPHY: We're buying it in bulk.

12 MR. WERNER: Thanks. So, there is no
13 difference in the temperature though. That's the important
14 thing, it's what you test for. I'm just trying to be
15 practical here because the common thing is to use gasoline.
16 I'm just wondering why you get fancy. Is there a reason
17 why that fancy?

18 MR. SORENSON: Well, the burn rate is, I think,
19 less for JP4 than for gasoline, so you can control the
20 flame a little bit better.

21 MS. SNYDER: We did some preliminary
22 calculations to get a feel. For a one-hour fully engulfing
23 fire with jet fuel would be about one tank or 9,000 gallon
24 tank or truck to sustain the fire for one hour. That would
25 give you a frame of reference.

1 MR. WERNER: I'm just with Eileen. Let's use
2 realistic tests --

3 MR. ELLIMAN: This is Dave Elliman from Sandia.
4 The other reason that we've used jet fuel as opposed to
5 gasoline is just for test facility safety. Jet fuel has a
6 much higher vapor pressure than gasoline. It doesn't
7 evaporate as quickly so you have much less chance of having
8 an explosion at the test facility when you go and throw the
9 match in.

10 MR. POSLUSNY: Mr. Resnikoff, you had a
11 question? A comment?

12 MR. RESNIKOFF: Well, I'm unsure where to jump
13 in here. The test conditions that I would take depend on
14 the results that Chris Bajwa is going to talk about, the
15 Baltimore tunnel fire. So, should we just jump in now and
16 talk about what fire conditions we think are appropriate or
17 should we wait until after Chris' presentation?

18 MS. SNYDER: I'm sorry. What I should have
19 made clear is there will be time for the workshop to talk
20 in detail about your ideas and comments on the fire
21 testing. So, the plan is to talk about the evaluation of
22 the, or NRC's evaluation of the tunnel fire and then open
23 it up to everyone to talk in detail.

24 MR. POSLUSNY: Okay. Let's go with any general
25 questions first and then we'll do the detail. Yes, Bob?

1 MR. HALSTEAD: Yes, I'd prefer to be involved
2 in a discussion of fire testing after the Baltimore
3 presentation. But I want to plant one idea in people's
4 minds, and that is, to what extent did you consider using a
5 furnace or some other approach to doing the thermal
6 environment test as opposed to the --. Most of us who
7 followed this the last 20 years are familiar with the open
8 fuel fire technique, but I don't remember seeing a
9 discussion of that in the '93 Sandia testing report that we
10 got, there was an evaluation of the pros and cons and
11 identification of the facilities that actually had furnaces
12 large enough to do 40 and 100-ton packages.

13 And would it be better to defer that, Ken,
14 until we do the Baltimore presentation?

15 MR. MURPHY: Just a quick answer is that a lot
16 of the conditions that we're talking about either it's for
17 the fire or the impact were simulating things that are
18 going on in the certification test. And I'll say we're
19 going a step or two beyond what's done at certification.
20 And that was sort of the reason that we picked the open
21 fire route than doing a furnace. And also, given the
22 question of where are we going to find a furnace with
23 access that would be large enough to hold a full-size cask.

24 MR. POSLUSNY: Okay. Any other general
25 questions on the fire? If not, we'll go to the discussion

1 of the Baltimore tunnel fire. And now I would like to
2 introduce Chris. I need my notes to do that.

3 Chris Bajwa also works for the Spent Fuel
4 Project Office. He's a fuel engineer assigned to our
5 staff. He's been with the NRC for about ten years. He's
6 worked in various regulatory activities related to fire
7 protection. He's responsible for conducting full and
8 contained reviews on spent fuel and transportation casks.
9 And he holds a Bachelor's in mechanical engineering from
10 Stevenson -- He is a registered professional engineer.
11 So, Chris?

12 MR. BAJWA: Chet is going to serve double duty
13 and do the slides, so I'll give him a second to get in
14 place.

15 Obviously we heard a lot about the Baltimore
16 tunnel fire today. It's been mentioned several times in
17 the morning session and already a couple of times this
18 afternoon. Some of you may not be familiar with what that
19 was, so I will cover some of that during the presentation.
20 We were asked after that event in July of 2001 to look at
21 the tunnel fire event itself, to sort through what happened
22 during that event and to look at how that event would
23 impact a spent fuel transportation cask had that particular
24 cask or had a particular cask been in that fire in the
25 Howard Street tunnel in Baltimore.

1 Next slide. So, what I'll do today is I'll
2 talk about the actual event, give you some of the details.
3 I'll talk about our coordination with the National
4 Transportation Safety Board. They're the main
5 investigatory body that was looking into this particular
6 event. I'll talk about a fire model that was put together
7 by the National Institute of Standards and Technology,
8 formerly the Bureau of Standards. And I will also talk
9 about a transportation cask analytic model that the staff
10 put together in conjunction with Pacific Northwest National
11 Labs. And finally, I'll share some of the conclusions that
12 we reached during this analysis.

13 Just to tell you a little bit about the event,
14 the Baltimore tunnel fire was actually a derailment
15 followed by a fire that occurred on July 18th, 2001. A CSX
16 freight train was traveling through the Howard Street
17 tunnel in downtown Baltimore. Howard Street tunnel is
18 actually adjacent to Camden Yards where the oil is placed
19 and if any of you are baseball fans, you might know where
20 that is.

21 Just a few pictures from the event itself. In
22 the corner here, this is a western portal of the tunnel,
23 and this is a tri-propylene tanker car. What had happened
24 is several of the cars, as the train is going through the
25 tunnel, several of the cars derailed, and this tri-

1 propylene tanker car had a hole punched in it during the
2 derailment and a fire ensued. They don't know exactly how
3 the fire started but they knew approximately when it
4 started. And right here is the hole that was punched in
5 the tanker car. It was actually punched by a brake
6 mechanism that came apart during the derailment. And that
7 hole is about 1.5 inches in diameter just to give you a
8 feel for the size.

9 Up here is a picture from the actual fire.
10 Emergency responders here. And this, I believe, was taken
11 at the eastern portal sometime during the fire. And this
12 is the eastern portal about a year after the fire, so it's
13 been cleaned up, just to give you an idea of how big it is.
14 This is a single rail tunnel which means that only one
15 train can pass through at any given time. I should also
16 say that the precise duration of the fire is really not
17 known and I don't think we'll ever know exactly how long it
18 lasted.

19 We do know through information provided to us
20 by emergency responders via the NTSB that the approximate
21 duration of the worst part of the fire was about three
22 hours. And we also know that 12 hours after the fire
23 started, firefighters were able to enter the tunnel and
24 actually approach the tri-propylene tanker car which was
25 the source of the fire. So, it was cool enough for them to

1 approach that car to make a visual on it and see that it
2 was not burning 12 hours after the fire. So, we have a
3 range of how long the maximum fire duration could have
4 been. But again, we believe that the most severe portion
5 of that fire was probably about three hours.

6 To get an idea of what this event entailed, in
7 other words, what the details in this event were, we
8 coordinated with the National Transportation Safety Board.
9 They were investigating this event and in fact are still
10 wrapping up the final report on how they think this
11 particular derailment happened and the consequences of it.
12 The derailment was the primary concern of the NTSB simply
13 because the derailment happened first, and that's what they
14 wanted to find out the reason for. They wanted to find out
15 the reason for the derailment. And the fire was a result
16 of that derailment.

17 The NTSB provided us information data and
18 technical expertise on rail events because we decided we
19 really were interested in the fire. So, we wanted to
20 characterize and understand what the fire was like in the
21 Howard Street tunnel. One of the other things they
22 provided was access to the railcars that were actually in
23 the tunnel during the fire, and that was through CSX. So,
24 we were able to look at and inspect the railcars that came
25 out of that tunnel.

1 Because we had a lot of conflicting reports of
2 what the fire was like, we wanted to take a look and see if
3 we could model this particular fire given that we knew what
4 fueled it, we knew approximately how much of the fuel there
5 was. And we went to the National Institute of Standards
6 and Technology to model the Howard Street tunnel fire.
7 They used a fire code that they'd been using for many
8 years, they'd been developing it for many years called the
9 fire dynamics simulator. It's a computational flow of
10 dynamics code, and basically what that means is it's code
11 that not only will allow the combustion that's happening in
12 a fire but the flow of air going into the fire and smoke
13 leaving the fire. So, it's kind of an all-encompassing
14 code.

15 It's been used extensively for nuclear power
16 plant fires and also for building fires. They've actually
17 worked with several fire departments to determine what
18 happened in building fires, for townhomes, single family
19 homes, that kind of thing. NIST put together a full three-
20 dimensional model of the tunnel geometry, the Howard Street
21 tunnel. So, they measured, they modeled the entire 1.7
22 mile length and they also modeled all the railcars in their
23 derail configuration.

24 One thing I should mention about the FDS code,
25 to get a better feel for how the FDS code would handle such

1 a tunnel fire event, they used data that was published by
2 the Federal Highway Administration and from the Memorial
3 Tunnel Test Program. An abandoned test facility in West
4 Virginia was actually a road tunnel. They set several
5 fires and took data as to what the temperatures were along
6 the length of this tunnel and published that data. And
7 what NIST did is they took that, a couple of different
8 fires from that pool of data, modeled them in FDS and
9 looked at the results versus the data that they got. So,
10 they modeled those tests and the results that NIST got from
11 their fire model actually correlated quite well to the test
12 data. So, we were comfortable with the tunnel fire model
13 that NIST had done, or I guess I should say we were
14 comfortable with the way FDS was going to handle a tunnel
15 fire model with the geometry and the flow characteristics
16 of a fire in a tunnel.

17 To tell you a little bit more about the Howard
18 Street tunnel fire model, they did use tri-propylene as the
19 fuel, as we know that that tanker was the source of fuel
20 for this fire. There was no ventilation in the model and
21 the reason for that was the manual ventilation system in
22 Howard Street tunnel, there is one, it was not activated
23 during the time of the fire. So, we did not model that.
24 The actual simulation reached a steady state or constant
25 temperature conditions in about 30 minutes. And what I

1 mean by that is the hot gases -- tunnel, the surfaces of
2 the railcars and the surfaces of the tunnel wall reached
3 pretty much a maximum steady state condition in about 30
4 minutes into the simulation.

5 This is a delineation of the -- tunnel fire
6 model. And it may be hard for some of you in the back to
7 see and I'd be happy to show it to you later if you'd like
8 to get a closer look. Basically, we have the tunnel
9 geometry. This is the top of the tunnel. The bottom.
10 There is a slight upward grade from here to here of about
11 0.8 percent. And you'll notice that as the fire
12 progresses, it is actually moving towards the upwind side
13 of the tunnel.

14 As far as the temperatures, this model
15 predicted that within the flaming regions of the fire was
16 about 1800 degrees Fahrenheit. Where it actually impacted
17 the top of the ceiling, we're looking at about 1500 degrees
18 Fahrenheit for this top of the ceiling surface. For the
19 hot gas layer above the cars here, for a distance of about
20 four railcars, the temperature was about 900 degrees
21 Fahrenheit. That's an average along four railcar-lengths
22 from the fire. And finally, the average of the tunnel
23 surface, about four railcar lengths from the fire was about
24 750 degrees F. So, that's what this tunnel fire model
25 predicted.

1 Now, to kind of tie all that together, this is
2 a graph of that data. And what you have here, and it may
3 not be clear on your handout so I want to go through it
4 briefly, degrees Fahrenheit on this scale and then distance
5 in meters on the scale down here. Zero is where the fire
6 is located in the NIST model. And as you can see, as you
7 move from the ceiling which is the line of the top here,
8 down to the top of the railcars, down to the side of the
9 tunnel, the tunnel walls, and down to the floor of the
10 tunnel, you see a decrease in temperature. So, the fire
11 obviously shot up through these railcars and started
12 heating up the ceiling almost immediately. And that's
13 where you saw your highest temperatures. And you'll also
14 notice that the upward slope is in this direction and that
15 the maximum temperatures are slightly offset from the fire
16 about between zero and five meters upwind of where the fire
17 was located in the simulation.

18 Next slide. We certainly do not want to ignore
19 another important piece of information. And that was the
20 physical evidence that was present in the tunnel. There
21 were railcars, there was brick, there was the rails
22 themselves. There was sand. There were all sorts of
23 materials that were in that fire and we thought that that
24 would give us an even better picture of what happened
25 there.

1 So, we went for it. We went to the Center for
2 Nuclear Waste Regulatory Analysis which operates at a
3 southwest research in San Antonio, Texas. And we
4 contracted with a fire and material experts to look at the
5 actual materials that came out of that tunnel to get a
6 better feel of what kind of temperatures they saw and what
7 kind of duration they were at those temperatures. So, we
8 decided that we would ask them to do a metallurgical
9 analysis on those materials that were taken out of the
10 tunnel.

11 They took samples from the railcars, samples
12 from the tri-propylene car itself and then from cars that
13 were surrounding the tri-propylene car. They had brick
14 samples. They looked at paint charring patterns on the
15 cars that were in the tunnel. And we're analyzing those to
16 determine temperatures that the paint saw, stratification
17 of temperatures in the tunnel meaning the cool temperatures
18 towards the bottom and then the increase in temperature as
19 you went to the top of the tunnel. The results that the
20 CNWRA reported were consistent within these temperature
21 results. So, in other words, what the center, we call the
22 center the Center for Nuclear Waste Regulatory Analysis,
23 saw in the actual materials that came out of the tunnel
24 corroborated with what NIST was predicting for temperatures
25 in the tunnel.

1 So, now we felt we had captured what was
2 happening in Howard Street tunnel fairly well. I mean,
3 obviously the point has been made before and I completely
4 agree with it that we're not going to know ever exactly
5 what happened in that tunnel. No one is going to know all
6 that. So, what we are doing is we're going on the best
7 information we have to try to capture what we feel is a
8 realistic simulation of what happened in the tunnel.

9 The next step in this is to look at how that
10 fire would affect a spent fuel transportation cask. This
11 is schematic of the Holtec Hi Star 100 which has already
12 been presented today. This is a multi-purpose cannister
13 cask. This particular one has 24 fuel assemblies. This is
14 the multi-purpose cannister, over pack and the closure
15 plate. What's not pictured in here but you'll actually see
16 in the next slide are the impact limiters.

17 So, this is a rendering of the Holtec Hi Star
18 100. It's actually on a specially designed railcar. It
19 has impact limiters in place. This is a cradle in which it
20 sits and then it is secured into the cradle. And these are
21 positioning blocks on either side. And like I said, this
22 is just a rendering.

23 This is a picture of a two-dimensional finite
24 element analysis model that we did of the Holtec Hi Star
25 Cask. If you can just go back one? This has 24-fuel

1 assemblies, 24 pressurized water reactor fuel assembly and
2 this is the fuel basket. This is the MPC shell. These are
3 cover steel gamma plates. This is the neutron shield
4 material. And then there's a stainless steel skin on the
5 outside. We also modeled the cradle on which it sits when
6 it's transported.

7 Next slide. This is a detail of the fuel area.
8 You can see the basket supports here, the shell. These
9 areas in here are helium because the cask is backfilled
10 with helium. This is a homogenized fuel assembly;
11 basically because of modern limitations and limited
12 computing capability, you can use a homogenized fuel
13 assembly which will pretty closely mimic the behavior of an
14 actual fuel assembly and give you decent temperature data.
15 Also, this particular model had a 20-kilowatt heat load
16 that was in the fuel basket for this particular analysis.

17 So, what do we do with this model? We took
18 temperature and flow data from the NIST tunnel fire model
19 and we applied it to this model. We did two assessments.
20 We looked at the cask center 20 meters from the fire
21 source. And the reason we picked 20 meters is that is per
22 federal regulations. Department of Transportation
23 regulations currently require that if a radioactive
24 material package or any railcar containing radioactive
25 material is being shipped, it must be separated by at least

1 one railcar length from a hazardous material railcar.

2 So, in the hypothetical situation of a spent
3 fuel cask being shipped on the same railcar as a tri-
4 propylene tanker or tank car, you would have at least a
5 separation of one railcar which is about 20 meters. So,
6 that was the first assessment we did. The second
7 assessment is kind of a feel of what would happen if we
8 were adjacent to the fire. We took the cask now located
9 five meters from the fire source.

10 And these are results of the assessment. This
11 graph actually shows different components of the cask
12 starting here at zero time. The fuel is at about 700
13 degrees Fahrenheit. As you can see, the fire started at
14 zero and there is the fuel, the cannister shell, the cask
15 inner shell, the gamma shield of the cask's outer surface.
16 We have a regulatory limit, short-term temperature limit on
17 spent fuel that the NRC currently enforces during cask
18 reviews of 1,050 degrees Fahrenheit.

19 And so, we just put this on this graph to show
20 you how long it would take for this particular fire with
21 the cask 20 meters away for it to heat up the fuel to that
22 particular temperature of 1058. It's about 116 hours. And
23 you'll notice here that the fuel doesn't even start heating
24 up until about 15 hours into the fire transient.

25 Next slide. Notice, if you move the cask

1 closer to the fire source, it's going to hit it faster.
2 That's pretty obvious. Here at the five-meter distance,
3 you'll see the fuel in about ten hours starts to heat up
4 and it exceeds the short-term temperature limit of 1058 at
5 37 hours into the transient. And then, you can see the
6 temperatures of the other cask components.

7 One thing to mention about the 1058-degree
8 Fahrenheit short-term temperature limit, it's not as if
9 when the fuel reaches that temperature, it all of a sudden
10 fails. And that's a regulatory limit. In fact, that
11 particular one that was established through experiments
12 where they exposed spent fuel cladding to that temperature
13 of 1058 for 30 days and 70 days and they saw new
14 degradation and new failure. It's a fairly conservative
15 limit on spent fuel.

16 Next slide. This is an animation of the five-
17 meter results. And what you're going to see here is the
18 fire starts up and you have, obviously the maximum
19 temperature is going to be up here towards the top. And
20 can you click on it again? I don't know, it looks like
21 it's not running. It died? There it goes, okay. So, you
22 can just leave the mouse there. Yes, that will do it,
23 okay.

24 Anyway, so, obviously the maximum temperatures
25 are at the top of this cask. The way we divided this

1 particular model is we took the top third and applied the
2 maximum temperatures in the seal region to the top third of
3 the cask. Then we took the middle section and applied the
4 maximum temperatures and flow of course from the tunnel in
5 this tunnel fire model to the middle section. And then we
6 took the bottom third and applied the maximum temperatures
7 and flow from the bottom of the tunnel. And you can see
8 that to your, obviously it's going to heat up first at the
9 top and then you have a wave of heat pretty much moving
10 down through the cask.

11 The other thing noticed here is the top of the
12 support here is heating up. And the reason that's
13 happening in this case is we wanted to capture the effect
14 of the flames. This is the five-meter case, it's right
15 adjacent to the fire. The flames coming up over the impact
16 limiter and having a direct view down on to the top of the
17 cradle, and so that's why you're seeing that particular
18 heat up of the cradle.

19 Next slide. If you can get to it. Why don't
20 you just try page down? There we go. So, just to sum up
21 the results that we obtained from our analysis, first of
22 all, the time to exceed short-term fuel temperature limit
23 of 1058 for the 20-meter case was over a hundred hours, for
24 the five-meter case, it was over 30 hours. The time to
25 cannister failure was also something we were interested in

1 because this particular design has a multi-purpose
2 cannister. If that cannister stays in tact during the fire
3 transient, you're not going to have a release of any of the
4 materials that's in that cannister.

5 So, we calculated the time to cannister failure
6 based on the heat up of the outside of the cannister and
7 the internal pressure. And we saw that for the 20-meter
8 cask, it would take over 30 years at the sustained peak
9 temperatures of that fire for it to fail the inner
10 cannister. And for the five-meter case, it was about the
11 same, it was over 30 years. So, our conclusion was that
12 for this particular transient, we would not see a failure
13 of the cannister, the multi-purpose cannister.

14 Conclusions. One of the things that I think is
15 evident from this particular analysis is the robust nature
16 of this particular cannister design. We concluded that the
17 exposure of this particular design to an environment
18 similar to the Baltimore tunnel fire environment would not
19 result in any release of radioactive material. And when I
20 say that, what I mean is that the radioactive material
21 within the cannister would not have been released. There
22 wouldn't have been a path to the environment for a release
23 of that material.

24 We believe the health and safety of the public
25 would have been protected had this hypothetical event

1 occurred. There's one thing I want to say also about the
2 neutron shield. The outer surface of this cannister has a
3 neutron shield surrounded by a stainless steel skin. The
4 neutron shield in this particular case would most likely
5 have been damaged during this kind of a fire. Most likely,
6 it would not have been completely gone, but certainly
7 damaged. Compromised, I'll say.

8 Now, this particular cannister design is
9 certified for accident conditions with non-neutron shield
10 in place. In other words, the vendor who applied for this,
11 to license this particular cask did an analysis of the dose
12 rates around the cannister, or sorry, around the cask
13 without the neutron shield in place. And it met the
14 federal requirements -- one meter.

15 Indications for PPS thermal testing.
16 Obviously, that's what we're here to talk about. For this
17 particular analysis, we see that the cask was not fully
18 engulfed. And we believe that for the actual Baltimore
19 tunnel fire event, panic has been involved in that, it
20 would not have been fully engulfed in the fire that
21 occurred. The PPS (Package Performance Study) is seeking
22 to do a fully engulfing fire test. And depending on the
23 duration that is chosen for that test, it is very possible
24 that the actual heat input to the package tested in the
25 Package Performance Study, a fully engulfing fire could be

1 greater than what we calculated here in the Baltimore
2 tunnel fire event. That's it.

3 MR. POSLUSNY: Let me ask you a quick question,
4 Chris. We've talked about fully engulfing fires several
5 times. Hypothetically, if a tanker was running on the
6 track and there was a spent fuel cask right next to it,
7 would that be considered subject to a fully engulfing fire?

8 MR. BAJWA: No. No, not at all.

9 MR. POSLUSNY: And why not?

10 MR. BAJWA: Yes, the fully engulfing fire is a
11 phenomenon that you would probably very rarely find in
12 nature. It is something that has been engineered to pass
13 the maximum thermal response or thermal performance of
14 packages. If a spent fuel cask was next to a fire source,
15 obviously that's not going to be a fully engulfing fire.
16 And the fully engulfing fire, like I said, to occur in a
17 transportation event is highly unlikely. But obviously,
18 for the regulations and for the Package Performance Study,
19 we feel that it is a severe test and that it gives you a
20 good indication of how a cask is going to perform in a
21 severe fire event.

22 MR. POSLUSNY: Thank you. I guess I will open
23 up the table to questions either on the proposed testing
24 under the Package Performance Study or even on the
25 Baltimore fire. So, obviously we have questions.

1 Mr. Resnikoff?

2 MR. RESNIKOFF: Well, first of all, I
3 appreciate the fact that the NRC has expended so much
4 resource to investigate this fire. I have a bunch of
5 comments and questions.

6 First of all, I have some comments and
7 questions about the fire itself I'm somewhat uncertain
8 about. As I understand the fire, and it was a three-hour
9 fire and then at the three-hour point, I think the water
10 main broke in the ceiling and then they noticed the
11 difference in the color of smoke coming out. And they
12 thought that perhaps the fire might have been extinguished
13 at that point.

14 But there were other materials that continued
15 to burn in the tunnel but at a lower temperature and not
16 necessarily in the same location. There might have been
17 paper and, you know, other materials that burned. What
18 concerns me is the fact that the brick heated up to a great
19 extent. We often talk about the fact that these casks are
20 so massive and it takes so much time to actually heat them
21 up, but there's a massive amount of brick in the tunnel,
22 too, that heated up. And that brick, after three hours,
23 continued to radiate heat.

24 So, my first question, I guess, is when NIST
25 modeled the tunnel, did they also take into account the re-

1 radiation by the brick itself? I have some other points
2 but I wanted you to, I'm interested to know your thoughts
3 on that.

4 The second is when you then put a cask, and
5 there was no cask in the tunnel, I don't know if you said
6 that, but if you then put a cask in the tunnel next to this
7 tri-propylene tanker, it looked to me like you're then
8 doing a two-dimensional analysis or P&L was doing a two-
9 dimensional analysis. You were assuming a fire was right
10 on the side of the cask or at five meters or 20 meters
11 away. And you were taking that two-dimensional slice of
12 the cask, not a three-dimensional cask.

13 In other words, what was happening to the
14 impact limiter at that time? And the Holtec impact limiter
15 is an aluminum honeycomb and I assume is going to melt at
16 the temperatures in that fire. What is happening there?
17 What is happening at the seals of the cask when this fire
18 takes place? Those weren't shown in the slide because you
19 were just looking at a two-dimensional. And it would be
20 helpful to us if you could actually release this P&L study
21 so that we all could take a look at it and, you know, and
22 see what modeling was actually done.

23 I think from the basis of what happened in the
24 tunnel, at least a three-hour fire should be looked at with
25 a continuing heat source in the tunnel itself because I

1 think that's what happened in reality. So, that answers
2 the question, I think, of what kind of test we think or I
3 think is appropriate for modeling, you know, in this PPS
4 study. I don't know if you wanted to answer any of this.

5 MR. BAJWA: Yes. Just to give you a better
6 feel for the NIST model, the NIST model did take into
7 account the heat up of the tunnel, the surface of the
8 tunnel. When we then applied those temperatures to our
9 model, we did take into account the radiation of the brick
10 onto the surface of the cask. One thing that we did do in
11 our follow on study is we actually did a seven-hour fire,
12 so where we took the 20-meter case and we ran the fire for
13 seven hours.

14 And then we did a cool down period after that.
15 And we didn't see any, we didn't even see the cask exceed
16 the short-term temperature limits in that particular case.
17 So, that's a case where you have seven hours worth of
18 radiation at the fire temperature on the cask. And that
19 was kind of an enveloping study that we did.

20 I wanted to speak also to the 2-D versus 3-D.
21 As far as the analysis that P&L did, we had proposed a
22 follow on meeting to talk about the NIST report and our
23 analysis. At that time, representatives from P&L will be
24 available, so they can discuss with you how we did that
25 model. They have not published or submitted to us any

1 formal, I don't think they've submitted to us any formal
2 documentation on the model. But at some point, we will
3 have a more descriptive representation of what we did and
4 that will be available publicly.

5 MR. RESNIKOFF: If you're going to have a
6 meeting in May, you know, to just consider this issue, it
7 might be a good idea to bring them in at the same time.
8 And NIST as well.

9 MR. BAJWA: That's what I'm saying. Yes,
10 that's what I'm saying we're going to do. That's the plan
11 at this point.

12 2-D versus 3-D, the reason we took a 2-D cross-
13 section, obviously to save a little overhead on the
14 computational time. A three-dimensional model of the spent
15 fuel transportation cask with impact limiters that would
16 give you enough resolution to really understand what was
17 happening in a fire environment is quite a big model. It
18 would take a long time to run and a long time to develop.
19 The 2-D model gives us a couple of advantages. Obviously,
20 there are not as many elements in that model, so it won't
21 take as long to run.

22 Plus, we are able to take the peaking factor
23 for the fuel. In other words, the cross-section that you
24 saw is the hottest possible cross-section in that cask
25 based on the peaking factor of the fuel decay heat. So,

1 that was the hottest possible cross-section. And I wish I
2 had kind of a visual, but when we say it was 20 meters from
3 the center of the cask, if this was the cask here, this is
4 the center, say this is the center of the cask, the fire
5 was located 20 meters to this side of the cask. So, it
6 wasn't as if it was, you know, it was this distance away,
7 okay.

8 So, this is the center of the cask, the hottest
9 possible cross-section, fire source here, impact limiter
10 here. And the impact limiter is actually going to have an
11 insulating effect, and obviously that's not taken into
12 account in our two-dimensional model. So, the two-
13 dimensional in that sense is actually more conservative
14 than a three-dimensional model would be.

15 MR. POSLUSNY: Let's do Corey. Your first
16 question.

17 MR. CONN: I want, Chris, to just ask you if in
18 the successive versions of the analysis, algorithms and the
19 parameters and the expansions of the sets of parameters
20 that you might be able to use as you move beyond two
21 dimensions, for example, would enable you to introduce into
22 the space where currently we see a homogenous region
23 opportunities to introduce constants and variables and
24 parameters derived from the computation of stresses on
25 welds and things of that nature.

1 MR. BAJWA: Well, theoretically, yes. This
2 model was a thermal model. So, we were focused mainly on
3 the thermal performance of the cask. You could do a
4 structural model that would take into account thermal
5 stresses and that would give you an idea of what those
6 stresses would be. That is something that could be done.

7 MR. CONN: I raised the question in part
8 because I am curious if it would bear on the strength of a
9 weld whether or not post-welding heat-treating had occurred
10 or not, and if any, you know, data was known from that. Of
11 course, brittle fracture, temperature ranges and things
12 like that change whether post-weld heat-treating has been
13 done. So, an example of things about which there is some
14 uncertainty at the level of fabrication and if a person
15 could be present at the time models are generated and to
16 have input where a range of uncertainties, at least a few
17 orders of magnitude could be, you know, introduced, I think
18 it would certainly improve the reliability of any forecast
19 in terms of failure thresholds.

20 MR. POSLUSNY: I would assume that comment not
21 only refers to what was done there but also in PPS?

22 MR. CONN: Yes. Especially in PPS.

23 MR. POSLUSNY: Right. Oh, let me go over to
24 Eileen, and then, Bob, you're next.

25 MS. SUPKO: I have a question, and it goes back

1 to my focus on realism and trying to explain the test
2 proposed for the Package Performance Study. What you're
3 proposing is a fully engulfing, optically dense fire, and
4 Chris, you commented earlier that, you know, theoretically,
5 it's not something that could happen in a real world
6 situation. My question is, is there a unit of measure? In
7 the impact test, the unit of measure is force or energy
8 absorbed by the package. And so, one can equate the total
9 force in a drop onto an unyielding surface to forces that
10 one might encounter with different impacts to real world
11 surfaces.

12 So, that's something that you can explain that,
13 you know, this covers this real world situation, you know,
14 whether it's a 120-mile an hour impact into, you know,
15 whatever, concrete. Is there a similar unit of measure,
16 and I don't know if it's heat transfer or some heat
17 transfer parameter that you can use to translate the fully
18 engulfing, optically dense fire into real world fire
19 situations? To be able to explain, because actually that's
20 one of the things that I find difficulty with. How do you
21 explain that the 1475-degree, 30-minute regulatory fire is
22 much more than just a 30-minute fire?

23 MR. POSLUSNY: Is there some conversion factor
24 or something?

25 MS. SUPKO: Yes. Is there anything, you know,

1 are you thinking about how to translate what you're
2 proposing into something people can understand and say,
3 okay, I got it?

4 MR. BAJWA: Yes. I think the term you're
5 looking for is heat flux, and that's the movement of heat
6 into the package or the heat input into the package from
7 the fire. You can determine that by calculation for
8 different size fires, different fuels, I mean, you know,
9 all different kinds of fires that you might find in actual
10 transportation events. And then, you can decide you can
11 calculate how much heat input would be put into a package,
12 say a spent fuel transportation package.

13 So, I think that's the link that you're
14 probably talking about and that's something that we could
15 certainly wrap into any of the fire work that we do to help
16 people better understand, taking the 1475-degree regulatory
17 fire and looking at the heat flux there and then comparing
18 it to, say an actual transportation event like Baltimore
19 tunnel fire.

20 MR. POSLUSNY: Robert? Bob?

21 MR. HALTEAD: Well, some of you know Chris and
22 I have been going around the country beating each other up
23 the last three weeks and it's been such a popular
24 performance that we're thinking about taking it on late
25 night television.

1 For purposes of what we need to do here, I want
2 to defer some of the next round of this debate until we
3 have an opportunity to get the NIST and P&L people in a
4 room with us. And hopefully, we'll do that in early May
5 and we'll have to somehow disseminate the transcript of
6 that meeting so people can look at it before you finalize
7 your comments. I want to summarize some concerns that I
8 think would lead to different conclusions, but mostly, I
9 want to talk about how we want to apply this fire with what
10 we got to do today which is try to figure out how to define
11 a fire temperature and duration that would be useful to us
12 in designing a test.

13 We think that the fire history is more
14 complicated. We're not convinced that, in particular, that
15 the full re-rate radiation of the heat from the brick has
16 been accounted for. But even so, it looks to us like at a
17 very minimum, there's a basis in the NIST report to say
18 that that fire was running at about 1,000 degrees C for
19 three hours. Now, you can say it could have gone another
20 four hours at 800 degrees C depending on how you account
21 for the re-rate, that's because of the fuel and the tri-
22 propylene tanker.

23 You add on number of hours for the other
24 combustibles like the boxcar full of paper that are burning
25 and the fact that the firefighters couldn't or for some

1 reason weren't sent in to put it out. You'd also have a
2 sizeable cool-down period where you'd have an elevated
3 temperature but it would be a temperature below the peak
4 temperature of the fire. So, number one, we think this is
5 a fire that at a minimum is a three hours at 1,000 degrees
6 C and could conceivably have created the equivalent thermal
7 environment of a fire that ran seven to 12 hours at 800
8 degrees C with that three-hour spike at 1,000 degrees C.
9 Now, that's, temperature-wise, not as high as some fuels
10 might burn in an open-air fire, but it's one hell of a
11 fire. So, it's a pretty good fire for us to look at for
12 these purposes.

13 The location of the cask in the fire was
14 important. First of all, we don't think you can delineate
15 these temperature zones as precisely as was done in the
16 NIST report, but, you know, that's an argument for the
17 meeting. But we look at the height and width of the tunnel
18 where this occurred and it's quite conceivable to us that
19 in a pile-up accident without any exterior damage to the
20 cask, you could actually have had the equivalent of an
21 engulfing fire. Again, that's another issue to be
22 discussed.

23 Thirdly, the selection of the cask is really
24 important. Some NRC casks appear to be less vulnerable to
25 this type of a fire than others. We looked at a range in

1 our analysis but we also didn't look at the one we think is
2 most vulnerable, the currently licensed IF300 which is a
3 70-ton cask that doesn't use an inner seal. And if I were
4 going to guess and then ask you to model it, I'd say that
5 cask would probably have failed in three to four to five-
6 hour range of the fire. And by fail, I mean would have
7 allowed the fuel inside to reach 740-750 degrees C.

8 And finally, I would argue that most of the
9 containment credit for this cask that was used in Chris'
10 example is the welded inner container. And it's a real
11 good reason to go back and look at some of the discussions
12 that occurred between state of Nevada, DOE and NRC people
13 who were in those meetings in the mid-90's and we were
14 talking about an MPC design that is the standard design.
15 And frankly, there's probably a pretty good basis, too, by
16 regulation requiring all the rail casks to have that welded
17 inner container because that seems to be where the real
18 barrier to a horrific release of cesium seems to come from.

19 All that said, for the life of me, I'm unable
20 to explain why the thermal modeling that Miles Bryner who
21 is a trusted mechanical engineer in the University of
22 Nevada, Reno who has worked extensively with Richard Wertz
23 is also at UNR and they have worked with Dr. Kaufski when
24 he was at Sandia and those guys have worked with the Sandia
25 staff on the fires for benchmarking the cafe code with

1 large calorimeters which were basically mockups of casks.
2 And we see some very different performance curves, so for
3 example, when we look at the 125-ton MPC which was the DOE
4 large rail package, still a little smaller than the cask,
5 than the Holtec or the other cask we're talking about, he
6 assumed that that cask is undamaged. We find failure
7 defined by heating up of the fuel inside being very
8 sensitive to the assumption of the temperature of the fire.

9 So, if you assume that the temperature burns at
10 the regulatory 800 degrees C, it takes about 22 hours for
11 the fuel to fail. If the fire is hotter at 1,000 degrees
12 C, the time to failure goes down to about 13 hours. And if
13 the fire is at 1300 degrees C which is what, 24 degrees
14 Fahrenheit more or less, then the fuel failure occurs in
15 seven hours. And you see a similar range occurs for the
16 truck cask.

17 What's interesting is if you assume that
18 there's exterior damage to the cask, and in this case,
19 again, I don't know why these curves are so different from
20 yours, Chris, but both looking at the absence of the
21 neutron shield and the impact limiter, at the higher
22 temperature fires, we get modeled results that's show the
23 truck cask having massive failure of the fuel and seals in
24 less than an hour. So, there are some real gaps between
25 the analysis that you guys have done and the analysis that

1 actually was not done for us but was paid for by DOE over a
2 period of about four years. It's published in peer review
3 journals and summarized in a report that was prepared for
4 us by Dr. Bryner.

5 Now, we need to put all of this information,
6 all these documents into the data that's on the Sandia web
7 site. And I guess the bottom line that I want to try to
8 pull us through here is as we try to design a fire test,
9 we've looked at about three different ways to approach
10 this. One, for each of the casks involved, it would be
11 useful if Sandia would assume for a damaged and an
12 undamaged cask, what type of exterior fire has to be
13 applied in order to reach a 750-degree C temperature on the
14 fuel cladding because that's when you expect that horrific
15 burst release of the radioactive cesium.

16 So, one approach to designing the test is to
17 first model where you think that failure threshold is going
18 to be and then actually run that fire. A second approach
19 to this would be to take a definition of what we think
20 would be the worst fire that could have occurred in the
21 Baltimore tunnel. So, say we define that as three hours at
22 1,000 degrees C and another four to nine hours of 800
23 degrees C and then we run that fire. And a third approach
24 which our consultant Dr. Burkie who was formerly of the
25 NTSB and is now back at the NTSB says that he really thinks

1 that we need to run a fire test without any exterior damage
2 to the cask.

3 And this is primarily as a benchmark in the
4 exercise, not to demonstrate the ability of the cask to
5 survive a fire but take an undamaged cask, install a
6 thermocouple where the fuel would be in the fuel cask and
7 another thermocouple in the seal region and another one on
8 the surface of the cask and see how long you have to run
9 the regulatory fire which is 1475 Fahrenheit to reach 750
10 degrees C or 1380 degrees Fahrenheit inside the cask and
11 untether it, just run the fire.

12 Now, here is the big problem with all of this.
13 Running fires for more than a couple of hours gets to be a
14 really tricky exercise in the real world. And that's why I
15 think we're going to have to go, I mean, I hate to say it,
16 another round with this document and then have another
17 meeting at some point to try and hash out the fine details.
18 But right now, looking at what we've learned about all the
19 modeling we've done in the Baltimore fire, we can see three
20 basic ways to design a fire test. One is to model a
21 failure point and run that fire for that cask. One is to
22 draw some conclusions for Chris' analysis and our analysis
23 of the Baltimore fire and replicate that fire and, hey, see
24 if we get a failure condition or not. And the third one is
25 to take an undamaged cask, install the instruments properly

1 and run the fire until we find out where the failure
2 threshold as defined by a certain interior temperature is.

3 I mean, I don't know if that's helpful or not.
4 I thought this was going to be easy three weeks ago. We'd
5 spend a couple of weeks bashing this back and forth and
6 we'd be able to give some precise feedback on exactly what
7 kind of fire we thought should be run. And obviously, we
8 should have been a little more humble before we said that
9 by the time we had a meeting in Las Vegas in two weeks, we
10 were confident that we could give you a firm
11 recommendation. Frankly, we'll be hard-pressed to have
12 this worked out by May 30th. But that's kind of where our
13 thinking is going.

14 Do you want to add by capturing this shot at
15 myself?

16 MR. POSLUSNY: I don't think it's a surprise.
17 I think the staff right up front indicated that this was
18 the more difficult of the two proposed tests. Do we have
19 some more ideas? Mr. Crose?

20 MR. CROSE: Just from a layman's term, I have
21 photographs here of all these cars that was in that tunnel
22 fire. All of them came out of there in tact. I mean, they
23 were not melted down. It's going to be hard to convince me
24 that the cask wouldn't be better built and withstand the
25 fire better, including the car that had the chemical in it,

1 a hydrochloric car, the boxcar in front of that car, they
2 all came out of there with no melt-down. They were able to
3 roll them out of the tunnel.

4 MR. HALSTEAD: Just remember, the failure we're
5 looking for in this case is not a structural failure but a
6 failure of the seal in the lid coupled with the internal
7 temperature and pressure that forces one bad actor, the
8 cesium 137 --. But, yes, that's right. You would not
9 expect a lot of structural damage or any other kinds of
10 visible, measurable exterior, except there is a question,
11 Dave, about whether you assume that the impact limiters and
12 the way they run the tests with the impact limiters and
13 neutron shield, it turns out at least from the modeling
14 we've done that the result is very sensitive to that. If
15 you take the impact limiter off, boy, that thing gets to
16 the failure threshold surprisingly quick. Whereas if it's
17 got the impact limiter on, it takes a long time.

18 MR. POSLUSNY: Mr. Wright?

19 MR. WRIGHT: Again, looking at, just like Dave
20 just said, looking at all these reports and everything, and
21 it just, not being an engineer, how can you put all the
22 same stuff in there and get such a divergent set of
23 standards? And then, the other part is, from the drift
24 that I'm getting is you're never going to get there because
25 no matter what each of you come up with, you're not going

1 to agree with it. You know, it's to the point where we're
2 going to have to basically put this sucker under in
3 acetylene torch because you're not going to get to some
4 place. That's the drift that I keep seeing with this.

5 And just like Dave just mentioned, the ones
6 that we're concerned about, the chemical cars we know are
7 not to the same standard. The trucks and the stuff that
8 our first responders go to all the time fail all the time.
9 But we're trying to put some standards on here that are so
10 far out that we can't even agree on how far out is far out.
11 And that's my concern is we're not going to come, at least
12 it appears, we're not going to ever get a resolution to
13 this because we can't get two scientists, we're bad enough
14 to get two lawyers to agree, but two scientists to agree on
15 the standards.

16 You know, I've read documents from peer reviews
17 and you can't get two peers to agree. So, I'm concerned
18 that right now about getting some type of resolution or
19 conclusion to all that what we're doing is we're in an
20 endless loop. Because every time there is a study, there
21 will be someone and this is that part of that peer review
22 process, there will be someone with a vita that goes
23 several pages long that will conflict with one portion of
24 that and say the study is invalid. Now, we'll go over and
25 over and so I'm concerned about are we ever going to get a

1 resolution?

2 MR. POSLUSNY: That seems a valid concern. I
3 really don't know the details of both analyses, nor do I
4 think that each group has seen the other's assumptions,
5 modeling techniques, et cetera, although that meeting would
6 bring us closer to a better understanding. I'll let you
7 speak for that.

8 MR. BAJWA: Now, I would agree. I mean, I
9 think really here, we're here to discuss Package
10 Performance Study. So, I mean, I think Bob has the right
11 idea in making the transcripts of any meeting that we have
12 to discuss the analysis that we did. And I'm sure Bob will
13 bring his analysis and we'll also discuss that. And those
14 will be made available. So, you can draw your own
15 conclusions.

16 I agree, it's hard to get engineers to agree on
17 something. But I think that a defensible analysis is one
18 that takes into account everything that you know about what
19 happened, everything that you know about the way materials
20 respond to a fire, and everything you know about fire. And
21 if you put those together, you can probably get a decent
22 analysis about, that will tell you approximately what
23 happened.

24 MR. WRIGHT: And that's what I think we're all
25 hoping for. And I'm just saying that my hope out of this

1 whole thing is we can get to a point where we can agree
2 that here is the range, and we get the range down, it
3 doesn't have to be down to a silly millimeter, but there's
4 got to be a point, and someone, I don't know who that
5 person is going to be to say okay, we've got enough
6 information, you know, we don't need to study it for ten
7 more years. And I think, because right now, it just seems
8 like that it's study after study and we're not moving any
9 far forward. It's just one engineer is conflicting with
10 the results of another engineer who is conflicting with the
11 results. So, I would hope that as part of this process, we
12 get to somewhere and someone who can make that decision
13 says here is where we're going to stop.

14 MR. POSLUSNY: Good comment. Yes, Bob?

15 MR. HALSTEAD: Well, people are probably ready
16 to move on, but let me try to make a couple of summary
17 points about the fire test issue. First of all, one thing
18 we want to remember about the fire test is it's the one
19 type of test that we don't have a good scaling basis for
20 scaling. So, if we want to understand a fire, we've got to
21 run a full-scale fire. I'm as skeptical as they come on
22 impact. There's just a lot of things you can do with a
23 half-scale replica model when you want to know about how
24 the materials respond to force. It's different with fire.
25 So, we need to do the fire full scale.

1 Secondly, the plan that's proposed in the PPS which is to
2 continue doing benchmarking studies with large calorimeters
3 is we believe a very good proposal and builds on some of
4 the past work. Now, remember, all that does is it tells
5 you about the heat input to the cask from the fire. It
6 doesn't tell you a lot about what's happening in the
7 internals of the cask. But as far as the heat loading to
8 the cask from the fire, frankly, a lot of that I think is
9 maybe even best done with the large calorimeter test
10 because then you're not at the same time worrying about
11 trying to collect temperature data from a couple of
12 different points like you'd be in the cask test.

13 So, number one, you've got to build the fire
14 test full scale. Two, you do part of this work through a
15 mockup of a cask, if you will, which is a large
16 calorimeter. Number three, if you ask me how I could fit
17 this extra regulatory fire test into what the state of
18 Nevada has proposed for full-scale testing of the
19 regulatory board, I think in fact, we're not as far apart
20 as the gentleman from Iowa fears.

21 My own feeling, and I'm not authorized to offer
22 this as a formal position, but you know, if Chris and I
23 went out in the hall and fought for another hour and had to
24 come up with a number, I would say that running the
25 regulatory fire for a period of six to seven hours in a

1 fully engulfing fire would be a pretty righteous test of
2 how either a damaged or in tact cask would hold up. The
3 nice thing about the fire test as opposed to the impact
4 test is you can continuously report data. So, and again,
5 I'm sorry Dr. Chad isn't here, but you know, it's not like
6 an impact test where, you know, you do all this work and
7 then you've got one data point and, boy, if you didn't set
8 it up right, you might have wasted six million dollars.
9 Okay, it's a little more forgiving with the fire test.

10 So, as a provisional recommendation, I would
11 say this. We were trying to combine Nevada's testing
12 proposal and what the NRC wants to do as far as actually
13 taking the test, testing the cask that would be used to
14 Yucca Mountain. Something like the regulatory drop test,
15 followed by the regulatory puncture test, followed by a
16 fire at the regulatory temperature. But taking continuous
17 temperature recordings in the interior cask for six or
18 seven hours would probably be pretty convincing to us and
19 pretty convincing to the general public. Now, we've got
20 some time between now and May 30th to think about that.

21 The one thing that I also throw out to the
22 people who are interested in validating their codes is the
23 strong argument that our consultant Dr. Burkie makes that
24 it's difficult enough to collect data on fires. And if
25 you've got the complication, (a), of damage to the cask and

1 (b) the fact that you had to install your instruments in
2 the cask before you damaged it in the drop test, and then
3 you're expecting that instrumentation to accurately report
4 fire data out, that's a big challenge.

5 And I'm hoping Andy is going to say or Ken is
6 going to say a little bit about that, the engineering
7 challenge to the people setting up the test of installing
8 instruments that can survive the drop test and then
9 accurately report how the cask responds to the fire.
10 Those cover our concerns. Thank you.

11 MR. POSLUSNY: Good. Jim?

12 MR. WERNER: I can offer a process suggestion
13 for you all, although after that little outburst from Bob,
14 that sounded like a suggestion, a proposal actually, you
15 just laid out there. But in order to get to a proposal
16 consensus, I would respectfully suggest not simply calling
17 an arbitrary halt and saying we've had enough argument,
18 here is the way it's going to be. We've had enough of
19 that, it doesn't bring any credibility, it doesn't get you
20 the right answer.

21 It's an interesting engineering question. As
22 an engineer, I'd love nothing better than to have weeks to
23 spend debating it but I don't do that anymore. I don't
24 really have time, a lot of our people don't have time. And
25 to get participation, you have to be able to engage,

1 although it would be a very interesting little exercise.

2 But as a kind of a project or program
3 management point, one thing I've seen successful is you
4 kind of parse it into middle level assumptions where people
5 can discuss the chunks of assumptions that might go in.
6 You know, do you think this is reasonable? Do you think we
7 ought to do these things in terms of duration and
8 temperature and then look at what the results might be and
9 how that would come up with a fire.

10 So, you don't have, people don't have to spend
11 a lot of time here debating -- by details. They can debate
12 levels at an issue that they can actually enter and
13 participate reasonably. And then, you have some sort of
14 consensus about that, and then you have perhaps consensus
15 about the test. That would be a process suggestion so you
16 can have participation in developing your test protocols.

17 Secondly, in terms of process, you know, I did
18 read this in advance, the paper that Bajwa, and it's
19 sprinkled with assumptions and suggestions about what the
20 technical assumptions should be, and then I read the NRC
21 thing. It was hard to really put it together and say, how
22 do the assumptions overlap? How do they, and they're not.
23 There was no easy overlap to make it even compare having
24 read both things. It just seemed like you all need to get
25 together on it.

1 You know, the same thing going back to sharing
2 codes. Speak English to people who, you know, speak in
3 that language. Speak in detailed codes to all these people
4 we have up here with level debate. But in terms of life
5 participation, and I've worked on developing it for
6 transportation scenarios and nuclear waste management for
7 nuclear and mixed waste is that you can, you know, we
8 actually put it into like a board game and had people from
9 various states.

10 I don't know if anybody here is in the state
11 level mixed waste thing, but you know, we've had people put
12 together a game board in a way where people, this is a
13 pretty serious discussion where you're treating remote
14 handle true, contact handle true, low level -- high level
15 waste spent fuel and say, all right, if we need this here
16 and then we move that there, you know, what is going to be
17 the result? And you can participate in the project without
18 being engineers because they're right, some people are not
19 engineers. But just sort of running the clock and then
20 just saying, there is the answer, that's not going to build
21 a lot of public support. You're not going to get it by
22 them in the decision-making.

23 MR. POSLUSNY: Good observation. Jim, do you
24 have any insight as to how long that process took or I mean
25 it's --

1 MR. WERNER: We spent a few months developing
2 the rules and the algorithm and it was a day meeting, day
3 and a half meeting --

4 MR. POSLUSNY: But you had more peers as well
5 here.

6 MR. WERNER: Oh, God, we had --

7 MR. POSLUSNY: We don't have that many peers.

8 MR. WERNER: We had states involved in that
9 overall. Yes, so it's simplified. We have, you know, a
10 couple of dozen. But it translated into decisions that
11 people can actually participate in and --

12 MR. POSLUSNY: Chunks at of time, little bits
13 rather than the full. Okay, good comment. Okay, any other
14 comments on either the tunnel fire analysis or the proposed
15 fire testing conditions? And clearly, if you don't have
16 time today or don't feel like doing it now, you still have
17 that written date by May 31st to send something in. And we
18 appreciate your comments on it.

19 Okay. In that case, we're done with fire. And
20 I would like to take a very short break about maybe ten
21 minutes and come back maybe about five after 4:00. Okay,
22 then, thank you.

23 (Off the record for a short break.)

24 MR. POSLUSNY: Okay. If you could get settled?
25 We'd like to move next to schedule -- on the agenda. And

1 remember that we owe the audience some comments on the --
2 as well.

3 Last but not least, important session, is going
4 to be a discussion on the impact test. And Dr. Murphy is
5 going to sort of key it up, to talk about some of the
6 issues we'd like to focus on. We want to -- participants.
7 So, with that, Andy?

8 MR. MURPHY: Okay. Keying up, easiest things
9 first, right? Proposed speed range, the protocols indicate
10 a proposal between 60 and 90 miles an hour. The 60 is
11 really easy to understand. At less than 60 miles an hour
12 with the shock absorbers or impact limiters on there, the
13 impact limiters absorb basically the energy. We are
14 looking for a cask test, so we need to fully engage the
15 impact limiters and that doesn't happen until about 60
16 miles an hour.

17 Now, we get into the more troubling or tricky
18 portion, realism. We had Sandia put together some of the
19 numbers from 6672 which is a risk study that we've talked
20 about a little bit here today. We used a number of the
21 data points in that study that basically are the data,
22 they're not part of the analysis and so forth, of how often
23 you get a 90-mile-an-hour rail accident with an orientation
24 of the cask that simulates the center gravity over corner
25 kind of thing. You're talking about an accident where the

1 cargo comes dislodged, falls, come off of the conveyance.
2 You're talking about having the roadside material being a
3 hard rock surface.

4 When you put all of those numbers together and
5 do a simple multiplication of all of those fractions, you
6 come up with a number of something like 10^{-8} . Okay, we
7 took a look at that. That tells us that 10^{-8} times has,
8 how often those occur. We took a look at that and we are
9 also looking at the question of realism, trying to compare
10 that number with some of the other numbers that the
11 Commission uses to make safety decisions or to inform
12 safety decisions. And we looked at it and decided that
13 something on the order of 10^{-7} or so which is represented
14 by the 75 miles an hour accident is what the staff would
15 propose.

16 Okay. Now, we get into some of the little
17 details. We're talking about a 75-mile-an-hour accident on
18 to one of these unyielding surfaces. For the Holtec cask,
19 that means basically a block of concrete that's about 30
20 feet deep and 30 x 40 feet in surface with a 12-inch steel
21 plate on top of it. And what that does for us is forces
22 all of the energy from the 75-mile-an-hour fall to be taken
23 into the cask so that we're spending all that energy to
24 forming the cask and not doing something to the target.

25 Okay. There are implications for that that our

1 calculations, and some of them were published in 6672,
2 indicates that that is about equivalent to at least 150-
3 mile-an-hour accident into a yielding surface. That does
4 represent a significant challenge to the cask. There's a
5 couple of reasons that we're doing that and one is that for
6 the codes that we are using, you've got elastic and plastic
7 or inelastic deformation.

8 Basically, elastic deformation is like with the
9 rubber band, you pull it all the way out and basically if
10 let go, then it comes back to the original position.
11 Plastic deformation, you pull that rubber band and it
12 breaks on you, or you hit the brass ball with a ball pein
13 hammer and you hit it hard enough and you get a dent in
14 your brass ball. What we're looking for is to get that
15 plastic deformation in our cask so that we are able to
16 challenge the computer codes and the computer models that
17 we have out there. Like I said, validation of our codes
18 and analysis is one of the things that we're driving at and
19 we have to take our speeds, get our speeds up to this level
20 in order to get measurable deformation.

21 Okay. Let me look at the notes. We talked
22 about earlier the question of challenging the codes. At
23 this stage, we are not proposing to do multiple tests of
24 the casks. In order to get our uncertainty analysis into
25 hand, we're talking about looking at a rail cask and a

1 truck cask that obviously are of significant difference in
2 their geometries and materials. We're looking at one cask
3 with an MPC on it or in it, multi-purpose cannister, and
4 one with and one without. We're looking at two different
5 orientations of the test. One, the center gravity over
6 corner, and the other the back breaker.

7 One of the more exciting aspects of this
8 discussion is the type of impact test that we're looking
9 at. And I got to say at this stage, given a lot of
10 discussion, it's an item that's going to take a lot of
11 discussion when we get back to the NRC's headquarters. And
12 that is whether to do it with a rocket sled or a tower
13 drop. We're talking about a tower that's about 300 feet
14 tall and using some very simple numbers, I don't remember
15 from high school physics, that represents a drop for this
16 stuff of about three seconds duration.

17 The rocket sled is obviously a far more
18 interesting -- operation of mounting a 140-ton cask on to a
19 sled and putting a rocket engine behind it that is large
20 enough to get this thing accelerated from zero miles an
21 hour up to 75 miles an hour in probably less than two
22 miles. So, you're talking about a very large rocket
23 engine. One of the reasons that we've thought about the
24 drop rather than the rocket is a safety consideration. If
25 you've got an accident with this rocket and this projectile

1 in front of it boogieing across the Sandia desert at 75
2 miles an hour, don't get in front of it. Satisfying the
3 safety folks at Sandia would be a non-trivial exercise.

4 Putting that all aside, looking at it from an
5 engineering point of view, one of the things we're going to
6 be doing is making a prediction of what's going to be
7 happening to the cask when it hits the target. And with a
8 rocket motor and sled operation, there is going to be some
9 uncertainty as to how fast you are actually going to get
10 this thing moving at the impact. There is not that
11 uncertainty with using gravity as your motivating force.
12 Basically, you can know exactly how tall it is, you know
13 what gravity is at your local location. You can tell how
14 fast it is when it's going to hit the ground. And we, as a
15 part of our validation, want to be able to predict what's
16 going to happen to that cask when it hits the ground or it
17 hits the target.

18 Orientation of the cask, we have selected, as
19 I've said earlier, the center of gravity over lid and the
20 back breaker to give us some level of diversity in the
21 challenge that we give to the codes. But also, we're
22 looking at them as particularly you can remember the back
23 breaker. There is significant plastic deformation that has
24 occurred to that cask. There is less deformation to the
25 Holtec rail cask, but those tests for both, I'll say for

1 both tests are challenging to the cask as well as to the
2 code.

3 Okay. I think that's what I've got in my
4 notes. I didn't remember that there are other comments
5 that we were working on. Bottom line at the moment, I
6 don't remember what they are, I don't have that written
7 that. So, I'll turn it back to Chet at this stage.

8 MR. POSLUSNY: Yes, why don't we go through the
9 issues? And the first hand up is Bob's.

10 MR. HALSTEAD: Well, I wanted to follow up a
11 question from last time. And Andy, now, you have had more
12 time at home than I have over the last, the -- home office.
13 We wanted to get some idea if you did the drop test on the
14 tower without an impact limiter, what the speed or the
15 height drop without the impact limiter equivalency would be
16 to your 90 mile-per-hour drop with the impact limiters.
17 And I don't want to belabor this but the reason that we're
18 inclined to have you do the test without the impact limiter
19 is, first of all, we have lots of information on impact
20 limiter performance. We think from the scale model test
21 that's the one area where there's been a lot of scale model
22 testing as part of package certification.

23 Secondly, if you were going to do the test with
24 the impact limiter for the rail cask, we would be inclined
25 to argue for the 90 mile-per-hour because we think that

1 would be a real world replication of what a pretty near
2 worst case runaway train accident would involve. Yes, I
3 know you've done these equivalencies at say
4 150 --

5 MR. MURPHY: I was going to ask you if we could
6 do the questions one at a time so that we don't get, me, I
7 don't get confused.

8 MR. HALSTEAD: Oh, I'm sorry. Yes, I didn't
9 know this was going to be the only shot I would, I didn't
10 want to --

11 MR. MURPHY: Oh, you can have a shot.

12 MR. HALSTEAD: Okay. Well, forget everything
13 else. What about the equivalency of with impact limiters
14 and not impact limiters to get the same G load in one of
15 the casks? Because that's a pretty impressive whack that
16 you put on the cask at 90 miles per hour with the impact
17 limiter.

18 MR. MURPHY: At the moment, that's an easy one
19 to answer. We don't have that information yet. It will be
20 part of the information package that we develop as we go on
21 from here doing the analysis to understand what's going to
22 be happening. And obviously, the analyses do respond to
23 the comments that we've gotten over the last two and a half
24 weeks.

25 MR. HALSTEAD: Okay. Well, can I ask Chet just

1 a process question? Do you want like each one of us to
2 give you the different issues or you want to do speed and
3 then come back to the sled and then come back to the --

4 MR. POSLUSNY: I'd like to do one at a time.
5 Let's do speed, go around real quick.

6 MR. HALSTEAD: Okay. If you're going to do the
7 rate with impact limiter, we would argue for the higher
8 speed. The back breaker at 75 miles per hour in the truck
9 cask, you know, we've previously said we think that's a
10 pretty good insult to the cask if you want to see what the
11 sideways impact would be. And we're holding open the issue
12 of whether the sideways impact on the truck cask which
13 gives us the loss of shielding accident is more or equally
14 important than doing an end drop on a truck cask which we
15 think coupled with the fire would be more likely to give
16 you a test of whether there is a loss of containment.

17 But for right now, let's say 90 miles per hour
18 on the rail test with the impact limiter and 70 miles per
19 hour for the back breaker for the truck cask certainly seem
20 good for us as an extra regulatory test. Now, understand,
21 we still think the most important thing to do is the basic
22 no impact limiter, nine-meter drop on the unyielding
23 surface which is what the regulations say then followed by
24 the other three tests at sequence.

25 MR. MURPHY: We had proposed to do the drop,

1 the extra regulatory drops, extreme drop with the impact
2 limiters because that would be the condition that the unit
3 would have if there were a real accident. So, that was the
4 rationale for that.

5 MR. POSLUSNY: That's a reality question again.
6 The reality, yes. Okay. Any other comments on speed? I'd
7 like to wait for the audience until the end if you don't
8 mind. Eileen?

9 MS. SUPKO: I hate to beat a dead horse but I'm
10 just going to reiterate, I have great concern regarding the
11 speeds proposed on using an unyielding surface and what may
12 or may not be, and I don't believe that they are, realistic
13 conditions that can actually happen in a real world
14 transportation accident. And you know, I agree that one
15 could see traffic accidents, rail, truck, that could happen
16 at those speed ranges, but not into unyielding surfaces.
17 And I have had great concern that the significance of the
18 unyielding surface in the tests that you do are not going
19 to be adequately explained and put into the proper context.

20 And that's kind of my issue throughout, you
21 know, everything that's been proposed so far. And I would
22 also suggest that you might look back to the comments of
23 the ACNW from June of 2001. I think they made basically
24 the same exact comments that I'm making today. They had
25 three or four points. And it seems as though the, you

1 know, you'd not factored that in. Enough said.

2 MR. POSLUSNY: Okay. Thank you. Any other
3 comments from the table on the speed?

4 MR. HALSTEAD: Could I pose a question to
5 Eileen or John in this? Are you comfortable with our
6 proposal that if we had to do one drop test, we would do a
7 regulatory drop test which we believe is a pretty severe
8 accident to set up an extra regulatory fire test? I mean,
9 you know, what if we said, look, we think that the fire
10 test is more important, the extra regulatory fire test is
11 more important, is there really a possibility of any common
12 ground between what Nevada has put forward and the way that
13 you did? Because I appreciate all your arguments about
14 what these high speed drops mean.

15 And in addition to the arguments you've made,
16 one of the reasons we're leery about them is the discussion
17 that we had with Dr. Chad earlier. It's a lot of money to
18 get one data point. When you're not sure what that data
19 point means, then, boy, if you make a mistake, you've lost
20 an expensive test article. But have you done any thinking
21 about how you would see coupling the regulatory drop test
22 with an extra regulatory fire test?

23 MR. VINCENT: To be clear, we haven't really
24 looked at that. It is interesting, I'm not sure exactly
25 how we'll come down on that. I guess as a matter of

1 general consistency with our comments in terms of speed, we
2 see no reason to go above 75 miles an hour for anything.
3 And in fact, you could argue that maybe 60 is fine as well
4 because that's typically what we're going to see. I
5 understand what Bob is saying about the runaway trains and
6 things like that but I'm not sure I'm completely convinced
7 of that.

8 But, and I'm not sure until I really think
9 about it, Bob, from your perspective, whether or not the
10 fire test is more of a problem or less of a problem. And
11 so, we would have to think about that. But, yes, I mean,
12 clearly if we were, I think, left to our own devices, you
13 know, the regulatory testing would be the first stop point.

14 But, and I understand from the perspective of the PPS as,
15 on the Package Performance Study as currently proposed,
16 that doesn't get you the data that you want in order to
17 benchmark the computers for what are admittedly the extra
18 or super-regulatory types of testing, very specifically,
19 the plastic deformation requirements that you want to see
20 and to verify in terms of code prediction.

21 But then again, I agree completely with what
22 Eileen is saying. Now you got the problem of trying to
23 explain that in a way that makes perfectly good sense to
24 somebody, like for instance, my brother and sister back in
25 Arkansas, and I guarantee you, I've tried and it doesn't

1 work. They know what I do and they just shake their head
2 and that's the end of it, okay.

3 That's a really important consideration and I
4 am trying to grapple with that from my own perspective
5 about how can we meet both of the criteria that you
6 specified in the PPS, particularly in the first appendix
7 about on one hand wanting to get the scientific data and
8 recognizing for the moment that you may have only one shot
9 at this to also satisfy the idea of trying to go in some
10 way towards improving public confidence about what we're
11 doing here. I'm not convinced at this point from what I
12 heard being in Rockville and here that there is a simpatico
13 between the two of those on one test.

14 And as I said, Bob, there might be some merit
15 in what you suggested but I haven't really thought it
16 through at this point. But as far as speed is concerned,
17 anything above 75 miles an hour I think is we're just
18 getting outside the ballpark. And clearly, I think we
19 would like to try to stay to keep things somewhat
20 reasonable so people can identify it with circumstances
21 they are familiar with.

22 MR. POSLUSNY: Thank you. Those are good
23 comments and makes for hitting the ball over to that side.

24 MR. HALSTEAD: Put somebody else on the spot.

25 MR. POSLUSNY: Okay. That's good. Good.

1 MR. HALSTEAD: -- one of the things with the
2 dedicated train issue thrown into it, while we've talked
3 about the 90 mile-per-hour runaway train condition, that is
4 the condition in my own mind that I think is reasonable in
5 general freight service on long western stretches. A good
6 case can be made for the 75 mile-per-hour rail impact if
7 you are assuming that these trains are traveling in
8 dedicated trains and what the Union Pacific calls key
9 trains for hazmat hauls of their western blocks where
10 generally speaking those trains are restricted to 55 miles
11 per hour.

12 And so, I mean, given that both the state of
13 Nevada and NEI have now endorsed mandatory use of dedicated
14 trains which of course Department of Energy still hasn't
15 agreed to, with that proviso, I mean, I think you can argue
16 with that the 75 mile-per-hour impact for rail represents
17 an awfully severe and hopefully rare accident. Because
18 you've got administrative controls now in addition to just
19 looking at the accident forces.

20 MR. VINCENT: Well, if you do what PFS is also
21 proposing, and I'll put on my PFS hat for a moment, with
22 regard to the redundancy of the locomotive, then you get a
23 circumstance that is likely never to happen because of the
24 redundancy and breaking systems. So, back to the dedicated
25 train business, yes, I'm not sure that that plays very well

1 in Peoria from that perspective either.

2 MR. POSLUSNY: Thank you. Okay. Any other
3 speed questions?

4 MR. WERNER: I very much appreciate John's
5 perspective of what plays. Bob, here I am, I have family
6 who raise chickens, it's hard to explain to them what you
7 do. I just know if I have to explain, not just to the
8 public, not just to my sister, brother-in-law, and not, you
9 know, just tell them, but somebody's staff has got to do an
10 emergency response and I went to a meeting and somehow sat
11 idly by where people said 75 miles is outside of the realm
12 of possibilities of unyielding surfaces, I could not
13 explain that.

14 Now, having talked to people and read the
15 material and trusting in the Sandia folks that we all work
16 with and said, well, you know, actually I trust them the
17 way -- would have the equivalent of plus 75 and in fact,
18 you know, the bluffs that we have in our state, a lot of
19 unyielding surfaces, trust me, it just doesn't hack it.
20 You've got to have some kind of data and some kind of
21 support for it. I think the staff proposal is, you know,
22 reasonable and it's not outside the realm of possibility at
23 all. Outside possibility would be something else, but this
24 is just people's commuting everyday.

25 MR. POSLUSNY: All right. I think at one of

1 the meetings, it was suggested that maybe 75-miler test
2 with a typical bridge abutment or something that a truck
3 could hit would be another alternative. I think that was
4 raised --

5 MR. WERNER: That's not an unyielding services.
6 I'm just talking about the bluffs where you hit a cliff
7 straight on at 75 but not straight out, you would have to
8 hit it from the side to be comparable to the test proposed
9 here. You know, head on, you have the absorption of the
10 cab and things like that. It wouldn't be 75, you wouldn't
11 take it 75 times 2. It would be more like we'd have a 45
12 times 2 or something like 40 times 2.

13 That is, in my mind, although you might be able
14 to explain it technically, again, we're not just having a
15 technical discussion here. This is a public policy
16 programmatic discussion. Technical discussions are
17 somewhere else. I don't think they are
18 at --

19 MR. POSLUSNY: Yes, I think we've heard loud
20 and clear that perhaps the biggest challenge is
21 communicating what has been done later on. Okay. Any
22 other comments on the speed question? Okay. Could we go
23 to the rocket sled versus, oh, well, okay, Ralph, just go
24 ahead.

25 MR. ALHAMBRA: For those of you who don't know

1 me, my name is Ralph Alhambra from Region 3. I have
2 several questions about the speed. Sorry.

3 It just hit me, being the outsider on this
4 group, unless you guys under the assumptions ruled out
5 oncoming traffic? Unless it's part of the design of the
6 cask and I'm hearing all this, the train is going 75 miles
7 an hour, what about a train coming at you at 75 miles an
8 hour? Has that been looked at or thought of or anything?
9 I mean, you guys keep talking about running into something,
10 but if you've got a highway cask, for sure there's oncoming
11 traffic. Unless you guys are part of the protocol of
12 transporting this stuff that's going to be -- oncoming
13 traffic, then how about on the trains? Did anybody ever
14 think of that?

15 MR. HALSTEAD: Yes. That's part of the
16 Association of American Railroads' protocols in fact, when
17 these trains would be passing another train. We didn't add
18 that in but I assume since NEI has gone as far as endorsing
19 dedicating trains, they'd probably agree to work with the
20 railroads. Yes, when a spent fuel train passes another
21 train, the proposed protocol is to have one of the trains
22 come to a complete stop precisely for that reason.

23 MR. ALHAMBRA: That's also on the highway,
24 isn't it?

25 MR. HALSTEAD: Well, no, that's a separate

1 issue. But, right, that's why the point that Jim was
2 raising for highways is certainly worth talking about. But
3 for the trains, the reason that we gave in so easy, if we
4 gave in easy on 75, is because the railroads have already
5 suggested a number of special rules to try and reduce
6 exactly that kind of, because that's a big concern. I
7 mean, two trains going by one another at 75 to 90 miles an
8 hour has a potential for a very damaging impact.

9 MR. VINCENT: If I can, two comments, one about
10 highway. The comment is, in fact, one of the reasons why
11 the preferred highway routing system is the federal
12 interstate system, because you do not have the possibility
13 for direct head-on collisions with two bodies moving the
14 same speed in opposite direction.

15 Number two, I wanted just to correct or update
16 Bob's thinking. The work that Private Fuel Storage has
17 done with the Association of American Railroads involves
18 the changing of the normal operating standards for spent
19 fuel shipments into the standard mode for all hazmat which
20 is OT55D. That's the current version. And that no longer
21 requires, I'm going to repeat that, no longer requires the
22 meets and pass restrictions for spent nuclear fuel trains
23 provided the train has been certified as well as the
24 railcars have been certified by the AAR for the purpose
25 intended.

1 MR. HALSTEAD: Has that been formally adopted
2 by AAR now?

3 MR. VINCENT: Yes. I don't know that the
4 performance standard itself has actually officially been
5 signed off on. I know it's essentially complete. But
6 that's the new way that they will be operating. All the
7 spent fuel shipments have moved into the normal hazmat
8 standard operating procedure.

9 MR. RUNYON: Was that very recent, John?

10 MR. VINCENT: Yes, that's within the last year
11 or so. And I know the last time that Bob Fonzac made
12 mention of the procedure, OT55D on the performance standard
13 for their train and railcars for spent fuel shipments, that
14 that should be signed off on here very, very recently.

15 MR. RUNYON: The last time Bob talked -- with
16 the speed, so that's news.

17 MR. HALSTEAD: Well, I would be interested in
18 that change. If that's the case, then I'd argue for 90
19 miles per hour. But if we're assuming that we've got the
20 rules that we thought we've got, I would say 75 would be an
21 acceptable speed. But if that's changing, then I think
22 maybe there's an argument for the 90 mile-per-hour.

23 MR. VINCENT: And the operating speed under
24 OT55D for all hazmat is 50 miles an hour.

25 MR. WERNER: John, could I just add one thing

1 in terms of interstate highway transportation? I thought
2 what you did when I worked in the -- building and we sat
3 there on the seventh floor making plans and drawing maps
4 based on interstate highway transportation because we
5 thought we knew what the standards were for highway
6 transportation or we were sure we did at that time when we
7 were working in Washington -- building. Now that I live
8 and work out in Missouri, interstate highways are not built
9 the same, particularly I-70 does not meet standards of what
10 we now define as interstate highway.

11 So, when we had our people come over from the
12 Department of Transportation to sit down and learn what the
13 standards were and how interstate highways would be, they
14 weren't thinking of grandfathered intersections like the
15 old I-70 section where you really do have the distinct
16 possibility of a head-on at full speed. It doesn't have
17 the same separation you would see on I-95 or 495 or 270 or
18 I-5 or, you know, any of the more modern interstate
19 highways. They're quite different.

20 I would just urge them to not look at what the
21 standards are. Don't look at what you got from DOE. Don't
22 look at what the paperwork says from DOT. Look at the real
23 roads out there if you're planning on transporting, and
24 they're not all built the same. And, I mean, it's a
25 blessing and a curse that Missouri had the very first

1 interstate highway section built, you know, thanks to
2 Truman and Eisenhower working something out way back then
3 in the 50's. But it's not the same thing as what you think
4 of as interstate highways that you guys may drive on. You
5 would look like, you know, more like closer to Rockville
6 Pike than it does to 270, okay?

7 MR. VINCENT: Right. Jim, I agree with you a
8 hundred percent. I did not mean to imply that it precluded
9 the possibility of head-on crash. It does not. It just
10 means that you've in all probability reduced the actual
11 probability for such an event by having selected that as
12 the preferred routing mode for highway shipments of
13 radioactive material.

14 MR. WERNER: I appreciate that. I was sort of
15 making a confession as a reformed Washington bureaucrat,
16 that I was guilty as one of those people who lays out plans
17 and that passes policies on the Potomac without really
18 knowing what the technical details were in the real world.
19 And I'm better now, thank you.

20 MR. POSLUSNY: Okay. Can we now turn to rocket
21 sled or drop? Any comments? I mean, I know we had some
22 state folks that mentioned that early on today. Thor, is
23 that you? If I remember right.

24 MR. STRONG: Yes, I had been generally in favor
25 of the horizontal impact approach rather than drop test,

1 honestly primarily because of the, I guess the drama that
2 you see in it. And there is also the safety issue that was
3 raised. And I haven't heard yet whether from a technical
4 standpoint for validating computer codes, whether you lose
5 something going to the horizontal impact versus the drop.
6 Although, we did mention the fact that you're not exactly
7 sure of what speed you might have with the rocket sled.

8 So, I guess, you know, I'm at a point of not
9 being a staunch advocate for it. I guess I'd like to hear
10 a little bit more of the pros and cons from a technical
11 standpoint.

12 MR. POSLUSNY: Who would like to address that?

13 MR. MURPHY: Just a quick comment on it. One
14 of the extras that you get with the rocket sled is that
15 you've got the cask on a conveyance of some kind or
16 another. That will act as a shocker, energy absorber. And
17 it will also make, forgive me, make the analyst job a bit
18 or considerably more complicated as they try to understand
19 how much energy is absorbed by the conveyance.

20 MR. STRONG: Sure. Okay. Going back to the
21 sort of the realism argument, you lose something in terms
22 of the very quantitative analysis. But indeed, then, you
23 do have the realism of other things acting as buffers and
24 impact limiters other than the impact limiters themselves.

25 MR. MURPHY: And I'll also make the comment so

1 that you know we are looking at this part of it. Very
2 definitely, it does make for a more convincing public
3 demonstration if you've got the rocket with the conveyance
4 and the impact limiters and the whole of the cask hitting a
5 target, whether it's unyielding or nearly unyielding. No
6 question about that, it very definitely does carry a public
7 message forward with it.

8 MR. POSLUSNY: Bob?

9 MR. HALSTEAD: Well, the rocket sled is more
10 dramatic, but as a person who's been critiquing the Sandia
11 crash films for the last 25 years, I honestly think it
12 generates so much controversy over what it is that's
13 actually being portrayed. If I were trying to argue for
14 the other side to convince safety, I would be against it
15 except if it were done in the way it was done in the
16 British test in '82, the Operation Smash Hit. There, they
17 actually did the regulatory drop test. They found a very
18 small closure opening less than the A2 value --

19 They then anyway redesigned the lid for further
20 confidence, and then they subjected that cask to a hundred-
21 mile-an-hour locomotive smash hit live at lunchtime on
22 British national TV. In that case, the combination of the
23 regulatory test and the real world test which put about
24 half the force on the cask as the drop test was an
25 interesting combination but it cost them \$8.2 million to do

1 that program back in 1982. I mean, that's not necessarily
2 out of the ballpark compared to the cost of reviewing but
3 acknowledging that you may get some public relations
4 benefit from a rocket sled test, but then again maybe not.

5 We're real comfortable with the drop test and
6 it's not only for this reason but because the biggest cost
7 element in doing the rail test is that one-time cost to
8 either upgrade the facility or build the new facility. And
9 once you've spent, we think, eight to ten million dollars
10 to do that facility, you've then got a facility that you
11 can drop the other -- tests or any other casks that you
12 want to test and you don't have an additional capital cost
13 for that. But I do understand why people think that that,
14 you know, my 17-year-old son loves to see that film. We've
15 played it many times at home and you often see the high-
16 schoolers at the Yucca Mountain information center and the
17 first place they go, because they've all been told by the
18 underground that they've got these amazing videos out
19 there.

20 But I think in terms of demonstrating
21 compliance with the regulation, and most importantly,
22 precise, measured physical data, I think most of the
23 advantages fall with tower drop.

24 MR. POSLUSNY: Fred?

25 MR. DILGER: Yes, I have to agree with Bob. I

1 think the tower drop is the best way to go. I think it
2 gives, it will yield better analytical data for the
3 analysts. I think it's safer for the people that are
4 actually implementing it. It's more reliable. You don't
5 have to worry if all the rockets go off at the same time or
6 if the rocket doesn't go off the right way or if you have
7 a, God forbid if you had a mini-challenger go on. You
8 know, you wouldn't want any of those things. If you have
9 the drop test, you don't have any issues with that.

10 And the other thing is in terms of its
11 publicity value, I think given the height that we're
12 talking about dropping this from, I think we're going to
13 have a pretty dramatic piece of footage as it is. And
14 whatever benefit we might get from running a train and
15 running into a train or a wall or something would be
16 fairly, would not be at all that significant.

17 MR. POSLUSNY: Okay. Thor?

18 MR. STRONG: I need to leave in about five
19 minutes, so I just wanted to make one other comment that
20 doesn't relate directly to the question at hand. When we
21 convened back after lunch, there was some mention made of
22 the Potterville train accident. And that did indeed
23 happen, it happened on Memorial Day right outside Lansing.
24 There was a train that had two propylene tank cars and two
25 train cars of sulphuric acid. Resulted in a five-day

1 evacuation of the little town of Potterville.

2 This all happened right sort of in the midst of
3 the senate consideration of Yucca Mountain, and the Lansing
4 State Journal, the Lansing paper, came out with an
5 editorial recommending against senate approval of Yucca
6 Mountain, arguing that if that train was carrying spent
7 fuel casks rather than propane, then the words they used
8 was that the little town of Potterville would be facing a
9 "devastating nuclear nightmare," their words. And I just
10 add that sort of as my parting shot to again reflect the
11 idea that, no, the public is not stupid, the media is not
12 stupid, but often whenever you start talking about anything
13 radioactive or nuclear, things get carried away rather
14 easily.

15 I had to write a response to that particular
16 editorial and basically say, well, if it had been spent
17 nuclear fuel, maybe the evacuation would have, there may
18 have been an evacuation but it would have lasted maybe
19 three hours rather than five days. So, for what that's
20 worth.

21 MR. POSLUSNY: Thank you. And if you have to
22 leave, thank you really for coming and for your comments
23 and hope you found the meeting useful.

24 MR. STRONG: I did, thank you.

25 MR. POSLUSNY: Don't forget, send in your

1 comments if you haven't. Okay, next comment.

2 MS. SUPKO: I just, I have a quick question.
3 Are there any unique challenges to doing a drop from the
4 height that you're talking about? What's the highest type
5 drop you've done before and, you know, is this double that,
6 triple that, you know, compared to the challenges
7 associated? We've talked about the challenges associated
8 with the rocket sled but I don't think there's been any
9 discussion of the challenges regarding the drop.

10 MR. SORENSON: We've certainly done drops that
11 high with different size packages, mostly in the weapons
12 arena. Certainly not this size of a package. One of, I
13 was going to mention to Thor real quickly before you leave,
14 one of the other practical aspects of the horizontal versus
15 the drop towers is the instrumentation cabling. It was
16 mentioned that to accelerate a train up to 75 miles an
17 hour, it would take probably over a mile of track, and
18 that's a lot of instrumentation versus cabling relative to
19 about 300 feet. So, that's another practical reason why
20 you'd want to do the drop tower.

21 But we don't see any large or show-stopping
22 hurdles in the drop test. I mean, it really as Andy said,
23 you've got 1G acceleration, it drops, where are you going
24 to let it go? And it drops in that orientation and, you
25 know, we definitely need to be very careful how we do that

1 and look out for contingencies that may occur. But we
2 don't see any show-stopping sorts of issues associated with
3 the drop test.

4 MR. POSLUSNY: Other comments on drop versus
5 sled? Okay, last issue, on orientation. For, I guess
6 first for the train cask, center of gravity over, what's
7 the right terminology? Over corner, thank you. Long day.
8 Bob?

9 MR. HALSTEAD: Well, we're comfortable with the
10 way that you've proposed it. The question I would ask you
11 is I assume that you did some runs looking at a sideways
12 drop or a drop equivalent to the ones proposed in the truck
13 cask. And what did you find when you did that?

14 MR. SORENSON: For the truck cask?

15 MR. HALSTEAD: No, no. For the rail cask.

16 MR. SORENSON: Oh, you want me to answer?

17 MR. MURPHY: Go ahead.

18 MR. SORENSON: Yes. We'd looked at CG over
19 corner, we looked at the end drop and we looked at the side
20 drop. Those are three different orientations and protocols
21 for the rail cask. Actually, you can get higher G forces
22 in the other orientations, but the actual insult to the
23 cask body to itself was not as severe because in the other
24 cases, for example, side drop, you're engaging both impact
25 limiters. The end drop, it's really, you're not exercising

1 the closure that much because of the impact when it's
2 coming back up into the closure area.

3 So, we felt that CG over corner was more the
4 case of actually exercising the analysis and having a
5 relatively severe insult to the cask was the best
6 orientation of those three.

7 MR. POSLUSNY: Any other comments on that
8 concept? How about the back breaker for the truck cask?
9 No comments? I guess we did have a number of comments
10 during the day.

11 Okay. I think we've gone through the schedule
12 as I have understood it. I'd like to give, I'm sorry?

13 MR. WERNER: Yes, I don't know if this is the
14 appropriate last comment. Again, not doing this full time
15 like some of the other people at the table, but I heard
16 earlier we're going to be doing a drop and then a fire
17 test. And I guess I'd like to put a pitch in for at least
18 evaluating the benefits of drop, fire and then quenching.
19 I just think that normally the water test is intended for
20 at-depth pressure integrity. But, you know, if I were to
21 sort of say, you know, you hit something by the town of --
22 City, you have a fire and then it rolls into the river
23 which is right next to it.

24 So, you've got a, you know, a rock cliff face,
25 you know, a whole yard of fuel containing cars and then a

1 river next to it, the answer would be what? And maybe we
2 know that the metal is at such a strength and -- that there
3 would be no brittleness problems and no problem with it
4 cracking. The result being heated up to 800 C followed by
5 quenching in the 33-degree water immediately, but maybe
6 not. You understand it was a different type of test that's
7 rapid change of temperature rather than immersing for
8 purposes of pressure testing.

9 MR. MURPHY: I guess I missed the question,
10 part of it.

11 MR. WERNER: Have you evaluated that?

12 MR. MURPHY: We have not done, we've got an
13 issue with reactor pressure vessels that we call
14 pressurized thermal shock which falls into that same
15 bailiwick. At this stage, we have not considered that
16 specifically for the Package Performance Study.

17 MR. WERNER: While you're heating it, why not
18 just put an extra tank of water and roll it on in?

19 MR. MURPHY: Good comment.

20 MR. POSLUSNY: Yes, good comment.

21 MR. WERNER: As long as you're spending the
22 money, let's just gather data. Instead of worrying about
23 pinching those pennies as much as you can, you're getting a
24 max amount of data for the amount of money spent. And
25 also, getting all the answers to questions like, yes, we

1 thought of that, sure, we tried, it's a practical question,
2 sure. Because most of our tracks actually are right next
3 to a river or a lake just because that's the flat ground for
4 running railroad tracks and a lot of highways through.

5 MR. POSLUSNY: Sounds like realism again.
6 That's good.

7 Okay. I'd like to go into the audience for a
8 few minutes because we promised them another, oh, I'm
9 sorry, George? I missed it.

10 MR. CROCKER: It's sort of another one of these
11 context thing. And we talked a little bit this morning
12 about sabotage and how that is something not necessarily on
13 this agenda but is something that needs to be incorporated
14 into the broader context in which packaging protocol fits.
15 And hopefully, you know, that message is loud and clear but
16 there's another context issue along those regards that I
17 really want the NRC to consider. And that has to do with
18 the fact that, you know, when there is an incident, then
19 there will be after the incident, right?

20 If we have a situation in which we had this
21 fire and we've had this insult and degradation to fuel and
22 cladding in a canister, well, maybe the canister did
23 hold, maybe the quality control, quality assurance was such
24 that the cesium state inside and that the cladding may have
25 ruptured but the pellets are still inside and they didn't

1 fall in a pattern that caused them to go critical. And so,
2 now we have this cannister or this device that's been
3 terribly insulted with all of this stuff in it.

4 What are we going to do with it? What's the
5 context after that? How do we manage the material that's
6 in that cask? How long will it have to sit like that?
7 What will happen when overtime the helium in it does get
8 out and the heats being generated perhaps does become a
9 problem? What in terms of packaging and how we package a
10 transportation module can we do to ensure that after an
11 event happens, that we still have some management options?

12 Do you see what, understand the point that I'm
13 trying to make?

14 MR. BRACH: George, I believe, let me try to
15 respond. One aspect of anything described in a
16 hypothetical situation, I'll say a severe accident where
17 the package and the containment to the package carried out
18 its intended function, you've just described the
19 containment kept all the material, not necessarily in tact,
20 there may have been some internal reconfiguration
21 potentially, but the containment held all the materials so
22 there was no release. I would offer a couple of things.
23 One, with the containment maintaining its integrity and no
24 water and leakage, the potential for reconfiguration of the
25 fuel wouldn't be a criticality issue. You -- moderator to

1 introduce criticality considerations.

2 But the underlying point you're raising is that
3 package, that container, that cannister would need to be
4 moved to a facility and be opened and the contents removed
5 and repackaged into another main -- safe handling and
6 transport. There are these facilities such as a hot cell
7 type facility that could be used to open that in a clearly
8 controlled environment so that any gases or so that that
9 would be contained in an enclosed facility. But I would
10 offer that what you've described, and that's a part of our
11 consideration is that there need to be plans and
12 considerations made to handle the special and specific
13 conditions of that package to take it to, move it to and
14 under what conditions it could be moved to a facility where
15 a special handling would be called in to take care of it
16 and to handle the fuel that's in that container that was in
17 the accident you described.

18 MR. CROCKER: Do we have a hot cell that's
19 capable of handling a piece of equipment as big as a rail
20 cask?

21 MR. BRACH: John Vincent -- in Idaho?

22 MR. VINCENT: No, they did a lot of loading at
23 Test Area North for the dry storage evaluation that you
24 referred to earlier.

25 MR. BRACH: That's correct.

1 MR. VINCENT: It was all done in a hot cell.

2 MR. BRACH: That is right, yes.

3 MR. WERNER: -- whether IBM is continuing to
4 invest in those -- structure there given the information --
5 facility as part of the clean up? -- check into what's
6 the, check the baseline for that, which hot cells are up,
7 what the cost is. I just remember we're spending about ten
8 or 20 million dollars a year maintaining things that
9 weren't doing anything. We're trying to offload that
10 capital cost to, Andy, I don't know if they accepted it
11 when I dropped out. I mean the cost of obligations,
12 there's some cost to the financial issues.

13 MR. BRACH: Jim, let me offer, I realize we're
14 in a what if and what would we do to address a particular
15 situation. I think what we're describing is that in your
16 outline, there may be other Department of Energy
17 facilities, I think what we would be doing is look and see
18 what facilities and what arrangements would need to be made
19 to handle this cask or cannister that's been in this severe
20 accident so that it could be moved and properly handled in
21 a facility. I'd hate to be speculating too much on which
22 facility, this plant, that facility here or there, I think
23 what we collectively would be doing is what resources, what
24 activities need to be brought to bear to handle that
25 situation.

1 MR. CROCKER: I mean, that's really the point.
2 I mean, we've spent all day long talking about this cask
3 that's going to undergo this terrible event and whether or
4 not it's robust enough to survive it. Let's also be
5 mindful that even if it does survive it, we still have this
6 thing to deal with. Thanks.

7 MR. POSLUSNY: Thanks again, gentlemen. We
8 appreciate your effort. I'd like to spend a couple of
9 moments going out to the public again. Thank you. Please
10 state your name so the recorder can record it.

11 MS. BAYMAN: Yes, my name is Cindy Bayman. I
12 live in Oak Park, just a little west of Chicago. Now, I am
13 concerned about many things. Why do all this waste have to
14 go through 43 states and contaminate us all en route. But
15 the main thing is I'm very concerned about the barge travel
16 of the waste from Point Beach, various places along the
17 lakes. This is the only freshwater lake we have in the
18 whole world, largest body of freshwater we have in the
19 whole world. And it just behooves me to think that you're
20 going to travel with these highly contaminated carcinogenic
21 casks over the water. I mean, I just don't think you
22 should do it.

23 I think there should be a prohibition of taking
24 these casks over the water. I mean, it's bad enough that
25 you have to take them over the land and rail. Just for the

1 sake that we have, water is a big thing now in this century
2 and one accident, the lakes will be finished. And I just
3 think you just shouldn't do it. And I don't know why it's
4 a done deal. I'm asking if it is a done deal.

5 And you have too many moves. First, you have
6 to move the casks on to the barge, then you have to take it
7 off the barge on to the train or on to the truck. It seems
8 to me you could get it right on to a truck right from the
9 spot. You have less moves of this highly carcinogenic
10 material which has more contamination than a Chernobyl
11 accident.

12 And the other thing that concerns me is one-
13 third of the casks will go by rail through Chicago, Union
14 Pacific. We are going to have one-third of the casks that
15 go in or out and will pass through Chicago. And I live on
16 Oak Park, literally 20 yards, all the buildings in all the
17 towns west of Chicago are very close to the railroads. The
18 railroads just bisect all the villages and towns. Oak
19 Park, Elmhurst and on and on. And my building is literally
20 20 yars, the parking lot is just underneath the railroad,
21 okay.

22 So, I can just imagine these high level, and
23 this track has freight, everything all together, okay. So,
24 it's the track that you will use, it goes out to Proviso.
25 Not to mention that the tracks will get contaminated, the

1 people -- commercial travel, all kinds of travel. And this
2 really behooves me that this highly contaminated X-ray
3 machine because that's what they are, you can't contain the
4 gamma rays in these casks.

5 I mean, you forget the fact that the truck
6 drivers are going to be contaminated driving the casks.
7 Everybody along the route are going to be X-rayed. I mean,
8 they are a mobile X-ray machine. You cannot contain the
9 gamma rays. And if it gets stuck and suppose a pregnant
10 woman gets behind one of these trucks, God forsake what's
11 going to happen to her baby. I mean, you are talking about
12 moving very dangerous carcinogenic material and
13 contaminating all of us. And I suggest, I mean, I was
14 against Yucca Mountain in the first place. And I suggest
15 that you try and hold off, and especially over the water
16 travel.

17 MR. POSLUSNY: Thank you for your comments. Is
18 there anyone else in the audience who would like, Ross?

19 MR. LANDSMAN: Yes. You said you would
20 consider the side drop? You didn't, this is Ross Landsman
21 here. I'm sorry. You didn't consider the side drop on the
22 rail cask because the impact limiters would hit first?

23 MR. SORENSON: We did consider the side drop
24 for the rail cask.

25 MR. LANDSMAN: Oh, but you said you didn't --

1 MR. SORENSON: But, yes, we decided that this
2 CG over corner was a better test for the objectives of the
3 Package Performance Study in terms of exercising the
4 closure end of the cask itself.

5 MR. LANDSMAN: All right. But did you look at
6 the stresses that would be on the side of the cask? I
7 mean, impact limiters might not hit first, so the cask
8 could hit a bridge abutment.

9 MR. SORENSON: Yes, they're much narrower than
10 the two impact limiters are apart.

11 MR. LANDSMAN: You might hit the side of the
12 cask. I know what you said. You said the impact limiters
13 are going to hit the flat surface first. Was that
14 considered?

15 MR. SORENSON: No, we did not look at a
16 secondary impact of like a bridge abutment after the impact
17 from --

18 MR. LANDSMAN: No, I'm talking about the
19 eventual impact of, you know, the railroad train gets
20 sideways on the track during an accident and it's coming to
21 the abutment sideways.

22 MR. SORENSON: No, not for the rail cask. We
23 did not look at that. We did look at it for the truck cask
24 and the back breaker.

25 MR. LANDSMAN: Right. I'm just wondering why

1 we're not, I don't know what the stresses would be, a back
2 breaker on the rail cask, assuming the impact limiters
3 wouldn't hit the abutment, you know, if the cask would.

4 MR. SORENSON: We did not look at that specific
5 orientation.

6 MR. LANDSMAN: Just a question. Maybe it
7 should be.

8 MR. POSLUSNY: Thank you.

9 MR. CAMPS: Kevin Camps with Nuclear
10 Information and Resource Service. I wish that Thor were
11 still here from Michigan because I was wanting to respond
12 to his comments about the Potterville, Michigan propylene
13 train derailment. I think he missed the point because he
14 said the town was evacuated for five days because it was a
15 propylene derailment and if it had been a nuclear waste
16 train, it would have only been a three-hour evacuation.

17 But the point that I was trying to make is that
18 the Department of Energy still will not agree to dedicated
19 trains for transporting high level nuclear waste. So, it's
20 the mix of hazardous materials that's the concern. The
21 propylene being high temperature burning material, also an
22 explosive material, I mean, moving materials on the roads
23 and rails, we're not talking about shutting down the
24 highways. So, the mix of these high temperature burning
25 materials, explosives, that could challenge the integrity

1 of the nuclear waste transportation containers.

2 So, in terms of the Package Performance Study
3 and the temperature of the fire, look at some of the
4 chemicals on the roads and rails today. I mean, the
5 Baltimore train tunnel fire was a real life accident.
6 There were certain chemicals in that tunnel. But the worst
7 case scenario really isn't real world. Look at the
8 temperature of some of the chemicals that are out there,
9 and if these high level nuclear waste sediments would be
10 mixed in with this possibility, then those are the kind of
11 temperatures that should be looked at.

12 Another issue I wanted to bring up is the lack
13 of certain tests that's been talked about today, the lack
14 of the submersion test, the lack of a terrorist scenario
15 attack test on these containers. And it came out, I don't
16 remember who said it today but the acetylene torch on one
17 of these shipping containers. But that's exactly the
18 point, there is no torch test in regulations. The
19 propylene train derailment that could result in a torch-
20 like condition, acetylene on the roads and rails resulting
21 in a torch-like condition.

22 So, it's unfortunate, and I said this in
23 Washington, D.C., that one of the first statements in the
24 Package Performance Study draft is that there will be no
25 changes to regulations as a result of the PPS. And I think

1 that the NRC should certainly be open to changing
2 regulations if it's shown that that should happen to
3 protect public health and safety.

4 And I guess the last point I'll make is on
5 that, that the NRC's mission is supposed to be to protect
6 public safety and the Davis Besse fiasco in Ohio has shown
7 that unfortunately, sometimes NRC puts industry profits
8 ahead of public safety. And on this issue, public safety
9 should be first and foremost. And I've heard from state of
10 Nevada officials and Clark County officials that the cost
11 of doing adequate safety testing on these containers should
12 not rule out, I mean, cost consideration should not rule
13 out adequate testing on these containers. So, if the NRC
14 has to go to Congress and ask for more money to do what's
15 required for safety's sake, then that should happen. And
16 tests should not be limited or cut because of lack of
17 funding. Thank you.

18 MR. POSLUSNY: Any other comments from folks in
19 the back of the room? Okay. I'd like to make some
20 observations for today.

21 MR. HALSTEAD: There is one more issue.

22 MR. POSLUSNY: Okay.

23 MR. HALSTEAD: On the cost issue, I know the
24 hour is late, but maybe you guys can just clarify this.
25 There were a number of questions about funding and how NRC

1 intends to proceed with this at the Las Vegas meeting, and
2 I was somewhat confused after all of that. Could you just
3 take a couple of minutes and explain to us how you propose,
4 my understanding was that you were proposing to request
5 funding from the Nuclear Waste Fund to support these
6 activities. And if you could just reiterate that and then
7 talk back the schedule, the budget -- I know some of this
8 is laid out in the testing protocol but if you could just
9 give kind of a brief explanation of schedule and how you
10 would request the funding for it? Bill or Andy.

11 MR. BRACH: On the funding first, this has come
12 up at just about every meeting. The funding for the
13 Package Performance Study starting next fiscal year will be
14 coming from the Nuclear Waste Fund. The exact amount of
15 the funds needed, I believe Andy had offered at one or two
16 of the meetings an estimate I'll say of the cost being over
17 20 million dollars. I know that Bob of the state of Nevada
18 has indicated cost and it might range up to 70 million.

19 The variable here, of course, is what it is,
20 what tests we conducted and such and what types of
21 facilities are needed. And that's one of the difficulties
22 we have right now in trying to be exact and projecting what
23 the cost will be. The meeting today, the meetings we've
24 had the past few weeks and the comment period we're in
25 right now is to ask for input and comment to help us

1 formulate what the test will be, what cask, how many casks,
2 what types of facilities, we talked just a minute ago about
3 the sled test and the drop test.

4 Those are right now all on the table from the
5 standpoint as far as discussion, input, comment. So, it's
6 awfully difficult to lay out a cost schedule that is more
7 than some of the general cost that Andy has mentioned
8 before that would be a prognosis as far as what the overall
9 cost would be. But it's generally in the, we're estimating
10 it right now in the range of 20 plus million dollars and
11 funding would be envisioned to be coming from the Nuclear
12 Waste Fund. A person asked a question to clarify before,
13 the Nuclear Waste Fund is a fund that's maintained, or it's
14 actually furnished from nuclear utilities from rate payers
15 from those that are using nuclear power. So, that's the
16 funding source that we're seeing for the Package
17 Performance Study.

18 As far as time frames and schedules, I'd have
19 to look at the protocol. I believe it talks about the year
20 2004 or 2005 for the conduct of the test. Right now, we're
21 in the middle of 2003. 2004 may be a little optimistic
22 when you look at the time it's going to take to get the
23 drop test protocols moved into being a final test protocol.
24 Moving to procurement of equipment with cask, construction
25 of test facilities, we may be looking a little bit beyond

1 the time frames we were earlier estimating.

2 MR. HALSTEAD: Thank you, sir. That covers
3 that.

4 MR. WERNER: Bill, can I offer a quick
5 suggestion? Budgetary. It's interesting to hear your
6 perspective from NRC worrying about 20 million dollars.
7 The -- their budget just went from 6.1 billion dollars a
8 year to 7.4 billion dollars a year. And if there is any
9 way, there is a DOE contribution to be made there, it might
10 be a worthwhile thing to sit down and set up. I don't want
11 to tread on somebody else's rice bowl here but there's a
12 lot of money there and there is a benefit to gain, I would
13 argue. You could cobble together that argument at least
14 for the purposes of going doing to OMB or somebody that
15 they're benefitting themselves from the test results
16 because they're transporting materials from their
17 facilities. And it's seemingly a higher priority to get
18 this technical data than operating, you know, spending 700
19 million dollars on a reprocessing -- river or you're
20 babysitting -- or whatever they do with the extra money.

21 MR. BRACH: Jim, we have had discussions with
22 the Department of Energy on the study and the potential of
23 their being a participant in some of the funding. I would
24 only mention that the discussions we've had have been not
25 with the environmental management but with the -- Nuclear

1 Waste Fund.

2 MR. WERNER: If you can get a straw in to an
3 artery at -- it might be worthwhile. I'd be happy to chat
4 with you offline and maybe they can do something in kind
5 to, you know, build a tower or buy some computers or
6 provide support for, you know, technical expertise and
7 modeling.

8 MR. BRACH: You're speaking as a state of
9 Missouri representative?

10 MR. WERNER: No. I think we all have an
11 interest in seeing the schedule and funding. I just hate
12 hearing you struggle up there by 20 million dollars. I
13 mean, my goodness, this should not be something we should
14 be discussing.

15 MR. BRACH: We struggle with 20 million
16 dollars, yes.

17 I guess while I have the mike, a couple of
18 comments I did want to make. Kevin raised a couple of
19 comments and observations, some of which we may have
20 covered this morning, Kevin, before you were able to get
21 here. With regard to the Package Performance Study, I just
22 want to reiterate what I had mentioned early this morning
23 that while clearly we or NRC feel confident in the adequacy
24 of the existing regulations and our programs and our
25 process, we clearly are looking at the PPS and I'll offer

1 experience, I've worked in other parts of the agency, a
2 responsibility we have is that as studies, events,
3 activities evolve, new information becomes available.

4 And for example, if in the Package Performance
5 Study new information becomes available that would cause us
6 to question, re-look at our existing process, regulations,
7 we will do that. I'd mentioned that early this morning. I
8 apologize if you had missed that. As well as the overall
9 function of our agency, I don't want to repeat too much,
10 but the function of the agency, the mission of the agency
11 is the protection of public health and safety, common
12 defense and security and protection of the environment.

13 And that clearly drives us in all of our
14 activities. And those are the activities or processes that
15 guide and direct us whether it be in our spent fuel
16 transportation activities, our reactor program arenas or
17 other NRC activities. So, these are the agency's guiding
18 mission, activities and functions that guide and direct us
19 all in all of our NRC activities.

20 MR. POSLUSNY: Corey?

21 MR. CONN: I just wanted to draw your attention
22 to the fact that because I was not here this morning, I
23 missed out on some of the ground rules and whatnot. But I
24 have remarks that I would have preferred to make this
25 morning had I been here.

1 MR. POSLUSNY: You could do it now.

2 MR. CONN: Okay. It might be an opportunity.
3 How close are you to getting to the participant concerns
4 discussion and closing remarks?

5 MR. POSLUSNY: We're very close.

6 MS. SUPKO: We're there.

7 MR. CONN: Perhaps we are there. I don't know
8 how many of you share the feeling that I have that there is
9 an elephant in the room with us because we've given a great
10 deal of attention to the analysis of our ability to
11 forecast the cask performance under these conditions. But
12 I want to point out that some of the assumptions that folks
13 were doing in this modeling and doing the best they can
14 with this information and it is really a tiny subset of the
15 information. You look at the efforts to model meteorology
16 and you really begin to appreciate how complex real things
17 are and how difficult they are to model. But some of the
18 things that they're relying upon are assumptions that are
19 based on the metrics and the original design put forward by
20 the vendors of these casks.

21 The elephant I want to bring your attention to
22 as you go forward and talk to each other peer to peer about
23 improving our ability to model and forecast this is that
24 there are real, well-known, widely-known industry-wide
25 quality assurance failures at the level of the vendor and

1 the supplier. And that, really our certainty here that
2 we're putting forward about the ability of the model to
3 forecast, you know, what its performance might be under the
4 fires and the crash scenarios, it has to be tempered by the
5 very real concerns, the gross uncertainties about design
6 control process. I'm speaking about design control process
7 failures that are outlined in a specific case, but I think
8 they cast a long shadow over all of these analyses.

9 The elephant I'm speaking of has nine parts and
10 these are the nine findings of a two-year old audit, a dry
11 cask storage quality group in NUPIC, Nuclear Users
12 Procurement Issues Committee group audit. This is the
13 audit number, SR-2000-257 which was conducted in part at
14 the request of Commonwealth Edison at a time when there
15 were industry-wide quality problems with defection of
16 equipment coming up onsite and having to be repaired in the
17 field in a poorly controlled or documented process.

18 Now, NEIS, a group which I'm representing today
19 has been asked to assist in empaneling a number of experts
20 to determine whether NRC has really a complete
21 understanding of design control process as it is stated in
22 10 CFR 50 Appendix B Criterion 3, and also in other
23 engineering codes, the ANSI Standard N45.2.11 and the ASME
24 NQA-1-1989 and its Supplement 3S in particular. The public
25 has a keen interest in knowing that quality assurance

1 failures are being handled properly. I'd like to know the
2 status of all nine of the audit findings on US Tool & Die
3 because they have supplied parts to the Hi Star 100's which
4 have already been loaded with spent nuclear fuel.

5 The findings are significant. They are about
6 deficiencies in record-keeping regarding training a
7 personnel, welding methods, materials procurement, the
8 calibration of instruments, the bizarre use of non-
9 conformance reports when doing what is known as welding at
10 risk. How am I to have confidence that there is
11 conservatism in the fabrication if field repairs of
12 defective parts are being made in violation of engineering
13 codes and the Commission's own regulations?

14 Accordingly, I would ask that the audit that I
15 mentioned which has not been made available to the public
16 be released to me. And that if it's possible to include it
17 at this date, the descriptions of all the causes and the
18 corrective actions taken including the actions that were
19 taken to prevent their recurrence. I'll say we're talking
20 about going forward and I need your help in that. Thank
21 you.

22 MR. POSLUSNY: Okay. Any other comments from
23 the members of the round table? With that, would you like
24 to close --

25 MR. HALSTEAD: I just want to throw in a QA/QC

1 cost issue. When one of our contractors gathered
2 information on a cask cost for us, one of the vendors gave
3 him a price for a cask with and without compliance with NRC
4 QA/QC. And the cost of a cask with full QA/QC trail was a
5 half million dollars on a 2.75 million-dollar truck cask
6 which is an interesting insight to me from the vendor
7 standpoint that was that full compliance was a fairly
8 rigorous trail of documentation. I don't know if that's
9 because this was a one-time purchase and that would be
10 different, say if you were ordering five or ten units.

11 But nonetheless, it's an interesting thing that
12 we would throw in. We would expect any cask that are
13 procured for use of this testing to have that full trail as
14 a demonstration of how the NRC system works. So, again, we
15 could make that clear to people.

16 And I'm sorry to interrupt you, Bill, but that
17 occurred to me, the QA/QC issue.

18 MR. BRACH: No, you didn't interrupt me.
19 Corey, on your point on the NUPIC audit, I'm not familiar
20 with what report you're making reference to. NUPIC is an
21 organization that's made up of utilities where the
22 utilities form joint audit teams and conduct audits of
23 vendors, companies that supply parts to them. The NUPIC
24 report would be a licensee, a utility generated report of a
25 vendor that is inspected. And that's not an NRC report,

1 that's not an activity wherein the NRC is in the middle of.
2 So, I am not in a position to offer or suggest -- as far as
3 -- is not within the NRC.

4 MR. CONN: Okay. I would certainly settle for
5 a third-generation photocopy of any documents received at
6 NRR on or about November 1 of 2001 sent by the senior lead
7 auditor on behalf of the audit team.

8 MR. POSLUSNY: Could you repeat that again?
9 What was the date of that?

10 MR. CONN: November 1, 2001.

11 MR. BRACH: That was sent to NRR? Let me
12 comment on just Bob's point. We didn't discuss this today
13 although it's been discussed at some of the other
14 workshops. So, Amy had mentioned that we are planning in
15 the Package Performance Study to use a cask that's been
16 fabricated, a currently certified cask that's been
17 fabricated consistent with the design and certification
18 specifications. And that clearly is our plan and vision
19 for the Package Performance Study but there's another point
20 that I do want to mention and stress.

21 I don't know if the discussion you had with the
22 vendor where they identified a product with or without QA,
23 from an NRC perspective, there is no such thing of a vendor
24 providing a cask or under the Part 71 for transportation or
25 Part 72 for storage that has that as an option. A licensee

1 who puts into use whether in Part 71 for transportation or
2 in storage under Part 72, they have a very basic, it's a
3 very simple straightforward requirement. That package for
4 transportation or that cask for storage must conform with
5 all conditions of the certificate.

6 Now, that means design, that means materials
7 and that also means quality assurance program. So, I'm
8 really lost that the vendor would represent that there's a,
9 you know, you can pay for it in one of two or buy it in one
10 of two ways. That bothers me that that's a discussion
11 because under both Part 71 and 72 for storage and
12 transportation, that's not a path forward.

13 MR. HALSTEAD: First of all, I can't --
14 distance from this particular conversation because I happen
15 to know the vendor representative and I didn't want to bias
16 it by being involved in it personally. My supposition is
17 that the vendor was saying this is a cask that isn't really
18 going to be used to haul spent fuel. Nevada is going to
19 buy it and test it. But anyway, I just thought it provided
20 some interesting insight in terms of the vendor's viewpoint
21 of putting a dollar price on the seriousness of what the
22 compliance with the requirements was. I don't know if
23 that's something you guys have gone and crossed it out as
24 either reasonable or unreasonable.

25 But I was surprised when the contractor

1 reported to me two prices. So, for whatever it's worth, I
2 offer it for the record. I would assume that anything we
3 do here, you know, you would insist on full QA/QC --

4 MR. BRACH: Well, that's true and it's not an
5 option. And some, there aren't many that licensee
6 representatives here today, but some I'll tell you that we
7 have frequently, if you will, have preached at them on not
8 only what the requirements are on Part 71 and Part 72, but
9 the very fundamental responsibility the licensee has, that
10 is, shipping material or storing material. And if using
11 storage, for example, the licensee's fuel that's going into
12 that cask and that cask is going to be on the licensee's
13 property at the licensee's --, the licensee is responsible
14 for the safe storage of that fuel. And the same goes for
15 transportation, that that responsibility is not only stated
16 in the regulations but it's an inherent responsibility they
17 have for the safe conduct of their activities, whether it
18 be storage or transportation.

19 And that means all aspects of quality assurance
20 as applicable for storage and transportation. So, there's
21 not two paths there.

22 MR. HALSTEAD: Well, the only reason I need to
23 add one comment is here, again, some of you remember last
24 year during the 10 CFR 71 rulemaking, we had this
25 discussion of a point which, by the way, still hasn't been

1 answered so I need to write another letter to the NRC, and
2 that is, when Chairman Masur answered Senator Durban's
3 inquiry about the extent to which NRC regulations would
4 apply to the DOE, he sent a letter expressing a very
5 minimalist statement of regulation that said we will only
6 apply the package certification requirements of 10 CFR 71.
7 And he specifically excluded all other aspects.

8 So, there is outstanding a question that we
9 need to have answered as to whether, and again, I suppose
10 it would depend on how the arrangements were made because
11 if a company decided to have a contractor relationship
12 where they purchased the casks and then provided services
13 to DOE, I would assume that they would be regulated as an
14 NRC licensee. But there is a gray area in the way that all
15 of those miscellaneous but important parts of 72 and 73
16 apply to the Department's program. And again, we'll
17 provide the letter to the, I'm going to send a bunch of
18 documents and I'll send you guys the correspondence file.
19 But unfortunately, there is some confusion about exactly
20 how the NRC would apply these regulations to DOE.

21 MR. BRACH: Let me get that. The letter you're
22 making reference to, I'm familiar with. And maybe it might
23 help to put the letter and the issues into context. The
24 comment from Chairman Masur to Congress was pointing out
25 what NRC's legislative responsibilities are in the shipment

1 of spent fuel. The issue that's on the table there would
2 be is it the NRC licensee or is it the Department of Energy
3 that would be shipping the fuel. If it's an NRC licensee,
4 those activities would be all under NRC license.

5 There has been much discussion with regard to
6 when and where the Department of Energy takes title to and
7 possession of the spent fuel. If DOE takes title to and
8 possession of the spent fuel at the nuclear power plant,
9 the legislation clearly requires that the package that's
10 used to transport that fuel to the National Depository be
11 in an NRC certified package. It's that last point is what
12 was Chairman Masur was addressing in the letter that you
13 made reference to.

14 MR. HALSTEAD: Well, Bill, again, I don't want
15 to belabor this but we had our lawyers review this and
16 we're not satisfied that we can assume that NRC QA/QC
17 applies to DOE shipments of commercial spent fuel under all
18 circumstances. What we would like is a statement from the
19 NRC that says that we can assume that all of the regulatory
20 requirements, pre-notification safeguards apply. And are
21 you saying that we don't need this clarification or that
22 you can't give that clarification?

23 MR. BRACH: No. The letter you're making
24 reference to was providing that clarification, that if the
25 Department of Energy which is not an NRC licensee for

1 transporting material is taking title to and possession of
2 the fuel at the power reactor. The -- legislation requires
3 that the package be an NRC certified package. Department
4 of Energy, using their same authorities as they use today
5 for transport of other materials with regard to
6 notifications, with regard to physical protection, with
7 regard to all other aspects, has that responsibility within
8 DOE.

9 MR. HALSTEAD: So, in other words, NRC would
10 only regulate the package certification and in fact QA/QC
11 would not apply? I'm not following you. I guess, and this
12 is why I don't want to do this here. I wrote this letter,
13 this is a problem of getting letters out of the NRC
14 sometimes. We ask for a clarification of this point
15 because frankly I believe Senator Durban would have
16 conditioned his vote on Yucca Mountain if he had understood
17 that he was voting to send one out of every three casks
18 through Chicagoland thinking that they would be regulated
19 the same way that an Exelon shipment would be regulated.
20 That is the standard. I take that as a compliment. The
21 way that the NRC regulates the utilities is the yardstick
22 of performance that we expect for regulation of shipments
23 to Yucca. And obviously, PFS is different because that's
24 completely private.

25 But it seems to me that we'll have to get some

1 more resolution of that because if what you're saying is
2 correct, I leave this meeting being uneasy as I was last
3 July in Rockville saying, you know, if what I see in this
4 letter is correct, it means that there is a gap in the
5 application of the NRC regulations except for the very
6 narrow package certification provisions. It also has to do
7 with the way transportation impacts would be addressed in
8 an EIS that's presented to the Commission as part of the
9 licensing package.

10 So, but thank you. I guess I understand what
11 you're saying.

12 MR. POSLUSNY: Okay. Sure, John?

13 MR. VINCENT: Two points. What you were just
14 discussing, Bob. Ignore for the moment whether DOE is or
15 is not responsible. As the certificate of compliance
16 holder is still going to be obligated to the NRC
17 regulations to the extent DOE buys material from the
18 private sector which is their avowed intent, so the
19 certificate of compliance and the NRC's responsibilities
20 back and forth between the two would still apply whether or
21 not you presume it's directly applicable at the outset to
22 DOE.

23 Now, number two. The industry is not going to
24 sanction the conduct of these tests using nuclear waste
25 fund moneys if the casks are not QA/QC'ed properly. We

1 will not support that. The money will not be forthcoming
2 from then nuclear waste funds to support that.

3 MR. POSLUSNY: Thank you for that comment.
4 Just some general observation. As I predicted, we would
5 hear several ideas today. There were a lot of ideas on
6 communication on what the PPS is or isn't, when it's done.
7 We know it's being done as well. Some new ideas on fire
8 testing, what it might, on what it should be. Some other
9 discussion on test to failure concept, still very
10 difficult. Let's see, a discussion of final shock adding
11 that at the end of the test. That's something we hadn't
12 heard. Metrics for the test, are they the right ones?
13 Should they be changed?

14 Trying to test somehow to -- so that those
15 would respond to an accident, could understand what the
16 risks are. That's a very interesting concept. Another
17 thing, communicate the results to all audience at different
18 levels of complexity.

19 Again, this was a very challenging meeting, but
20 I thank everyone for their participation. And I hope they
21 got what they expected to get out of the meeting. And
22 please let us know formally or informally. Bill, would you
23 like to add anything?

24 MR. BRACH: It's getting late and I know that
25 people have already had to leave. But if I go back to the

1 slide that I had up this morning and I was trying to
2 describe what I would see as a success for this meeting,
3 clearly from my perspective, I think we've accomplished
4 that. I was looking for a good, open dialogue, frank
5 discussions and realizing that there may be expressions on
6 our views that are offered, maybe 180 degrees from each
7 other. But that was all from the standpoint of everyone
8 having won the opportunity but also giving their input with
9 regard to considerations that NRC in our Package
10 Performance Study test protocol development need to hear
11 from you. And that's what we were here for today and I
12 appreciate everybody's patience and time. It's been a long
13 day but I think a very productive day and the dialogue I
14 think has been very helpful.

15 And I thank everybody at the round table,
16 literally and figuratively, excuse me, the round table, as
17 well as those in the audience that have persevered and
18 stayed for the entire time. I thank you very much.

19 (Whereupon the meeting was concluded
20 at 5:40 p.m.)

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