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U.S. NUCLEAR REGULATORY COMMISSION
SPENT FUEL TRANSPORTATION CASK TESTING PROTOCOLS
WORKSHOP
THURSDAY
MARCH 6, 2003
ROCKVILLE, MARYLAND

The Workshop met in the Auditorium at Two White Flint North, Rockville Pike, Rockville, Maryland, at 8:30 a.m., Chip Cameron, Facilitator, presiding.

PRESENT

CHIP CAMERON	Facilitator
CHET POSLUSNY	U.S. Nuclear Regulatory Commission
DAVID BENNETT	Tri State Motor Transit Company
BILL BRANCH	U.S. Nuclear Regulatory Commission, Spent Fuel Project Office
RICK BOYLE	U.S. Department Transportation, Office Of Hazardous Materials Safety, Research and Special Programs

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2 MICHAEL CASH Alabama Department of Public
3 Health, Environmental
4 Monitoring and Emergency Plans
5 MICHAEL CONROY U.S. Department of Energy,
6 Office of Environmental
7 Management, Office of
8 Transportation
9 FRED DILGER Clark County Nevada, Nuclear
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11 ROBERT FRONCZAK American Association of
12 Railways
13 LISA GUE Public Citizen
14 ROBERT HALSTEAD State of Nevada, Agency for
15 Nuclear Projects
16 MARK HOLT Library of Congress,
17 Congressional Research Service
18 ABBY JOHNSON Eureka County, Nevada
19 KEVIN KAMPS Nuclear Information and
20 Resource Service
21 RAY MANLEY Maryland department of the
22 Environment, Air and Radiation
23 Management Administration
24 ANDREW MURPHY U.S. Nuclear Regulatory
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5	AMY SNYDER	U.S. Nuclear Regulatory
6		Commission, Spent Fuel Project
7		Office
8	ALAN SOLER	Holtec
9	KEN SORENSON	Sandia National Laboratories,
10		Transportation Risk and
11		Packaging Department
12	JOHN VINCENT	Nuclear Energy Institute
13	EDWARD L. WILDS, JR.	Connecticut Department of
14		Environmental Protection,
15		Division of Radiation
16	DAVID ZABRANSKY	U.S. Department of Energy,
17		Radioactive Waste, Office of
18		Transportation and Integration
19		
20		

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

8:45 a.m.

MR. CAMERON: If you could take your seats, we'll get started with today's program.

My name is Chip Cameron. I'm the Special Counsel for Public Liaison here at the Nuclear Regulatory Commission, the NRC. And I want to welcome you to our meeting this morning. And the topic for today is the NRC plan to conduct full scale testing of spent fuel transportation casks. And that plan is embodied in the package performance study test protocol, that I think everybody has a copy of.

I'm going to be serving as your facilitator for today's meeting. And I'm being assisted in my facilitation and convening responsibility by Mr. Chet Poslusny, whose right here, and he's from the spent fuel project office.

And our general responsibility as facilitators is to try to help all of you have a productive meeting today.

Before we get to the substance of the program, I just want to say a few things about the meeting process. And I'd like to talk about the purpose of the meeting, format and ground rules for the meeting and go over the agenda with you so you

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1 know what to expect today.

2 In terms of the purpose, the first purpose
3 is to clearly explain the NRC plans for cask testing.
4 Why is the NRC doing this, what is planned, how we are
5 going to accomplish it.

6 The second purpose is to listen to all of
7 your views and recommendations on those plans. The
8 ultimate goal will be to use the commentary that we
9 hear today and at the other public meeting and in the
10 written comments, to use that commentary to assist us
11 in finalizing the draft test protocol that you have in
12 front of you.

13 The format today is a round table and,
14 literally, you know it's not round. But we
15 have a group of what are usually called
16 stakeholders around the table, representatives of the
17 broad spectrum of interests that are effected and
18 concerned about spent fuel transportation. And we're
19 fundamentally interested in each of your views. But
20 the purpose of using a roundtable format is to engage
21 in a discussion of those individual views by others
22 around the table. So this will give the NRC and it
23 will give all of us another perspective on the issues
24 that we may not get in only reading individual written
25 comments that come into us on these issues.

1 And I anticipate that our discussion will
2 identify major issues of concern in regard to the
3 draft test protocol. It will identify the extent of
4 agreement on those particular issues. And also
5 develop recommendations for moving forward with an
6 effective test protocol program.

7 In terms of ground rules, the first one is
8 I would ask all of you to be focused, concise and
9 major in your comments today. The roundtable format
10 has the benefit of giving us what I call a richness of
11 views around the table in the discussion that comes
12 out. But it also means that we may have to sacrifice
13 a full description of your individual views on these
14 important issues so that we can give everybody around
15 the table an opportunity to talk today, and to make
16 sure that we get through all of the items on the
17 agenda.

18 So I'm asking you to try to keep your
19 comments to major points. The written comment
20 opportunity that the staff will be telling you about
21 will give you an opportunity to fully explain whatever
22 your comments are.

23 And, second ground rule, I would just ask
24 you to give us a rationale for any views that you have
25 so that we can understand whatever point you're trying

1 to make.

2 You have name tents in front of you. And
3 if you want to talk, just put your name tent up like
4 that, and that will spare you the burden of having
5 your arm up all the time. And I will go to you for
6 your comment.

7 I may take not take the cards in the order
8 they're turned. We do want to follow discussion
9 threads. In other words, we just don't want to hear
10 the unrelated monologue that it's sometimes called. No
11 negatives attached to monologue. But we want to hear
12 a point from one of you and then we want to go to
13 others around the table to see what they might have on
14 that point.

15 We are taking a transcript today, and John
16 is our stenographer over here. And I would ask you
17 only one at a time speaking so that we can get a clean
18 transcript and also so that we could give our full
19 attention to whomever has the floor at the moment.

20 The focus of the discussion is at the
21 table today. But, we realize that those of you in the
22 audience also have important things to share with us.
23 And we will going out to you in the audience for any
24 comments, observations, questions that you might have
25 out here. We'll do that once before lunch and once at

1 the end of the day.

2 And when we do go out to the audience,
3 I'll bring you this cordless microphone. And please
4 give us your name and affiliation so that we have that
5 for the transcript.

6 Okay. In terms of an agenda overview so
7 that you know what's going to be happening. We're
8 going to start out with what's called the regulatory
9 and research framework. And we have three brief NRC
10 presentations for you in terms of the NRC mission and
11 responsibility, how we arrived at the cask testing
12 decision and what we plan to do in the future. And
13 then go out to all of you for questions and answers so
14 that everybody's clear on what the backdrop is at this
15 point.

16 The next session that's supposed to start
17 at 9:15, and obviously we're running late, is called
18 participant interest. And basically what we'd like to
19 do is to give each of you an opportunity to make a
20 short statement on your major interests, views and
21 concerns so that at least once during the day you all
22 have a chance to talk. And that will serve as useful
23 backdrop for the rest of the discussion.

24 I also want to use that as an agenda
25 building session for us. There may be items that we

1 need to put in the parking lot to make sure that we
2 cover those under the agenda items. I think the
3 agenda items are pretty broad to cover a whole range
4 of topics, but we may need to do some additions also.

5 9:45, overarching issues. We're going to
6 have Dr. Andrew Murphy, who is right up here. And I
7 will be introducing your speakers a little more fully
8 in a minute, but Andy is right here. He's going to do
9 what I call tee the subject up for you, and just tell
10 you what the major issues are. And that's a
11 participant discussion segment. It's not meant to be
12 an NRC presentation, so we'll talk about those
13 overarching issues. For example, what criteria are
14 being used to develop the cask protocol, are they to
15 be given equal weight. This may be an opportunity to
16 talk about process issues in terms of what process the
17 NRC uses to develop and implement the test protocols.

18 And then we're going to go for a break,
19 for coffee and whatever. We're going to come back and
20 we're going to talk about general testing issues.
21 Again Andy Murphy is going to tee that up for us and
22 you'll see some specific issues in the agenda and to
23 start our discussion.

24 We'll go to lunch. And we're going to come
25 back and we're going to start with impact testing

1 issues at 1:15. And there's also some suggested
2 questions on your agenda. They're issues that the NRC
3 is interested in, but obviously we want to hear any
4 other issues that you have on impact testing. And
5 we'll also do a tee up on that one, again that will be
6 Andy Murphy.

7 We'll break at 3:00, and then we're going
8 to start on fire testing aspects of the protocol. And
9 because it was a significant event of interest, we're
10 going to start off the fire issues by having Chris
11 Bajwa from the NRC do a presentation for us on the NRC
12 evaluation of the Baltimore fire. And then we'll go
13 for questions and answers. And I know we have two
14 participants here, Bob Halstead and Fred Dilger who
15 have done a recent paper on the Baltimore fire issue,
16 and I know they're going to be illuminating our
17 discussion with some of their findings.

18 Amy Snyder is right here, who will tee up
19 the fire test issues for us. We'll have a discussion
20 of that, and then we'll have time for further issues.

21 We have a lot to cover. I just thank you
22 all for taking the time to come down and be with us
23 today, and hopefully it will be an informative and
24 productive discussion for everybody.

25 A couple of administrative items. There

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1 are evaluation forms of the meeting on the desk back
2 there. And if you could give us those or mail those
3 in, we'd appreciate that.

4 There's also handouts, including the
5 *Federal Register* notice that has all the contact
6 information for submitting written comments, if you
7 want to talk to someone about the issues. And there's
8 also a sign up sheet.

9 With that, what I'd like to do is just
10 make sure we all know each other before we get
11 started. And let's start with Ray Manley here and
12 then we'll proceed around. And we do have a carrier
13 pigeon system to get across this large gap between
14 Rick and Ed Wilds. All right.

15 Ray?

16 MR. MANLEY: Good morning. I'm Ray Manley
17 from the Maryland Department of the Environment.

18 MR. PENNINGTON: Good morning. Charlie
19 Pennington, NAC International.

20 MR. ZABRANSKY: David Zabransky, DOE
21 office of Radioactive Waste, Office of Transportation
22 and Integration.

23 MR. CONROY: Michael Conroy. I'm also
24 with Department of Energy, with the Office of
25 Environmental Management, the Office of

1 Transportation.

2 MR. SHERMAN: I'm Bill Sherman. I'm with
3 the Vermont Department of Service, and I'm
4 representing the Northeast High Level of Radioactive
5 Waste Transportation Task Force as well.

6 MR. BENNETT: I'm David Bennett with Tri
7 State Motor Transit Company representing the U.S.
8 Transport Council.

9 MR. BOYLE: I'm Rick Boyle. I'm with the
10 U.S. Department of Transportation and the Hazardous
11 Materials Safety Group, that's the co-regulator of
12 radioactive material and the competent authority for
13 the United States. Thank you.

14 MR. CAMERON: Ed?

15 MR. WILDS: I'm Ed Wilds with the
16 Connecticut Department of Environmental Protection,
17 and also with the Northeast High Level of Radioactive
18 Waste Management Task Force.

19 MR. FRONCZAK: Bob Fronczak. I'm with the
20 Association of American Railroads. We represent the
21 major freight railroads in the U.S., Canada and Mexico
22 as well as AMTRAC.

23 DR. SOLER: Alan Soler from Holtec
24 International.

25 MR. DILGER: Fred Dilger from Clark County

1 Nevada.

2 MR. HALSTEAD: Bob Halstead, state of
3 Nevada, Agency for Nuclear Projects.

4 MR. VINCENT: John Vincent with the
5 Nuclear Energy Institute.

6 MS. GUE: Lisa Gue with Public Citizen.

7 MS. JOHNSON: Abby Johnson with Eureka
8 County, Nevada.

9 MR. SORENSON: Ken Sorenson, Sandia
10 National Laboratories.

11 DR. MURPHY: Andrew Murphy with the NRC's
12 Office of Research.

13 MR. LEWIS: I'm Robert Lewis with NRC's
14 Spent Fuel Project Office.

15 MR. POSLUSNY: Chet Poslusny with Spent
16 Fuel Project Office.

17 MR. BRACH: Bill Brach NRC Spent Fuel
18 Project Office.

19 MS. SNYDER: Amy Snyder, NRC's Spent Fuel
20 Project Office.

21 MR. CAMERON: Okay. Great. Thank you. I
22 think you can see we have a wide and impressive range
23 of expertise around the table today.

24 And what I'd like to do is to just get
25 right into the context on this. And we have three

1 short presentations that we're going run through and
2 then go out to you for questions.

3 And let me introduce everyone who is going
4 to be speaking now so that we can get that done in
5 front.

6 And the first person that's going to be
7 talking to us is Mr. William Brach, Bill Brach. And
8 Bill is the Director of the Spent Fuel Project Office.
9 He's in charge of all this. And Bill has spent over
10 30 years working for either the Atomic Energy
11 Commission or the successor agency, the Nuclear
12 Regulatory Commission. And I think he first started
13 out back in 1971 as an inspector in the Oak Ridge
14 Tennessee field office of what was then the Atomic
15 Energy Commission. And since that time he's had a
16 wide variety of management responsibilities at the
17 NRC. Safeguards licensing issues, vendor inspection,
18 reactor licensee performance evaluations, low level
19 waste and decommissioning, medical and industrial use.
20 And since 1999 the Director of the Spent Fuel Project
21 Office.

22 So Bill's career spans most of the
23 activities that we do. And we're going to be going to
24 him for one second -- well, why don't we go to you now
25 and then I'll introduce Any and Ken after you're done.

1 Go ahead, Bill.

2 MR. BRACH: Thank you, Chip. And good
3 morning, everyone.

4 On behalf of NRC, I want also to welcome
5 you to today's roundtable discussion and our workshop
6 on the spent fuel transportation package performance
7 study.

8 As Chip mentioned, I'm Director of the NRC
9 Spent Fuel Project Office. And our office licenses and
10 inspects interim storage of spent nuclear fuel and the
11 transportation of radioactive material, including the
12 transportation of spent fuel.

13 The NRC's principle and guiding mission to
14 protecting public health and safety, common defense
15 and security, and the environment guides our
16 activities, especially with regard to our
17 transportational spent nuclear fuel, as we'll be
18 discussing today.

19 The NRC's primary role in transportation
20 of spent fuel to a repository would be in the
21 certification of the packages used for transport. The
22 NRC, I believe, is well positioned to maintain its
23 independent focus and role on maintaining safety in
24 this arena.

25 The NRC staff believes that shipments of

1 spent fuel in the U.S. are safe using the current
2 regulations and programs. And this is an important
3 point, and let me repeat this, and again I'll put that
4 in the context of why I think it's so important as
5 we'll be discussing the package performance study
6 today. The NRC staff believe the shipments of spent
7 fuel in U.S. are safe using the current regulations
8 and programs. The package performance study that
9 we'll be discussing today is focused on severe
10 accident conditions, conditions which are markedly
11 beyond the accident testing conditions and
12 requirements as well as the experience that NRC has
13 seen in transportation.

14 Our belief in the safety of transportation
15 is based on: (1), NRC's confidence in the robustness
16 of the shipping container that we certify as well as
17 the ongoing research in transportation safety.

18 Also, as noted in the third bullet on the
19 overhead, this confidence is based on industry's
20 compliance with safety regulations and the conditions
21 of the certificates which has resulted in an
22 outstanding transportation safety record.

23 We've been studying the issue of
24 transportation safety for more than 25 years. And we
25 continually find that the likelihood of release from

1 an accident and an associated risk to the public are
2 extremely low. Even so, the NRC continues to be
3 vigilant about transportation safety as an essential
4 part of our mission.

5 The NRC follows an aggressive program to
6 investigate and assess the continued safety of spent
7 fuel shipments, including analyzing spent fuel
8 transportation experience and the records to better
9 understand safety issues, evaluating new
10 transportation issues such as the potential for
11 increased shipment levels, increased and changing cask
12 contents, population along transportation routes and
13 other factors, as well as using new technology such as
14 enhanced modeling and analysis tools to estimate
15 current and future levels of potential risk to the
16 public.

17 The Package Performance Study, or PPS is
18 an important part of NRC's confirmatory research
19 program for spent fuel transport. The Office of
20 Nuclear Regulatory Research has the NRC lead for the
21 study, with assistance from the Spent Fuel Project
22 Office for programmatic direction and also outreach
23 activities. And we recognize that some stakeholders
24 do not share NRC's confidence in its regulatory
25 programs. We believe that the Package Performance

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1 Study can be an appropriate means for others to
2 understand and to hopefully gain and share our
3 confidence.

4 The NRC routinely conducts studies to
5 review the adequacy of its regulatory programs. For
6 transportation regulations we've completed three major
7 studies since the 1970s, the most recently being
8 completed in year 2000. Our current major effort is
9 the Package Performance Study.

10 In March 2000 NRC published a report
11 entitled *Re-Examination of Spent Fuel Shipment Risk*
12 *Estimates*, more commonly referred to NUREG-6672. This
13 study focused on risks of a modern spent fuel
14 transport campaign from reactor sites to possible
15 interim storage sites and/or permanent geological
16 repository. The study was initiated in 1996.

17 At that time the NRC recognized a
18 significant increase in the number of spent fuel
19 transports is likely during the next few decades, and
20 these transports will be made to facilities along
21 routes and using casks not previously examined in past
22 studies. And the risk associated with these
23 transports can be better estimated using new data and
24 improved methods of analyses.

25 This study, NUREG-6672, also concluded

1 that accident risks were much less than those
2 estimated in earlier studies.

3 In 1999 the NRC initiated the Spent Fuel
4 Transportation Package Performance Study. This study
5 examines the performance of spent fuel transportation
6 casks in severe accident conditions. This study is
7 expected to take 5 to 6 years. The study is being
8 developed by NRC staff to confirm the reliance of
9 analytical techniques to predict cask performance in
10 accident conditions. The study is also being
11 developed to demonstrate to the public and to the
12 stakeholders the robustness of the NRC's certified
13 transportation casks.

14 The study, as Chip has mentioned, is using
15 a public participatory process or approach to obtain
16 public and stakeholder input on the plans for and
17 conduct of the study.

18 I want to provide just a very brief
19 overview of the PPS from its inception leading up to
20 our meeting today.

21 PPS began with a series of public meetings
22 to collect views on possible future work on shipments
23 of spent fuel and to identify possible follow on work
24 to NUREG-6672, the report we issued in March of 2000.

25 In 1999 we held the first series of our

1 public workshops and meetings. After the first set of
2 workshops and meetings, NRC, we published what we
3 referred to as the Issues Report in June of 2000.
4 This report compiled stakeholder input obtained from
5 the four previous meetings in 1999 and letters and
6 email comments we received. Commenting stakeholders
7 included nuclear industry groups, transportation
8 industry groups, Departments of Energy, Departments of
9 Transportation, state, local and tribal governments,
10 public interest groups as well as general members of
11 the public.

12 Then to discuss whether the Issues Report
13 accurately captured the comments and suggestions, and
14 to discuss recommendations to address them or to
15 resolve these issues and comments, four additional
16 public workshops and meetings were held in the year
17 2000. After these meetings, NRC took the Issues
18 Report, the recommendations and comments and began an
19 extensive planning phase for the Package Performance
20 Study.

21 The first major product of this latter
22 phase of the Package Performance Study is the topic of
23 today's meeting, that is to present the draft test
24 protocols and receive your comments, your views and
25 your recommendations.

1 Now if you will, what do I see as a
2 success for today's meeting? The PPS draft test
3 protocol report, NUREG-1768, summarizes the field
4 tests that NRC proposes to perform under the Package
5 Performance Study as well as the analyses performed to
6 develop the test summaries.

7 The test we propose involve previously NRC
8 certified designs and are not directed to and are not
9 related to NRC certification of any specific cask
10 design.

11 We've issued the report, NUREG-1768 the
12 draft test protocols for a 90 day public comment
13 period, which ends May 30. The report and comment
14 period were announced via *Federal Register* notice,
15 dated February 21st of this year, along with meeting
16 notices, a press release, a mass mailing of over 500
17 copies of the PPS draft test protocol to those on our
18 mailing list, and as well the report is available on
19 the PPS website.

20 I would offer if you are not on the
21 mailing list and you wish to do, please see NRC staff
22 at the table outside of the auditorium.

23 Now the purpose of today's meeting is to
24 obtain comment on these proposals. I want to emphasize
25 that no decisions have been made yet. And I want to

1 say that again, no decisions have been made yet on the
2 test conditions, the test parameters or the test
3 activities. And I'm looking very much forward to
4 active discussion and input with regard to views and
5 perspectives on the draft and recommendations for our
6 consideration in the draft test protocol.

7 I'm happy to see such a large group of
8 qualified participants, both at the roundtable and in
9 the audience. And I'm confident and I'm hopeful that
10 your comments will help us, NRC, develop the best and
11 most appropriate test plan for the Package Performance
12 Study.

13 And finally, let me note that we're also
14 interested to hear from you if you find this meeting
15 and its format useful and productive. As I've
16 mentioned, this is the third series of public
17 workshops and outreach meetings that we've had on the
18 Package Performance Study. Chip has mentioned that
19 meeting evaluation forms are available on the back
20 table. I'd be interested if you have any comments, to
21 please provide those to us. As well, perhaps, if
22 you're providing written comments to us on the Package
23 Performance Study following today's meeting, you can
24 as well provide comments and views on the meeting and
25 the conduct of the meeting in those comments as well.

1 With that, I thank you.

2 MR. CAMERON: Okay. Thank you very much,
3 Bill.

4 And if you would all just bear with us for
5 a few more minutes, we'd like to get this whole thread
6 of background out for you and then go out to you for
7 questions.

8 Bill has given you the broad overview, and
9 now we're going to go to Dr. Andy Murphy, who is right
10 here. And he's from the Office of Nuclear Regulatory
11 Research, and he's the Project Manager for the Package
12 Performance Study, including the development of this
13 test protocol.

14 And Andy's been with the NRC for
15 approximately 24 years in the earth science seismic
16 and structural engineering field. And his major
17 projects at this point are overseeing the Package
18 Performance Study, and he's also working on seismic
19 hazard estimates for nuclear facility siting.

20 During his career here he's managed a
21 number of large scale testing programs with nuclear
22 power plant inspectors. It makes him very qualified to
23 oversee this particular program.

24 Before he joined the NRC he was the
25 research scientist at Columbia University's earth

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1 observatory. He has a bachelor's in geophysical
2 engineering and graduate degrees in seismology and
3 he's going to give you an introduction to the draft
4 test protocol.

5 Andy?

6 DR. MURPHY: Good morning, as Chip has
7 introduced me, I'm Andy Murphy with the Office of
8 Research and the Project Manager for this program.

9 Listed on the first viewgraph are the
10 staff members who have worked with me in producing the
11 test protocol package that is available. When Ken
12 Sorenson gets up here in a few moments, the co-authors
13 on his paper are the folks from Sandia that have
14 supported us tremendously in putting together this
15 package. They have done the analysis and taking the
16 details for us, and I'd like to indicate our
17 appreciation of that.

18 First slide, please.

19 There we go, objectives. This morning's
20 topics, the objectives of the Package Performance
21 Study, and then our expectations, the staff's
22 expectations of the outcome of this meeting. We'll
23 also talk about the status of the Package Performance
24 Study, and indicate very briefly what the staff's
25 proposal are as far as the impact and thermal tests

1 are concerned. And then we'll address some specific
2 issued identified for comment.

3 Next. Here we take a look at the
4 objectives of the program. The first is that we're
5 interested in significantly working at enhancing the
6 public confidence in the safety of these packages.

7 We also be looking at the validation of
8 the analysis codes that are being used to predict the
9 response of the packages in severe or extreme accident
10 conditions.

11 I guess I'll tell you what do we mean by
12 this. Very specifically, the contractor, our
13 contractor Sandia, after we have developed the
14 detailed test plans, they'll be making predictions of
15 the behavior of the casks in both the impact and the
16 thermal testing. And we will publish those, make those
17 publicly available along with criteria to indicate
18 what we think would be a successful prediction. Those
19 predictions will be published beforehand and will be
20 available for the public to take a look at it to see
21 how well we did when the tests were accomplished.

22 As far as actually carrying out the tests,
23 we anticipate and plan to have those opened to the
24 public. We are planning on having a seminar or
25 workshop, an instructional period or meeting before

1 them to explain what's going to be happening in the
2 test. And then the day of the tests we will have the
3 folks, the public available to actually view the
4 tests.

5 So that in the particular case of the
6 impact tests, we will predict a ding or a dent for the
7 cask. After the test is completed, you'll be able to
8 go up and look at the cask and say "Okay, fine. They
9 predicted this size dent in it and we predicted that
10 it would be here, and it is there or it isn't there."

11 The entire forum will be open so that
12 there will be no question about what we have predicted
13 and what has happened.

14 The next bullet on there is to obtain data
15 for refining the risk estimates that we have been
16 making, such as was done in 6672. We're providing
17 actual physical data to refine those estimates.

18 The next bullet up there indicates that
19 we'll looking for a level of acceptance of the realism
20 that is used in the tests. We could carry out in
21 principle, carry out the tests and instead of dropping
22 it from some 275 feet or so to obtain the 75 miles an
23 hour, we could be dropping it from 500 feet or 600
24 feet to see this thing bounce all over the place. But
25 our intent is to carry out an experiment that has some

1 realism associated with it.

2 What are our expectations for today's
3 meeting? As Bill has indicated earlier, we are here
4 to get comment. We have put together a test program by
5 way of a proposal and I think everybody here has
6 probably figured out that if we're actually using real
7 casks, this is going to be an expensive experiment and
8 there'll be little chance of repeating this
9 experiment. So that when we do carry it out, we want
10 to get the tests parameters right so that we're doing
11 the appropriate challenges to the codes and the
12 activities to work on improving public confidence.

13 The next slide, please.

14 The status. The first thing you should
15 know is that what we are talking about today by way of
16 the test protocols for the Package Performance Study
17 are the draft experimental plans. This is what the
18 staff thinks would be a good experiment, this is what
19 we're proposing is a good experiment to challenge the
20 casks and to accomplish the objectives.

21 The next bullet up there is the website on
22 which the Package Performance Study test protocols are
23 posted. They're also posted on the Sandia website. We
24 give you this website in addition because on this site
25 there is a pointer to a page at which you can leave

1 your comments. Fill it in looking at the document,
2 you can read it on one part of the site, go to another
3 part and leave your comments.

4 The Package Performance Study's test
5 protocols are out for a 90 day comment period that
6 ends the 30th of May. To tell you what's going to
7 happen there, in the past we had issued comment
8 resolution documents based upon the comments that we
9 received. We do not have a plan at this time to issue
10 a formal public comment resolution document. What we
11 do plan on doing is that as we modify the test plans,
12 we'll indicate in the test plans the reasons for the
13 modifications that came from the draft test plans.

14 After we have received the comments, the
15 comment period is ended, the staff in Sandia will
16 develop the detailed test plans. This will be the
17 plans that we will follow in carrying out the
18 experiment. These will be issued to the public, not by
19 way of comment, but if folks do have comments or
20 thoughts on them, we would be receptive to receiving
21 those additional comments. But this is not a document
22 that is formally being issued for comment.

23 The sub-bullet indicates that this is the
24 point where we'll be making decisions. We have made
25 decisions at this stage as far as what we're going to

1 propose. But as Bill indicated, these are not final
2 in any sense. It is not until we have the public
3 comments in that we're going to work on making the
4 final decisions, the final recommendations as to what
5 this test program is going to be all about.

6 Next one.

7 To carry out the calculations and analysis
8 that we needed to do to put together these test
9 protocols, the staff had to make some decisions about
10 the two cask types that we're going to look at; the
11 rail and the truck ones. We selected the Holtec cask
12 based upon a couple of criteria, the first two of
13 which were that it would be a certified cask and that
14 there would be some likelihood that these casks would
15 actually be used.

16 I'll put in the caveat right now that in
17 no sense in making these two selections for the
18 Holtec, for the GA-4 cask is this any kind of
19 commercial recommendation of these two casks.

20 The staff proposes to carry out these
21 experiments using full sized casks, actual casks
22 manufactured by the vendors. They're proposing to do
23 a vertical impact from a tower. The orientation of
24 the casks that we're proposing at this stage, and this
25 is where the prop comes in, will be at a slight angle,

1 center of gravity over the corner. Hopefully the
2 can's empty. We'll be hitting it on the lid end,
3 which will be the more challenging both for the
4 analysis and for the cask itself.

5 The impact speed that we have proposed at
6 this stage is a 75 mile an hour impact, which is a
7 drop from 275 feet give or take a little bit onto an
8 unyielding surface. And we have selected the
9 unyielding surface for a number of reasons, the
10 technical reason being that it takes the target out of
11 the analysis equation. If we allowed it to impact on
12 some sort of a soil site or a soil target, or a
13 yielding target, we would then be having to carry out
14 the same kinds of challenging analysis for the target.
15 This way with the unyielding target, we force all of
16 the kinetic energy in the drop into the cask. Okay.
17 This has the effect of increasing the apparent speed
18 with which this object hits the ground.

19 Dropping this on this package onto an
20 unyielding target has the effect of at least doubling
21 the impact speed so that we're talking about 100 --
22 basically 150 mile an hour drop onto some sort of a
23 yielding target.

24 The package, the Holtec package can hold
25 24 fuel assemblies. We are proposing to take one of

1 those fuel assemblies to be very similar to or
2 identical to an actual fuel assembly, except we will
3 not be using a radioactive materials in that
4 experiment. We're carrying these out so that we are
5 able to affix transducers to these objects and to get
6 values of the stresses and the strains that are
7 occurring the fuel assembly.

8 The Holtec, the other 23 assemblies will
9 be dummy assemblies. Different from the surrogate, in
10 that they're basically -- they'll mimic the weight and
11 the density of the assemblies.

12 The next one.

13 Okay. This is a very simple sketch of
14 what the Holtec Hi Star 100 Rail Cask looks like. It
15 shows the basic features of the multilayer sidewalls,
16 the lid. On the upper right hand side you see the
17 multipurpose canister being inserted as well.

18 The next one, please.

19 This is a very nice picture of the Holtec
20 cask mounted on a rail car. Give you a good idea of
21 the size of this package. The extra trucks on this
22 thing will give you an idea of the impact of the
23 weight. The cask weighs about 125 tons.

24 The next one, please.

25 Here we're talking about the proposal for

1 the truck. We're proposing to use the General Atomic
2 GA-4 Truck Cask. Again, we will be using an actual
3 cask. We're again proposing to drop it from the tower.
4 This is where the other props come in, the
5 orientation. If this is the cask, if it's cylindrical
6 -- no, excuse me. It's got a square cross section with
7 the impact limiters on the end.

8 What we're proposing is what we call the
9 back quaker drop, and that would be dropping a cask
10 onto a cylindrical projection from the unyielding
11 target. Again, un unyielding target and, in effect as
12 you can see, backbreaking -- breaking the back of the
13 cask.

14 Ken has a very nice sketch of that in his
15 presentation, which he'll show you in a few moments.

16 Again, we're talking about a drop of 75
17 miles an hour unto an unyielding surface. This 75 mile
18 an hour impact for both the truck and the rail casks
19 was selected so that we would get into the plastic
20 regime of the deformation. That the objects would be
21 deformed and that we would be looking at the
22 deformation in our analysis trying to pick that
23 deformation out.

24 Again, the cask will have a surrogate fuel
25 assembly, one and then three dummies in it.

1 The next slide, please.

2 And this is, again, a simple sketch of the
3 General Atomic GA-4 Truck Cask showing the cross
4 section and the various components, and the impact
5 limiters at the ends.

6 Next, I'll talk to you for a few moments
7 about the thermal testing. Very specifically the
8 thermal testing will be carried out on the same casks
9 that were used for the impact testing and, obviously,
10 it will be the same -- do the other way. The sequence
11 will be that the impact tests will have been conducted
12 before we do the thermal tests.

13 The thermal tests, again, we will be
14 testing both casks. We'll be using a fully engulfing
15 optically dense hydrocarbon fire. What does that
16 mean? That basically the fire will completely
17 surround the package, that the fire will be intense
18 enough so that you will not be able to see through it.
19 And the hydrocarbon means that we'll be using
20 something like jet fuel as the fuel.

21 We have proposed that the duration for the
22 test will be in excess of one half hour. More than a
23 half hour. Okay.

24 Next one.

25 We have identified in the test protocol

1 package two different places in two different formats
2 so that we could be explicit about what we are
3 interested in so that there would be no question that
4 there were a number of things that very specifically
5 the staff was interested in getting comments on. I've
6 got a number of them here on this slide, and they're
7 very simple.

8 We've selected two cask designs. We would
9 like to hear comment on whether two is the right
10 number for the casks that we have selected. Actually,
11 I should be using the word proposed. The casks and the
12 number that we have proposed are listed there. We
13 would like comment on those.

14 The orientation, we're going to drop it CG
15 over a corner, center of gravity over a corner or
16 we're going to do a back breaker? We're interested in
17 comment.

18 The impact speed the staff has indicated
19 in the Package Performance Study test protocols that
20 the impact speed range that we had initially looked at
21 was between 60 and 90 miles an hour. And the staff
22 made a decision as described in appendix A of the test
23 protocol report why we have selected the 75 miles an
24 hour.

25 Those are decisions or proposals that the

1 staff has put together. We're very definitely
2 interested in comments on those.

3 Okay. I told you that we're going to be
4 doing this with the actual casks. They'll be full
5 sized, full scale. There have been a number of
6 comments within the agency, anyway, as to whether or
7 not the appropriateness of carrying out these with
8 full scale or with subscale casks. We would like
9 comment and thought on that as well.

10 I told you that we will be using one
11 surrogate. It looks very much like a fuel assembly
12 plus a number of dummies.

13 The duration that we have proposed for the
14 thermal test is more than a half hour. And there's a
15 question that Ken will touch on in a few moments about
16 the position of the cask relative to the pool fire
17 itself.

18 The important thing that we want to get
19 out of this series of workshops here, Nevada and
20 Chicago, is that we're interested in getting comment
21 on what we have proposed. What we have written down is
22 a proposal. As I indicated earlier, this is a rather
23 expensive program. We're probably only going to get
24 to do it once, and we need to get it right and we need
25 the help from anyone and everyone to do that.

1 There are a number of issues in here that
2 the decision -- there I go again. The proposal from
3 the staff was based upon some of the comments that we
4 have received. In particular when you take a look at
5 the question about scale, and the issues report was
6 very definitely a overwhelming set of comments that
7 these should be done a full scale. That has definitely
8 influenced our decision, and I think at this stage
9 it's a good decision to do full scale testing.

10 Chip alluded to the fact that in a prior
11 series of assignments it was involved in large scale
12 testing programs for reactor components. And the vast
13 majority of those we did them as scale models. And I
14 can see very definitely the benefits here both for the
15 validation purposes and for public confidence
16 enhancement to carry these out at full scale.

17 A number of the decisions that were made
18 were based upon the input, the folks from the public.
19 And we're interested in carrying out that dialogue and
20 continuing it to get as much information as we can, to
21 get as many opinions about how to do this as we can so
22 that we can make the right or the best decisions about
23 how to proceed with this program.

24 Thank you.

25 MR. CAMERON: And thank you very much,

1 Andy.

2 One more piece of context on this, and
3 then we'll really turn the meeting to all of you
4 around the table.

5 And Ken Sorenson is with us. And Ken is
6 the Manager of Transportation Risk and Packaging at
7 Sandia National Labs. He's there for 15 years working
8 on transport of various issues, whether it's on
9 computer analysis of cask response to various loading
10 conditions, testing of casks, risk assessment. He's
11 also the chair of the package and transport division
12 of the Institute of Nuclear Materials Management.
13 Bachelor's degree in civil engineering from University
14 of Arizona. A master's in civil engineering from
15 Colorado State and a MBA, University of Mexico.

16 And he's going to give us a little bit
17 more detail about the draft protocol.

18 Ken?

19 MR. SORENSON: Thanks, Chip.

20 And good morning, everybody. Let me say
21 we are glad to be here this morning. I think as Andy
22 said, we consider your feedback very important and we
23 look forward to getting your comments on the
24 protocols.

25 We have one chance to do this test, and we

1 want to get as broad as range as comments as we
2 possibly can to make sure that all the considerations
3 are taken into account.

4 Sandia is the support contractor for the
5 NRC in the Package Performance Study. We've done the
6 analysis that you see in the test protocols. I'd like
7 to recognize the analysts who've actually done this
8 work. They are Doug Ammerman, Bob Callan, Carlos
9 Lopez and Jeremy Sprung.

10 Let me see, we have three here. Jeremy
11 Sprung did not make it, but the other 3 are here. So
12 if we have some very specific technical questions,
13 they might be able to support something as well.

14 As a way of background for this short
15 talk, what I'd like to do is bridge a time span from
16 March of 2000 to today and show you how we got to
17 where we are on the protocols. And it's important to
18 note, I think, Bill Brach mentioned it and Andy as
19 well, that there was a lot of public feedback comment
20 that went into this process and it's really reflected
21 in the test protocols. These early public meetings
22 that we had really set some guideposts in the pathway
23 for us, if you will, to really give us a direction on
24 how to design the test protocols to a point where we
25 could get it out again for public comment and get the

1 feedback from you all.

2 When the reexamination of spent fuel
3 shipment risk estimates came out in March of 2000, as
4 Bill mentioned we had some public meetings on that to
5 get feedback. And in addition to that, we had a second
6 set of public meetings where once we had that
7 feedback, we had what was called the issues report
8 where we had assimilated the public comment and put it
9 in a NRC document form so that we could go back to
10 these public meetings and say "This is what we heard.
11 Is it correct?" And we had this second set of public
12 meetings in the summer of 2000.

13 There's lots of comments that we got from
14 that process. Some of the general ones are shown here
15 in general. Some of the main comments was you need to
16 do a more refined job of your computer analysis.

17 For example, in 6672 we did a 1D finite
18 element analysis for the thermal part of it. For the
19 structural part of it the finite element analysis
20 around the closure area of the modeling was a little
21 more coarse than it could have been. These issues
22 were trade-offs that we used in the analysis due to
23 resource and schedule constraint. So the comments
24 coming back was well you really need to do a much more
25 refined job of your analysis in these test conditions.

1 And then secondly, one of the overriding
2 comments that we got back from these public comment
3 periods was that you need to do some testing, just
4 show us how these casks really do perform in a severe
5 testing environment.

6 As a basis of that then, these public
7 comments with the issues report, the NRC sponsored the
8 Package Performance Study and we got the point of the
9 test protocols that you see before you today.

10 The PPS work scope, the objectives as
11 they've been defined, really are developed from
12 recommendations during these public meetings and
13 listed in the issues report. And there's five main
14 recommendations that come out of this.

15 The first, as I've already mentioned, is
16 perform 3-D computer analyses for severe or extreme
17 mechanical loading environments.

18 The second one is to perform detailed 3-D
19 thermal computer analyses on extreme thermal loading
20 environments for the casks.

21 Number three, given those analyses,
22 conduct high speed impact tests and also thermal tests
23 for the casks.

24 What you see before you today is the test
25 protocols, and these are test parameters based on the

1 recommendations in the issues report that are proposed
2 for the test. And, again, the point of these meetings
3 is to solicit feedback on these proposals and address
4 those comments as we get them to see if we need to
5 change direction.

6 And then the final test parameters will be
7 defined in the test procedures after the comment
8 period and after we have a chance to simulate the
9 comments and address the comments.

10 The fourth recommendation to come out of
11 the issues reports was to conduct fuel tests
12 experiments to see how the actual field bundles
13 behaved in these severe or extreme mechanical loading
14 environments.

15 And then the fifth one was to reconstruct
16 the accident event trees that were used in 6672 that
17 also came from the modal study back in 1987/88 and
18 look at probability of distribution functions of
19 accident speeds and also fire durations.

20 The argument was that the data that was
21 used in those event trees is somewhat dated. There's
22 lots of new data out there. The interstate highway
23 speeds went from 55 to 70, 75 and so you could expect
24 some changes in accident rate distributions and things
25 like that.

1 Now, for the Package Performance Study
2 points four and five are not covered. Four is on a
3 different testing schedule and five is not a test sort
4 of activity, and so that's not covered in the Package
5 Performance Study. So what we are looking at in this
6 document is the analyses of the severe loading
7 environments and then also the test conditions.

8 So the objects, what we have in the test
9 protocols is to identify candidate casks. Again,
10 these are casks that are put forward in the protocols
11 as a way to stimulate discussion in terms of what sort
12 of casks we should be using and those sorts of things.

13 Describe the concepts for the impact and
14 fire tests. And this is where some of these
15 recommendations from the Issue Report come in terms of
16 doing the computer analyses and doing the testing. So
17 we use these computer analyses to present impact and
18 fire test options.

19 And then, thirdly, the protocol's goal or
20 objective is to use them to solicit public feedback
21 and comment.

22 I'd like to show you just a couple of
23 analysis pictures, just to stimulate your thinking, if
24 you will, a little bit. This first one is the Holtec
25 Hi Star Rail Cask, about 125 ton cask. It carries 24

1 PWR assemblies in a canister. This is right out of
2 the protocols. It's what Andy described as the center
3 of gravity over of corner impact at 75 miles per hour.
4 And the plot on the right there is actually an
5 acceleration plot versus time. And so this is how many
6 Gs this package is seeing because of the drop. And,
7 again, since this is a unyielding target, all the
8 kinetic energy that has been developed through that
9 drop goes into deformation of the impact limiter in
10 the package. None of it goes into deformation of the
11 target.

12 And you can see that this results in a G
13 loading to the cask itself of about 100 Gs.

14 We did a 9 meter drop, regulatory type
15 drop analysis for this particular design at 9 meters
16 in this orientation. And that's the red horizontal
17 line where it says regulatory test. And that resulted
18 in a G loading for that cask design of about 30 Gs in
19 that orientation.

20 So you can see the 100 Gs that's developed
21 for this orientation and speed for this cask design is
22 really a severe test relative to the regulatory
23 requirements of the 9 meter drop.

24 The second cask that's in the protocols is
25 the GA-4 Truck Cask. As Andy said, in the original

1 public meetings that we had two and a half years ago,
2 there was talk of doing one test, the rail cask test.
3 After looking at the Issues Report and considering
4 more NRC made the decision that really we should look
5 at a truck cask as well. And we thought if we have a
6 second drop test with the truck cask as opposed to
7 rail casks, what are the opportunities we have here to
8 learn something different. We just didn't want to
9 repeat the same test that we'd done for the rail cask.

10 And, again, out of the Issues Report that
11 came from the public comment, one of the comments that
12 was very consistent during these meetings was what
13 happens in an accident if the cask hits a target and
14 bypasses the impact limiters? The impact limiters are
15 not put in to play, what happens to the cask?

16 Well, here was an opportunity to look at
17 that type of orientation or that type of an accident
18 scenario for the second drop. And what you see here
19 is what's called a back breaker test, and you can
20 envision possibly an accident where a cask is
21 involved, a truck cask is involved in an accident and
22 maybe is wrapped around a bridge pillar or something
23 like that, a bridge support where it would not
24 actually engage impact limiters. And that's the
25 intent of this type of drop orientation.

1 This is one is also done at 75 miles per
2 hour. And you can see this results in a peak G
3 loading on that cask of about 150 Gs, and an average
4 G loading of about 100 Gs. And you can see you get
5 really quite a lot of deformation of that cask in that
6 particular orientation for this design.

7 This is a pretty busy picture, actually,
8 of some of the thermal analyses that come out of the
9 protocols. The casks show there is the Hi Star Rail
10 Cask. It has a surface temperature plot, the big plot
11 in the middle. And that is for the one meter height
12 above the pool fire. But we show on the left hand side
13 different locations relative to the pool.

14 The one on the bottom, of course, is if
15 the cask is on the ground. The middle one is the
16 regulatory height of one meter. And then the top one
17 is if you have the cask, what we call above the fire
18 dome. That's at 3 meters. Excuse me. The vapor dome.

19 The dark part right under the cask is
20 called the vapor dome, and that's where you have
21 incomplete combustion of the fuel/air mixture because
22 there's not enough oxygen in there. So it's a relative
23 cool area relative to the fire. And so we were doing
24 some investigations to see how these different
25 locations relative to the pool level effected the heat

1 of the cask, the surface temperature of the cask. So
2 there you can see what the plot looks like for the
3 surface temperatures and then a temperature versus
4 time plot of different specific points on the cask
5 for that particular orientation and test condition.

6 The picture at the upper right hand corner
7 is actually a 3-D plot of the fire condition. And one
8 of the analysis tools that we use in the protocols,
9 and we're using for this program, is called CAFE,
10 which is a fire code that actually -- it's able to
11 analyze the flux to the cask surface based on the fire
12 conditions.

13 That's the technical part or a snapshot of
14 the technical part of the protocols.

15 We also had a fair amount of technical
16 review during the process between summer of 2000 and
17 today in getting to this point.

18 We first introduced, if you will, the
19 Package Performance Study at PATRAM 01 in Chicago in
20 September. Rob Lewis gave a plenary talk on the
21 Package Performance Study.

22 We had last April an expert internal
23 expert review panel look at where we were on the test
24 protocols. Actually we had two expert review panels;
25 one was structural and one was thermal. And we got

1 experts from academia and industry to review where we
2 were. We had some international participation as well
3 to review where we were and from the technical
4 standpoint if what we were proposing made sense.

5 And then in June of 2002 we made a
6 presentation to the NRC Advisory Committee on Nuclear
7 Waste. And also in June we made a presentation to the
8 National Academy of Sciences.

9 So up to this point this document has had
10 a fair amount of technical review to it already.

11 Thank you.

12 MR. CAMERON: Okay. Thank you very much,
13 Ken. And thank you all for bearing with us so that we
14 could get all that information out. There was a lot
15 of information, and we want to go out to you for
16 questions. I realize those questions may be the
17 leading edge of a comment, and I'll keep track of that
18 so that we can factor that into the discussions.

19 Before we go to Bob Halstead, a couple of
20 people have joined us since we began, and I just
21 wanted to give them a chance to introduce themselves.

22 Rick Boyle, I believe came in. Rick,
23 could you just tell us where you're from and what you
24 do?

25 MR. BOYLE: Thank you, Chip. I'm with the

1 U.S. Department of Transportation in the Research and
2 Special Programs Administration. I head up the
3 radioactive materials branch in the Office of
4 Hazardous Material Safety. Simplistically it's the co-
5 regulator with the NRC where they do the type B and
6 the package designs. We do the communications and the
7 administrative side. We serve as the competent
8 authority representing the U.S. at IEA. Thank you.

9 MR. CAMERON: Okay. Thanks, Rick.

10 Kevin?

11 MR. KAMPS: Hi. My name is Kevin Kamps.
12 I work at Nuclear Information and Resource Service
13 here in Washington, D.C. And we are a public interest
14 organization with members of the states, many of whom
15 live along proposed nuclear waste transportation
16 routes to the private fuel storage facility in Utah as
17 well as the proposed Yucca Mountain repository in
18 Nevada.

19 MR. CAMERON: Okay. Thanks, Kevin.

20 And Mark?

21 MR. HOLT: Hi. Mark Holt with
22 Congressional Research Service. I'm an energy policy
23 analyst primarily responsible for energy.

24 MR. CAMERON: Okay. Thank you very much,
25 Mark.

1 Let's go to Bob Halstead for our first
2 question. Bob?

3 MR. HALSTEAD: Yes, Chip, a comment, and
4 probably the last easy question of the day. I'd add
5 to the list of references that Ken had there the
6 transcript of the November 19, 2002 Advisory Committee
7 on Nuclear Waste meeting, the number of presentations
8 by Doug, NRC staff and other contractors that
9 supplement that June 2002 discussion.

10 And, hopefully the easy question for Ken
11 or someone, is are the expert panel review meeting
12 transcripts on the Sandia website yet or can they be
13 made available as soon as possible?

14 MR. CAMERON: Ken?

15 MR. SORENSON: They're not on the website
16 yet, but they could certainly be made available.

17 MR. HALSTEAD: Yes. That's real important
18 to us.

19 MR. CAMERON: Okay. Thank you, Bob.

20 John Vincent?

21 MR. VINCENT: John Vincent, NEI.

22 I just had a point of clarification for
23 Bill Brach. It's my understanding that what we're
24 contemplating here is extra-regulatory testing and not
25 severe accident testing. Severe accident testing is

1 covered mostly, almost completely by the existing
2 regulations. So I think it's very confusing to
3 reference the fact that you're doing or calling extra-
4 regulatory testing severe accident testing. Just a
5 point of clarification. I thought that that was the
6 way I understood the situation.

7 MR. CAMERON: And can we get a
8 clarification on that? Bill?

9 MR. BRACH: John, your characterization is
10 correct. Extra-regulatory testing is what we are
11 considering in the draft test protocol and my earlier
12 reference to severe accident was I'll say with lower
13 case letters not meant to imply anything beyond. We
14 are considering in the draft test protocols extra-
15 regulatory testing, as you just mentioned.

16 MR. VINCENT: I just had two other very
17 simple comments.

18 I heard referenced twice already this
19 morning the fact that 75 miles an hour equates to a
20 275 foot drop. That's not correct. 75 is 189 feet.
21 275 is the 90 mile an hour drop test. Just a point of
22 clarification.

23 And secondarily, I'm going to put my PFS
24 hat here for a brief time. A slide that was shown with
25 the PFS cask, some of you may have noticed that it

1 seems like the CG of the cask is awfully high above
2 the bed of the transport trailer. There is an extra
3 intervening support stand for the cask and the cask
4 cradle for transport in that picture. So the cask CG
5 would actually not as high as portrayed in that
6 picture.

7 MR. CAMERON: Yes, thank you very much,
8 John.

9 Let's go to Ray Manley and back over to
10 Lisa.

11 MR. MANLEY: Ray Manley from Maryland.

12 I think I'm caught in a bit of a Catch 22
13 here. Generally the gentleman's comments across the
14 table back in July of 2000, just had a theory on the
15 Howard Street Tunnel about this afternoon.

16 He got a lot of concern from our
17 stakeholders in regard to that incident and I guess
18 one of the things I'm here to take a look at is
19 specific criteria that meet up with that accident in
20 the Howard Tunnel. And I'm not going to make any
21 recommendations at this time, but I just have some
22 very general comments of things that I don't
23 necessarily see in the testing protocol, and that is
24 perhaps a clear definition of accident, minimum
25 temperatures that can read this thermal test with

1 regard to measuring those criteria. When you're doing
2 the test, I don't see specific pass/fail criteria for
3 any.

4 I know the purpose of this is how it
5 compares against the modeling, but when it's a test,
6 when it fails, what does that mean? How far away from
7 that model do you have to be for that test to fail?

8 And I guess I'm just concerned. I think
9 it's said that the current regulatory criteria meets
10 99 percent of transportation accidents. But I'm still
11 a little unclear whether the Howard Street incident
12 meets that one percent or is not represented by that
13 regulation.

14 And I guess just a final comment. I know
15 it would probably be, and I'm not an engineer in
16 possible cask failure. These tests should provide a
17 better estimate and analysis of that failure. ??

18 Thank you.

19 MR. CAMERON: Okay. And, Ray, we are
20 going to address those specifically when we get to
21 those issues, including the relationship between the
22 Baltimore tunnel fire and the test protocol. So thank
23 you for raising those, and we will get to those
24 specific questions.

25 Lisa?

1 MS. GUE: I had a question coming out of
2 Ken's presentation, but perhaps directed to the NRC.
3 And that's about the fourth task that was identified
4 as a result of the previous comment period and scoping
5 processes for laboratory tests on actual fuel.

6 It's been mentioned and published that
7 this is proceeding according to a different schedule,
8 and I'm wanting some information about what that
9 schedule is. And then also a second question, what are
10 the plans to synthesize the results of the fuel tests
11 with the results of the cask tests and how will those
12 -- does the NRC intend to present those are two
13 completely separate studies or, again, in some way
14 synthesize the results?

15 MR. CAMERON: Who wants to handle that?

16 DR. MURPHY: I guess I'll handle that if
17 I get the questions straight.

18 We do not have at this stage a visiting
19 milestone schedule for the fuel tests. They are very
20 definitely still part and parcel with the Package
21 Performance Study. The final report on this will
22 include a synthesis of the fuel tests and the
23 implication to those with the impact and the fire
24 tests that particularly will be with the impact. We
25 will be looking at the stresses and strains that are

1 placed upon the fuel in impact situation. That's why
2 we mentioned that we will have surrogates of fuel
3 assemblies in both the Holtec and the GA-4 casks that
4 we will have an idea of what stresses and strains will
5 apply to them.

6 MS. GUE: Thank you, but can I just make
7 a clarifying question.

8 MR. CAMERON: Yes, just for clarification
9 so everybody understands your question. Is that
10 question about the fuel testing as it relates to one
11 of the five elements in the Issues Report that Ken
12 mentioned, that's not part of this but Andy explained
13 the relationship. Yes, Lisa?

14 MS. GUE: So when it's mentioned that the
15 impact and thermal tests in the Package Performance
16 Study are scheduled to be concluded in 2005, can I
17 understand then that the fuel tests -- or you don't
18 have a specific schedule, are also expected to be
19 completed by 2005 in time for that final report?

20 DR. MURPHY: That would be correct.

21 MS. GUE: Okay. Thank you.

22 MR. CAMERON: Okay. Great. Thank you.
23 Thank you, Andy. Thank you, Lisa.

24 Let's go to Bill Sherman and then we'll
25 come up to Charlie Pennington. Bill?

1 MR. SHERMAN: Thank you. I'm Bill Sherman,
2 state of Vermont.

3 I may have missed this, but did you
4 mention how this is being funded?

5 MR. CAMERON: Is that Andy again or are we
6 going to go to Bill Brach or Rob Lewis?

7 DR. MURPHY: I am not 100 percent sure how
8 to answer your question. We have, the NRC, a budget
9 for this program that I'd like to say if Congress has
10 seen the merits of carrying this out then we
11 anticipate that we will have full funding to carry out
12 this program.

13 MR. SHERMAN: I guess I can be more clear.
14 Do you expect the funding to come from the Nuclear
15 Waste Fund?

16 MR. CAMERON: Bill? Bill Brach?

17 MR. BRACH: Thank you. I understand the
18 comment as well as the interest in the funding aspect.
19 As Andy mentioned, clearly and as evidenced by
20 everyone's participation here and the large audience
21 participation as well, there's very much a broad
22 interest in the conduct of this activity. And
23 realizing too, as both Ken and Andy have mentioned,
24 that the costs of these tasks are significant. And one
25 reason for our active effort on our part to engage the

1 public is that to be sure that to the extent that when
2 we carry the tests out that we have as best as we can
3 considered and represented the views of broad section
4 of stakeholders because the costs of the tests are
5 such that we will not be in a position to have
6 repetitive tests, if you will to now that we've done
7 this, let's do a follow on test.

8 We want to be sure as we can that we have
9 considered all the appropriate parameters and
10 conditions in the conduct of the test now. And that's
11 from the standpoint of the significance and costs of
12 doing the test.

13 As Andy as mentioned, within the NRC we're
14 looking at the budget for the tests and understand
15 that within the NRC the conduct of this activity is
16 part of the NRC's hallowed Waste Fund activity, if you
17 will. And that to the extent funding would be
18 presumably from the Waste Fund. But we are looking at
19 various avenues for funding to support the conduct of
20 the test.

21 MR. SHERMAN: Thank you. If I can just
22 make a follow up comment, and that is as you know you
23 have a strategic task goal of enhancing public
24 confidence, but you also have a strategic task goal of
25 reducing unnecessary regulatory burden. And if what

1 you say is true, that it comes from the Nuclear Waste
2 Fund, then the paymaster for this are the ratepayers,
3 who I think if I've gotten the name cards right, I'm
4 the only representative at the table that is a
5 ratepayer advocate. And so I would suggest that you
6 include those stakeholders in your talks, particularly
7 members of the National Association of Regulatory
8 Utility Commissioners, NARUC, and that to assure that
9 the strategic goal of reducing unnecessary regulatory
10 burden is considered in commiserate proportion with
11 enhancing public confidence.

12 MR. CAMERON: Okay. Thank you, Bill. And
13 I know that we do have a NARUC representative with us
14 at the hearing today.

15 Charlie?

16 MR. PENNINGTON: Thank you. Charlie
17 Pennington, NAC International.

18 Just a quick statement of thanks for
19 holding this meeting, for allowing this. I think it's
20 an important process and we do like the open process
21 here. So thanks ahead of time. Depending on how the
22 day comes out, you may not be hearing that from any
23 people late in the afternoon, but just wanted to say
24 thanks up front.

25 A quick comment, question, Ken. And I

1 apologize if I have not picked this out of your
2 protocol work, but with respect to the GA-4 thermal
3 test, you know that impact limiters have two
4 functions. And I'm a little bit interested in how you
5 modeled prior tests with the GA-4 with respect to the
6 real impact limiters or as opposed to dummy weights on
7 the end. And second of all, could you characterize
8 briefly for me what the shoulder design is of that GA
9 impact limiter?

10 MR. SORENSON: Let's see, for the thermal
11 test or for the drop test the impact limiters were not
12 specifically modeled, but the mass was put in there.

13 For the thermal test the impact limiters
14 were not included on the analysis.

15 MR. PENNINGTON: Why not?

16 MR. SORENSON: This was a scoping study to
17 see how the different casks performed. And, again,
18 there's no decision at this point whether, you know,
19 the length of the fire, whether the impact limiters
20 will be actually on there or not.

21 MR. PENNINGTON: Well, I think for
22 clarification. In fact, I would greatly appreciate it
23 if you would clarify that based upon many, many fire
24 tests that the performance of those seals with impact
25 limiters, because we know that the other function of

1 a impact limiter is to protect seals from flame
2 impingement, if you could characterize that as an
3 extremely imperative element in the modeling state.

4 MR. SORENSON: Yes. Absolutely. Yes.

5 MR. PENNINGTON: Thank you.

6 MR. CAMERON: Thanks, Charlie.

7 Let's go to Rick Boyle and then we'll go
8 over to Kevin Kamps.

9 MR. BOYLE: Thank you. Just a brief
10 question for the NRC. I agree that you have a unique
11 and somewhat expensive test program with an objective
12 to benchmark codes. Is there any thought or possible
13 benefit to offering the opportunity to model the cask
14 to foreign countries so that they can benchmark their
15 codes as well? Thank you.

16 DR. MURPHY: We've had a fairly extensive
17 program in contact with foreign governments and
18 foreign contractors that handle it. That's an
19 opportunity. Exactly what shape that's going to be, we
20 don't know yet. But outside folks say this will be
21 the analysis, but it would be a round robin style,
22 something simple.

23 MR. CAMERON: Does that answer that for
24 you?

25 Kevin?

1 MR. KAMPS: Yes, I can talk about this
2 when there's more time in the discussion later, too.
3 But, again, we're very disappointed about the lack of
4 certain physical tests taking place, such as a
5 crushing load test, the torch test. Especially
6 concerning is the lack of any testing for submersion,
7 especially given the Department of Energy's proposal
8 to use barge shipments during the Yucca Mountain
9 program. And one of the most important ones that's
10 missing is the testing on anti-tank missiles and high
11 explosives so the terrorist scenario tests are again
12 lacking.

13 And I think just in a broad perspective on
14 this, I've heard enhancing public confidence, but I
15 haven't heard much about enhancing public safety. So
16 I'm really questioning the motivation for the PPS at
17 this point.

18 MR. CAMERON: Okay. Some of the issues in
19 regard to crushing load, submergence, torch, I think,
20 let's play those into the discussion areas. I think
21 that your point about the anti-tank terrorism
22 connection should address that and answer that now.
23 And also your second point about public confidence
24 versus -- well, not versus, but the public safety
25 element I'd like the staff to address.

1 First of all, how are we, if we are,
2 addressing the anti-tank terrorism issue in terms of
3 these casks. And secondly, can you just comment to
4 Kevin about his point that where's the public safety
5 aspect of doing those protocols.

6 Bill, do you want to handle the first, at
7 least, or both?

8 MR. BRACH: Let me if I can try to respond
9 to both concerns.

10 One, the Package Performance Study if we
11 go back to 1999 when we first were developing and
12 asking for input and comment, was envisioned to be a
13 test of the safety, the robustness of the cask in
14 accident conditions and extra-regulatory accident
15 conditions. Consideration of terrorism, sabotage was
16 not and has not been included in the test. That's not
17 a reflection that that's not an issue or concern.

18 What I was saying, that's not a reflection
19 on our part that terrorism/sabotage is not a concern
20 to the agency. I can't go into the details, but I
21 think many of you are aware the agency since September
22 11th has taken a number of regulatory actions both to
23 address spent fuel transportation, spent fuel storage
24 as well as other reactor activities that we regulate
25 to enhance and increase the level of protection

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1 against terrorism or sabotage types of issues or
2 concerns. So I wanted to pointed out that terrorism
3 not being a part of the study is not at all reflective
4 that we're not addressing and considering those issues
5 outside of the scope of the Package Performance Study.

6 I do want to mention, though, that there
7 are aspects of the package performance study that
8 clearly will be providing information to us, useful in
9 a broad context.

10 Ken had in one of the overheads a picture
11 of a -- excuse me, a schematic of a cask in a severe
12 fire scenario as well as a drop scenario. So you
13 could think about different conditions or scenarios
14 where those originating actions could be the result of
15 a terrorist or a sabotage action as opposed to what
16 we're looking at in this particular case of it being
17 the result of an accident, if you will.

18 So, I just wanted to stress that while the
19 PPS study is not specifically in our modeling
20 addressing sabotage as the, if you will, initiating
21 event, there are other actions the agency has taken to
22 consider that now and we continue to look at that
23 issue.

24 With regard to public confidence, I
25 mentioned in the opening comments a concern we have

1 and an objective we have, and that's really, if you
2 will, an underlying reason for the workshop that we're
3 having today, meetings later this month in other
4 locations, as well as the previous meetings. And that
5 is to try to ask for and receive and then understand
6 a broad spectrum of stakeholder views on the tests and
7 conditions that we're considering. That on our part is
8 an effort to try to: (1) engage with the public, but
9 also to help build, if you will, that bridge and that
10 understanding and hopefully bridge to the
11 understanding and gaining confidence on broad
12 stakeholder's part, public and public interest groups,
13 individual members of the public and other
14 stakeholders as well on what we're doing, the basis
15 that we use to conclude that the actions we're
16 carrying out are providing for us safe -- in this
17 case, safe transport of nuclear material.

18 As I mentioned in the opening comments,
19 we're very confident with regard to the adequacy of
20 our current rules and regulations to assure and
21 provide for safe transport of nuclear material.

22 The tests we're planning and discussing
23 now are to look at extra-regulatory accident
24 conditions to understand how those casks, in spent
25 fuel how the spent fuel casks would withstand those

1 extra-regulatory tests, conditions and parameters.
2 And we're planning, as Andy walked through, very much
3 of an open public process to have a public
4 availability to observe the tests, public availability
5 to have available the results of the tests, public
6 availability of the conclusions we've reached in
7 looking at the same test data and results as observed
8 by the broad spectrum of stakeholders so that the
9 conclusions we reach would be based on information
10 that is widely and broadly available to all the
11 stakeholders in the conduct of the test. That on our
12 part is an effort to, if you will, engage but also
13 hopefully gain public confidence in the conduct of
14 these activities.

15 MR. CAMERON: Well, let me just follow up
16 with two questions to make sure that we address
17 Kevin's question.

18 One is you alluded to the fact that we're
19 going to be addressing these terrorism considerations
20 in other forms. The first question, I guess, is there
21 a specific initiative that we're taking to do that?
22 And I guess the second follow up question is, is one
23 of the objectives, and I forget whether it was in
24 yours or Andy's or Ken's slide, is a confirmation of
25 the basis for the existing regulatory framework which

1 would be, I guess by implication, addressing the
2 public safety part of it as well as what you said?

3 Could you just answer those or give us any
4 more information on that?

5 MR. BRACH: I think I'm going to start
6 with the second point first, and that was one of my
7 overheads that made reference to the confirmatory
8 research nature of the Package Performance Study. And
9 clearly a purpose of the study is to confirm the
10 robustness of these tasks to withstand accident
11 conditions markedly beyond our regulatory standards,
12 if you will.

13 Secondly, with regard to security tests,
14 another forum. I mentioned since September 11th the
15 agency's taken a number of actions through advisories
16 and orders to various licensees and regulatory
17 activities we regulate to enhance the security of
18 those measures. We as well have underway a number of
19 reviews to look at the robustness, the capability of
20 our regulatory activities, whether it be spent fuel
21 transportation, spent fuel storage or other regulatory
22 activities that we're involved in to assure the safety
23 and security of those measures.

24 Now, those activities are separate from
25 the Package Performance Study activity we're talking

1 about today. And much of that is actually of a
2 classified nature and I really can't go into much in
3 the way of specifics, other than that that is being
4 looked at. And as I was trying to stress before, there
5 may be information, I expect there will be
6 information, that evolves from the Package Performance
7 Study when we're looking at impact results and fire
8 results that would as well be useful in input to our
9 considerations in the security, if you will, side of
10 the reviews and regulations.

11 MR. CAMERON: Okay. Thank you.

12 Let's go to Alan and Bob and then let me
13 do an agenda check with you, since we're obviously
14 running overtime, which is fine. But let's go to Alan
15 and then we'll go to Bob.

16 DR. SOLER: Jim, I have a question. Do you
17 have a feel at this point as to the entire cost of the
18 program that you've proposed if nothing changes? And
19 by that I mean building the facility, procuring and
20 instrumenting the cask and analyzing the results. In
21 particular a breakdown of those items, percentage of
22 total cost?

23 MR. BRACH: If I could maybe interject
24 rather than Ken. I understand the question, but I'd
25 ask that the purpose and focus of our discussion

1 today, clearly cost is an important element and we
2 within the NRC need to be sure that once the test
3 plans have been finalized following our outreach
4 activities and determinations made within the NRC, an
5 important element on NRC's part, on our part is to
6 assure that funding is there and is adequate to carry
7 out those tests that we're planning.

8 I believe the ramifications of a specific
9 test or breakdown of tests, I would offer I would like
10 to ask if we can keep our focus and direction today on
11 types of tests, types of conditions, parameters to
12 consider and, if you will, the why part behind that so
13 we can understand from yourself and all the other
14 stakeholders' perspective so that we can then step
15 back and help fashion a test plan that is responsive
16 to the comments and views as well as responsive to
17 what we were laying out as the objectives of the test
18 plan.

19 DR. SOLER: Yes. I had asked that question
20 primarily because I've heard the statement that we've
21 got one chance at this, and therefore we've got to do
22 it right the first time. And I was trying to get a
23 feel for really what the incremental costs would be of
24 doing it a second time once you have the major
25 components constructed. Because my own personal

1 experience we learned a lot about predicting what
2 happens by embarrassing failures at the outset.

3 MR. CAMERON: I think there will be room
4 to bring this point up again, Alan. But what you're
5 suggesting is that the NRC should at least consider,
6 and of course it's an important consideration, but
7 don't just close the door at this point in time to be
8 able to go back and revisit through a second test?

9 DR. SOLER: Actually, and I'll say it
10 later in more detail, that if I look at this package
11 as it is and if the test confirms this, that what I've
12 done is proven that the impact limiter works well up
13 through 75 or 90 miles an hour. But I haven't really
14 proven that an elaborate finite element model of the
15 cask will be sufficient to predict a what-if scenario
16 if something happens at 125 or 140. And I was
17 examining, you know, how do you do that with this test
18 as it stands?

19 MR. CAMERON: Okay. That's great. And I
20 see Bob Halstead shaking his head in agreement with
21 that. And I think we'll get into that discussion with
22 Bob.

23 MR. HALSTEAD: I'm not going to take the
24 bait on that, because that's a wonderful topic that we
25 all need to discuss.

1 Two quick comments. Fred and I have done
2 a fair amount of costing work. We feel if you propose
3 testing, you need to have a sense of the costs. And we
4 plan to get into that, Bill, in some detail as we talk
5 about the specific testing areas this afternoon. I
6 think it would be distracting if we do that now.

7 Secondly, regarding Kevin's concern and
8 some other people's concerns about the
9 terrorism/sabotage issue. Let's remind ourselves for
10 the record that in June of 1999 the state of Nevada
11 filed a petition for rulemaking requesting both a
12 reassessment of terrorism/sabotage impacts and
13 requesting immediate changes in the regulations based
14 on existing knowledge.

15 The NRC accepted that petition for
16 docketing under docket number PRM73-10. The comment
17 period was extended into early 2000. Golly, we're now
18 almost 3 years into that and we have not heard
19 anything from the NRC on how they're going to respond
20 to that petition for rulemaking which addresses not
21 only the issue of cask vulnerability to high energy
22 explosive devices, missiles and shaped charges, but
23 also addressed the issue of the possibility that
24 terrorists would try to attack infrastructure to cause
25 worse case accident conditions to occur.

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1 Nonetheless, it is important to add,
2 without going into any detail because it does get into
3 safeguards information, that Bill is correct
4 in his statement that a number of the
5 immediate relief changes to the regulations that the
6 state of Nevada requested in that petition have, in
7 fact, in one way or another been addressed in these
8 interim directives. Nonetheless, we are still waiting
9 for a formal response to our petition for rulemaking.

10 Thank you.

11 MR. CAMERON: Any word from the NRC on the
12 status of that particular petition?

13 MR. BRACH: This is Bill Brach.

14 Bob, your comment and the dates, I don't
15 have them handy, but I generally recall that that's
16 about the right time frame for the submittal and, yes,
17 about 3 or 4 years have elapsed in the intervening
18 time.

19 I mentioned earlier, and I would just draw
20 everyone's attention again to the events of September
21 11 and the petition that the state of Nevada had
22 submitted to us. And it dealt with physical security
23 for spent fuel transportation. It was under review
24 and the September 11th events were rather eye opening
25 to us all, whether it would be involved in nuclear or

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1 other activities, with regard to the threat
2 environment changing terrorism issues and concerns.
3 And I would note, as Bob as mentioned and I can't go
4 into details, many of the actions the agency has taken
5 since September 11, whether it be for spent fuel
6 transportation or other regulatory activities we
7 regulate, are very reflective of some of the
8 considerations in the petition from the state of
9 Nevada from 1999.

10 I believe there was a communication to the
11 state. I believe it was the end of the last calendar
12 year, November/December time frame, that provided a
13 very brief summary with regard to the status of NRC's
14 review of that petition in noting that those issues
15 are still under review by the agency. And we have not
16 yet taken a formal agency action to close and
17 disposition the recommendations from the state in
18 their petition with regard to rulemaking actions on
19 our part. So it's still under active review and
20 consideration. It is not lost, albeit it's been 3 to
21 4 years now since we've had the petition. But I just
22 want to draw your attention that in the intervening 2
23 years the September 11th events have caused us to re-
24 look and reconsider a number of actions, many of which
25 as I mentioned are included in the Nevada petition.

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1 MR. CAMERON: Okay. It's not lost.

2 DR. SOLER: Thank you.

3 MR. CAMERON: All right.

4 We'll go to Ed Wilds. But what I'd like
5 to do before we break is to at least do our segment on
6 participant interest. And I think we're sort of
7 getting our statements of participant interest in a
8 way here. But, as I mentioned before, that's an
9 opportunity for all of you to just give us 2 minutes
10 or so on what your major concerns are with this. And
11 when we go to that, I'd like to start with Abby, if
12 that's okay with you, Abby, and go clockwise.

13 So let's go to Ed for a question and then
14 we'll talk about participant interest.

15 Ed?

16 MR. WILDS: Yes. I'm trying to understand
17 where you're going to place the surrogate fuel element
18 inside the cask for the test and how you made that
19 decision, and how that will relate to the impact tests
20 for the fuel element because that will all have to be
21 linked together for public confidence.

22 DR. MURPHY: We have not made a decision
23 as to where in the canister or the cask the surrogate
24 element will be placed. I would appreciate your
25 comments. And one of the questions is, is one

1 surrogate element assembly sufficient? And if it's
2 not, or even if it is, where should it be placed and
3 if there should be more, where should they placed?
4 That is open to discussion and comment.

5 MR. CAMERON: Okay. Thank you.

6 Abby, would you like to start us off?

7 MS. JOHNSON: Sure. Thank you, Chip.

8 My name is Abby Johnson, and I'm with
9 Eureka County, Nevada. I'm their nuclear waste
10 advisor. Eureka County is one of the counties that
11 could be the host to rail spur to go from the Union
12 Pacific line south to Yucca Mountain. And we're the
13 first county, so we'd be right at the Y where the spur
14 would come off the main line.

15 So we're at the draining end of the
16 transportation funnel. Here's the funnel, here's us.
17 And so from our point of view, we're a very
18 unsophisticated rural county that's trying to make
19 sense of the many federal agencies that are involved
20 in this. And, of course, we're the first line of
21 defense when it comes to any kind of safety issue for
22 our residents. And so that's our perspective on this.

23 I was at the Nuclear Waste Technical
24 Review Board meeting last week in Las Vegas. They did
25 two panel meetings. And I heard the words "public

1 confidence" ten times, and I've already heard them
2 about ten times this morning. I don't know what that
3 means anymore. And before if the purpose of one of
4 the major 3 purposes of doing these tests is public
5 confidence, I think you'd better be darn sure of what
6 public confidence you're seeking and how it all works.

7 In just reading the document, public
8 confidence that models can be used as reliable
9 predictive devices. Public confidence that casks will
10 contain the waste in an accident. Public confidence
11 that the existing cask regulations, the existing
12 regulations that you have for casks are adequate for
13 today's materials and conditions. Public confidence
14 that the government and the nuclear industry are being
15 truthful about the hazards of nuclear waste
16 transportation. That's four kind of different public
17 confidences.

18 The other part about public confidence
19 that I'd strongly like to see as part of the equation
20 is common sense. And when I'm trying to explain to
21 the residents of Crescent Valley, Nevada what's going
22 on with this whole huge complex issue and they say
23 things like "Well, what if somebody shot a missile at
24 the cask, would it leak?" I go "Well, I don't know."
25 And they say "Well, aren't they doing these tests?"

1 Yes, but they're not going to do that, that's a
2 different thing and they're just going to model that
3 and that's a separate thing. And that does not build
4 public confidence.

5 And so the reason why I'm here today is
6 represent the draining end of the funnel and just to
7 kind of say don't forget common sense when you're
8 doing this. And remember the public isn't the people
9 in this room. The public is a different -- if you're
10 looking for public confidence, you have to be able to
11 explain your decisions to regular people and you have
12 to be able to figure out what you're looking for with
13 public confidence. And I'm happy to be the sort of
14 common sense public confidence meter today, if you
15 need that test.

16 Thank you.

17 MR. CAMERON: Thanks. We'll get you a
18 bell. But that is a good example of when we get to
19 the overarching issues of, you know, one of the
20 criterion, and that may be too precise a word, but one
21 of the criterion of public confidence maybe we should
22 have a discussion about what are the elements of
23 public confidence so that we can be a little more
24 precise about that.

25 Thank you.

1 Lisa?

2 MS. GUE: Again, I'm here representing
3 Public Citizen, we're a national nonprofit public
4 interest organization. And most of our 150,000
5 members, as well as many of the local and state based
6 organizations that we work in coalition with, are
7 living in states that would be highly effected by the
8 current proposals for high level waste shipments to
9 either Yucca Mountain or private fuel storage at Skull
10 Valley.

11 Beyond the specific scope of the Package
12 Performance Study we have long advocated for full
13 scale physical testing as a condition of cask
14 licensure. And so I guess one of the concerns that I
15 bring today is about the presentation of this study.
16 We are clear that the one time confirmatory tests
17 being proposed here is no substitute for upgraded
18 regulations that would require physical tests as a
19 condition of licensure. And there seems to be, again
20 getting back to this issue of public confidence a
21 little bit too, there seems to be some confusion as
22 this -- I don't know if it's presented or interpreted
23 as the be all and end all of physical testing for
24 nuclear waste transportation casks and the one time
25 response to the wide spread public concern about the

1 adequacy of regulations to guarantee safety.

2 Getting back to the specific scope of the
3 PPS, if we're going to talk only about a one time
4 confirmatory testing, we're interested in information
5 about cask failure points and we're concerned that the
6 draft protocol do not consider tests to destruction as
7 well as the limited scope in which tests are being
8 done, as Kevin mentioned earlier.

9 And then I guess I also bring a general
10 critique of the NRC's singular focus on risk informed
11 management. We feel that it's important to recognize
12 that the extreme consequences of some accident or
13 attack scenarios may warrant consideration even if
14 they carry a relatively low probability or an
15 undefined probability.

16 And finally, just a concern again about
17 the motives for this study and the timing of this
18 study. Since the NRC is likely to make a decision on
19 their private fuel storage license applications before
20 this study is completed. I'm also wondering, I guess,
21 how the decisions were made to hold these meetings in
22 Rockville, Chicago and Las Vegas and not for example
23 in Salt Lake City or in North Carolina where most of
24 the current nuclear waste shipments are happening.

25 So, looking forward to the day.

1 MR. CAMERON: Okay. Thank you. Thank you,
2 Lisa. And I'm going to put that issue in the parking
3 lot for right now in terms of how the meeting location
4 and timing, and come back and try to give you an
5 answer to that, okay? All right.

6 John Vincent.

7 MR. VINCENT: I'd just like to emphasize
8 for all the participants here that what we're really
9 talking about is a set of circumstances that deal with
10 extra-regulatory testing. The industry has believed
11 for a long time and continues to believe that full
12 scale cask testing is not a necessary condition of
13 cask certification and should not be employed as such.

14 There are a lot of things we do today that
15 we can do extremely well using component testing where
16 it's necessary, scale model testing and highly
17 efficient and much improved computer simulations which
18 will allow you to do testing multiple times over and
19 over again to understand what the true sensitivities
20 of the cask performance really are to real world
21 circumstances.

22 We've, all along in our regulatory scheme,
23 involved severe accident conditions as part of the
24 criteria for the development of the cask designs and
25 the certification requirements. That's still true

1 today. The requirements, as explained in the modal
2 study and follow on, are that one in 10,000 cask
3 incidents that you might think about in their
4 harshness or however you choose to characterize them,
5 might not be covered by the current regulatory scheme.
6 That's a pretty small fraction and it's hard to
7 imagine things beyond that that you could actually
8 come up with that would be a situation which might be
9 probably normally incident to transportation.

10 We're also concerned about public
11 confidence building. And we understand, in fact as Amy
12 pointed out, that there are various aspects to that
13 and those need to be understood. We're very much
14 interested in improving that as a matter of the
15 industry's performance. We would encourage the NRC as
16 part of this to make sure that they do things that
17 would facilitate that.

18 But having said that, I think it's
19 important that we recognize at the outset that in fact
20 doing these tests to accommodate scientific data
21 collection and doing them in support of public
22 confidence in whatever aspects that you may define in
23 terms of its elements, may in fact be mutually
24 exclusive or may in fact be in such a circumstance
25 that the NRC ends up satisfying no one, either the

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1 engineers or the public, if it tries to serve both of
2 these purposes with one test.

3 And we'll have other comments through the
4 day about the specific items. But I think up front
5 that's where we are.

6 MR. CAMERON: Okay. Thanks, John. And you
7 raised another point for the overarching issues
8 discussion, it's what's the relationship between these
9 various criteria, public confidence and for example
10 realism; how should they be balanced. So we'll get to
11 that discussion.

12 Let's go to Bob Halstead.

13 MR. HALSTEAD: Thank you, Chip.

14 State of Nevada has proposed full scale
15 cask testing for at least 15 years that I'm aware of.
16 And when St. Patrick's Day rolls around in a week and
17 a half, that'll mark 25 years since the first time
18 that I got involved with the full scale cask testing
19 issue. And in all that time I can't ever remember the
20 NRC holding a meeting solely for the purpose of
21 discussing full scale testing. So this is a special
22 occasion, and I acknowledge and appreciate the fact
23 that you are holding the meeting and that you've
24 invited the people who are around the table.

25 The proposal that Nevada has made is

1 described in a paper that I'm going to pass around.
2 And there are copies on the table outside the doors to
3 the room.

4 Essentially, our proposal differs from the
5 NRC's proposal in that we still believe that both
6 technical detail and public confidence in testing can
7 best be through a combination of mandatory full scale
8 regulatory testing of casks that's according to the
9 performance standards in 10 CFR 71. And then in
10 addition to that we'd like to explore the extra-
11 regulatory area through some combination yet to be
12 determined of computer simulations, scale model
13 testing, full scale testing, component testing.

14 We describe our approach to these tests in
15 the paper and we've attached costs to them given the
16 best of our ability to ascertain those costs.

17 From a public confidence standpoint, I
18 think that the way the NRC is handling the draft
19 testing protocol is a pretty good model.
20 Unfortunately, it contrasts sharply with the way that
21 the Commission and its staff have handled certain
22 other recent proceedings which have the effect of
23 undermining public confidence. Let me give you an
24 example.

25 Some of you have had a chance to read the

1 NIST contractor report on the Baltimore Tunnel fire
2 prepared for the NRC. It may surprise some of you to
3 know the history of that report. It may surprise some
4 of you to know that in July state of Nevada
5 consultants were barred from attending NRC meetings
6 regarding that report. We're still not sure whether
7 they had a legal basis for excluding us from those
8 meetings, but it sure as hell undermined our
9 confidence in the proceeding.

10 Further, the document as you can tell on
11 the publication page was prepared in August. It was
12 released about a month ago. And we were forced to
13 file a Freedom of Information Act, which as of last
14 count we've spent about \$2,000 on without receiving
15 the report.

16 We dispute the assumptions and the
17 findings of the report. And, frankly, this has
18 reached such a point that the only thing that's going
19 to allow us to have confidence in this report is for
20 the NRC to bring the authors, the contractors from
21 NIST to the meeting and we will be happy because we've
22 done a very detailed technical review of this report,
23 including the critique of the tests that were done at
24 the West Virginia University tunnel facility. And we
25 would like to go into those issues in detail. And we

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1 still believe and agree wholeheartedly with Ray
2 Manley's contention that the Baltimore fire ought to
3 be the standard that we look at to see if the thermal
4 test reflects what can happen in the real world.
5 Unfortunately, instead of having a technically
6 objective and unbiased report that captures to the
7 best of our ability what happened in that tunnel, we
8 now have a report that we believe is seriously
9 deficient both technically and in terms of public
10 confidence.

11 Thank you.

12 MR. CAMERON: Okay. And, Bob, just a
13 couple of clarifications. When you talk about the fact
14 that there should be a regulatory confirmation
15 component as well as an extra-regulatory, is that
16 pretty consistent that regulatory confirmation with
17 Lisa's point about bringing this into specific
18 licensing for a specific cask?

19 MR. HALSTEAD: Well, I don't want to be
20 presumptuous and speak for Lisa's proposal. Our
21 proposal is the same as it's been since 1997, which is
22 that we believe that each of the casks used for Yucca
23 Mountain shipments should preferably be tested full
24 scale as part of the certification process at the NRC.

25 Now, we understand there are a lot of

1 reasons why NRC doesn't want to go that way because
2 they regulate casks that are used for other shipments.
3 Because of the cost issue and, Bill, I hope we'll talk
4 about this this afternoon, our secondary
5 recommendation would be if the NRC doesn't want to do
6 that, perhaps the most appropriate way is for the
7 Department of Energy to put a procurement requirement
8 on its contractors that any of the casks used for
9 repository shipments would be demonstrated to meet
10 these tests.

11 I realize that this is now complicated by
12 the PFS proposal, and I haven't completely thought
13 through the institutional issues there. If there is
14 not a PFS facility, we calculate that over the next 50
15 years shipments to Yucca Mountain would probably
16 represent an excess of 95 percent of the spent fuel
17 shipments, and therefore that's why we focus that way.

18 MR. CAMERON: Okay. Thank you. And we
19 will be getting into the Baltimore tunnel in spades
20 later this afternoon.

21 Fred Dilger?

22 MR. DILGER: Fred Dilger, Clark County,
23 Nevada. Clark County Nevada is where Las Vegas is.
24 We are also at the region of the nuclear waste
25 shipments to the proposed Yucca Mountain facility.

1 Under three of the four possible rail routes to Yucca
2 Mountain, 85 percent of rail shipment will traverse
3 Clark County. If the waste travels by the mostly truck
4 option, Las Vegas and Clark County will have between
5 6 and 11 trucks of high level waste traversing it for
6 the duration of the program between 24 to 38 years. So
7 we have a definite stake in this issue.

8 First, I want to thank the NRC for having
9 these meetings, having these meetings early on in the
10 process. We did a lot of investigation talking to
11 other NRC staff about trying to identify whether or
12 not decisions had already been made and whether or not
13 these meetings would be a useful place for us to
14 participate. And everything we've heard back and
15 everything you've said today says that, yes, we are
16 early enough on in the process for our input to make
17 a difference. We appreciate that.

18 There are a couple of issues that we're
19 very concerned about. The first is NRC's commitment
20 to the testing program. We understand that in a draft
21 document like the protocols you don't want to be held
22 to any particular testing regime, but we would like to
23 see NRC's commitment to the process reflected in some
24 kind of discussion of the budget and a clear
25 statement, unambiguous statement that the NRC's

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1 dedicated to doing these kind of tests. We've heard
2 some of that today from Bill Brach.

3 We're also curious to find more about the
4 priority of the tests. From what we read in the
5 protocols it seems as though there is an emphases on
6 the drop test, and we're not sure if that's
7 appropriate.

8 We think the role of the stakeholders
9 needs to be clearly specified in this. As Bob
10 mentioned, it's alluded to and described carefully in
11 the paper that's available to you. The model for that
12 is the stakeholder participation and the TRUPAK 2
13 testing that went on for the WIPP facility. Alan's
14 point is very well made because they learned a lot in
15 those tests, and as I understand it, actually
16 redesigned the cask a little bit as a result of that
17 test.

18 The final area that we have a big question
19 on is in that cask selection. We'd like to hear some
20 more today about the rational for cask selection. I've
21 talked to Dr. Murphy a little bit before the meeting,
22 but to hear a little bit more about the cask selection
23 process would be very helpful.

24 That's all. Thank you.

25 MR. CAMERON: Great. Thank you. And we

1 will talk about cask selection and also I think during
2 the overarching issues discussion we'd like to hear
3 more about exactly what the TRUPAK public
4 participation process was, and get reactions of other
5 people to that.

6 Alan?

7 DR. SOLER: Alan Soler of Holtec.

8 I'm here, really, I would say wearing
9 three hats. One is, obviously, a vendor. The other as
10 a public citizen because I have two sons that are
11 directly in the business as well. And thirdly, as an
12 analyst to make sure that when these tests are
13 finished, that we get the most bang for the buck, if
14 you will. That we're not only able to prove that for,
15 what I'll call, reasonable extra-regulatory accidents
16 everything works as it should, but also be able to
17 instil public confidence that we can take the most
18 widely inconceivable accident and simulate it with a
19 computer model and prove that, yes, even in that case
20 everything still works or at least be able to know
21 exactly what fails.

22 MR. CAMERON: Okay. Thank you.

23 Bob?

24 MR. FRONCZAK: I guess I'd like to
25 reiterate some of the things that Dr. Soler just said.

1 We've never taken a really strong view on
2 full scale testing. But having said that, we see full
3 scale testing as an opportunity to answer some
4 questions.

5 The rail industry, their primary interests
6 are safety and efficiency; safety of the public,
7 safety of our employees and the efficiency of the rail
8 network and be able to deliver freight to our
9 customers. What we see as an opportunity of these
10 tests is a way to answer several questions that we've
11 got.

12 One, and I see this happening, is that use
13 this to input to the models to confirm that the models
14 are legitimate. Ultimately use those models to figure
15 out when the cask can fail. Take that information and
16 figure out are there any credible accidents that can
17 occur that would fail the cask. If that were to occur,
18 then we have to figure out how can we mitigate that.
19 And an example of that might be the cask, maybe it can
20 withstand a one hour fire, you know emersion fire, but
21 what if it's two hours? You know, is there a way to
22 vent and burn a car that might be impinging on that
23 cask within that period so that we can prevent any
24 failure of that cask.

25 Finally, a couple of other things. We

1 would like to figure out what can this test tell us
2 about crush loading. I know it's not designed to
3 address crush loading. But the back breaker analysis
4 or test might be able to help us understand that a
5 little bit better, because we feel that that's a
6 possibility in rail accidents.

7 And the finally, again, if we do have to
8 deal with an incident, what can we do to get that
9 situation mitigated, cleaned up so that we can get the
10 railroad back in operation.

11 Thank you.

12 MR. CAMERON: Okay. Thank you, Bob.

13 Ed?

14 MR. WILDS: Yes. You know, we support
15 Package Performance Study, we do have a couple of
16 little concerns. Looking down the future there's all
17 the discussion on, you know, this will confirm the
18 models and you're going to prepublish the criteria.
19 But, you know, we see no discussion of what if the
20 models are not confirmed, but where do we go from
21 there? And that gives us some concern. And with that
22 question in mind, then the other question is are you
23 choosing the criteria so that the model is confirmed
24 with a single test only in advance? You know, there
25 will always be that question.

1 So I think from our standpoint and my
2 personal standpoint that you'd have to do it more than
3 just a one time shot. The one time shot will enable
4 you to improve the models, fine tune them a little bit
5 and then, you know, use the second for subsequent
6 tests to confirm those corrections to the model. And
7 that way, also, you don't have that condition of well
8 whatever criteria you chose in the beginning, you
9 chose it to make sure that you confirmed the model
10 just because you only had one shot to confirm.

11 MR. CAMERON: Great. Thank you very much,
12 Ed.

13 Kevin?

14 MR. KAMPS: The main interest of Nuclear
15 Information and Resource Service is public safety and
16 not the nuclear power industry's bottom line or
17 schedule considerations. And so that's why we would
18 hope that the Nuclear Regulatory Commission would
19 require full scale physical testing as a part of the
20 certification of transportation containers, and that
21 that would include under water submersion, tests and
22 crushing loads and torch tests where propane tankers
23 could create an intense hot torch on a nuclear waste
24 transportation container in addition to what's being
25 talked about today.

1 And a concern that we have is that the
2 Package Performance Study not become a public
3 relations exercise, and that's what really concerns me
4 hearing the words "public confidence" again and again.
5 We really hope that, unlike the past, the films that
6 are being talked about in the PPS that will be taken
7 of the tests will not end up in the next NEI video
8 about how safe nuclear waste transportation is. That
9 was used as a lobbying tool leading up to the Yucca
10 Mountain vote complete with fake sound effects, which
11 was not the intentions of the tests in the late '70s
12 and early '80s.

13 And along those same lines, this trade-off
14 between public safety and industry profits, I think
15 the Davis-Besse fiasco is a good example of public
16 confidence would kind of follow from a devotion to
17 public safety. And the Nuclear Regulatory Commission
18 talks a lot about public safety, but as Davis-Besse
19 shows industry financial considerations sometimes
20 overrule NRC's interests in public safety.

21 And a recent NRC decision right around
22 Christmas time that terrorists attacks are too
23 speculative to consider during licensing proceedings
24 is another blow not only to public confidence but also
25 to public safety.

1 And attending the Advisory Committee on
2 Nuclear Waste in November I was amazed that during the
3 presentation of the Baltimore tunnel fire analysis by
4 the NRC, that the impact of the fire on the radiation
5 shielding in the container was beyond the scope of the
6 analysis. And so that came out during the question
7 period after the presentation that the radiation
8 shielding really was not considered. And so the big
9 question was well what about the safety and the very
10 lives of the emergency responders who would be sent
11 into a situation like that.

12 So time and time again we are seeing a
13 neglect of public safety. And that's a big concern of
14 ours and that's why we call for very vigorous testing
15 of these containers. And it's often missed, the very
16 deadly nature of the material that's contained in
17 these containers, and that's what we're most concerned
18 about.

19 MR. CAMERON: Okay. Thank you, Kevin.
20 And I think you sort of raised some of the points that
21 Abby may have been concerned about, just in terms of
22 being specific about what is meant by public
23 confidence. And we'll get to that Baltimore. Let's
24 talk about the shielding issue when we get to the
25 Baltimore tunnel fire and how that relates to the

1 draft test protocol.

2 Rick?

3 MR. BOYLE: Thank you. I'm Rick Boyle
4 with the Department of Transportation.

5 As a regulator of transport, I think our
6 objectives are very similar to what was presented by
7 the NRC in the earlier slide, so I'll not go through
8 their presentation again.

9 I think we all at DOT are interested in
10 the adequacy of the analytical methods in the extreme
11 conditions. And we're also encouraged and confident in
12 the discussions that are being brought forward now
13 that we're going to look at those results and really
14 bound them, and see yes it's extreme or it's extra-
15 regulatory, but how far can you go with that and what
16 does it really apply to and would further testing need
17 to be done to expand that envelop further.

18 So, we're encouraged and, again, confident
19 that that work will be done as we progress through the
20 study.

21 I think it's important to say this is far
22 from the first opportunity or the first time we or the
23 NRC have been involved in public safety. But I do
24 think it is early in our public involvement and public
25 participation or public conception efforts. And I, for

1 one, applaud the NRC. I think they're ahead of DOT in
2 these efforts. I certainly think it's a step in the
3 right direction, a big step in the right direction and
4 I would encourage that to continue and not be, well,
5 we did it once or twice because were told to and the
6 effort stopped. I don't see that as their attitude,
7 and I would encourage and push them to continue to
8 have these meetings. And we certainly would be
9 willing to participate whenever requested.

10 If I can look back to my role at the
11 Department of Transportation, we have a much broader
12 role in all radioactive material, so we're very
13 interested in the results and the work that's being
14 done in this Package Performance Study and its
15 applicability to all transport packages, all type B
16 packages. If you look at the numbers, no matter how
17 big a PFS project is or no matter how big a Yucca
18 Mountain project is, there will still be a lot more
19 transport of other packages. So we're very interested
20 in seeing how these results can be applied and how
21 they will effect other package designs.

22 And because the people right on the other
23 side of the wall from me, I do the radioactive
24 material but the rest of my office does all the other
25 eight hazard classes, I'm interested in being the

1 liaison and taking these results and taking just the
2 thought process behind this study into the rest of the
3 HAZMAT division and see where its applicability and
4 see how its usefulness can be applied in other hazard
5 classes.

6 Thank you.

7 MR. CAMERON: Okay. Thank you very much,
8 Rick.

9 And let's go to Mr. David Bennett.

10 MR. BENNETT: Yes. David Bennett
11 representing U.S. Transport Council.

12 We thank you NRC for our opportunity to
13 participate. We are a consortium of leading
14 transportation companies and stakeholder customers who
15 are obviously interested in the objectives of this
16 program and the success of it.

17 In our view this program enhances some
18 laudatory goals.

19 Number one, we reconfirmed the validity of
20 the quarter scale testing today. And two, the
21 enhancement of public awareness acceptance of the
22 package performance testing. These attributes we
23 believe are very positive. We do have some issues that
24 we do think need to be addressed by the program.

25 The cost benefit of moving to full scale

1 testing demonstrated above what currently is in place
2 of status quo?

3 Should the test serve as confirmatory or
4 should they move beyond the design basis?

5 In general, what would be the cost of the
6 program for the benefits derived and will the cost of
7 the program detract from dollars that are needed to
8 begin implementation of the program for Yucca
9 Mountain?

10 And will the U.S. Department of Energy,
11 will their role be as a benefactor in this process?

12 And is it better to be more inclusive than
13 exclusive with respect to the members of rail and
14 casks that are tested? Are we then necessarily
15 opening a Pandora's box for nuclear spent fuel
16 transportation given the fact that current cask
17 certification and test requirements have proven over
18 many years their ability to protect public health and
19 safety?

20 I guess in short we as a council share
21 common ground with respect to overall objectives of
22 this program. We definitely support safety. We are
23 open to testing protocols and we believe the beginning
24 of this implementation is an excellent place to start
25 with an open forum like this, and we look forward to

1 working further in any way we can as a council.

2 MR. CAMERON: Thank you, Dave.

3 Bill?

4 MR. SHERMAN: Bill Sherman from the state
5 of Vermont.

6 I think that at the time I represent 3
7 interests. First the interests of my own state of
8 Vermont. Secondly, I'm a ratepayer advocate, and so I
9 mentioned that earlier. And third, as a member of the
10 Northeast High Level Radioactive Waste Transportation
11 Task Force, in general a regional representative from
12 the northeast. With all those hats we're generally
13 supportive and I think it a very good thing that NRC
14 is proposing.

15 I have a couple of comments, and one I'll
16 try and say as quickly as I can. Public confidence is
17 something that comes out. Been said a lot, be said a
18 lot more probably. But here's an interesting data
19 point that I don't know if it got picked up. I don't
20 know if the Northeast participated in previous
21 discussions, in previous workshops, perhaps.

22 A number of years ago, six to seven or so,
23 four regional groups sponsored by DOE through Council
24 of State Government, and others, had the opportunity
25 to vote on cask testing, full scale cask testing. It

1 might be useful for you to know that the three of the
2 four groups endorsed it, but the Northeast group did
3 not endorse full scale cask testing, and I think
4 there's a reason for that.

5 In the northeast we have never bought into
6 the line that this spent fuel transportation that
7 maybe upcoming is novel. We've had routine spent fuel
8 transportation in the northeast for over 40 years. And
9 I think that probably that vote where we declined to
10 endorse full scale cast testing was because we are
11 more used to it than the other regions of the country.

12 I only put that out to say this: That
13 therefore, from the northeast perspective I don't
14 think that we feel that this effort is necessary for
15 public confidence, at least northeast public
16 confidence. But I do feel that it's useful.

17 Now, having said that it's useful, I have
18 one additional comment, and that is that there is a
19 real danger in using conditions beyond what might fall
20 within a reasonable bell curve of transportation.

21 Now I'll wear the ratepayer hat. It's
22 reasonable for ratepayer hats to pay for confirmation
23 of reasonable transportation accidents. I'm not sure
24 that it's reasonable for ratepayers to pay for
25 research projects to determine beyond reasonable bell

1 curve accidents and certainly not determine tests to
2 destruction. That's not a reasonable item from our
3 point of view or from a ratepayer point of view.

4 And I think that concludes the comments
5 that I have. Thanks.

6 MR. CAMERON: Okay. Thanks. And we have
7 to explore that realistic bell curve accident when we
8 go to the overarching issue.

9 Michael Conroy.

10 MR. CONROY: Michael Conroy again.
11 Department of Energy, Office of Environmental
12 Environment.

13 We are supportive of NRC's efforts in this
14 area and in the process that they are undergoing in
15 this meeting and subsequent meetings.

16 Looking at the reports, a couple of
17 statements that we thought were worth mentioning was
18 that, as NRC says, the current regulations and
19 programs, transporting spent fuel do result in a high
20 degree of safety. NRC's certification of spent fuel
21 casks has contributed to an excellent safety record
22 for transporting spent fuel. And the safety
23 protection provided by the regulatory system is well
24 established. As has been mentioned there's a long
25 history over about the past 50 years. There's

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1 substantial experience gained in the transportation of
2 spent fuel and high level waste. In the U.S. alone
3 there's been over 2700 shipments of spent fuel
4 traveling over 1.6 million miles. None of those
5 shipments has resulted in the release of the
6 radioactive contents. Similarly, there have been a
7 thousand more shipments made throughout the world with
8 similar safety record.

9 What is being proposed here should be
10 remembered that we're looking at examining the
11 adequacy of analytical methods used to estimate the
12 response to improbable extreme accident events, not
13 something of the ordinary every day occurrence. We
14 anticipate that the tests described in the test
15 protocols or as further developed will demonstrate the
16 validity of computational methods that are used to
17 model the response and should enable us to use those
18 type of method. We would like to see that NRC make
19 clear that these tests are not being proposed as new
20 standards for package certification, but rather for
21 the validation of the computational methods.

22 And also we'd like to emphasize that the
23 test condition could be correlated to real world
24 conditions of transportation as some of the
25 discussions earlier about correlating drop heights to

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1 speeds to what it means on yielding surfaces versus
2 unyielding surface so that people can have a better
3 appreciation of the events like those and to real
4 efficient transport.

5 Thank you.

6 MR. CAMERON: Okay. Thank you very much,
7 Michael.

8 David?

9 MR. ZABRANSKY: Okay. Dave Zabransky from
10 the DOE Civilian Waste Management program. Mike's
11 program is actually working with licensing development
12 operation.

13 From our perspective versus Mike's
14 department, I would also just like to add that at
15 least our role is to facilitate and not to
16 participate. We do hope that you do define public
17 confidence because it will help with public perception
18 of this issue.

19 MR. CAMERON: Okay. Thanks, David. We'll
20 look forward to DOE providing us any information we
21 need today.

22 Charlie

23 MR. PENNINGTON: Thank you. An awful lot
24 of big comments. I will say I'm speaking from the
25 international viewpoint. Obviously a substantial

1 fraction of tests have been done over the last decade.

2 I think that there's a misalignment here,
3 at least my perspective being objective in cast
4 program . I'm looking for firstly casting alignment.
5 I'm looking for a little better alignment. I believe
6 there's probably a divergence or at least a difference
7 a difference in perspective between the capabilities
8 of our analysis method and the demonstration of those
9 analysis methods.

10 I hear the discussion here about upgrading
11 regulatory models and we in industry, I believe, have
12 a fairly high confidence level in what we've taken our
13 modeling to.

14 This is a by-the-by, and to go back a
15 little bit. Bill's folks have posed a number of
16 upgrades and modeling capabilities over the last few
17 years and appear now at the point of being able to
18 predict millisecond-to-millisecond deformation in
19 scale model and in some cases a full scale component
20 test. We predict incredibly accurately at the
21 conclusion of the tests by confirmation those
22 deformation, and we have G results that are remarkably
23 been within an incredible amount of accuracy to the
24 actual performance.

25 So, I sense a disconnect here between the

1 level of achievement with the industry and a getting
2 a regulatory approval and what the regulatory body is
3 designed to take its regulatory confirmatory analysis
4 methods, too. So I think there's a little difference
5 of perspective there.

6 Secondly, I'm surprised at how much my
7 feelings resonate with some of the folks on the other
8 side of the table. I believe that if you feel
9 objective here is your first objective, you listed
10 your first objective today contrary to the way you've
11 listed in your protocol as is the public confidence.
12 And for the types of accidents you're looking at, and
13 I would endorse wholeheartedly my colleague from the
14 DOT and the chairman's comments, I think they're right
15 on the money. There is a very grave need to make sure
16 that the testing does lend to public confidence. And
17 to this extent we're not only extra-regulatory, we're
18 supra regulatory in the testing. So my own feeling is
19 I believe you have the opportunity to do something
20 that I've been kind of harping on, similar to what Bob
21 has been harping on. I believe comparative hazard
22 assessment, a fundamental. I believe that public
23 understanding is fundamentally based on informed
24 consent. And the only way you can do that is to spend
25 some money in relative assessment. I think Dr.

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1 Einstein had it right; it's all relative. I believe
2 that's really an element, spending some money at
3 Sandia to do some other analysis upgrades. I believe
4 there should be some money channeled to work with
5 compared hazardous testing and I think DOT would be a
6 very appropriate participant in that. And I think
7 I'll be giving you more details on that by the end of
8 the day.

9 MR. CAMERON: Okay. Great. I was going to
10 ask you to explain what you mean by relative hazard
11 assessment, but you'll be going into later, so we'll
12 wait for that. Okay.

13 MR. MANLEY: Ray Manley from the Maryland
14 Department of the Environment. I'll just briefly go
15 over again some of the comments that I made earlier.

16 We have a large number of stakeholders in
17 the state of Maryland. We're very concerned in regard
18 to conditions of casks that may result from a
19 situation similar to the Howard Tunnel incident of
20 July 2001.

21 Looking over the testing protocol, one of
22 my major concerns is there just doesn't seem to be a
23 clear fail criteria. I realize that the purpose at
24 this time is the evaluation of the adequacy of the
25 analytical method and the model used currently to

1 credit the cask. But the results of these tests
2 doesn't seem to say how that analysis and comparison
3 is going to be made. And if -- and I would like to
4 leave this meeting with clear ideas as to whether this
5 type of testing is going to be sufficient from a
6 temperature standpoint to stimulate the environment of
7 that tunnel fire that occurred. And at this point
8 looking at the test protocol, I don't see anything
9 indicating maximum or minimum temperature criteria
10 that way. Even though not being an engineer I can
11 intuitively see that it may be very difficult to test
12 these, more expensive to test these casts to the point
13 of failure. It seems reasonable that with these tests
14 you might be able to come up with a more adequate
15 method to predict these tests to the point of failure
16 using the model.

17 Thank you.

18 MR. CAMERON: Okay. Thanks, Ray.

19 Mark?

20 MR. HOLT: I just want to briefly clarify
21 the role of the Congressional Research Service. I
22 take any public policy issues. Basically we serve any
23 member of Congress that has any concern in the entire
24 range of this phase and we try to serve that. I know
25 that there are members that have all the past studies.

1 These cast studies are an extremely important element
2 to raise. They are important to the findings they
3 study. Keep in mind the effect of all the objections
4 raised -- transportation, etc.

5 MR. CAMERON: Okay. Great. Thank you very
6 much for that reminder, Mark.

7 We've gone overtime, obviously. Started
8 late. But I think that this has been a useful
9 foundation and I think there's been a lot of useful
10 information already provided in terms of identifying
11 issues. But also showing where different people are
12 on the spectrum of opinion here.

13 Let's take a break. We originally
14 promised a half hour. I think we're going to try to do
15 20 minutes and come back around 11:30. And then we'll
16 see if we can go through some things quickly and still
17 take a lunch break around 12:30, including audience
18 participation. But I think we have time.

19 We'll see you around 11:30.

20 (Whereupon, at 11:13 a.m. to 11:44 a.m. a
21 recess.)

22 MR. CAMERON: Okay. Let's get started on
23 what we called overarching issues, and just reviewing
24 what we talked about this morning. I just wrote some
25 of the overarching issues down that you already raised

1 and might want to discuss.

2 Which criteria should be used? I think
3 the staff might have all be objective.

4 What is public confidence? Abby raised
5 that and a number of other people talked about that.
6 Maybe we can put a definition on what are the
7 parameter of public confidence so it just doesn't
8 become sort of a mantra. That's probably the wrong
9 word, but what is public confidence.

10 What is realism? And Bill Sherman talked
11 about realistic bell curve accident.

12 What's the balance between public
13 confidence, realism? The other one was further
14 confirmation, I think, of existing models.

15 We heard some process issues. Bob Halstead
16 talked about using a process such as we used with
17 TRUPAK to help advise the NRC on -- and I'm taking
18 liberties with advise the NRC, Bob. I'm not sure what
19 you meant.

20 MR. HALSTEAD: That was Fred's.

21 MR. CAMERON: That was Fred's. Okay. I
22 don't want to give the impression that the state of
23 Nevada and Clark County are interchangeable. Much
24 different. But Fred could talk to us a little bit
25 about that.

1 Lisa raised the issue about why were these
2 locations chosen, the implication.

3 Maybe we need more meetings. Rick Boyle
4 said keep the meetings going.

5 I don't know if this last one is an
6 overarching issue or not, or what happens if this
7 model isn't confirmed? I mean, is that an overarching
8 issue.

9 But at any rate, those are some of the
10 things that I heard. Is this about right for starters
11 to have a discussion and get some interchange between
12 people?

13 John?

14 MR. VINCENT: Well, I think that my
15 comment about one test satisfying both issues are both
16 of your test wants; that is the scientific data versus
17 real world or testing I think is a very good one that
18 should be up there. It goes to a lot of those things.

19 MR. CAMERON: Okay. Let me make sure that
20 I capture that one correctly. The lead point is --
21 why don't you state it rather than having me.

22 MR. VINCENT: Well, I think what I said
23 originally was that for the purposes of the testing
24 here, it may be that trying to do what you might do
25 for designing a test for public confidence, whatever

1 elements you ascribe to that definition, may not be
2 the same as the ones you would employ if you were
3 trying to get a good set of scientific data to
4 benchmark codes, whatever. And as an overarching kind
5 of thing, that leads you then in several different
6 directions before you even get to the point of what
7 are the acceptable test criteria, what are the
8 acceptance tests for the data that you get as a result
9 of the tests. And then also it addresses most of the
10 other things that you put on the table there.

11 MR. CAMERON: Okay. It is a real
12 overarching question of can you really satisfy all of
13 the objectives that are laid out in the test protocol
14 with one test. And do you need to select one
15 objective as a priority and base your test on that.
16 I think let's talk about that, but let me just go to
17 Bob and down to David and Mark first to make sure we
18 have all the issues. But I think that you're right,
19 that is a key issues.

20 Any other suggestions here?

21 MR. HALSTEAD: Yes. I want to save
22 speaking to that issue until we talk about issues. But
23 a holistic step back from that issue, the larger
24 process issue, both Amy and Bill on different
25 occasions over the last 2 weeks have assured us that

1 from the NRC perspective everything is still open.
2 And that's such an important issue. I want that put up
3 as an overarching issue; that because of the technical
4 elegance of some of the portions of the test protocol
5 there may well be a tendency of some people reading
6 that document to say "Okay, this is what they've
7 decided." And, frankly, in a couple of areas that was
8 my own feeling, and so that's why we've raised that
9 issue. And if that is the case, and I'm going to take
10 them at their word because you know when we don't like
11 something the NRC does, we don't have any shyness
12 about telling you about. But this, I think, is a very
13 important and positive exemplar for public
14 participation, the approach they have taken.

15 So, for example, Fred and I will be
16 looking at our own proposal and trying to find common
17 ground with the NRC's proposal informed by the insight
18 that John has just laid on the table here; that if
19 it's really possible for us to economize by
20 accomplishing more than one object by a hybrid
21 approach to what we've suggested and you've suggested.

22 I don't want to be made a fool of. I'm
23 assuming that you've given us -- I mean, I make a fool
24 of myself many times. But if you've told us that this
25 is an open process and you're not locked in on that,

1 then that we're going to take you at your word and we
2 hope everybody else will.

3 MR. CAMERON: Thank you. Thanks, John.

4 Let's go back to that and deal with that
5 first off, because that's an important issue. And then
6 I think John is right, that what he's saying wraps up
7 a lot of these -- let me get some further thoughts
8 here before we delve into this.

9 David?

10 MR. BENNETT: Yes. Public confidence has
11 been an issue and I think NRC recognizes that's
12 important. But a comment was made by David during the
13 break that really brought a big point. There is a
14 point between public confidence and public awareness.
15 And Bill alluded to the fact that we are not inundated
16 with something new all of a sudden. Some of their
17 very fuel we're speaking of has already been
18 transported one, two, maybe three times. And I think
19 NRC has a track record that is almost, maybe not
20 perfect but close because it's been so many years so
21 well.

22 I'm not sure we would gain a lot by going
23 back to square one when we have a comfortable solid
24 proven base to at least begin. And I appreciate that
25 in the test protocols that they did leave open the

1 fact that we have done this many times, and it's not
2 new. We could maybe improve due to technology.

3 But I think a key point, public awareness
4 and public confidence are not the same thing. And I
5 think the public generally is not in this room, but
6 they are not terribly aware of all that has been done
7 in the technological sense, just the fact whether it
8 makes the news or not. So I think that's a
9 perspective we need to remember that we had it pretty
10 tried and true to some points.

11 MR. CAMERON: Okay. I think that that's
12 part of our discussion of what is public confidence.
13 Kevin and others raised the point that, well public
14 safety really leads to public confidence. And I think
15 you're pointing out, although you and Kevin may
16 disagree ultimately, I don't know, but you're saying
17 that track record in making the public aware of that
18 is one element of public confidence.

19 Let's get some more suggestions on this.
20 But I guess what I'm looking for is to make sure that
21 we have, and we can't discuss everything obviously,
22 that we have the major questions for discussion.

23 Bob Fronczak, did you want to offer
24 something?

25 MR. FRONCZAK: It may be incorporated in

1 the issues you already have up there, but I just
2 wanted to reiterate it, and a couple of people have
3 mentioned it. We need to make sure that we can use
4 the information that's generated through this work to
5 figure out how that relates to real world accident.

6 MR. CAMERON: Okay. I read that the same
7 as the realism, realistic bell curve accidents. We're
8 talking about the realism part of the equation?

9 MR. FRONCZAK: If that's what you mean by
10 realism, I guess I'm satisfied.

11 MR. CAMERON: Okay. Anybody want to do a
12 quality check. When we talk about realism what Bob
13 said, that's -- okay.

14 MR. HALSTEAD: I do disagree there, and I
15 don't know if Bob's thinking this. But for example,
16 I'm not sure the Baltimore rail fire, where that falls
17 on the bell curve. And I don't want the bell curve
18 constraining what we deem to be a credible maximum
19 severe accident. I've tried to avoid using that word
20 "worse case" for a while. But isn't clear what
21 determines realism to different people around the
22 table.

23 MR. CAMERON: Yes. And I wasn't trying to
24 say that. I just wanted to make sure that I had the
25 same concept. But I guess, Bob, what you're saying is

1 that just like you, we need to talk about what are the
2 elements of public confidence. The other point is
3 what is real or what is realistic. Is that the point
4 you're making?

5 MR. HALSTEAD: Yes. And there's quite a
6 bit of transcript on this from the earlier PPS
7 meetings. It's one of the things that was only
8 partially captured I think in the Issues Report. And
9 some of it may be in that fifth task on redefining the
10 eventuries and the frequencies based on updated
11 accident data. Because I know, for example, we put in
12 20 severe accidents that had occurred since the modal
13 study that we thought we were kind of analogous case
14 studies for different types of insults to the cask.
15 And we have not yet gotten any feedback from Sandia on
16 how they handled that. That was our way of defining
17 realism by saying based on the NTSB accident reports
18 these, these and these real world accidents are what
19 we think you should consider whether those type of
20 accidents fit your probabilistic model or not.

21 MR. CAMERON: Okay. That's definitely an
22 issue we need to discuss.

23 Lisa?

24 MS. GUE: I was just going to suggest as
25 an overarching issue the question of how does this

1 study interact with the NRC's other specific licensing
2 programs, I guess. One of those is just a general
3 issue of the licensing regulations for nuclear waste
4 casks. And the other is the reality that although
5 this is being put forth as a generic study, that there
6 are two specific proposals on the table right now that
7 would drastically increase the amount of high level
8 nuclear waste that's being shipped. And the issue or
9 the question, I guess, that I had raised earlier in
10 the comment time of, you know, that is raised by the
11 fact that this study is not scheduled to be concluded
12 before the NRC is scheduled to make a decision
13 regarding the private fuel storage issue.

14 MR. CAMERON: Okay. All right.

15 Mark?

16 MR. HOLT: I would add as an overarching
17 issue cost in the sense of how much is reasonable
18 total amount to devote to this effort. Because that
19 sort of seems to be implied that the current proposed
20 program would not amount -- and anything proposed
21 would have to do something else or -- to be accepted.
22 So that would be an overarching issue to me.

23 MR. CAMERON: In other words, don't you
24 have to ask the cost question in terms of is the cost
25 worth the benefits. And that gets into, I guess, goes

1 back to John's question perhaps.

2 MR. HOLT: Well, yes. If you do the cost
3 benefit, then you've got a more difficult analysis of
4 your total amount of the problem, would sort of be the
5 idea.

6 MR. CAMERON: Okay. Right.

7 Let's hear from Fred and Kevin. And then
8 let's start off on an issue and see where we go with
9 it.

10 MR. DILGER: I'm sorry to even suggest an
11 other overarching issues, because we might need a new
12 special set of overarching issues meetings. But
13 before I get to that, I just want to make a comment
14 that I think that implicit in the NRC's decision to go
15 forward with the Package Performance Study is a
16 recognition that we are on the verge of a different
17 and new kind of shipping campaign for these materials
18 and that our past experience is not necessarily a
19 perfect guide.

20 As we all know, approximately 19 times
21 more shipments will be needed to move waste to Yucca
22 Mountain than have taken place in the past. You know,
23 we currently have experience with about 1.4 million
24 shipment miles. Yucca Mountain could ultimately
25 require 181 million shipment miles. So I think it's a

1 different ball game. I think the NRC recognizes that,
2 and I think that's a good thing.

3 But in terms of overarching issues based
4 on some of the discussions I've had recently and
5 including this morning, I would like to hear some of
6 the very smart people we have around the table talk
7 about the issue of testing to failure. I think that
8 that is at the heart at some of these cost issues in
9 terms of marginal costs of additional tests. I think
10 it has to do with the difference between testing to
11 failure versus regulatory testing as well as
12 validating the models that we're currently using. So
13 I think that would be a very useful discussion to
14 have.

15 MR. CAMERON: Is the testing to failure
16 issue, is it all tied up in here with objectives or
17 should it be discussed with discussion of general
18 testing issues? And maybe we should rename this
19 workshop. Because this is the first workshop on
20 overarching issues. So we're going to have plenty of
21 other meetings.

22 What do you think, Fred? Is that testing
23 to failure part of -- it is all wrapped up in this
24 overarching or is it one of the general testing
25 issues?

1 MR. DILGER: I think it's a key possibly
2 central testing issue, but I'm not a testing experts.
3 We have testing experts here and I'd really like to
4 ask them.

5 MR. CAMERON: Why don't I just put an
6 asterisk there and see where we go. But testing to
7 failure has been raised, discuss it at some point.

8 Kevin, and then we'll come back to John
9 and then let's go to --

10 MR. KAMPS: I can mostly wait until we
11 breakout. But I just wanted to make sure that
12 terrorism was under realism and probabilistic risk
13 assessment in that same section there.

14 MR. CAMERON: Okay. When we get to what
15 is realism, we'll go to that.

16 John, did you have --

17 MR. VINCENT: Just a follow-up comment,
18 Chip. After I made my statement about the competing
19 needs of the two kinds of purposes that you had here,
20 you made the statement that we would probably have to
21 select one or the other and proceed down that path. I
22 don't think that's the only option. I think you can
23 probably accomplish both, you may not do it with the
24 same test.

25 MR. CAMERON: Great. Okay. Thank you for

1 that clarification.

2 Why don't we get this off. Why don't we
3 affirm this statement, concern of Bob's and everybody
4 I know has this concern. That everything is open at
5 this point.

6 Now, I guess the question is are there
7 things that would send the message that it's not all
8 open now? I mean, I'm going to go to Bill, the senior
9 manager on this, and let him start talking about it.

10 MR. BRACH: Let me if I can go back to my
11 opening remarks earlier this morning. I had mentioned,
12 and I felt it was important, and actually repeated it
13 from the standpoint that decisions on our part had
14 been on the Package Performance Study. And that
15 pertains to the cask, the cask selection, the types of
16 test, the test conditions, the test parameters. I
17 restated it twice because I thought it as important.
18 I think it's very important for the dialogue we're
19 having in this workshop in the future as well as
20 comments we receive that we, NRC, are looking too you
21 all to give us your views, comments, perspectives.
22 And this morning I clearly have heard a good spectrum
23 of inputs and comments and want that to continue.

24 But I will be short and say, yes,
25 affirming the earlier statement that the PPS test

1 protocol are staff's proposals for your and others
2 review comments and suggests, and they're open to
3 consideration on our part and change based on further
4 discussions, deliberations and recommendations.

5 MR. CAMERON: Okay. I guess that one of
6 the things to ask here is that, obviously, if the NRC
7 hears all the comments from the meetings, written
8 comments, it's conceivable that some part of what's in
9 the draft test protocol remains the same. I would
10 speculate that doesn't equate to the fact that
11 everything is not open at this point.

12 But, Bob, hearing what Bill said, do you
13 have anymore concerns about this. Is there anything
14 that you think the NRC should not do in this
15 intervening period that would indicate that it's not
16 open and then get some other reactions and I think we
17 can go on from this point?

18 MR. HALSTEAD: Well, actually, I've been
19 shocked by their candor and openness, and I'll give
20 you the best example.

21 There have been some statements in the
22 press that I was told were incorrect as an expression
23 of official policy about what the future role of
24 Sandia in this testing is. Now, understand, if
25 someone asked me where's the best place to do full

1 scale testing in the U.S., my first answer would be
2 Sandia. I've got the bias of most of the people who
3 have been involved with this topic for, you know, a
4 couple of decades.

5 On the other hand, as a matter of
6 credibility, avoiding the perception of conflict of
7 interest, meeting a smell test because millions of
8 dollars are going to be involved, the whole issue of
9 whether a commitment has been made to a particular
10 organization for future work that hasn't yet been
11 specified is an important matter of principle. And I
12 say this not to cause any pain to the people from
13 Sandia, but I specifically, you know, asked that
14 question and I was told that even that issue, because
15 it falls in future fiscal year budget requests, that
16 even that issue was open and subject to discussion.

17 So, again, I guess I'm trying to validate
18 what I think Bill is saying here and what Amy said
19 very eloquently at the Waste Management Conference
20 last week. And if I'm wrong, you know, straighten me
21 out.

22 MR. CAMERON: Okay.

23 MR. HALSTEAD: But I think it adds to the
24 creditability of the overall commitment.

25 MR. CAMERON: Okay. Thank you.

1 Let's hear any other comments on this, our
2 issues open at this point and then go onto the next
3 issue.

4 Lisa, were you commenting on this issue?
5 Go ahead, and then we'll go to Abby.

6 MS. GUE: Well, related to some of what
7 Bob was just saying, I guess definitely information
8 about how contractors are chosen for this project,
9 fire walls between the contractors, interests in this
10 project and others. For example, Yucca Mountain
11 contracts would be important under that category.

12 And secondly, I think one issue here that
13 would help is more specific information about where
14 all these comments are going. And I was disappointed
15 to hear that there will be no public comment
16 resolution document issued as part of this. And I
17 think one of the things that we come up against trying
18 to facilitate public engagement in government
19 processes is including the NRC's, is the sense that
20 people are commenting into a black hole.

21 And so acknowledgement of comments and
22 addressing those comments through a resolution
23 document is something that I hope is still open. And
24 also, just information up front about what the NRC's
25 time line is like between May 30th when we know the

1 comment period and the time when we should start
2 looking in the *Federal Register* for your response.

3 MR. CAMERON: Okay. So what you're saying
4 is that there's certain things the NRC could do to
5 enhance the fact that everything is open. And some
6 type of more specific or detailed comment resolution,
7 not a separate document necessarily, but some more
8 detailed documentation of how we respond to the
9 comment would enhance the belief that, yes, we're
10 open. Okay.

11 Go ahead, Andy.

12 DR. MURPHY: Just to go along with the
13 openness, as we told you this morning was that our
14 plans were to not have a comment resolution document
15 to address the comments and changes -- to make a
16 detailed plan. It's on the table. If you think that
17 it's very important or important at all, you think it
18 ought to be done, tell us so and tell us why and we
19 will consider it.

20 MR. CAMERON: Okay. And thank you for
21 that, Andy.

22 Anybody else want to just quickly talk to
23 the issue of a more detailed comment resolution
24 document?

25 And, Abby, do you want to talk to that and

1 give us your point on this open issue? Go ahead,
2 Abby.

3 MS. JOHNSON: Yes, I very much agree with
4 what Lisa said, and I think that the pledge of
5 openness is an excellent pledge. But the verification
6 of openness has to come with something more than just
7 the detailed test plan.

8 If at a minimum the detailed test plan
9 could say this was suggested, we adopted it or this
10 was suggested and we chose not adopt it and here's
11 why; something more formal than that or something more
12 specific. I'm used to the environmental impact
13 statement kind of thing where everybody comments and
14 then there's the justification of we incorporated it
15 or we didn't.

16 MR. CAMERON: So what you're suggesting is
17 that it doesn't necessarily have to be the most
18 thorough specific comment resolution identifying
19 specific commentors, but it could be something a
20 little bit less detailed than that, I guess.

21 MS. JOHNSON: Yes. I don't want to turn
22 this into an ordeal for anybody.

23 MR. CAMERON: Right.

24 MS. JOHNSON: I just think that there
25 needs to be some sort of accountability here. And so

1 something that says we heard you, or we think we heard
2 you, this is what you said, this is what we responded.
3 So that everybody's on the record about who said what
4 and what the agency response was is important.

5 MR. CAMERON: Okay. And did you have
6 anything else?

7 MS. JOHNSON: No.

8 MR. CAMERON: Before I go to Rob, I just
9 wanted to tell you that the response by the NRC to
10 this particular suggestion, if you're a response from
11 them, but I just wanted to emphasize again that the
12 NRC staff is here to listen to your comments and to
13 consider your comments. And they'll be very specific
14 questions that come up that we'll respond to or
15 suggestions. But staff is in the listening mode,
16 they're not going to be responding to everything that
17 you hear said around the table. That waits until we
18 sit and evaluate. I just wanted to put that in.

19 Anything else on the open issue? Charlie,
20 did you have something?

21 MR. PENNINGTON: Yes, I did. Without
22 beating a dead horse, I do kind of resonate with John
23 Vincent's comments that this testing is not going to
24 serve two masters and it's not going to serve 6 or 7
25 masters represented around the table here. But I

1 would suggest is that protocols is first document, and
2 I'm pretty confident that most of the comments that
3 are being generated here will not be solved to anyone
4 or maybe everybody's satisfaction here, but rather
5 following the protocols I would expect in concert with
6 normal testing to have a testing plan which may
7 incorporate some of this. And then following that test
8 procedure that I would expect to look at very
9 carefully, and I would expect that there would be due
10 process given, perhaps as we get down into layers of
11 details. So I would hope that if you say everything is
12 open, that that issue is not thoroughly closed out but
13 just the issuance of the final protocol document.
14 There are several other levels of documentation that
15 can be implementation state.

16 MR. CAMERON: Okay. So openness goes
17 through -- transcends the protocol document.

18 MR. PENNINGTON: Transcends. Very good.

19 Bob? Sorry, go ahead.

20 MR. LEWIS: Actually, that's very similar
21 to one thing I was going to say. The Package
22 Performance Study is kind of the first and the biggest
23 research project that we tried to use this public
24 participatory process on since 1999, and it's kind of
25 been a learning experience for everybody I would say.

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1 And, hopefully, some evidence as you move from the
2 handouts in '99 to the Issues Report in 2000, and to
3 the new protocols document, I hope people can see some
4 evidence that we've taken comments and put them into
5 the project.

6 And I also wanted to in the interest of
7 the topic of openness, talk about how the meeting
8 sites were picked.

9 MR. CAMERON: Okay. Thank you.

10 MR. LEWIS: I think it's a similar issue.

11 We had extensive meetings everyone knows
12 in 1999 and 2000, and those were in Las Vegas, and
13 Pahrump, and also D.C. The D.C. meeting, of course,
14 was picked because of its proximity to all the
15 relevant government offices and the headquarters of
16 all the relevant government offices in many
17 stakeholders, interest groups that are here in D.C.
18 area.

19 The Nevada meetings were picked not only
20 because of Yucca Mountain, but also because we thought
21 that people there are very interested, we could get a
22 high turnout at the meetings there.

23 In the interest of continuity, we kept the
24 meeting locations the same in 2000 and again this
25 year.

1 In addition, this year we added a meeting
2 in Chicago because we had a specific request to add a
3 meeting in Chicago. So we went ahead and did that.

4 Let me make it clear, there's been no
5 effort to exclude any location from meetings.

6 As I said it's a learning process. In
7 1999 or so we thought about having the meeting in
8 Utah. We were having other public meetings in Utah at
9 that time and they were within months of each other.
10 So I believe at the other meetings some Package
11 Performance Study type issues were probably talked
12 about, and there wasn't an effort to exclude them from
13 a specific Package Performance Study meeting, and
14 there still isn't today.

15 MR. CAMERON: Okay. And just on the
16 Chicago meeting and it's tied to the request, is that
17 that gives an opportunity for all the corridor states
18 that are effected to come to the table. Okay.

19 Thank you for that.

20 Now, obviously, that doesn't mean that we
21 shouldn't have or that suggestions won't be made that
22 we should have more meetings in other places. But
23 thank you for providing that.

24 And then we'll go to the big enchilada
25 issue I guess we'll call it.

1 Kevin?

2 MR. KAMPS: And my comment applies as much
3 to relationship to NRC regulations as it does to
4 openness. But it's just on the first page of the
5 executive summary of the PPS.

6 The PSS is not intended to involve the
7 development of new standards for transportation casks.
8 And I guess it applies as well to what if the model is
9 not correct. So it seems like a basic thing to be
10 open to changing the standards to strengthen them if
11 that's what's called for.

12 MR. CAMERON: You know, and that's a real
13 good point, and let's get that out on the table and it
14 ties into somewhat of Lisa's point about relationship,
15 NRC, regulatory program, perhaps to Fred Dilger's
16 comment. But you were shaking your head affirmatively
17 when you heard Kevin's comment. Can you response to
18 that so everybody can hear what our thinking is on it?

19 MR. LEWIS: Sure. I think if we have a
20 situation where we've done the package performance
21 study and however we define success for the test, we
22 didn't achieve that, we'll have a lot of questions to
23 answer. Those questions could involve whether the
24 model was correct, whether the cask design is
25 adequate, whether the regulations themselves are

1 adequate. I think it would be really speculative to
2 try to look at all the different scenarios that could
3 come without knowing the information that the tests
4 produced that we were questioning.

5 MR. CAMERON: But --

6 MR. LEWIS: But nevertheless, we would
7 certainly ask those questions if we were surprised by
8 these tests.

9 MR. CAMERON: Okay.

10 MR. LEWIS: And take the appropriate
11 action as well.

12 MR. CAMERON: I think it's important for
13 people to hear that. And when we write the next
14 document, we should keep those types of concerns in
15 mind, I guess, that one of the implications of what
16 Kevin is saying in terms of how we express that.

17 Okay. John, I'm going to ask you to lead
18 off this. Just briefly this issue is that the test is
19 not necessarily going to be the same to meet the
20 separate objective. And if you could just lay that out
21 and then let's get a discussion going, that might be
22 the simplest way to do it.

23 MR. VINCENT: Well, I think it's actually
24 pretty simple. It might hinge or I might start the
25 discussion by just talking about real world testing

1 I think which in some respects might be more amenable
2 to public confidence building in that you have
3 circumstance which provides a degree of familiarity
4 with the public at large as opposed to trying to
5 explain the physics of an unyielding surface.

6 And so having done that, then that leads
7 you to two avenues here to try to look at this. One,
8 in order to satisfy the competing needs is to do
9 something that will accommodate the needs for the
10 scientific data. And beyond that also to do something
11 that will fall into this other category of providing
12 tests that is familiar and provides an input directly
13 into the question of public confidence, whatever
14 elements to ascribe to its definition.

15 Is that what you were looking for, Chip?

16 MR. CAMERON: Let me ask you a
17 clarification on that. Obviously what your view is,
18 how you define public confidence, is going to
19 influence what type of test. And, you know, we heard
20 David earlier talk about public awareness. That would
21 be one of his elements of public confidence. And we
22 can go into doing that.

23 When you say scientific data, I guess can
24 we put a finer point on what you mean by scientific
25 data? Is that the realism confirming further

1 confirmation of models? What do you mean by that?

2 MR. VINCENT: Well, I think what I really
3 mean by that is the testing that you've decided you
4 need in order to produce data that will allow you to
5 benchmark the models. That's what that whole
6 objective is about. And you might do things there in
7 terms of the nature of the tests that guarantee you
8 get the results, not certain results, but you get
9 results that you can use for benchmarking purposes for
10 the computer codes. And that might not be at all
11 satisfying in the sense of trying to do something that
12 would represent a real world circumstance or a real
13 world circumstance may not allow you as an example to
14 measure the parameters you might want in that
15 circumstance, much less understand, for instance, what
16 the actual impact philosophy was so you can correlate
17 the data with other aspects of the data.

18 MR. CAMERON: So when you're talking about
19 scientific data, you're really focusing on
20 benchmarking the models and public confidence would be
21 separate, but there would also be the other category
22 of realism? In other words, what you mean here doesn't
23 get you to realism necessarily?

24 MR. VINCENT: Right. I didn't mean to
25 imply that, as you just said, that public confidence

1 could only be exhibited or influenced by a real world
2 type test scenario. I just said I think there are
3 aspects of that that are easier in terms of trying to
4 explain the situations that will be helpful in that
5 regard, whereas you still need all this particularized
6 types of data that you plan on measuring,
7 accelerations, de-accelerations, velocities,
8 temperatures for the purpose benchmarking. And those
9 kinds of things, you know, you try to explain that
10 even -- and I've tried to do it to my own family, it
11 doesn't work.

12 MR. CAMERON: Kind of feel sorry for your
13 family. You're at home testing this out on them. I
14 know Halstead does that.

15 MR. VINCENT: Well, they asked before I
16 responded, otherwise I wouldn't respond.

17 MR. CAMERON: All right. You know, I think
18 if we can get agreement or discuss these three
19 concepts, then I guess you can go back and say okay,
20 well here's the type of test we need. That leads us
21 into the specifics.

22 Let me open this up for people to comment
23 on this model, so to speak, that John laid out.

24 Bob?

25 MR. HALSTEAD: I want to do something

1 different, Chip. I like, by the way, the way that John
2 clarified the question. I like the way he answered in
3 reference to real world common testing at home,
4 because that's important.

5 I'm real concerned if we spend this time
6 beating this beating this issue to death that we may
7 not even get through a discussion of general cask
8 testing issues today. And, God, far be it from me to
9 want to cut off the discussion, but I will voluntarily
10 cut off my discussion of what I think are nonessential
11 points. Because I have some real important points like
12 the relative merits of rocket sleds versus drop tests,
13 the relative merits of different types of heat
14 shielding on cables to make sure that the expensive
15 instrumentation that we put inside an expense test
16 article actually produced meaningful data after we've
17 beaten the heck out of that cask and then we put it in
18 a fire.

19 So, with that said, I'm just going to
20 plead that people focus on their essential issues, and
21 I will promise to do the same.

22 MR. CAMERON: Well, we can go wherever the
23 group wants to go on this. I guess just from a
24 facilitation perspective, the one thing you need to
25 make sure of is that if you don't do this up front,

1 are you going to have to repeat this discussion all
2 afternoon when we get there?

3 In other words, what do you need to
4 establish or discuss in order to intelligently talk
5 about those things this afternoon? And whatever you
6 guys, this is your meeting, whatever you want to do
7 we'll do.

8 MR. HALSTEAD: Ten second follow-up. To me
9 this is the heart of the discussion between full scale
10 testing and scale model testing. And so I'd say this
11 one is now specified to be carried over into the next
12 discussion.

13 MR. CAMERON: All right. Charlie, what do
14 you have to say?

15 MR. PENNINGTON: I thought Bob was going
16 to say one thing, and I was ready to say something
17 else. So he --

18 MR. CAMERON: You looked like you were
19 ready to agree?

20 MR. PENNINGTON: Well, I do, as a matter
21 of fact, agree with what he said.

22 MR. CAMERON: Okay.

23 MR. PENNINGTON: No. I'm simply saying
24 that it is a fairly straight forward exercise to bound
25 the natural environment. I can tell you the

1 compressive strength of the hardest granite, I can
2 tell you the surface conditions, I can tell you the
3 maximum velocities we're going to have. And I think,
4 and this goes back to what I was saying and I think it
5 reverberates with John, that will be important I
6 believe for public confidence but will, as purely laid
7 out in protocols, not be as satisfying to the analyst.

8 For instance, I would advocate let's have
9 the conveyance, let's use a bounding surface at the
10 appropriate velocity and let's use that as a
11 demonstration and let the analysts do the best damn
12 thing they can to come up with the actual predictive
13 models. Because I think our modeling is in better
14 shape than others do. And I think that was what I
15 would say is the way I would express what Don is
16 thinking.

17 If we're going to do this for public
18 confidence building, then let's do realistic tests in
19 which we bound natural phenomena and do it that way.
20 If we're going to do something else, then here's where
21 I would go back and agree with Bob. We can do scale,
22 we can do component full scale; there's a number of
23 ways we can get data to support the analysts. Public
24 confidence will be built in something that resonates
25 with them. I agree, I do not like to explain

1 unyielding curves to a lot of people. My 19 year old
2 daughter, most especial. So it's a tough call, but
3 that's the way I would say it.

4 MR. CAMERON: All right. Well, maybe with
5 this in mind, this framework, maybe we can move on to
6 general testing issues. I want to check in, though,
7 with Abby who raised the important issue about what
8 are the elements of public confidence. And we've
9 heard a little bit here. Do we want to have Abby, do
10 we want have a little more discussion of that before
11 we go on to general testing issues?

12 MS. JOHNSON: Well, Chip, I would just
13 suggest that everybody keep it in mind. Clearly,
14 everybody is because they're still talking about it.
15 And just kind of see how it goes.

16 I think there's a lot of -- I agree with
17 Bob that there's a lot of -- not that this is my forte
18 -- a lot of technical information that needs to be
19 discussed at the meeting.

20 MR. CAMERON: I didn't know you were an
21 existential philosopher. Okay. Well, that's about
22 where we are with it, I think, but that's good.

23 All right. There were some process issues
24 raised. We talked about we don't necessarily, you
25 know, maybe we'd talk about Fred's model and TRUPAK

1 process later on this afternoon. We still have this
2 testing to failure issue. I guess what I'm doing is
3 I'm trying to figure out are we ready to move on to
4 general testing issues, as Bob suggests?

5 All right. And, Bill, let me check in
6 with you before we do that.

7 MR. SHERMAN: I just wanted to make this
8 comment, and that is in the overarching issue that
9 we're discussing, it appears to me that there is a lot
10 of compromise necessary from the perspective that I've
11 expressed from New England, I think that as much as
12 any an important attribute of this to us is confirming
13 the analytical models. Because we're willing to place
14 a lot of confidence in the analytical model.

15 On the other hand, we realize that there
16 are elements of the public that want to see the whole
17 thing smashed. And therefore, it's important to do a
18 whole system test rather than just the cask itself.
19 That is a compromise. But then there's another
20 compromise associated with, you know, how fast do real
21 casks go on the roads of the tracks and you want to
22 increase to prove extra.

23 So I think that all of us around the table
24 maybe should agree that the final product needs to be
25 an element of compromise.

1 For example, some around the table may
2 wish to see every single cask tested to destruction.
3 I know the hats that I put on, neither do we think
4 that's necessary nor would ratepayers, would we wish
5 to advocate that ratepayers pay for that. So I think
6 that it's important to register the necessity for
7 compromise around the table in the very issue that
8 we're talking about. And then I would add, I think
9 that overall that the proposal is fairly close to
10 hitting the mark for compromise.

11 MR. CAMERON: Okay. Thank you very much.

12 And let's keep the need for compromise in
13 mind as we go through our discussions.

14 Can we go to the general testing issues?
15 Bob, is that what you're suggesting at this point?
16 And do we need Andy to tee that up for us? Or Bob,
17 are you going --

18 MR. HALSTEAD: Yes, except what time are
19 you doing on your lunch break and all?

20 MR. CAMERON: What lunch break?

21 MR. HALSTEAD: Well, I mean, it's fine by
22 me. I'll stay here and drink coffee, you know.

23 MR. CAMERON: I know. I know.

24 Yes, it's 12:30. You want to try to do a
25 half hour of general testing issues and break for

1 lunch or do you want to go now?

2 NRC? Bill, what do you do think?

3 MR. BRACH: Since this is our place of
4 work, I would rather let the panel offer a comment on
5 their views on continuing now or breaking for lunch.

6 MR. HALSTEAD: We have it in the budget to
7 buy lunch, Bill, that's what I want to know?

8 MR. BRACH: That's an easy one. The short
9 answer is no.

10 MR. CAMERON: Go ahead.

11 MR. HALSTEAD: Well, I think we better
12 give people a break. Because otherwise when you get to
13 3:00/3:30, people are going to be pretty unruly.

14 MR. CAMERON: Unruly. Yes, well that's
15 something to look forward to.

16 Let me just ask -- okay, Bob, we'll do
17 that. Not that Bob is -- I think people are agreeing
18 with Bob. Bob isn't running the deal, and I don't
19 think he wants to.

20 Was anybody out here that had a burning
21 issue before we break? Because we said we would go to
22 the audience.

23 And while you're thinking about that, I
24 just wanted to introduce -- there's plenty of people
25 we could introduce, but NARUC was mentioned, and this

1 is Brian O'Connell. And maybe you just could talk --
2 could someone talk about it that is behind door number
3 one. Excuse me. Who are you?

4 PARTICIPANT: Well, most of the people --
5 Charlie knows me. Charlie knows me. I've worn many
6 hats with the vendors, with vendor companies. But I
7 have a new job right now. I'm manager of business
8 development for the German company called GNSI, Gmb.

9 MR. CAMERON: Thank you. And it's a
10 compliment to be mistaken for Brian O'Connell.

11 Brian, do you just want to tell just a
12 little bit about NARUC.

13 MR. O'CONNELL: Well, NARUC is the
14 Association of Public Utility Regulators in the
15 states. They've been tracking this program ever since
16 a reasonable compact was made that the federal
17 government would dispose of all high level waste and
18 that those who have benefitted, would pay for it. And
19 the ratepayers have been doing their job since 1983
20 and continue to do so. And we want the federal
21 government to do its part.

22 MR. CAMERON: Thank you, Brian.

23 Anybody else? Okay.

24 Let's go to lunch. And how about quarter
25 to 2:00? Is that okay.

1 (Whereupon, at 12:35 p.m. the meeting was
2 adjourned, to reconvene this same day at 1:52 p.m.)
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1 A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

2 1:52 p.m.

3 MR. CAMERON: Welcome back from lunch.

4 And I think we really had a great discussion of some
5 of these overarching issues, objectives, how do you
6 define public confidence and now perhaps somewhat
7 belatedly we're going to get into some specifics on
8 general testing issues. Andy Murphy is going to tee
9 that up for us, and I think that there were a couple
10 of things that we heard this morning. What does
11 testing to failure mean? Perhaps the need, as Alan
12 and others brought up, not to put all the eggs in the
13 one test basket, so to speak.

14 But let's have Andy tee it up and then
15 lets go to all of you for discussion.

16 And, Bob, if you don't mind when we go for
17 discussion, I'll start off with you, okay? All right.

18 DR. MURPHY: Okay. What are we going to
19 do? We're going to talk about general testing issues.
20 Well, all I'm going to do is sort of walk through
21 these bullets on the slide to get us thinking again
22 about what are the issues that we have in mind and
23 what do we want to comment in.

24 I think we've attracted a bunch of
25 attention this morning on the full scale testing

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1 question. Obviously, there have been some folks that
2 think we ought to be doing it and think we should have
3 been doing it for a long time. And there's some
4 others that seem to have taken the tact that scale
5 model testing will more than satisfy the requirement.

6 There's again a little thing about what
7 are the requirements that we're trying to satisfy, but
8 we will not go into that right here.

9 Question about the types and number of
10 casks to be tested. At this stage the NRC staff has
11 proposed that we look at a Holtec cask, a Holtec rail
12 cask and a GA-4 truck cask to obtain or to satisfy the
13 objectives that we have outlined for the package
14 performance study. I think what I'll suggest at this
15 stage is that this morning we spend a lot of good time
16 talking about the objectives. I think right now we'd
17 like to try to focus on these items as being, okay,
18 fine, this is what the NRC is trying to do. Are these
19 physical tests now the right way to accomplish those
20 objectives.

21 One of the other questions that came up
22 this morning was the type and number of fuel
23 assemblies that should be included in the test models.
24 At this stage we've proposed that there be a
25 surrogate, at least one surrogate in each of the casts

1 and by a surrogate, we're talking about an assembly
2 that very closely mimics all of the properties of a
3 real assembly, spent fuel assembly except it will be
4 non-radioactive materials.

5 One of the interesting little topics that
6 got kicked around this morning was the question about
7 test to failure. And for this part of the discussion
8 I'll use failure as being an open pathway to the
9 environment, to the outside of the cask.

10 The tests that NRC has proposed are not
11 tests to failure. Okay. We are going to challenge the
12 casks both by impact and by fire, but we're not
13 talking about creating a pathway to the environment.
14 They're not tests to failure.

15 The other thing that came up again this
16 morning, late this morning, is the question about
17 multiple tests. I had very definitely indicated in the
18 discussion of my points that this is a expensive
19 process and that at this stage we're planning on a
20 single test, one for rail and one for task, one impact
21 and one fire for each of them.

22 And I think in our minds it was probably
23 a little premature to start planning about testing
24 because of the expense and the process involved of
25 getting us to this point. And if we end up with a

1 problem, yes, it's something that maybe we should put
2 on the table to talk about the potential of doing
3 multiple tests. That then flips sort of back to the
4 question of scale because if we're going to doing
5 multiple tests, then maybe we should be doing scale
6 tests rather than full sized tests.

7 If this hasn't been a thought provocative
8 tee off, I can start over and really bore you. But
9 let's get with the discussion, as Chip has indicated,
10 and talk about some of these points.

11 MR. CAMERON: Great. Thanks, Andy. Good
12 tee up. I think I've captured most of those issues up
13 here.

14 And I'd like to discuss these
15 systematically. In other words, let's talk about one
16 issue and then complete a discussion.

17 MR. HALSTEAD: Why don't you leave the
18 slide up.

19 MR. CAMERON: All right.

20 Bob, you want to start us off. Have we
21 heard all that we need to hear about full scale
22 testing at this point or should we start --

23 MR. HALSTEAD: Well, I need to ask two
24 clarifying questions before I give you some comments
25 on this.

1 First of all, on this surrogate fuel
2 assembly, I'm curious if you've asked anybody what
3 it's going to cost to procure that and I'm curious
4 other than, you know, handling a LSA source what your
5 reason for using something other than a fresh fuel
6 assembly is other than cost. Because I figure you're
7 probably in the 150,000 to \$150,000 range. I haven't
8 checked fresh fuel prices lately. But is that too
9 high, John?

10 MR. VINCENT: Probably three.

11 MR. HALSTEAD: Really? Okay. Well, then
12 it's even worse than I thought.

13 MR. CAMERON: Let's make sure that we --
14 John, let's make sure we get this discussion on the
15 transcript, okay.

16 MR. HALSTEAD: That's the nice thing of
17 having good technical people by you.

18 So, one of the concerns that we have had
19 in the development of our own approaches to testing is
20 controlling the cost of what's inside the cask as a
21 test article. I personally think that your approach,
22 and again I've only had 20 work days to review it, of
23 using properly weighed dummies in a basket or in the
24 cells in the GA-4 is probably acceptable.

25 I think in the fire test when we're

1 talking more specifically about this, we might want to
2 talk about heat load if you assume that that's high
3 burn up fuel and what you want to simulate with a
4 heater in there.

5 And I have some concerns about where you
6 put that real fuel assembly mock up in each of the
7 impact tests.

8 But that aside, I guess just tell me about
9 this surrogate fuel. What is it going to have in it?
10 Clay pellets or -- I mean --

11 MR. CAMERON: Can we get an answer to that
12 and then let's go back up to the general testing
13 issues?

14 MR. HALSTEAD: Well, that is one, Chip.
15 That's a real important one because that's important
16 to understand the whole test article, it's not just
17 the cask, but the internals.

18 MR. CAMERON: Okay.

19 DR. MURPHY: We have not decided
20 specifically or proposed at this stage specifically
21 what would be in this surrogate assembly. The
22 surrogate assembly would be physically as close to the
23 real thing as possible or as practical.

24 The purpose of putting a surrogate
25 assembly in there is to give us an accurate place to

1 place the instrumentation. So that if we place the
2 instrumentation on a pellet, the stress and the
3 strains that we measure out of that are accurately
4 reproduce what's happened so that after we've done
5 fuel experiments we can take those actual stresses and
6 strains measures and understand how the fuel itself
7 would --

8 MR. HALSTEAD: Okay. Now whether there's
9 a special thermal issue, we'll save that for the first
10 test.

11 The second thing is I don't know what rail
12 cask types to assume might be offered up depending on
13 where the department's Yucca Mountain proposal goes.
14 But most of the discussion of rail casks is assumed
15 that you'd be testing the rail cask with a welded
16 canister. And that has a whole bunch of issues that
17 I don't want to get side tracked on, but are you
18 considering testing a rail cask that would be like a
19 transport only cask that doesn't have a welded
20 canister?

21 DR. MURPHY: It could be considered yes.
22 It would be considered.

23 We've taken a look at -- because I believe
24 in part we're talking about a cask that has some
25 reasonably likelihood of being used and has been

1 certified, take a look at it. We've got one cask that
2 has an NPC in it, a purpose canister and one that does
3 not. Now this again is to exercise our code, the
4 codes that we have available, both environment.

5 MR. HALSTEAD: Okay. All right. Well, let
6 me quickly address these issues. Full scale testing,
7 of course, our basic proposal is to test a full scale
8 prototype as part of certification or as part of
9 procurement. And the basic advantage that we see with
10 that package is that: (1) the performance of the
11 package. And in this case, you know, because we're
12 not going to put live fuel in it, you know we're not
13 going to take a radiation test to see if we've got a
14 loss of shielding, but we're basically going to do a
15 pressure test at the end. I assume that's going to be
16 the principle measure in most of the tests as I read
17 them in the protocol, and we've approached that, too.

18 I don't want to overly complicate this by
19 talking about full scale versus scale model for code
20 benchmarking. I just want to make the case here that
21 from the standpoint of convincing the public that the
22 casks that are being used meet the regulatory
23 requirements for cask performance. I don't think
24 anything will substitute better than actually doing
25 the sequential tests, which is the 9 meter drop, the

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1 puncture test, the 30 minute 1475 degree 800 degree C
2 fire test and then an immersion test.

3 One of the hybrid approaches to that that
4 I'm considering for next week is to defer the
5 immersion test and suggest that the common ground
6 between us is to do the regulatory impact test, the
7 regulatory puncture test and then depending on some
8 code runs, we pick a time for fanning the regulatory
9 fire at 800 degrees C or that we run a slightly hotter
10 fire for a shorter period of time. And then the
11 question is whether we pick a failure threshold based
12 on modeling or for the fire test we simply rely on the
13 instruments and run either the regulatory test or a
14 hotter test until we reach some failure threshold that
15 we've specified, in this case probably something like
16 a 750 degree C temperature on the fuel cladding, which
17 is where I think most of us would agree you'd
18 experience first rupture and you would assume that the
19 seals would have failed long before that.

20 MR. CAMERON: Bob, can I? Let me check in
21 with the group before we go onto the next issue. And
22 it seems like Bob is proposing a variation to the full
23 scale testing that's contemplated by the protocol. And
24 what I want to do is I want to get other people's
25 comments on --

1 MR. HALSTEAD: Well, could I just do two
2 sentences to tell you where to comment.

3 First of all, I think that that type of a
4 test would address the public confidence issue that
5 the specific packages being used meet the regulations.
6 Secondly, you would create some benchmark data, and
7 particularly for thermal. But then I'd add on to that
8 and say for addressing the determination of failure
9 thresholds, we could look at it at a number of
10 different approaches.

11 I personally have never felt that you have
12 to use a full scale model for the impact of puncture
13 tests for extra-regulatory, but of course I do feel
14 that for thermal. I just don't think there's any good
15 basis for scaling it.

16 So, I guess I'd say this. For regulatory
17 testing you use the full scale and you get the maximum
18 public confidence in addition to having given you the
19 basis of public confidence. You've verified the
20 measured physical data that the cask complies with the
21 performance standards in 10 CFR 71.

22 Then beyond that, I can see using a full
23 scale cask for thermal for the extra-regulatory part
24 of the test. I think there are problems with these
25 new cask designs if you go smaller than a half scale

1 replica. You know, I'm willing to discuss it, and
2 that's not an inconsequential thing. Because if you
3 use a half scale replica for the rail cask, you're
4 probably saving \$4 or \$5 million, and that's not to be
5 sneezed at.

6 I'm sorry. That's what I wanted to say.

7 MR. CAMERON: Okay. Bob has given us a
8 proposal for a testing regime that includes full scale
9 testing to give us certain results and something less
10 than full scale testing for other results. And he
11 termed it a hybrid. And I know that many of you
12 around the table probably instinctively know or picked
13 up on what he's talking about. Others of us may not
14 know specifically. But with that proposal by Bob, why
15 don't we go to talk about full scale testing.

16 What do people think about Bob's proposal?
17 And if we need to understand it more, we can ask him
18 about that. Al?

19 DR. SOLER: Well, I mean, first of all, my
20 personal feeling is that as part of this study having
21 nothing to do with regulatory requirements as they
22 exist, if you really want to do a complete job I think
23 you need three tests.

24 You need one which encompasses what I'll
25 call realistic conditions, which I think in your words

1 challenges cask. Then I think you need a structural
2 test which gets rid of the impact limiter because if
3 you severely challenge the cask, all you're really
4 doing is highly dependent on your impact limiter. The
5 results date, and by that I mean published in this
6 study, basically say that around 90 miles an hour your
7 impact limiter ceases to function. It's used up its
8 capacity. And if you wanted to push the cask, not the
9 impact limiter, if you wanted to push the cask into a
10 mode where you get significant deformations where you
11 are not running into accuracy problems with your
12 computer code trying to predict these deformations,
13 then you get rid of the impact limiter for this beyond
14 the challenge test and you pick a point. And you
15 deform that cask and then you benchmark your codes
16 against it.

17 As far as the thermal test, I believe it
18 should also be full scale and it should be performed
19 separately from the mechanical test, simply to avoid
20 problems with instrumentation, failure of
21 instrumentation during the mechanical tests and then
22 running a thermal test.

23 As far as defining a failure mode, a
24 failure in those two tests beyond challenging, I would
25 not be -- I cannot really define a failure point

1 because I'm more interested defining whether my codes
2 fail, whether my casks fail.

3 MR. CAMERON: Okay. Thanks, Alan.

4 DR. MURPHY: Excuse me, Chip. Just one
5 interjection here.

6 MR. CAMERON: Yes, go ahead.

7 DR. MURPHY: The calculations that Sandia
8 has done for us indicate that 60 miles an hour impact
9 limiter, it locks up fully. You begin to have a cask
10 test rather than an impact limiter.

11 DR. SOLER: Yes. So what I'm saying is if
12 you take your quote "second test" in my lingo, you
13 know you don't really need to build another impact
14 limiter, if you will. Because you've already gotten
15 rid of that. Just figure out what test you run to push
16 the cask beyond that. And get really large strains
17 and deformations and things opening up so that you're
18 going after confirming measurable numbers, not
19 millimeters or fractions of inches. Don't try to
20 predict whether a seal lifts off, because if your code
21 is in question then, I mean just the numerical
22 accuracy. Just let it lift off, let it bend in half if
23 that's what it wants to do, and see if you can predict
24 it.

25 I'm thinking of putting myself in the

1 place of a guy on the street who knows nothing about
2 finite elements or any of these fancy codes. If
3 somebody came to me and said "Look, here's a test,"
4 and this cask bent double, if you will. And here's my
5 computer code and it also predicted the cask bent
6 double. Now, wouldn't you now have confidence in that
7 computer code to predict any accident error to
8 postulate?

9 MR. CAMERON: Okay. We're going to
10 Charlie Pennington. And we've heard two separate
11 ideas, they're different from the test protocol in the
12 same ways. And I'm not sure what the correspondence
13 is between what Bob suggested called a hybrid and what
14 Alan suggested which you need these three tests. But
15 let's keep working this.

16 Charlie, you heard both of those, what do
17 you say about it?

18 MR. PENNINGTON: Yes. Let me start back
19 with Bob's original comment, and I would resonate on
20 this fuel assembly issue. And this goes right back to
21 the point we made this morning.

22 My personal opinion is you're wasting a
23 lot of money testing a fuel assembly in a cask. You
24 can instrument the hell out of that thing and you can
25 drop it separately and you'll know the accelerations

1 from your other testing. So you can test that fuel
2 assembly quite well outside of the cask and get better
3 data.

4 Now, granted if you're trying to satisfy
5 a public and you want the assembly in there for that,
6 then okay that's a different story. But if you really
7 want your best data and the easiest way to test it, I
8 would submit test that dummy fuel assembly outside the
9 cask. But that's in the eye of the beholder.

10 Going to Bob's points, I don't agree with
11 all of it, but I think there's a degree of moderation
12 there and modulation that I can go along with. I
13 think I would probably debate a couple of points, but
14 overall I think there's a good rational there.

15 And Alan's points, Alan I think you've got
16 the heart of an analyst. I don't think that the
17 numbers at the deformations you're talking about are
18 going to make an awful lot of difference. I think
19 when you start talking about stuff that is not only
20 off the bell curve, but off of about three other bell
21 curves, we don't really need that. But, again, if you
22 do -- somebody thinks they really need that, then
23 scale model is the way to get it. There's no sense I
24 think in going for a full scale test to develop that.

25 But, again, what I like about Bob's

1 position is that regulatory standards are really nice
2 because a 30 foot drop makes it nice and convenient
3 combined with an unyielding surface to basically say
4 that's an 80 to 90 mile per hour impact with bounding
5 natural surfaces. That's one of the beauties of a
6 regulatory requirement. And I'm not sure that when you
7 really get to the regulations that are going to be
8 imposed on these transports, dedicated trains, speed
9 limits; even considering terrorist attacks and
10 infrastructure interruptions that might make it worse,
11 I'm not sure that there's much beyond the regulatory
12 considerations. But I do like the concept of the
13 hypotheticals in the regulatory.

14 Now, you want to go something beyond that
15 for the analyst's sake and for the sake of improving
16 regulatory codes? Fine, scale model will do it.
17 Debate something about the fire test, I think, but hey
18 reasonable people can disagree reasonably. So I think
19 there's some middle ground there that could work.

20 MR. CAMERON: Okay. Reminding us of Bill
21 Sherman's watchword of compromise.

22 Lisa?

23 MS. GUE: First of all, I'm looking for
24 some more information, not necessarily right now, what
25 is the difference in properties between the surrogate

1 assembly being proposed and the dummy assemblies being
2 proposed. And I'm also interested to know, although I
3 appreciate that the fuel testing itself is happening
4 separately, what's the impact on cask performance of
5 the heat that would be generated in a real accident
6 condition from the fuel inside that presumably would
7 not be taken into account in this test conditions if
8 it's cold dummy fuel being used?

9 And then speaking a little bit to Bob's
10 hybrid proposal, and I spoke earlier about our
11 continued support for full scale physical testing as
12 a condition of cask licensing, I guess first of all I
13 did just want to add onto that that we're not quite as
14 convinced of the beauty of the regulatory standards as
15 Charlie is. And our advocacy for physical tests as a
16 condition of licensing is coupled with concern that
17 the regulations themselves need to be upgraded.

18 Beyond that, I think definitely full scale
19 tests are necessary. And in part that's because I
20 think the sequential testing is very important and it
21 is likely the case that these different -- these
22 different tests might be scaled differently so that
23 you wouldn't actually be able to use the same scale
24 model in an impact test as a thermal test.

25 And then finally, in terms of the extra-

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1 regulatory test, confirmatory tests, I want to get
2 back to the idea that we didn't discuss this morning
3 but that was up on the list of testing failure points.
4 And I wanted to emphasize again that I think
5 particularly for the thermal test and also the
6 submersion test, I think that information about
7 failure points is really what's most important.

8 How much have we done either technically
9 or for public confidence, if it is possible to
10 separate those two things, and certainly in terms of
11 public safety if we can give information about what
12 happens at a 90 minute fire when it might be the case
13 that at 92 minutes there's failure?

14 So that's just a very simple example of
15 why we advocate including looking for more information
16 about cask failure points as one of the main goals of
17 this kind of confirmatory study.

18 MR. CAMERON: Okay. Thanks, Lisa. And I
19 know you had a couple of questions.

20 MS. GUE: But I actually just wanted to
21 add one more quick question on there, which is how
22 many kinds of -- in response to the second bullet
23 point up there. How many kinds of transportation casks
24 are currently licensed or expected to be licensed by
25 the time, say, the Yucca Mountain shipments begin?

1 Just as an experiment the other day I called the NRC's
2 Office of Public Affairs with that question and was
3 unable to get an answer. There's no list on the
4 website and I was finally referred by the Public
5 Affairs folks to a DOE database of package
6 availability in general. So I think some information
7 about how many casks are out there from among which
8 the NRC is choosing is at least information that
9 should be provided as part of the study. And, again,
10 we would advocate that if we don't get our first wish
11 of regular physical tests as a condition of licensing,
12 then at the very least every cask model that's to be
13 used in Yucca Mountain shipments should be included in
14 these tests.

15 MR. CAMERON: Okay. Thank you, Lisa.

16 I guess thee were three questions posed.
17 What's the difference between a dummy and a surrogate?
18 Is that right? And what's the reaction, is it really
19 a legitimate test if you don't have that heat source
20 in there? And how many casks models or at least
21 number of casks? I'm not sure we can do all of that
22 now, but if we can do some of that, what I'd like to
23 do is ask Bob and Alan and Charlie, and others, you
24 heard Lisa's concern about what type of tests should
25 be done. Is there anything in the hybrid or the

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1 pretest or the pretest modified by Charlie in a sense
2 of scale modeling; can you talk to Lisa's concerns
3 from your perspective? Anybody, yes.

4 MR. PENNINGTON: Yes. I think I could
5 enumerate all the casks for you right now, but I don't
6 think that's going to -- take time.

7 The testing to failure is getting into an
8 issue that's been raised quite a bit, and I do not
9 agree at all with Andy's definition of failure. I do
10 agree with it in a regulatory sense, certainly, and
11 well before that.

12 In a regulatory test testing code to
13 standards in which you have at least two orders of
14 magnitude apart, so in a supra regulatory test I do
15 not agree at all that the no cask to the environment
16 is a failure criteria.

17 So, again, reasonable people would have to
18 agree on what is failure, and that I don't think we're
19 going to get there today. But I think that failure
20 testing, again, if it comes down to budgets and what's
21 most important in prioritizing, then want to finish up
22 -- and Bob, I think you probably do a bit of this, do
23 at the end some failure testing. If you want to do
24 testing to failure and provided you get a decent
25 definition of failure -- I don't think that that's

1 necessarily a problem. But I think where the real
2 problem comes down to is how do you define failure?
3 Because I've got a really different definition of
4 failure, understanding of what I believe failure than
5 other people. It's a matter of trying to establish
6 what that is.

7 Now, that was the one point of failure
8 that stuck in my mind. Was there something else that
9 was as important that I didn't get?

10 MR. CAMERON: Okay. Thanks, Charlie.

11 Go ahead, Bob. Then we'll go to Bob.

12 MR. LEWIS: I just want to talk about the
13 types of cask designs that we have certified already.
14 And I noticed in Bob's and Fred's paper on the second
15 page there's a table of all the current recertified
16 cask designs. That table came from a letter, I think,
17 that the NRC wrote to Senator Reed. That's still
18 current as far as I know.

19 Every year we publish a compilation that
20 includes all the certificates for certified cask
21 designs. And anybody that wants a copy of that NUREG
22 document, just let me know and I'll get you a copy of
23 that.

24 As far as the number of designs that would
25 be approved by the time Yucca Mountain or any other

1 project comes to light, NRC really doesn't control
2 that because it depends on the number of applications
3 we would get from the vendors of the casks.

4 And, in addition, we don't have any
5 information on the actual number of casks of each
6 design that are produced. Once we approve the design,
7 the people that own the cask design can make as many
8 of those casks as they'd like.

9 MR. CAMERON: Okay. Thanks, Bob.

10 Bob?

11 MR. HALSTEAD: Yes, let me address a
12 couple of issues.

13 First, on the types of numbers of casks,
14 I think an important issue for NRC based, obviously,
15 on the input that we give you as stakeholders is to
16 decide exactly what you want to address here. Let me
17 break it down into three groups of casks.

18 You have, first of all, casks that might
19 be used for shipments to Yucca Mountain. Now most of
20 the assumptions based on the Department of Energy's
21 plans have been that pretty much all the trucks shall
22 be GA-4 or GA-9 new high capacity truck casks. And
23 the assumption has been made that some variety of rail
24 casks will be used. Some may have canistered fuel,
25 some may be transport only. And right there there are

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1 a number of uncertainties.

2 Now, Charlie, I don't know what your plans
3 are for extending the life of the NAC-LWT, that's an
4 untested cask but it's a work horse. It's been the
5 work horse of the industry. And I certainly can
6 conceive of a lot of shipments being made from the
7 older reactors for another 20 years or so because
8 there are reactors that cannot handle or don't have
9 the setdown space. They may have the crane capacity,
10 but for a number of reasons about 10 or 12 of the
11 older reactors may not be able to handle the GA-4 cask
12 or GA-9 cask.

13 So even if you're looking at enveloping
14 your choice of cask designs based on what might be
15 used for Yucca Mountain shipments, you may want to
16 consider an existing model cask.

17 Secondly, if you go with the new cask, I
18 don't know if anybody's ordered one yet, a GA-4 or GA-
19 9, but we've heard different stories about lead time.
20 And, boy, all of them are all long.

21 Now, this is good for you, Bill, in terms
22 of your budget planning cycle. But it certainly
23 sketches out the schedule here. It may well be, and
24 particularly if we want GA to install thermal couples
25 in that cask to facilitate testing, you may have a

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1 considerable time.

2 So, what I'm saying is the issue of
3 selecting just the truck cask, if you're assuming
4 Yucca Mountain shipments is not in and of itself an
5 easy thing. And while I would probably come down with
6 your staff and your consultants in saying if I had to
7 pick one right now, I would say it would be the GA-4,
8 that's kind of a strawman out there because I haven't
9 had a chance to discuss cost and availability and a
10 bunch of other issues, and maybe NAC will donate a
11 NAC-LWT.

12 Then I'd raise a question, Charlie, if you
13 do that, then that would raise a question in
14 everybody's mind whether they ought to test that one.

15 So then the other issue is the PFS
16 facility, and that considerably complicates this.
17 Now, unless something changed, and correct me, John,
18 but you know my understanding is that PFS unless
19 there's an emergency that requires a welded canister
20 being opened, doesn't have any intention of doing any
21 kind of fuel inspection when casks would be received
22 at the proposed facility. Now, that's quite a
23 different proposition than what Nevada thinks will
24 occur at the surface facilities at a repository. And
25 understand that there is great uncertainty, and

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1 correct me if I wrong on this, there are several
2 different approaches that may be taken to verifying
3 compliance with the fuel acceptance criteria as fuel
4 is delivered.

5 I mean, I remember when we endorsed the
6 NPC with welded canisters back in '96, one of the big
7 concerns was well, do you really want to seal that
8 fuel in a welded canister if you're going to take it
9 to the repository and you're going to either open some
10 percentage for spot checking or if you use some truly
11 exotic approach to fuel aging and fuel blending to
12 heat tailor our packages because you've got a hot
13 repository redesign, which is also still uncertain.

14 So even if PFS in the system, you may be
15 able to predict the type of cask you think would be
16 used from reactors to PFS, and that still might not
17 reflect what happens on shipments from PFS to the
18 repository.

19 I'm not trying just to punish people. I'm
20 just trying to tell you that seems like a simple
21 issue, like deciding what cask to test if you go to
22 pick representative casks is not an easy issue and
23 it's one of the reasons that we've argued for testing
24 all the ones that will be used for Yucca Mountain.

25 Now I need to add one thing to my --

1 MR. CAMERON: You said there three groups?

2 MR. HALSTEAD: Well, yes. And then you've
3 got the shipments that are being made now. There are
4 some single use casks for DOE shipments from retired
5 reactors. There are some combinations of casks, like
6 a NAC-LWT and an ISO container on a rail car. I mean,
7 there are a number of other things that happen in
8 daily commerce -- not daily, but they probably happen
9 on a monthly basis. And so, again, this is something
10 that we have some ideas and we'll help flush it out,
11 but I think the NRC has to decide here whether your
12 criteria in picking casks if you don't do one of each
13 model, is whether it's based on what's moving now and
14 will move in the next ten years whether there is a PFS
15 re: Yucca Mountain, whether you spec it for Yucca
16 Mountain shipments and/or PFS.

17 The thing I just want to add to my hybrid
18 that I offered, and thank you, Charlie, for being
19 opened minded. The one down side to us with making
20 that accommodation has to do with what we would like
21 to see in the extra-regulatory thermal tests.

22 Now, there are a whole lot of arguments
23 about what should happen to the impact limiter and
24 what should happen to the neutron shield. I think if
25 I had my drathers and I was advising the state on

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1 where we would come down, if we were in a system where
2 we were assured of having a regulatory test of each of
3 the designs likely to be used, the one full scale test
4 I'd still like to run, Charlie, would be to run the
5 fire test on an undamaged cask. Partly for modeling
6 simplicity, but also partly because there's always
7 some uncertainty about how the impact test is going to
8 effect the instrumentation that you've installed for
9 the fire test. So the cleanest, easiest way to run
10 this, and Dr. Miles Griner, who some of you know whose
11 been both an advisor for this program and the only
12 person I know in the country whose being
13 simultaneously funded thanks to Bill Lake, who is with
14 us today, by both DOE and the state of Nevada to do
15 fire testing, or any type of evaluation, for that
16 matter.

17 We worked with him on some of the pros and
18 cons of mixing these tests up. And the discussions
19 that Miles had with Kotski, when he was with you guys,
20 and with the Sandia staff suggests that even though
21 it's expensive, the best way to do the extra-
22 regulatory thermal test is to do it without prior
23 damage from an impact.

24 MR. CAMERON: Okay. Let's try to keep on
25 this types and number of casks to be tested.

1 Bob pointed out there are three categories
2 of shipments that are either occurring or might occur
3 and that the NRC should choose it casks to be tested
4 with a mind toward those 3 categories.

5 Do we have other comments on type and
6 number of casks? Let's go to Ed, and then we'll go
7 across to Bill and come back to Charlie.

8 Ed?

9 MR. WILDS: I was just going to comment on
10 the types and numbers and that I disagree that you
11 should choose it based upon what we're using now or
12 what you think we'll go to PFS or Yucca Mountain.

13 It's my understanding, and correct me if
14 I'm wrong, that we're trying to verify the code here.
15 And so to me if you've chosen a cask somehow that will
16 challenge the code, and that is verified, you don't
17 need to test every other cask. And so to hear that,
18 I guess, you know and looking at other industries and
19 other areas, we don't do 100 percent full scale
20 testing on a lot of other items.

21 For us in Connecticut, I don't believe
22 I've seen a 100 percent full scale test of one of
23 those subs. We do scale modeling. You know, there's
24 computer codes used. And once those are validated, we
25 feel pretty sure that they're very accurate.

1 So I have to disagree that we need a test
2 on every canister out there.

3 MR. HALSTEAD: Just let me clarify. I
4 wasn't saying for the extra-regulatory tests that you
5 had to do every one and I said that I had a proposal
6 to do every one for Yucca Mountain. What I said that
7 I think is significant is that the NRC has to decide
8 what criteria it wants to use in picking the casks.
9 And you've offered a very good one. If the primary
10 objective is code validation, then frankly it may not
11 be that important to look -- but to look, for example,
12 at cask availability and cost and whether there's some
13 representative in that cask, say the rail cask if you
14 think all the rail casks are going to be monolithic,
15 steel casks and you test the steel cask instead of a
16 steel lead steel cask.

17 But I don't disagree with you, but I just
18 want to make sure that we don't mischaracterize what
19 I've proposed.

20 MR. CAMERON: The implication of what
21 you're saying, though, is that for an objection, a
22 different objective than validating codes, that the
23 answer may be -- there may be a different answer?

24 MR. HALSTEAD: Absolutely.

25 MR. CAMERON: All right.

1 Bill?

2 MR. SHERMAN: Thank you. Bill Sherman,
3 Vermont.

4 I'd like to address some of the things
5 that Bob Halstead has said, but first I have a
6 question in a different vain.

7 I notice that the proposed tests only
8 include BWR casks -- I'm sorry, PWR assemblies rather
9 than BWR. Is there a reason that you haven't chosen
10 one as BWR and the other as PWR?

11 DR. MURPHY: No. Just worked out that way
12 at this stage.

13 MR. SHERMAN: Would you get more useful
14 information if you used one with a BWR type assembly
15 and the other with PWR, or do you not feel there's any
16 benefit to be achieved that way?

17 DR. MURPHY: I think in the course of our
18 discussions that we did not fully address that. Off
19 the top of my head, there does not seem to be a
20 significant difference between using one over the
21 other and having be --

22 MR. SHERMAN: Because you'll get
23 acceleration from data from whatever's there and then
24 you can go and apply that to either type later.

25 DR. MURPHY: Right, you got it.

1 MR. SHERMAN: Thank you.

2 MR. CAMERON: Great. Go ahead, Bill.

3 MR. SHERMAN: And to address a couple of
4 things that Bob has said, in the spirit of compromise
5 that I mentioned before, it's good to see that Bob
6 came from movement from testing all casks to just the
7 ones that are going to Yucca Mountain. But on the
8 northeast in the northeast and on the northern part --
9 or in the eastern part of the country there are a lot
10 of casks that go up and down the coast to Savannah
11 River. And it hasn't been necessary to full scale
12 test all those casks, or the ones that go to Idaho
13 across the country. And at the risk of repeating what
14 I've said before, we have confidence in model testing
15 and so the confirmatory aspect of confirming the model
16 tests with the full scale tests are very important for
17 us in our states. And then with that, we don't see
18 the need to do testing of every type of cask.

19 Now, Alan Soler's suggestion of three
20 tests has validity. And that's one test at reasonable
21 conditions with whole system versus -- and then a
22 second test that maybe is without impact limiters to
23 test for model testing. That's a possibility. But we
24 also see that doing the tests that are proposed can
25 achieve the same goals.

1 MR. CAMERON: And when you say the "tests
2 as proposed," you mean as proposed in the draft
3 protocol?

4 MR. SHERMAN: That's correct.

5 MR. CAMERON: All right.

6 MR. HALSTEAD: Can I just do a quick
7 response, Chip?

8 MR. CAMERON: Yes, sure.

9 MR. HALSTEAD: Bill, one of the things I
10 want to tell you is what we have in mind is what we
11 think would -- if we're doing our best guess of what
12 casks would be used for Yucca Mountain based on what
13 we know today, with and without possibly a PSF in the
14 system, my guess is we would be talking about testing
15 one truck cask, and it would probably be the GA-4. And
16 assuming because of the similarity of the design that
17 it is not necessary to do a GA-4 and a GA-9.

18 If there were going to be a large number
19 of NAC-LWT shipments, that might be an issue. Some of
20 you know that Ed Bentz has a design proposal for what
21 he calls a shortie cask to service the 12 oldest
22 reactors that have the greatest constraints, so there
23 might be a new design. But that's basically my
24 understanding of NAC-LWT.

25 But if DOE is able to pull off the mostly

1 rail scenario, which in my opinion will end, if they
2 do, as two-thirds rail and not 95 percent rail, but I
3 would expect the mix of casks that we would go to the
4 mat on to be a GA-4 and 3 or 4 rail casks. And maybe
5 my cost calculation is off, and I know mine's better
6 than NRC's because there's isn't on the table. But we
7 think that you could do that cask testing total in the
8 package for a range of somewhere from \$40 to \$70
9 million. Yes, that's a lot of money, but our last
10 lifecycle transportation cost analysis, which I'm sure
11 is low now because it was done between '96 and '98,
12 suggested that the lifecycle transportation cost was
13 going to be \$6 to \$9 billion including the cost of
14 building a rail spur in Nevada and including some
15 heavy hauls.

16 So the argument I would make if you're
17 concerned about what Nevada's proposing is this: We
18 see it right now as being pretty much bounded by the
19 types of casks that are in the pipeline that are
20 identified in our paper. And so just to the cost
21 number in perspective, you know we're talking about
22 somewhere in the range of one percent of the total
23 lifecycle, and we did this over 38 years cost of the
24 transportation system. Still a lot of money, but just
25 so you see how we see it as a system.

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1 MR. CAMERON: Okay. I think we'll go to
2 Charlie and Rick, and then maybe unless there is
3 another burning issue here on general testing, move on
4 to impact.

5 But just in terms of a summary, it seems
6 that in regard to the full scale testing regime, I
7 heard four different -- although I can't say I
8 understand them or the differences -- I heard four
9 different proposals.

10 One was in the draft protocol, it was the
11 hybrid that Bob Halstead was talking about. Three
12 tests mentioned by Alan. And I guess I would have to
13 include Lisa's full scale testing for licensing as
14 another proposal. And we've heard comments from
15 Charlie, from Ed, from Bill Sherman about these
16 different regime. And I guess some of them or maybe
17 all of them focus on your different objectives;
18 confirmatory, extra-regulatory and public confidence
19 is part of that particular matrix.

20 And if anybody wants to comment on that
21 summary, do so. But why don't we go to the rest of the
22 cards and we'll get Bill on right now. And then let's
23 go to impact.

24 Bill?

25 MR. SHERMAN: I just had a comment. Bob,

1 you're proposing full scale licensing testing,
2 correct? So I think that the number two and four on
3 your thing are the same, I think.

4 MR. CAMERON: I'm not sure that I heard
5 that.

6 MR. HALSTEAD: No. Because I think Lisa's
7 also talking about -- understand, Bill, right now the
8 proposal that we have on the table is in the paper.
9 And it says full scale regulatory, which we've costed
10 out, and then it says on top of that find the failure
11 thresholds, validate the regulatory performance
12 standards, some extra-regulatory.

13 The cost, frankly, it doesn't cost that
14 much to run the fire test out additionally. So if you
15 took what I call our base proposal and wanted to do
16 extra-regulatory, it really doesn't add a lot of
17 dollars to it from a cost standpoint.

18 And I guess to be really accurate, I would
19 add Nevada based in the Nevada hybrid which I'm going
20 to try to be ready to see whether we're going to
21 present it as an alternative to you next week.

22 MR. CAMERON: Okay. Great. And I think
23 the difference between what Bob is saying and what is
24 Lisa is saying is Bob is saying that the hybrid would
25 include a test to validate the existing huddles. And

1 Lisa is saying that every time that a cask is to be
2 certified by the NRC, that that cask has to go full
3 scale testing of some type. I think that's the
4 difference.

5 Let's go to Kevin and Charlie. I know you
6 had your card up for a while. And we'll come to you
7 after we go to Kevin and Rick.

8 Kevin?

9 MR. KAMPS: Just trying to bring the
10 realism overarching principle in to some of this, too.
11 On the earlier discussion about surrogate and dummy
12 fuel, one of the concerns that I want to raise is the
13 issue of damaged fuel across the country and in a real
14 world accident how that damaged fuel would behave
15 inside of these packages that we're talking about.
16 So, I would very much encourage NRC to give that all
17 the attention it deserves, given the level of damaged
18 fuel across the country and the deterioration of fuel
19 as time goes on.

20 MR. CAMERON: Okay. Thank you, Kevin.

21 Rick?

22 MR. BOYLE: Thank you. As I said in my
23 introductions this morning, I'm interested in the
24 transport of all radioactive materials. So I
25 apologize right up front that my comment might be a

1 little bit diversionary.

2 But as we've talked about here as the
3 objective of your study is to benchmark codes, and we
4 seem to be arguing about or discussing -- we wouldn't
5 argue -- extra-regulatory testing, testing to failure,
6 how your models would predict failure, realistic
7 testing and the like, I wonder if -- and I certainly
8 don't pose it right now, but if you were to extend
9 your study, would you consider testing casks other
10 than spent fuel casks with my comment being if you
11 really want to benchmark a code, why don't you test
12 one of the air transport cobalt casks? You'd be at a
13 much higher speed. You'd benchmark your codes much
14 farther out in the envelope. That envelope, I think,
15 coupled with the testing that you're proposing now
16 would allow you to do more analysis on a spent fuel
17 cask to a much worse condition than what's probably
18 being proposed now. So if you benchmarked your codes
19 and, I believe most say those casks would fail, so
20 you'd really see how your codes address failure much
21 higher speeds. You should be able to then analyze
22 spent fuel casks whatever you want, to a much worse
23 case scenario.

24 And to the people here that have raised
25 cost concerns, my opinion is cobalt costs would be

1 much cheaper and much more available than spent fuel
2 casks.

3 Thank you.

4 MR. CAMERON: Okay. Thanks, Rick.

5 And we've been throwing around three
6 different terms, and I know that they are different or
7 may be different. We've talked about verification,
8 validation and benchmarking. And just be aware that
9 there may be significant differences between the use
10 of those terms.

11 Charlie?

12 MR. PENNINGTON: I wanted to respond
13 really to one of Bob's original statements. And I hope
14 I can remember it. But in line of some of the
15 intervening comments, I think I would agree with Bill
16 Sherman almost down the line.

17 I think there's a substantial case that
18 can be made for "middle of the road approach" he's
19 discussing. And I think that's where I would come
20 closest.

21 But back to Bob's statement about the need
22 for a new cask for a fire test. With respect to
23 determining heat fluxes, I think there's a number of
24 ways to do that including the one described in the
25 protocols. So if you're trying to come up with a full

1 scale test failure of some sort for a rail cask, or
2 for any cask, there's a very approach here in which
3 you simply model the end of the cask that's at risk,
4 and that's a lid end, with a small full scale full
5 diameter type thing together and you put the impact
6 limiter over it. You use the proper shoulder design
7 and everything else. And you've got a heck of cheaper
8 and you get your demonstration or your fire test to
9 failure, whatever you want to call it. You can do
10 that much more cheaply than building a brand new rail
11 cask. Simply get a scale undamaged fire test.

12 MR. CAMERON: Okay. Bob, respond?

13 MR. HALSTEAD: Well, Charlie, I appreciate
14 it. And that's precisely why that part of our testing
15 proposal is purposely left open ended for discussion
16 with others.

17 Understand, we think it would be a pretty
18 significant thing if we got agreement on regulatory
19 testing for that group of casks we're concerned about.
20 Frankly, that would make it a lot easier to make
21 compromises on all these other more expensive issues,
22 or certainly more complicated extra-regulatory tests.

23 And, frankly, this gets to one of the
24 concerns that I have with the proposals that are in
25 the draft protocol and I hope we'll get to talk about

1 them in detail.

2 The notion that you would instrument the
3 GA-4 cask, subject it to the back breaker and then
4 expect the thermal couples that you had installed to
5 operate properly in, say, a 3 hour regulatory fire?
6 I mean, you can convince maybe, but I go into that
7 skeptical from having looked at instrument performance
8 issues.

9 So there are a whole lot of reasons why
10 we've suggested a variety of ways to do determination
11 of failure thresholds. But, like I say, I think it's
12 easier to deal with that if you've done the regulatory
13 full scale tests. And the thing I would say to Rick,
14 I mean I appreciate from a cost consciousness
15 standpoint your counter proposal to this, but that's
16 not going to answer the public confidence issue of
17 being able to stand in front of group of justifiably
18 concerned people and tell them that the cask has been
19 physically tested to demonstrate its compliance with
20 the regulations.

21 Now, there may be a reasons that you don't
22 want to support that. But I'm saying that's the one
23 advantage that I don't think you get any other way.

24 And I'll rest my case. Thank you.

25 MR. CAMERON: Okay. Final comment before

1 we go to impact. Alan, do you have something to say
2 on that?

3 DR. SOLER: Just a small point. And that
4 is that I've heard some indication that if you test,
5 say, a half scale cask that that somehow going to be
6 cheaper and that that might be a way of accommodating
7 things. I'd like to point out that everybody who has
8 built a cask or who has one that's currently licensed,
9 has all kinds of templates to put this thing together.
10 And if you go in and say now build me a half scale
11 cask, there are all kinds of fabrication issues that
12 can keep the cost the same with no real benefit. And
13 if you take it down too far, while the scaling laws
14 are well know, making a good weld that's one half or
15 one quarter of the size that you've got in a full
16 scale cask is a challenge.

17 So don't be led to believe that somehow
18 you can do more because you can get more for your
19 money if you build two half scale casks rather than
20 one full scale cask and do testing. It may cost you
21 more in the long run.

22 MR. CAMERON: Okay. Thank you. Good
23 point. Good point.

24 Andy, do you want to tell us a little bit
25 about the impact test and we'll get into the specifics

1 of that?

2 DR. MURPHY: Okay. Before I start talking
3 about the items up there on the viewgraph, I'd like to
4 answer one question and say one thank you.

5 The first question is that about the
6 surrogate and the dummy. The surrogate fuel assemblies
7 that we're talking about are basically would be
8 indistinguishable from a real assembly except that the
9 fuel would be another -- I'll say another metal rather
10 than actual spent fuel.

11 The dummy is just simply a box that has
12 the same weight and density distribution as a real
13 assembly. So we're talking about something that's an
14 engineering object in the surrogate and in the dummy,
15 it's a dummy.

16 The thank you goes to Ed down there for
17 covering and explaining what we're going to be doing
18 with this validation stuff. That we're looking to
19 validate the codes and the models that are used, we'll
20 be using this experiment, to predict the behavior of
21 these casks. Presuming that we're going to have a
22 successful experiment, i.e., the standards that we're
23 going to accept on the successful predication, our
24 company will then plan on using that code or those
25 codes and those models to predict the behavior of

1 these casks and other casks in similar extra-
2 regulatory -- which I hate that word -- situations.

3 That's the explanation and the thank you.

4 The impact tests. We're proposing a speed
5 range of 60 to 90 miles an hour. The 60 miles an hour
6 came from our work with analyzing the impact limiters
7 on the Holtec cask. And we needed to get to at least
8 60 miles an hour to take the impact limiters out of
9 the experiment, i.e., to use up all of the energy
10 absorbing capacity of the limiters so that above 65
11 miles an hour basically we've got a cask test on a
12 real specimen, a specimen that looks like one.

13 The 90 miles an hour came from the realism
14 side of the argument that we in the appendix A to the
15 protocol report, we explained why and how we looked at
16 the data from 6672 and from the Volpe Center to come
17 up with the frequency with which this kind of accident
18 would occur.

19 The staff took a look at this and, again,
20 giving some thoughts to the realism aspects of it,
21 we've selected the 75 miles an hour because we felt
22 that based on the calculations, preliminary
23 calculation from Sandia, that we would get a dent or
24 a ding, some deformation of the cask and we would
25 still be maintaining a realism. Our estimates that a

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1 little better than back of the envelop was that this
2 accident speed and the conditions of a near unyielding
3 surface would be about 10 to the minus 7.

4 The type of impact that we're talking
5 about, Sandia is very definitely famous for its rocket
6 sleds. We looked at that as a potential. I'll say one
7 of the very important criticisms there or the concerns
8 there, or the criteria there was that we wanted to
9 validate these codes. So we're interested in selecting
10 a velocity with which this cask would be impacted.
11 The issue with the rockets is that there is a
12 variability larger than we wanted to see in the speed
13 that you could achieve with that.

14 And the drop test was decidedly proposed
15 because gravity basically doesn't change. I can say
16 that as a seismologist because I know. But actually
17 the gravity force at the top of the tower is different
18 from the gravity force at the bottom of the tower.
19 Didn't know that, did you? But that difference is
20 insignificant.

21 The bottom line is we thought we could get
22 a better experiment using the tower than using the
23 rocket sled. And, actually, I like this story. That
24 the rocket sled track as it is set up at Sandia at the
25 moment, the impact end is pointed toward Albuquerque.

1 And the concern was the safety folks would say you got
2 a rocket that you're going to prepare to pull a 140
3 ton cask down. What happens when it jumps the track
4 and in what direction is it aimed.

5 The orientation of the cask. There we
6 decide don the center of gravity over the lid corner.
7 And the back breaker because they gave us a level of
8 plastic deformation and they represented radicular
9 challenges to these casks. Radicular challenges to
10 the cask and, obviously particular challenges to the
11 code to predict what happens with those casks.

12 I'll say with those few comments, let's
13 start over again.

14 MR. DILGER: Okay. Thank you, Andy.

15 How about starting at the top with the
16 proposed speed range. Anybody want to start off on
17 that, any violent agreement to disagreement? Bob
18 Halstead?

19 MR. HALSTEAD: Well, I want to start with
20 a couple of questions, and particularly the cost
21 issue. You say on page 9 of the draft protocols that
22 cost was one of the factors. And by the way, let me
23 say, for a bunch of reasons think the power drop is
24 preferable to the rocket sled mostly because of your
25 ability to control the experiment.

1 But I was curious about the cost issue.
2 Now, I've had discussions -- boy, this dates me going
3 back to when Marilyn Warrant was at Sandia in mid-
4 February of 1990, as I recall. And in discussions we
5 had with Yosha Mura in '95 and '96 and some, again,
6 discussions we had with the Werks Group at UNR. The
7 bottom line is we got numbers around \$8 million plus
8 or minus \$2 million to upgrade the drop facilities
9 following the ten to 1 ratio of the target to the test
10 object and some enhancements to the fire pit because
11 of some concerns about the wind cycle and how that
12 would limit your ability to do a fire of more than an
13 hour, an hour and a half, 2 hours.

14 So is there anything you can enlighten us
15 on the cost assumption that you made about what it
16 costs to build a 3 million pound unyielding target and
17 build a 300 foot drop tower?

18 MR. CAMERON: Bob, I think I can probably
19 do this, but maybe you should make the connection
20 clear between these issues and the answer to that
21 particular question. Does that have an impact on
22 impact testing, I guess?

23 MR. HALSTEAD: Yes. I guess what I really
24 would like to know is was your bottom line dollar cost
25 -- what was your bottom line dollar cost for the

1 facility upgrade to do the drop test compared to your
2 estimate for the rocket test?

3 DR. MURPHY: Right. Our first answer to
4 that is that we made a decision basically on the
5 technical merit. Started off looking at both of them,
6 studied the issues associated with both, technically
7 and safety incidents and decided that the drop
8 facility was the more appropriate way to go.

9 And I'll say the numbers that you have got
10 are in the right ball park, but I've got to tell you
11 at this stage Sandia is out on bid looking at those
12 costs to let us know collectively what those are going
13 to be.

14 MR. HALSTEAD: So when you have that test
15 data, it will be part of the discussion that we have
16 within the -- whoever is left at that point if they're
17 in still in public discussion, you're going to bring
18 your costs forward when you have that data?

19 DR. MURPHY: The answer is yes. Yes. We
20 would --

21 MR. CAMERON: Andy, make sure you talk
22 into that.

23 DR. MURPHY: Sorry. I think the answer to
24 that question is yes, that information would be put on
25 the table. The bottom line here again is that I think

1 we want to go back to what we did for the first part
2 of this, and that was to make the decision on what was
3 going to be the best technical test come out of it.

4 MR. HALSTEAD: And I'm frankly in
5 agreement with that. I'm just trying to build a clean
6 record here, you know. I feel some responsibility
7 along with you guys for proposing that this type of
8 work be done, and I think it's responsible to try and
9 clarify the costs. And I think this also gets us into
10 the whole issue of how you would bifurcate your future
11 decisions about proceeding with the PPS. And, you
12 know, I think at some point you have to decide how you
13 will do our test selection, whether you're going to
14 have some kind of a competitive selection process.
15 You know, in which case putting out your cost data is
16 probably something that a lot of people will be
17 interested in.

18 I don't want to belabor the point, but I
19 think you do need to understand that a lot of people
20 are going to view this as a very big ticket business
21 decision and they're going to look at your procurement
22 decision on it. So having these costs on the table
23 sooner rather than later, I think makes it a better
24 process for everyone.

25 And when you say our costs in the ball

1 park, I assume that means that they're not higher than
2 50 percent of what I've put out. If you can give me
3 any guidance on that, I'd appreciate that.

4 DR. MURPHY: Like I said, I think you've
5 got in the right ball park at the moment, yes.

6 MR. HALSTEAD: Okay. That said, we were
7 delighted to see the focus on the drop test. It is
8 true that you can generate a pretty extraordinarily
9 entertaining video with a rocket sled test. But it
10 doesn't give you the technical test on the cask that
11 you get with the drop test, plus your ability to
12 control the test.

13 This is a very expensive test article.
14 You know, I don't see the rocket imperiling
15 Albuquerque, but I don't want to damage an expensive
16 test article.

17 I think another way to look at this is to
18 look at the BNFL experience with the operation Smash
19 Hit testing in the early '80s. In my opinion, the
20 reason that that was an effective test was because
21 they did a drop test, lots of simulations and a design
22 revision where they had a very small lid movement leak
23 that was within the regulatory tolerances, but allowed
24 them to argue their commitment to safety by
25 redesigning it anyway. Then, coupled with the

1 locomotive test.

2 I think if they had just done a locomotive
3 test, that test would not be very compelling. And the
4 danger with going with someone dramatic like the
5 rocket slide in addition to being able to control the
6 experiment and verify that you've actually caused to
7 happen, is this issue of the actual impact that you
8 put on the cask lid. So we find that a strong part of
9 your proposal.

10 We're still looking at speeds, I'll give
11 you our initial thinking for the rail cask drop.

12 MR. CAMERON: Don't worry, I just wanted
13 to -- while we've zoned in on drop and rocket, let's
14 see what other people have to say about that and we'll
15 go back to you on the speed issue.

16 Charlie, on the drop versus rocket?

17 MR. PENNINGTON: Well, I'm going to go a
18 little different route. Again, as we've said or as
19 I've said, it's my belief that I like the listing of
20 primary purposes that you displayed this morning. I
21 think that I would argue with some of the
22 probabilities you've thrown into the protocol. You've
23 gotten a certain probability for certain velocities,
24 but when you tie that probability in with a
25 probability of an unyielding surface, or so supra

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1 regulatory as to be effectively out of any bell shaped
2 curve.

3 So my own personal preference would be
4 that you're going to do this, and I think 75 miles per
5 hour is a reasonable test. I believe, as I said
6 earlier, that we should bound the conditions with
7 natural conditions that we know the compressive
8 strength of some of our worst granite. And I would say
9 drop it with a conveyance.

10 And you can rig a test where it can be
11 dropped vertically, as Bob has said, attached to a
12 conveyance on an essentially yielding but still
13 extremely hard, it would be extremely hard for any
14 other object other than a cask. But you can bound it
15 with a natural surface. And that I think has far more
16 -- is far more useful with respect to your first
17 objective, public confidence.

18 Now, there are other issues and, Bill, you
19 want to do something about better analytical data. But
20 my preference is that one.

21 MR. CAMERON: And when you say use the
22 phrase conveyance drop? Okay. Is that when we're
23 talking about drop test, is that what we're talking
24 about? No.

25 DR. MURPHY: We're talking about dropping

1 the cask including its impact limiters in no
2 conveyance, no rail car or anything.

3 MR. CAMERON: Oh, I see. Conveyance, what
4 conveys that cask. Okay.

5 MR. PENNINGTON: Beyond regulatory,
6 outside of licensed for --

7 MR. CAMERON: And let's continue with the
8 drop or rocket, but let's focus on that conveyance
9 drop versus the drop that the NRC would contemplating.
10 And let's go to Bob Fronczak.

11 MR. FRONCZAK: I guess I disagree with
12 you, respectfully.

13 I tend to agree with the NRC and Sandia,
14 I guess, and the report in saying that I'd rather see
15 something where you take one variable out of the
16 equation, and I think that was the reason for the
17 unyielding surface. So I do agree with that.

18 And as far as the rocket sled or drop, I
19 personally and I think AAR believes that the drop test
20 is probably the way to go. I agree with the
21 philosophy in the report on that.

22 The rocket sled has its attractions from
23 a different viewpoint. And that viewpoint is if you
24 want to assure public confidence, you know, should you
25 perhaps do something like that where it's more

1 realistic. It's more what it would actually look like
2 if it actually happened. But I don't think that would
3 give you that the scientific information that you're
4 looking for and that you could use to extrapolate
5 into, you know, whether this cask would survive a real
6 transportation accident and what type of accident
7 would it take to ultimately potentially fail a cask.

8 MR. CAMERON: So your distinction, Bob, on
9 not needing a conveyance drop is that you don't need
10 that to get you the scientific data? But if you're
11 talking about public confidence, then the conveyance
12 drop may add more from the public confidence?

13 MR. FRONCZAK: I go back to the English
14 tests where you have the train going a 100 miles an
15 hour and it crashes into a cask. And they seem to have
16 gotten a lot of credibility out of that test. How
17 much scientific information they got, I don't know. I
18 think they got a lot of that, too. But, you know, does
19 that present a picture perhaps that the public might
20 feel good about? And I'm not the right person to
21 answer that, and I don't know how many people here
22 are, you know, other than as citizens. Ultimately I
23 think you need to do a survey, a national survey.

24 MR. CAMERON: I think that there are
25 people here who are in touch with the citizenry, if

1 you'd give us opinions on that also.

2 Let's go to Fred Dilger and then we'll go
3 to Alan.

4 MR. DILGER: Very quickly, I want to say
5 I agree with Bob Fronczak on this. I think the drop
6 test is certainly the most easily controlled test. We
7 would hate to have to have Sandia do a probabilistic
8 risk assessment of the likelihood of that rocket
9 cartwheeling off into Albuquerque, so we don't want to
10 have that happen.

11 And as far as the conveyance is concerned,
12 I think the public will have confidence in a really
13 good -- correction. I agree with Bob Fronczak here,
14 again, in this. I'm not in any position to make broad
15 generalizations about what the public will or will not
16 have confidence in. But I will say that the best
17 data, that the best testing program you come up I
18 think will give you the confidence you need far more
19 than good video footage.

20 So, I think a drop 75 mile an hour drop
21 from a height is probably suitable.

22 I just want to make one other comment now,
23 and that is for the back breaker test, I'd like to
24 recommend you just buy a highway abutment because that
25 seems to me to be the most likely obstacle that you

1 would face for a truck cask in a back breaker kind of
2 situation. And I see that you had steel sheathed
3 concrete pole as your object on which you were going
4 to conduct the back breaker experience. But I'd
5 recommend you just purchase a standard highway
6 abutment and use that.

7 MR. CAMERON: So a standard highway
8 abutment.

9 Maybe this is a good way to check in on
10 the public confidence we talked about. And, Abby, I'm
11 going to ask you about this first. Is that if you
12 understood the conversation about the dropping the
13 conveyance with a cask inside versus outside and you
14 heard Bob and Fred talk about the film and all that,
15 just using this example do you think that doing the
16 conveyance test would increase public confidence in
17 terms of, you know, your understanding of it? You
18 know what I'm asking. I'm just curious to get an
19 opinion on that.

20 MS. JOHNSON: Well, did it leak? And when
21 did it leak? You can't tell that from video when
22 we're talking about radiation. And so it's sort of a
23 false assumption to assume that, you know -- I was
24 just writing notes here to fear factor cask testing.

25 You know, the thrills and chills of cask

1 testing is very dramatic, like the British train crash
2 thing. But it really doesn't tell you if it leaked.
3 You can't tell that from looking at the video. And so
4 I think the real challenge is to figure out how to
5 convey to the public whether it leaked or not and if
6 it didn't leak, will they believe you.

7 MR. CAMERON: So the key to you in terms
8 of public confidence is being able to answer the
9 question did it leak. And I'm not sure that conveyance
10 drop or nonconveyance drop, I don't know how those
11 differ in answering that question about did it leak.
12 All right. Thank you.

13 Alan, you had a comment.

14 DR. SOLER: I believe there's a slide
15 somewhere in this package that shows the BFS Velcar.
16 Trying to build a tower that would lift that high
17 enough in the air to drop it, but I can't get over the
18 CG over corner test drop and I got this object that's
19 roughly about times the length of the cask. I would
20 say if you did that, it would only confuse the public
21 and I don't think you would load the cask hardly at
22 all. The Valcar would hit first and it would be
23 horizontal before the cask itself ever felt any.

24 I'm a firm believer that if you're going
25 to test the cask, test the cask. If you want somehow

1 to test public perception with a good video, then put
2 a cask on a rail car and run a tanker filled with this
3 stuff that was in the Baltimore fire and you can
4 accomplish two things at once and get public
5 perception.

6 On an instrumented test where you get some
7 real data, don't think you want to drop a rail car
8 with a cask. You want to do exactly what's proposed
9 here. Pick the orientation that most exercises the
10 cask, which is CG over the corner, and decide on an
11 appropriate speed and this looks appropriate for what
12 I'll call a threshold type test. And instrument it.

13 The simplest test you can propose is the
14 one that's most likely to succeed. The more
15 complicated you make the test, the more likely you are
16 not to get any data from it.

17 MR. CAMERON: Okay. Thanks, Alan. That's
18 an interesting perspective on this.

19 Bob, you were listening to this and you
20 put your card up. What did you have to say?

21 MR. HALSTEAD: Let me juggle three
22 thoughts.

23 MR. CAMERON: Well, Bob -- I'm sorry. I
24 was pointing to Bob and then we'll go to you.

25 MR. HALSTEAD: I'd rather be the caboose

1 here anyway.

2 MR. FRONCZAK: I just wanted to agree with
3 what Dr Soler just said, you know. And, again, I think
4 you're going to get the most information out of the
5 way the test has been proposed.

6 And as far as the speed goes, you know the
7 rail industry's imposed a 50 mile an hour speed
8 restriction for spent nuclear fuel. There's a
9 potential to have an opposing train of say, 70 or 80
10 miles an hour for a total relative speed of 130 miles
11 an hour. Seventy miles at 5 miles an hour is as good
12 as any other speed because, you know, even if two
13 trains hit head on, there's going to be a lot of
14 energy absorbed before that -- any at all. So I agree
15 with the low speed, too.

16 MR. CAMERON: Okay. And, Bob, I asked you
17 to defer your comments on speed earlier. You might as
18 well give us what you have.

19 MR. HALSTEAD: Well, I wanted to firm one
20 more time, because I wanted to ask a question about
21 something that's in the protocol document.

22 In the list of issues that your expert
23 panel reviewed, identified that are a couple of
24 interests. But because of time here, the one that I
25 think is most important is the report said that there

1 was some fairly open discussion of the advantages and
2 disadvantages of doing the drop test with or without
3 an impact limiter.

4 And can you just -- I mean, I can kind of
5 guess, I think, you know, based on what most of us
6 here have said. But can you summarize for us what the
7 expert panel said and whether there's anything that we
8 should be factoring into our discussion. And then I
9 do want to talk about speeds.

10 MR. CAMERON: Andy, can you just for the
11 sake of those who aren't experts in this, can you also
12 just tell us what an impact limiter is?

13 DR. MURPHY: Bob's question is easy to
14 answer. Right now I don't -- yes, I'm sorry.

15 I'll say Bob's first question is easy to
16 answer. At the moment I don't personally remember
17 exactly what the dialogue with the experts was over
18 the impact limiter.

19 MR. CAMERON: So Ken remembers, huh?

20 DR. MURPHY: Ken remembers.

21 MR. CAMERON: All right.

22 MR. SORENSON: The main part. The expert
23 panel was really looking at the technical aspects and
24 the technical objectives. And then clearly to do the
25 test without the impact limiters would be much easier

1 analytically than with the impact limiters. But then
2 there's also a lot of discussion that in terms of the
3 realism arguments, that really the test should be done
4 with the impact limiters. And the recommendation that
5 came out at the end of the day by these instructional
6 expert panel was that the test should be done with the
7 impact limiters, but that you should make sure that
8 the full stroke of the limiters is engaged with the
9 test so that you have a sufficient speed that you make
10 sure that you use the entire impact limiter. And
11 actually then impact the cask as well.

12 MR. HALSTEAD: Yes, that's helpful. So it
13 does essentially address the same thing that Alan was
14 saying.

15 Yes, I don't like to waffle on points, but
16 I got to tell you this is one that we're still
17 thinking over, the relative merits of impact limiters,
18 no impact limiters coupled with different speeds. And
19 thank goodness we don't have to give you those final
20 comments until May 30th, although I may feel compelled
21 to say something about it next week.

22 Let's talk about the speeds. I think I
23 agree on the rail speed on this with Bob, and that is
24 I have never believed that DOE is going to succeed in
25 shipping casks in general freight trains. And if I

1 thought they were going to, I would want the 90 mile
2 an hour impact. Because regrettably we have a few
3 instances of usually run away trains derailing in
4 excess of 90 miles an hour, and I think that's a
5 credible accident.

6 In spite of my, you know, natural tendency
7 not to try to find any way to moderate these issues,
8 I think the real world issue here is that in a
9 dedicated train transport, your maximum energy
10 transfer between two very big, very heavy casks
11 traveling essentially in the opposite direction
12 impacting one other was probably captured by that 75
13 mile per hour impact, although we'll also do some
14 thinking about that. So I think that's reasonable.

15 I must say that I'm not sure we shouldn't
16 consider a sideways impact at that speed. Because I
17 think there are some possibilities where you could
18 have a sideways impact in the 60 to 75 mile per hour
19 range, although I am assuming, Bob, that there will be
20 basically like with P trains, it'll be like a 55 mile
21 per hour limit. And if you have some different
22 assumption, I'd appreciate it if you'd share with it
23 us. But that's kind of the way our thinking has been.

24 For the highway speed, that's an
25 interesting one. Because if you look at DOE's

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1 assumptions in their final EIS, that is if you
2 actually go and look at the highway runs that they did
3 in support of their logistic modeling, you know,
4 they're assuming that these spent fuel trucks are
5 whizzing away on the interstate at 65 miles an hour.
6 Again, I'm not sure that that will be allowed to
7 happen. But for conservatism going with a higher speed
8 rather than a lower speed for the truck impact, even
9 if it is the sideways, presumably jackknife type of
10 impact rather than the head on impact, I think at this
11 point generally we would argue for the higher speed.

12 And I think the back breaker impact for
13 the truck cask is a very interesting proposal. I don't
14 remember seeing anyone float it before. I believe it
15 goes back to a report that a lot of us have used over
16 the years that Bill Rind did for SAIC at Oak Ridge,
17 probably about 1979 or 1980 when he was primarily
18 talking about the types of accidents that would do the
19 maximum damage to a steel lead steel cask. And I very
20 much appreciate the creativity of the people. You can
21 say, God, creativity in a document like this? I think
22 that that shows some real open mindedness. Again,
23 having only like 20 days to look at this, you know, I
24 need to think about it. But I certainly acknowledge
25 that that is not something that I thought I would see

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1 in your test protocol.

2 MR. CAMERON: Okay. Thank you, Bob.

3 Let's go to Ray and Kevin, and I think Bob
4 Fronczak wants to say something, and Lisa and Rick.
5 And let's close this out and we'll move to break.

6 I'll check in with the audience before we
7 go to a break, though.

8 Ray?

9 MR. MANLEY: I have a question about the
10 speed. I understand the reasoning on the other side of
11 the table about the 75 miles an hour. But what I don't
12 understand is that if current models simulated
13 indicate that a cask will survive at 90 miles an hour
14 and you're setting up this very expensive experiment.
15 Why wouldn't you just raise it up in next appropriate
16 height to reach the 90 miles an hour to confirm your
17 models? So, I'm a little -- I would go for the 90
18 miles an hour.

19 DR. MURPHY: A real quick answer on that.
20 That was one of the concerns about the realism. It was
21 pointed out what is the frequency with which a 90 mile
22 an hour accident is likely to occur. And at this
23 stage, we opted to go with a slightly slower speed
24 with a slightly lower, factor 10 lower probability.
25 No. A slightly higher probability of occurring going

1 from 10 to the minus 8 to 10 to minus 7.

2 MR. MANLEY: I understand what you're
3 saying, and I can agree in concept except when the
4 accident occurs that's 76 miles an hour. If you've
5 done it at 90, then you've got it 90.

6 DR. MURPHY: Yes. But also if you've done
7 it correctly at 75, I would presume that you could
8 handle 76, 77 on up to 90.

9 MR. CAMERON: Okay. Thank you. Thank you,
10 Ray.

11 Let's go to Kevin, Bob and Lisa and come
12 over to Rick and see where we are.

13 Kevin?

14 MR. KAMPS: In terms of the speed, I was
15 traveling on interstate 80 in Nebraska a couple of
16 summers back and was passed by a -- it wasn't a
17 radiated fuel shipment, but it was a nuclear waste
18 shipment that was going at a pretty good clip. And I
19 was interested because I had my radiation monitor with
20 me and set at a certain level to go off, and it went
21 off and I didn't know what was going on until I was
22 passed by this truck. And he was only next to me for
23 a very short window of time and still was able to set
24 off my radiation monitor. And I couldn't catch up to
25 that guy because of how fast he was going.

1 So I think the 75 miles per hour may be a
2 little low, actually, compared to what some drivers of
3 nuclear waste in this country seem to be willing to
4 drive at on the highways.

5 And another issue I wanted to bring up is
6 with the back breaker test, some of the statements
7 that I read in the PPS draft here about how the
8 closure lid bolts would not be impacted by the back
9 breaker tests kind of raised questions in my mind.

10 The back breaker test seems to be
11 challenging the cask or impacting the cask at its
12 strongest point. So why would you not test the cask at
13 a weaker point, which is at the welds, at the closure
14 point there? Shouldn't there be a test that
15 challenges the closure lid?

16 MR. CAMERON: Okay. Thanks for the
17 comment on the speed. Is there something that anybody
18 wants to say quickly on the last point that Kevin
19 brought up about the lids versus the middle of the
20 cask?

21 DR. MURPHY: Right. I've got a quick
22 comment on that. It goes a little bit to the diversity
23 of the experiment.

24 We're looking specifically at the closure
25 lid with the Holtec test. That will very definitely

1 challenge that area. The back breaker challenges the
2 slide orientation. In there we were responding to
3 some of the comments that we got in developing the
4 Issues Report of seeing an experiment test that
5 bypassed the impact limiters. So that's the -- I'll
6 say the diversity that we're trying to achieve with
7 the two separate tests rather than doing another CG
8 over corner kind of thing on the truck cask.

9 MR. CAMERON: Go ahead, Kevin.

10 MR. KAMPS: Then I guess a part of my
11 concern was that, correct me if I'm wrong, but the
12 truck cask had less closure lid bolts than the Holtec
13 cask. So I was concerned that that's not being looked
14 at.

15 DR. MURPHY: In that particular experiment
16 it's not being challenged the same way that the Holtec
17 rail cask is being challenged. The part that we're
18 out to here was to look at our ability to model these
19 things. If we can model the head end, the lid end of
20 the Holtec correctly and we can model the back breaker
21 of the GA-4 correctly, we're hoping that that will
22 provide an indication to the public, it'll be part of
23 our intent, that we're able to look at the diversity
24 of the models and to come up with accurate
25 predications of what's going to be happening.

1 MR. CAMERON: Okay. Andy, you may want to
2 talk to Kevin more about that off line to make sure
3 that that information is out there.

4 Let's take the cards that are up now and
5 let's go to Bob Fronczak. We'll to Lisa and then over
6 to Rick and finish up with Bob Halstead.

7 Bob?

8 MR. FRONCZAK: Just a real quick point of
9 clarification for the record. I think, Bob, you
10 mentioned OT55 speed being 55 miles an hour is
11 actually 50 miles an hour. And OT55 is our operating
12 and transportation recommended practice for hazardous
13 materials.

14 MR. CAMERON: Okay. Thank you, Bob.

15 Lisa?

16 MS. GUE: I don't have a specific
17 recommendation about these speeds, but just a comment
18 and a justification for them. And I warned you at the
19 beginning that I was going to be skeptical of the
20 performance, or the probabilistic weighed risk
21 measurements here. And so again I just wanted to let
22 you know that I'm, in a way, less interested in the
23 annual probability of an accident at 75 miles per
24 hour, although that's good information to have as
25 well, than I am to know how does 75 miles per hour

1 compare to the maximum speed limits along potential
2 highway or rail routes for Yucca Mountain and PFS
3 shipments. How does that compare to the potential
4 surface impact speed for a shipment that would fall
5 off of the highest bridge along those routes, for
6 example.

7 And in connection with that I just want to
8 also flag along a concern that this information is
9 difficult in light of the fact that the Department of
10 Energy has not specified the shipment routes for
11 potentially Yucca Mountain shipments nor do we have
12 that information for private fuel storage shipments
13 either, although at least we know that those would be
14 train shipments.

15 So, I guess I just wanted to move on and
16 say one quick thing also on this issue of public
17 confidence, since you were asking about a moment ago,
18 Chip.

19 I think from our perspective as a
20 government watchdog group, what we are really looking
21 for is the information that the NRC is regulating to
22 protect public safety. And there are a lot of
23 indications right now that that may not be the case.
24 And that comes out of NRC's own surveys indicating
25 that only about half of your employees feel that

1 that's the case or feel that it's safe to speak up
2 within the agency. It comes from situation or
3 syndromes, maybe, like Davis-Besse where decisions are
4 made and the NRC agrees in this decision to allow
5 finances to rule over safety. And it comes from the
6 current contacts where we have recent experiences that
7 maybe some of the most real concerns that people have
8 are probably outside that.

9 We have experience within recent history
10 that may fall outside of that realism bell curve that
11 we've so much about. What was the probability of the
12 September 11th terrorist attacks, of the space shuttle
13 falling out of the sky? Probably fairly low, and
14 those happened. Or the Baltimore train tunnel fires
15 has already mentioned.

16 So I think what we're really looking for,
17 and as I already mentioned, is information that the
18 NRC knows where the failure points are in the casks
19 that it licenses and that its regulations are
20 appropriate with that information. And so far as the
21 draft protocol has been presented, I'm not really
22 convinced that either of those goals will be met.

23 MR. CAMERON: Okay. Thank you. Thank
24 you, Lisa.

25 Rick?

1 MR. BOYLE: Thank you. I just wanted to
2 make the comment on the back breaker scenario, and I
3 have to open with an apology to Bob Halstead that as
4 he spoke, the creativity of that scenario was
5 attractive to him. I don't want to come across as a
6 narrow minded regulator; that that creativity is
7 giving me a bit of a problem.

8 First of all with that scenario, I wonder
9 useful and applicable it is because you've really gone
10 outside the regulatory scheme. As I see it, you're
11 doing a high speed puncture test and it's not preceded
12 by the drop test, which is usually a drop test and a
13 puncture test where now you're doing a very high speed
14 drop test -- or a puncture test, excuse me. The
15 problems with doing that I think will be similar with
16 the problems we've experienced with the normal
17 puncture test, in that the characteristic material and
18 the shape of your punchbar, you're certainly going to
19 use a much bigger than are shown in the regulations.
20 I think defending how you're making that punchbar or
21 how you determined what that punchbar is, you're
22 opening yourself up to a lot of questions as to
23 whether you did that correctly.

24 In the next case, because of the speeds
25 involved, we've seen problems with the punchbars used

1 just for regular testing that they don't always stay
2 in place, that they tend to shift a little bit when
3 you do the puncture test. And then also because of the
4 weights and speeds involved, are you truly going to
5 have an unyielding punchbar so that you'll get the
6 results that you want.

7 And then as far as the orientation, I'd
8 have to leave it to you, but I'd like a little more
9 information as if you're going to do a high speed
10 puncture, is that truly the worst case orientation or
11 could you do more damage in a different orientation.

12 Most recently we saw that the oblique
13 angle created more of a problem, and that came into
14 the long bar puncture test for fresh fuel packages. So
15 I didn't know if you had considered that possibly an
16 angle or dropping it in a whole different orientation
17 would be more useful.

18 The next comment is the reality. We've
19 talked a lot about reality. And I don't know how
20 realistic this high speed puncture test at exactly
21 this point, how realistic that is. And given the cost
22 you're going to run into, I wonder if a different test
23 or a different scenario might yield more data or more
24 useful data for the cost you're going to proceed.

25 The third thing, a little bit, as we run

1 through this since you're in a different regime I
2 think you're going to have an awful lot of people
3 questioning what you were doing and how useful that
4 data is. And then as you explore your code if you're
5 doing a test no one else has ever done, how applicable
6 are your results to a more regulatory framework?

7 And the last point, it's just a comment.
8 Have you thought because you're in two regimes; you're
9 doing a puncture test on one and a drop test on the
10 other, have you thought about doing a high speed drop
11 on both and then a high speed puncture on both.

12 Thank you.

13 MR. CAMERON: Thank you. We really need to
14 quickly wrap here.

15 MR. HALSTEAD: We're not going to quickly
16 wrap up. This is a very important point.

17 MR. CAMERON: Before we take a break.
18 Okay. We really do, because we do need to get to the
19 fire. Okay.

20 Now, you had your card up.

21 MR. HALSTEAD: I'm glad I had my card up.
22 I think Rick did an excellent job of critiquing the
23 back breaker impact. And before I respond to it, let
24 me say what I appreciate about it, the original
25 proposal.

1 This particular accident mode, as I said,
2 has a history that goes back at least a couple of
3 decades. And it's important because it is an accident
4 mode that relates primarily to a loss of shielding
5 rather than a loss of containment accident. And
6 that's a type of failure that, frankly, I don't think
7 we paid enough attention to.

8 You know, I know Charlie doesn't think any
9 of these things are likely to occur. My personal
10 feeling is loss of shielding is more likely to occur
11 or more credible to me than a loss of containment,
12 although we worry about both. And the original
13 analysis that Bill Rind did, again, based on some
14 limited data suggested that with a steel lead steel
15 cask something like an NLI or a NAC, that some
16 significant damage could occur at speeds -- at impact
17 speeds on the sideways midpoint impact in the 20 to 30
18 mile per hour range, and that's never really been
19 tested and so we -- in full scale, and so that was one
20 reason I thought this was creative.

21 I have to say that I have to do some
22 thinking about a 60 or 70 mile per hour speed limit.
23 I think that that is certainly something that can
24 occur. And my response to Kevin on this is, that's
25 one hell of a sideways impact. And so if you're

1 looking at something like a worst case loss of
2 shielding accident that probably doesn't involve any
3 loss of containment, this is the kind of incident
4 that, right, then; like I said, thank goodness we got
5 until May 30th to get these comments in.

6 Now, turn this around. What other impact
7 might you do, although I kind of like Rick's last
8 point. But, you know, maybe it would be interesting to
9 treat this as a puncture test and do it on both casks.
10 And that's one of the things I was going to get at
11 some point here, Chip, was on your schedule was that,
12 you know, impact and immersion aren't really dealt
13 with here.

14 Suppose you did the traditional drop test
15 on the corner? Where I think there's an advantage
16 there in terms of exploring cask failure is that when
17 you couple that with a fire test you're very concerned
18 in the truck cask because you don't have that neat
19 extra-regulatory barrier which I'd like to fill on the
20 rail cask. Because I think that biases the whole
21 discussion. But you've got bare spent fuel assemblies
22 in there and, you know, it's a seal and a lid that are
23 protecting them from the environment.

24 So in terms of the combination of accident
25 forces that we've traditionally been most concerned

1 about in a truck accident, the corner drop coupled
2 with a fire test is, you know, clearly the more
3 traditional way to approach the issue of a loss of
4 containment accident.

5 And I guess that's why I'm glad we have
6 until May 30.

7 Now going back to the rail, I think Ray
8 raises a really good point. If you're not going to
9 get significant deformation like Alan says, why spend
10 \$6 plus million maybe to drop that damn thing? And
11 that is a really good argument.

12 On the realism side I guess the thing I'd
13 say is that because I was assuming more administrative
14 controls over the rail cars than currently exists, the
15 75 miles per hour as an opening seems reasonable,
16 though we're going to look at 90. However, I will say
17 I totally disagree with the probabilistic analysis on
18 page A3 paragraphs 2 and 3 where really an incorrect
19 approach to probabilistic bounding occurs. A low ball
20 number of 150 shipments per year is proposed. And a
21 low projected accident rate is proposed. Let's for
22 the record, when you look at DOE's numbers under the
23 38 year proposal for a mostly rail scenario assuming
24 an average of 3 cars per train, you're talking more
25 like a doubling of the annual number of shipments over

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1 that entire period up to about 350 shipments per year.
2 And if you want to do a bounding scenario approach to
3 this, which obviously the authors of this report
4 didn't want to do, but I would recommend, you have the
5 horrific reality that the historically accident rate
6 for spent fuel shipments -- and I hate to throw this
7 out because Bob hates it, it's a limited sample. But
8 the bottom line is you'd have one accident in about
9 200 shipment miles, and that works out to an accident
10 rate that's about ten times higher than what's the
11 report, somewhere in the neighborhood of 5 per million
12 miles traveled.

13 So I'm just saying -- I mean, we can get
14 into fighting what your probabilistic basis is for
15 defending 75 versus 90, and I think you need to look
16 at that. And that's one of about a thousand line by
17 line detail comments that I'm sure all of us are going
18 to be writing for May 30th.

19 But, again, I think Ray's point is good
20 that if you don't get deformation, significant
21 deformation as Alan said, why do it? On the other
22 hand, I think you can make a case for that 75 mile per
23 hour impact because you're assuming that there are
24 going to be administrative controls.

25 MR. CAMERON: Okay. Good information.

1 Let me check in with the audience. You've
2 heard a lot of discussion. I'm going to give you a
3 chance to speak.

4 Please introduce us and give your
5 affiliation.

6 MS. SUBCO: Eileen Subco, Energy Resources
7 International.

8 Regarding the discussion of the proposed
9 speed of impact and in reading the proposed test
10 protocols, the discussion that I see missing from it
11 is a correlation between the speed of the impact and
12 the forces involved in the impact. Because it really
13 isn't the speed of impact that's important when we're
14 talking about an unyielding test. As you know, it is
15 what are the forces that are being absorbed by the
16 package.

17 And an example is NUREG 6672 chapter 5
18 tables 510 through 513. There's a wonderful real
19 target equivalent velocities where NRC looked at a
20 number of different of types of spent fuel packages
21 and 30 mile an hour, 60 mile an hour, 90 mile an hour,
22 120 mile an hour without an impact limiter and gave
23 basically the equivalent velocities for impacts with
24 a range of different surfaces. And in transport all
25 surfaces involved in an accident involved in an impact

1 are going to rigid targets. You're going to have a lot
2 of targets that are not rigid and that are going to
3 yield. So you're talking about equivalent impact
4 speeds probably on the order of 150 miles an hour or
5 more for some targets, maybe not that high for other
6 targets.

7 And I think that in discussing the issue
8 of what's the speed, NRC really needs to explain that
9 because the current regulatory tests, 30 mile an hour
10 impact 30 foot drop onto an unyielding surface, covers
11 much higher impact speeds with a lot of real world
12 targets. And I think that that argument and that
13 discussion is missed and it needs to be part of this.
14 Because the current regulatory tests do cover -- just
15 looking at this -- up to much greater than 150 mile an
16 hour impacts for some packages and some surfaces. And
17 I haven't heard any discussion about that, and I think
18 it's a very important aspect.

19 MR. CAMERON: Great. Thank you. Thank
20 you, Eileen.

21 Anybody else in the audience. All right.
22 And introduce yourself.

23 MR. COLLAR: Yes. I'm Felix Collar with
24 the Nuclear Energy Institute. And just a couple of
25 observations this afternoon.

1 One thing that I don't find in the report,
2 and it hasn't been brought up in any of the
3 discussion, is looking for contingencies. One of the
4 things you're going to be doing when you're doing
5 these tests, particularly when you're talking about
6 the orientation, center of gravity over the corner and
7 also the back breaker, when you start dropping it from
8 the heights you're dropping it, you're not going to
9 hit it. It's not going to end up like you think it's
10 going to end up.

11 You know, I know of tests that were done
12 overseas where they dropped from 100 foot and they
13 completely missed the pad. And so when you're going to
14 try and hit this target and stuff, you're going to
15 have some real problem when you're going up to 235
16 feet. So what you have to do is you have to include
17 some contingencies in there. So if you're not at your
18 angle, if you're 15 degrees and you get 18 degrees or
19 you get 20 degrees, what impact does that have.
20 Because you're going to have to do that beforehand,
21 because if you do it after hand, after the fact, then
22 you start running into questions of credibility and
23 believability from the public.

24 So that's the first aspect, is to look at
25 the contingencies for your test program and make sure

1 that you can try and -- because Murphy is going to be
2 there; whatever is going to go wrong, is going to go
3 wrong. So you need to make sure you have the
4 contingency.

5 The second thing I think Mr. Halstead hit
6 on a little bit is that if you look at the designs of
7 these packages, yes, they're for containment but the
8 primary purpose is for radiation shielding. And when
9 you look at the fire test, which you haven't got into
10 yet, lead -- used to be the big issue and we've gone
11 away from that now. So what you have to do though is
12 you have to look at the radiation effects after the
13 results of that.

14 If you have a package that as a result of
15 your drop test you have a 6 inch tear or a 10 inch
16 tear in the side of the stuff but it doesn't really
17 impact your radiation shielding, it still passed the
18 test 100 percent. But people say would you look at
19 that big rip in the side of it. But from the radiation
20 shielding aspect of it, it was not impacted. So
21 therefore, you have to look at the radiation shielding
22 effects as well as content.

23 MR. CAMERON: Thank you, Felix, affirming
24 that distinction Bob brought up between shielding and
25 containment.

1 John, real quick and Charlie. And then
2 we're going to take a break.

3 MR. VINCENT: I had just had one very
4 simple comment. I think in line with the NRC's
5 efforts to risk inform all of its rulemaking policies
6 and regulations that in fact this process should, to
7 the extent it's possible, be governed by risk informed
8 analysis where it makes sense to do so. And that will
9 include how you do some of the tests, what you do. It
10 goes very specifically to the point that Ed made about
11 if you know what it is before you do it and that's
12 only a little bit, why bother to do it. The same
13 thing applies. It's contrary to what Lisa was saying,
14 but that is a very, very important aspect of all of
15 this.

16 MR. CAMERON: Okay. Thank you.

17 Charlie?

18 MR. PENNINGTON: Yes. Just a follow up.

19 If anyone has been paying attention, and
20 it seems pretty clear I think that the majority of the
21 voice without almost exception, but really the data
22 acquisition objectives seems to be the higher priority
23 rather than public acceptance. I think that's one
24 thing that I hear.

25 The other aspect, and I go along with

1 Eileen's comments, that that's a very important aspect
2 that needs to be addressed and I think brought out in
3 public session. But that's another item.

4 The other item that Bob was mentioning is
5 that back breaker is indeed shielding loss. I see
6 shielding loss as less important to the public than
7 containment. I would offer that there is another
8 event that we should perhaps look at with a long
9 pencil type cask, a truck type cask, you're going to
10 find the slap down G loads on the lid are higher than
11 for the rail cask. The aspect ratio is different so
12 that in fact the highest loads on the lid are going to
13 occur during a slap down event. And so you might look
14 at from a containment perspective the slap down test
15 as opposed to the back breaker.

16 I think that that may be a reasonable
17 compromise.

18 MR. CAMERON: So that would be a better
19 test?

20 MR. PENNINGTON: Well, it depends. I
21 mean, I value containment more shielding. Shielding is
22 going to be a relatively trivial issue from dose, from
23 containment is what the public is worried about. So
24 that may be a way to capture both public and data
25 gathering information.

1 MR. CAMERON: Okay. Thank you.

2 And thank you all for this discussion. I
3 think we got some good information out of it.

4 We're going to come back at around 10
5 after 4:00. We're going to hear from Chris Bajwa on
6 the Baltimore fire and then Amy Snyder is going to tee
7 up the fire test for us.

8 We'll still try to get you out of here by
9 5:30, but at the latest by quarter to 6:00. Thank
10 you.

11 (Whereupon, at 3:55 p.m. a recess until
12 43:15 p.m.)

13 MR. CAMERON: We're going to start with a
14 presentation on a significant event, the Baltimore
15 tunnel fire. And before we get into our discussion,
16 and we'll have questions after that presentation. But
17 let me introduce you to two people that you probably
18 know, but let me introduce them a little bit more
19 fully.

20 We have Chris Bajwa right here. And Chris
21 is going to do the presentation on the Baltimore
22 tunnel fire. And he's with our Spent Fuel Project
23 Office. He's a thermal engineer there. And he's been
24 with the Commission for about ten years in various
25 activities relating to fire protection, including I

1 take it with nuclear reactor fire protection. And
2 he's responsible for conducting the thermal and
3 containment reviews of spent fuel casks now for
4 certification purposes as well as well as thermal
5 analysis for other types of radioactive material
6 packaging.

7 He has a bachelor's in mechanical
8 engineering from the Stevens Institute of Technology.
9 And he's a registered professional engineer in the
10 state of Maryland.

11 And before you go on, Chris, just let me
12 introduce Amy Snyder, whose right over here. And Amy
13 is also in Spent Fuel Project Office. And she is the
14 project manager for Spent Fuel Project Office on the
15 Package Performance Study. She's a relatively new
16 addition to the NRC here since 2000. And besides
17 being project manager on this study, she was also the
18 project manager on the Waste Valley Demonstration
19 project before she came to Spent Fuel Project Office.
20 That's not part of Brach's empire.

21 But she has considerable experience in the
22 private sector as a health physicist on several
23 decommissioning project. She was an officer in the
24 United States Air Force. Has a bachelor's in
25 geological sciences from the State of University of

1 New York, a master's in management from Leslie
2 College, and also a master's in health physicists from
3 the University of Cincinnati.

4 And after we're done with Chris, then Amy
5 is going to tee up the fire discussion for us.

6 Chris?

7 MR. BAJWA: Thank you.

8 Well, if you've been with us this entire
9 day, you've probably heard the Baltimore tunnel fire
10 mentioned at least ten times, maybe more. The crowd
11 has thinned out a little bit, but hopefully we'll
12 answer some of the questions that have come up
13 regarding that event.

14 As many of you know, the event took place
15 in July of 2001. And it generated a lot of interest
16 among the media and probably most all of us here heard
17 about it and were interested by it. And part of that
18 reason was this event, obviously, has some
19 implications when related to this transportation of
20 spent nuclear fuel.

21 The Spent Fuel Project Office was asked by
22 the Commissioners of the NRC to look at this
23 particular event and assess the events that a fire
24 like the one in the Baltimore tunnel might have on a
25 spent fuel transportation cask.

1 Next slide.

2 So what I'd like to do today is tell you
3 a little bit about the Baltimore tunnel fire accident,
4 tell you a little bit about the coordination that we
5 had with the National Transportation Safety Board in
6 investigating this event, talk about a tunnel fire
7 model that was done of the Howard Street Tunnel fire
8 by the National Institutes of Standards and
9 Technology, formerly the Bureau of Standards. I will
10 also tell you a spent fuel transportation cask
11 analytical model where we looked at the effects of
12 this fire on an actual certified spent fuel
13 transportation cask, and a computer model. And then
14 I'll give you some of the staff's conclusions. And
15 hopefully by the end of all that everyone will still
16 be awake. All right.

17 These are some pictures, and they actually
18 might be a little bit hard to see from the back. But
19 the Baltimore tunnel event, as I said, it occurred in
20 July of 2001. A CSX freight train traveling through
21 the Howard Street Tunnel in downtown Baltimore,
22 Maryland derailed in the tunnel; 11 of the 60 cars
23 that were part of that train derailed. During the
24 derailment a tripropylene tanker car was punctured and
25 that was thought to be the source of the fire.

1 Now, some of these pictures here, this is
2 the tripropylene tanker car after it was removed from
3 the west portal of the Howard Street Tunnel. This is
4 a picture of the hole that was punched in that car
5 during the derailment. And that's where the fuel, the
6 liquid tripropylene came out. And that hole is about
7 1.5 inches.

8 This is the eastern portal of the tunnel
9 during the fire. And this picture down here is the
10 eastern portal of the tunnel taken actually about a
11 year after the fire and you can see the differences
12 there.

13 What I should say before I go into the
14 National Transportation Safety Board is that the
15 precise duration of the Baltimore tunnel fire is
16 basically unknown. Information provided by emergency
17 response personnel indicates that the most severe
18 portion of the fire lasted approximately 3 hours. We
19 also know that firefighters when they entered the
20 tunnel 12 hours after the hour were able to visualize,
21 actually see the tripropylene tanker car and it was no
22 longer burning. So we know certain that the severest
23 portion of that fire didn't last -- it lasted between
24 3 and 12 hours and probably likely around 3 hours
25 based on the reports that we have.

1 The National Transportation Safety Board
2 is the lead investigative agency for major
3 transportation accidents in the United States.

4 We first met with the NTSB staff that were
5 in charge of investigating this accident September of
6 2001, and we've had several meetings since with them
7 to discuss the details of the accident.

8 The derailment was the primary concern for
9 the NTSB considering that the derailment came before
10 the fire. So we, of course, were most interested in
11 the fire. And so we decided that we would go ahead and
12 pursue and investigation of the fire and the NTSB has
13 fully supported that investigation. They provided
14 information, data and technical expertise on rail
15 events, and they also provided access to the actual
16 cars that were in the tunnel during the fire. We were
17 able to examine those and take samples from them to
18 help us in our analysis.

19 Next slide.

20 Now, rather than rely solely on the
21 current body of knowledge that exists with regard to
22 cask response to fires, the staff determined that the
23 best course of action would be to better characterize
24 what happened in the Howard Street Tunnel. There was
25 a conjuncture as to what the conditions were in that

1 tunnel, but we really didn't know. We didn't have any
2 solid evidence, at least at the point we started our
3 investigation as to what it was like during that fire.

4 So we went to the National Institutes of
5 Standards and Technology and we contracted with fire
6 experts there to model the Baltimore Tunnel Fire for
7 us. NIST uses their fire dynamic simulator code in
8 order to model fires. And this code has been
9 extensively in nuclear power plant fires to simulate
10 room fires in nuclear power plants.

11 So one of the parts of the analysis that
12 NIST did for us, is they validated the FDS code with
13 data from the Memorial Tunnel Fire Test Program. The
14 Memorial Tunnel Fire Test Program was done, sponsored
15 by the Federal Highway Administration, and they did a
16 series of tests in an abandoned highway tunnel, lite
17 a series of fires and collected data from that.

18 NIST used the FDS to model a couple of
19 those fires and the results that they got were very
20 close to the data that came out of that Memorial
21 Tunnel Test Program. So we were confident that the FDS
22 code could handle a tunnel fire scenario.

23 Before we go on, the model of the Howard
24 Street Tunnel that was put together was a full three
25 dimension model of the tunnel geometry and it included

1 all the rail cars. So they modeled the entire 1.7
2 miles of the tunnel and all the rail cars that were in
3 it during the fire.

4 Next slide.

5 A little bit more about the model.
6 Tripropylene was the fuel that fueled the most severe
7 portion of this fire, and that was the fuel source
8 that was used in the NIST model.

9 There was no ventilation in their model.
10 The Howard Street Tunnel does have a ventilation
11 system, but it was not activated during the time of
12 the fire. So we did not put any ventilation in the
13 model, any forced ventilation.

14 When the fire model was completed, what
15 they found is that steady state or constant conditions
16 were reached about 30 minutes into the simulation.
17 What that means is that the hot gas layer above the
18 rail cars and surface temperatures of the tunnel wall
19 and the rail car metals reached a relatively constant
20 temperature with 30 minutes into the simulation. That's
21 what I mean by steady state.

22 The next slide is actually an animation of
23 the tunnel fire model done by NIST. And if we could
24 click on that. I think we need to go a few. Okay.

25 All right. As you can see here, this is

1 the tripropylene tanker car and this is the pool of
2 tripropylene fuel. The flames are rising very quickly
3 up into the ceiling of the tunnel. And you'll see that
4 the flames are then spreading out along the length of
5 the tunnel.

6 This tunnel model actually has a slope of
7 0.8 percent going in this direction; from down here to
8 up here. And that mimics the slope of the tunnel from
9 the west portal to the east portal.

10 As far as temperatures that we saw in this
11 fire model, within the flaming regions of the fire we
12 saw about 1800 degrees fahrenheit, and that's in the
13 narrow flaming regions of the fire.

14 Where flames directly impinged on the
15 surface of the tunnel ceiling surface, we saw about
16 1500 degrees fahrenheit.

17 We also saw an average in the hot gas
18 layer above the rail cars, in other words up here, of
19 about 900 degrees fahrenheit. And that was an average
20 about 3 rail car lengths along from the fire.

21 We also had an average tunnel ceiling
22 temperature of 750 degrees fahrenheit along here,
23 about 3 rail car lengths from the fire.

24 Next slide.

25 This is a plot to kind of capture what the

1 temperatures were from the NIST data. As you can see
2 here, just so you don't get thrown off, the scale here
3 is degree celsius and you see that as a maximum up
4 here of a 1,000. That's why you're not seeing the
5 number 1800, which I just said. That's 1800
6 Fahrenheit.

7 So you see the upward slope of the tunnel
8 going in this direction. The fire in this case is at
9 distance zero, which about in the middle of the graph.
10 And you can see that up here at ceiling you have the
11 highest temperatures and then the temperatures slowly
12 decrease as you move down from the ceiling. I believe
13 this here is at the top of the rail car. This here is
14 at the bottom of the rail cars. And then you move on
15 down the side of the tunnel, and then down to the
16 bottom of the rail cars. And the floor of the tunnel
17 itself. So that are plots of those temperatures.

18 And what we did in this plot is we took
19 the maximum temperature at each location and plotted
20 it here. So this is a worse possible or a maximum
21 temperature plot from the NIST tunnel fire model.

22 Next slide.

23 Now, not everyone trusts computer models.
24 And one of the things that we thought would be prudent
25 to do, in fact I think it would be irresponsible if we

1 didn't do, is to look at what was sitting right in
2 front of us, and that was the physical evidence in the
3 tunnel.

4 Here we had a number of rail cars that had
5 been burned, a number of materials within the tunnel;
6 brick, sand, rails, all had seen a severe fire
7 exposure. So we decided to characterize what kind of
8 temperatures they saw and what duration the fire could
9 have been by looking at the materials that came out of
10 the tunnel.

11 We went to the Center for Nuclear Waste
12 Regulator Analysis, which is an independent facility
13 out of Southwest Research in San Antonio, Texas. They
14 have material and fire experts that do tests and
15 analysis for all different types of materials and all
16 different types of industries.

17 What we had them do is come out and
18 inspect the tanker cars, the tripropylene tanker car
19 and other cars that were involved in the tunnel fire.
20 They took samples from those cars, paint samples. They
21 took brick samples from the tunnel. They cut up some
22 of the pieces of the rail car. And they also had, in
23 particular, an air brake valve right off the
24 tripropylene tanker car to look at what happened to
25 those materials during this fire.

1 They did metallurgical analysis on the
2 samples obtained from those rail cars. And the results
3 that they reported back as far as what those materials
4 saw actually were very consistent with the
5 temperatures reported in the NIST tunnel fire model.
6 So we were confident that the NIST tunnel fire model
7 was characterizing what actually happened fairly well.

8 Next slide.

9 The next step for the staff in this was to
10 look at what effect this fire would have on a spent
11 fuel transportation cask. And this is the schematic
12 of the particular transportation cask that we would
13 then model and do the analysis on.

14 This is the Holtec Hi Star 100, which
15 you've probably heard about today. I think we've
16 talked about it. You've seen pictures of it. This is
17 a diagram of that cask.

18 As you can see here, this is the
19 multipurpose canister, which is a seal welded canister
20 made out of stainless steel. This particular basket
21 for the model that we put together holds 24
22 pressurized water reactor fuel assemblies. This
23 particular cask has several layers of steel plates for
24 gamma shielding and then an outer neutron shield as
25 well as a stainless steel skin.

1 What you don't see in this picture is the
2 impact limiters.

3 Go to the next slide.

4 This is a rendering, and I'm sure the
5 gentleman from Holtec will probably recognize this,
6 this is a rendering of the Holtec Hi Star cask on a
7 specially designed rail car. You saw a picture of an
8 actual one earlier today. This particular cask has the
9 impact limiters in place. There's a transport cradle
10 that's mounted to this rail car, and then it has tie
11 down straps there. And that's just to give you kind of
12 a better picture of what it would look like if it was
13 on the rail. And I don't know which mountain range
14 that is back there, but I'm sure I can find that if
15 you want to know.

16 Anyway, next slide.

17 This is our model. It's a computer
18 analysis model. Just to point out some of the
19 features here.

20 We explicitly modeled all the gaps, the
21 basket here. This is 24 pressurized water reactor
22 assemblies. This is the outer skin of the MPC. And
23 then the gamma plates, gamma shielding plates which
24 are carbon steel. The neutron shield material is
25 within each of these little stainless steel

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1 compartments.

2 This is a two dimension model.

3 And we also threw in the cradle on which
4 this rail cask would sit when it was being
5 transported.

6 Next slide.

7 This is the detail of the fuel assembly
8 area. You can see that we did homogenize the fuel
9 assembly. We did not model individual fuel pins. That
10 usually takes more computer resources than we have to
11 do that kind of a detailed model. However, the fuel
12 homogenization here has been validated with data, so
13 we're pretty confident we're capturing what the fuel
14 is doing.

15 These are basket supports in the multi-
16 purpose canister, and then the multi-purpose canister
17 shell is out here. And you get a sense for the mesh
18 that we used in this analysis model.

19 Next slide.

20 So what did we do with this model that we
21 built? We applied the temperature and flow data that
22 we received from the NIST calculation. The NIST
23 calculation using FDS gave us temperature and it also
24 gave us the flow of air around the cask. That's one
25 of the advantages of using a CFD code for modeling

1 fire. You can get the flow that that fire induces when
2 it starts. So we used that data and we applied it to
3 our analysis model.

4 We did two assessments. The first
5 assessment was of the cask center 20 meters, which is
6 approximately one rail car length from the fire
7 source. And that's per federal regulations. Department
8 of Transportation regulations mandate that any
9 radioactive shipment be separated if it's being done
10 by rail, be separated by at least one rail car from a
11 hazardous material car. So we postulated that if a
12 spent fuel transportation cask was actually being
13 shipped in the Baltimore tunnel in that Howard Street
14 Tunnel on that train, it would have to be separated by
15 at least one rail car from the tripropylene tanker car
16 that served as the source for this fire.

17 The second assessment we did was with the
18 cask located adjacent to the fire, about 5 meters from
19 the fire source to the center of the cask.

20 Next slide.

21 These are the results from our analysis.
22 The first assessment 20 meters. If you look at this,
23 you have several things going on here. A plot of the
24 fuel temperature, canister shell, cask inner shield,
25 gamma shield and cask outer surface.

1 In this particular model you can see that
2 the fuel doesn't really start heating up until about
3 15 hours into the transient. And on this particular
4 graph the fuel exceeds 1058, which is 1058 Fahrenheit
5 which is an acceptance criteria that the NRC uses in
6 thermal review and certification of casks. And I'll
7 talk a little bit more about that in a minute. But it
8 exceeds that acceptance criteria at 116 hours into the
9 transient.

10 So if you parked this particular spent
11 fuel transportation cask 20 meters from the Baltimore
12 tunnel fire it would take 116 hours at the maximum
13 temperature for it to exceed that fuel criteria, 1058
14 degrees Fahrenheit.

15 Next slide.

16 Obviously, if you move the cask closer to
17 the fire source, you're going to heat up a little
18 quicker. IF you look at this plot here, you'll see
19 that the fuel starts to heat up about 10 hours into
20 the transient and then the fuel actually exceeds the
21 1058 Fahrenheit criteria at 37 hours past the start of
22 the fire.

23 Next slide.

24 We'll play this animation in a second.

25 What I want to make sure I explain is it's important

1 to know that the short term temperature limit is by no
2 means the temperature at which the fuel will fail.
3 This limit was established by experiments that exposed
4 fuel cladding specimens to high temperatures. The
5 exposure of specimens to 1058 do not lead to any
6 noticeable degradation or failure for periods of 30 to
7 70 days. So it's not as if when we reach 1058 the fuel
8 just falls apart. That's not the case. This is a
9 regulatory limit that we have in place and decided
10 it's our acceptance criteria.

11 Okay. We have an animation here of the
12 cask model, which I just showed you. When Chet starts
13 it. This 150 hour animation and it's not going to take
14 that long to run.

15 As you can see, the fire is up here. The
16 highest part of this cask is up here at the top, the
17 ceiling of the tunnel, which makes sense. And as the
18 fire progresses the temperature starts to increase
19 along the sides of the tunnel. And you can see here at
20 the top of the cradle, you'll also see an increase of
21 temperature. And the reason you see that there is we
22 actually took account for the impact limiter and the
23 impact limiter would shield part of the cask from the
24 fire. But there would be flames shooting up over the
25 impact limiters. And that's why the top of this cradle

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1 here is starting to heat up.

2 And you'll notice that there's a
3 relatively cool region down here for the cradle. And
4 that's partially because there's flow of air on the
5 sides of this. So as this fire is starting, it's
6 drawing air into it in order to feed the fire. And so
7 you have an appreciable flow of air across the sides
8 of this things. And then you're heating up basically
9 from the top to the bottom.

10 Next slide.

11 So to summarize our results. In this case,
12 the time to exceed the short term fuel temperature of
13 1058 for 20 meters were over 100 hours, and for 5
14 meters were over 30 hours.

15 Now time to canister failure, the seal
16 welded canister which holds the fuel in this case, if
17 that particular canister were to fail you would have
18 a release, most likely. You would have a release. So
19 that's what you're really worried about; what's going
20 to happen in that canister in a severe fire like this?

21 The time to canister failure at the
22 sustained peak temperatures that we had in this
23 analysis we determined that by doing a stress
24 calculation based on creep rupture of the canister.
25 For 20 meter case, it was over 30 years. And for the

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1 5 meter case it was also over 30 years. So that means
2 that you would have to hold this cask at the maximum
3 temperatures we calculated for this fire for about 30
4 years before you failed that inner canister that was
5 holding the fuel.

6 Next slide.

7 Some of our conclusions. Obviously, the
8 robust nature of this spent fuel transportation cask
9 that we analyzed for this particular event is evidence
10 from the results of this analysis. Based on our
11 analysis, the consequences of a spent fuel cask being
12 involved in a fire such as the one that occurred in
13 the Howard Street Tunnel are minimal. Our conclusion
14 is that there would be no radioactive release. And as
15 a result, the health and safety of the public would
16 have been protected had such an event occurred.

17 What I want to say also is that a question
18 had been raised previously at other meetings about the
19 shielding, the outer neutron shield being gone after
20 a severe fire event. The cask, when this particular
21 cask was certified, the vendor that did the analysis
22 on that cask in order to get it certified looked at
23 this particular scenario. They assumed that after the
24 fire the neutron shield was gone and the dose rates
25 that they calculated were within the regulatory

1 limits. So the cask was approved based on that. So
2 that question about the neutron shield being gone
3 actually has been assessed already by the cash vendor
4 for certification.

5 Finally, so where does that lead us?
6 Implications for PPS thermal testing. Maybe that's
7 the question of the day: Where are we now when we
8 take the Baltimore tunnel fire and compare it to what
9 has been proposed in the PPS, Package Performance
10 Study thermal test?

11 The thermal testing proposed in the
12 Package Performance Study, which includes a fully
13 engulfing fire in which the cask, all the surfaces of
14 the cask are seeing the fire temperatures, depending
15 on the duration that is chosen this PPS performance or
16 this PPS test could provide a greater overall thermal
17 challenge to the spent fuel transportation cask than
18 the exposure that we've analyzed for the Baltimore
19 tunnel fire event. So probably part of the information
20 that feeds into comments should consider the duration
21 of the fire for the PPS test.

22 Thank you.

23 MR. CAMERON: Okay. Thank you, Chris.

24 Now, obviously, that last note at least in
25 terms of this meeting, the implications of this study

1 would be draft test protocol is the key issue in terms
2 of this study for the test protocol. There's obviously
3 other issues, and Amy is going to introduce that for
4 us.

5 But before we get into that, are there
6 questions to Chris about this particular study. And
7 let's go to Bob Halstead first and then we'll go to
8 Kevin.

9 Bob?

10 MR. HALSTEAD: Chip, I want to make some
11 quick comments on the Baltimore fire analysis by NIST
12 and Chris' presentation. I'll keep them very brief
13 because of the hour, and also because some of you may
14 know the two people who worked on this analysis for
15 the state of Nevada. Dr. Merit Burkey, who is formerly
16 the chief fire investigator for the NTSB had to leave
17 and has, in fact, been hired back by NTSB because they
18 decided they couldn't figure out what really happened
19 in the tunnel without him. So we'll actually be
20 operating, unfortunately, under a conflict of interest
21 provision in the NTSB's contract. So I will be
22 responsible, obviously, for these comments, but I want
23 to recognize the fact that I learned a great deal
24 about doing this fire analysis from Dr. Burkey.

25 And Marvin Reznikoff, who was one of the

1 people who worked on the fire consequence analysis for
2 us may or may not be available at the Chicago meeting
3 on March 19th.

4 And so we do intend to file some comments
5 on the NIST report as part of our PPS comments that
6 are due on May 30th.

7 Point number one, with all due respect to
8 Chris, we would like to see the authors, the NIST
9 authors of the report brought to a meeting so we can
10 discuss this report with them.

11 We had a terrible experience over this
12 particular project, and I won't repeat all the
13 details, but they basically had a very undermining
14 impact on our ability to work with NRC. We first
15 requested that our experts be allowed to sit in with
16 the early discussions between NRS staff and their
17 various contractors. We then asked for early access to
18 the information. As you can see on the title page of
19 the report, the manuscript was apparently completed in
20 August and not released until February. We spent a
21 fair amount of money, close to \$2,000, on FOIA
22 photocopying without getting much information to
23 inform our preparation for this meeting.

24 And so I don't know how we completely
25 avoid these problems in the future. Because, as you

1 know, there's a larger issue of what right Nevada
2 consultants and staff have to be present in certain
3 types of NRC meetings. And we're still researching
4 the legal ramifications. But the long and short of it
5 is the best way now to resolve it is to bring the NIST
6 report authors to the table and let them speak for
7 themselves.

8 Point number two, we believe the most
9 important point for testing is to ask an answer the
10 question what's the worst case fire that could have
11 occurred in the Howard Street Tunnel. And our original
12 position two months after the fire was 24 hours or so
13 at over 500 degrees Fahrenheit, probably 12 or more
14 hours at about 800 degrees C or 1500 degrees
15 Fahrenheit. And we still think that that was a
16 reasonable assumption on the NIST report.

17 Point number three, for testing the second
18 most in question is what is the most vulnerable NRC
19 certified cask and fuel configuration that could have
20 been present in that fire? WE've looked at some
21 performance envelop analysis that Miles Griner did
22 under contract to DOE, and we find some compelling
23 reasons that in fact the Westinghouse design MPC with
24 a welded canister might have failed under those fire
25 conditions, but certainly analysis suggests that a

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1 traditional steel lead steel transport cask without
2 that additional extra-regulatory barrier of the welded
3 canister is a big issue.

4 And I appreciate the sensitive and self-
5 effacing way that Chris dealt with this. You know,
6 it's clear we've got a situation here where two
7 different parties evaluated this fire using different
8 sets of assumptions and both stand by their findings.
9 And is so often the case in these kinds of disputes,
10 you know, the question is in the assumptions.

11 Point number four, the key fire condition
12 at issue that we want to remember is this: The NIST
13 finding of constraint in that fire is the intrusion of
14 water from the water main. Now one of the reasons as
15 I understand it that Dr. Burkey has been called back
16 now as a retired consultant to NTSB is because they're
17 reconsidering that issue. And I don't think -- is Dr.
18 Burkey still here? Did he have to go? Okay. I'm
19 sorry because of the time of the day. And certainly
20 he can speak for himself.

21 But this, as I understand it, one of the
22 issues that he'll be working for NSTB on.

23 Point number five, there are a number of
24 key issues in the fire methodology. To mention them
25 briefly, there are reasons to question the assumption

1 that steady state is reached in 30 minutes. Questions
2 about the tunnel simulation that was run. Perhaps it
3 should have been run for a period of 3 hours. There
4 are some questions about whether the NIST analysis as
5 we read it included -- and we read it did not include
6 the re-radiation of the heat absorbed by the thick
7 brick wall of the tunnel. And moreover, we think it's
8 credible to assume that the cask lid, because of the
9 whole business with no requirement for dedicated
10 trains and no requirement for properly designed buffer
11 cars, that when you do the analysis it's perfectly
12 appropriate to assume that the lid end of the rail
13 cask would have been within that 5 meter zone, the
14 hottest part of the fire.

15 Finally, we read the NIST report
16 conclusions on page 28, and we find nothing in the
17 report that disputes our original conclusion that the
18 fire we're concerned with could have burned for up to
19 12 hours at 800 degrees C or 1500 degrees Fahrenheit.
20 And we find the further added conclusion that the fire
21 could well have burned for 3 hours at a 1000 degrees
22 C or 1800 degrees Fahrenheit as, you know, a portion
23 within the longer fire. And that that's a pretty
24 significant fire event, and we continue to believe
25 that it's an appropriate example to use as we try and

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1 look at real world fires that would inform the extra-
2 regulatory condition that we'd like to look at in the
3 PPS.

4 And I apologize for the length of time.
5 Thank you.

6 MR. CAMERON: Okay. Well, thank you for
7 being concise on that, Bob. And I think the question
8 is going to be when we look at the draft, discuss the
9 draft test protocol how either NIST finding or the
10 Nevada finding should be factored into that test
11 protocol.

12 Chris?

13 MR. BAJWA: Yes. I just have a few things
14 I'd like to say, and I'll make those comments brief.
15 Just sort of to respond to some of the things that Bob
16 has said.

17 First of all, Bob, I completely agree that
18 one of the -- probably the best ways for us to go
19 forward is to sit down and talk about the analysis
20 that was done, some of your objections to the
21 assumptions and the conclusions and to really go
22 through this. Both NIST and the individuals at the
23 Pacific Northwest National Labs who assisted us with
24 the thermal analysis are fully willing to do that. So
25 I think that we should discuss those things in that

1 kind of a forum. I think that we could get a lot of
2 good discussion and information exchange in that
3 forum.

4 The other thing I'd like to say, two
5 things actually. We actually did run an additional
6 case of a 7 hour fire. We modeled a 7 hour fire. NIST
7 did, not we, but NIST did. They modeled a 7 hour fire
8 with a 23 hour cool down and then additional 100 or so
9 hours. And we looked at the 20 meter case. We reran
10 our analysis of the cask and we didn't see any
11 problems with that. We didn't see any difference
12 performance.

13 So we did run an extended fire case of 7
14 hours and we didn't see any problem with that.

15 Now, just to set the record straight here.
16 A 12 hour fire at 1500 degrees Fahrenheit would have
17 been impossible in the Howard Street Tunnel. And the
18 reason I saw that is because there was not enough fuel
19 in that entire tunnel to burn for that length of time
20 at 1500 degrees Fahrenheit.

21 If you take the 28,000 gallons that were
22 in that tripropylene tanker and you burned it in a
23 controlled pool fire burn, you're talking about maybe
24 7 or 8 hours.

25 MR. HALSTEAD: Well, I appreciate that.

1 And what I'd say in response why we want to have the
2 NIST people and our consultants here is their argument
3 is, Chris, is that there are some uncertainty beyond
4 that. I think we're arguing about a period between 7
5 and 12 hours based on the re-radiation of heat and
6 also the fact that there were other flammables present
7 in the tunnel, which certainly had a much lower burn
8 temperature but may have contributed to this.

9 Nonetheless, I want to say I appreciate
10 the professionalism and the elegance of your analysis.
11 I'm disturbed by the fact that there are other
12 analyses, in particular the work that Griner did,
13 extensive work under that projects that Bill Lake
14 designed which developed some performance envelop
15 analyses that we think point in another direction.
16 And the only thing I'm angry about is the procedural
17 business of us having to wait so long to get the
18 available information.

19 I have great respect for the analysis that
20 you've done. And I also think it's possible that
21 doing these side-by-side analyses on different cask
22 configuration, we may come to a point that Nevada
23 raised to everyone's attention and then it got lost in
24 '96 after someone in the industry had the bright idea
25 of precluding the Department of Energy from spending

1 money developing a multi-purpose canister, which was
2 one of their better ideas. And that is the issue that
3 since the welded canister does seem to provide very
4 significant protection, there's an issue here as to
5 whether we ought not to address that as a regulatory
6 issues and have that on the table as part of the
7 protection that the package provides in a severe fire
8 environment.

9 But I very much appreciate the way that
10 you've handled this whole issue.

11 Thank you very much.

12 MR. CAMERON: Okay. Thank you both.

13 We're going to go to Kevin and then Fred
14 Dilger and have Amy tee it up for us.

15 Kevin?

16 MR. KAMPS: Chris, I just had a couple of
17 questions. Did I understand correctly when you said
18 that the neutron shielding even if lost on the Holtec
19 would still only result in below regulatory doses?

20 MR. BAJWA: For accident conditions. For
21 the hypothetical accident fire the doses that are
22 allowed by regulations, this particular design would
23 have stayed under those dose for the accident
24 conditions.

25 MR. KAMPS: Okay. Do you know what the

1 dose rate? Is that 5 rem? I'm not sure what dose
2 rate you're referring to.

3 MR. BAJWA: I don't know exactly.

4 MR. HALSTEAD: One rem at one meter.

5 MR. BAJWA: One rem at one meter. Okay.
6 Yes.

7 MR. KAMPS: Another question I have is
8 there are -- that was what you analyzed was the fire
9 that happened in the Baltimore tunnel fire. But a
10 point I wanted to make was that there are lots of
11 hazardous inflammable materials on the roads and on
12 the rails that burn at much hotter temperature. And
13 Bob Halstead made some points that I was going to
14 bring up as well about other nuclear waste
15 transportation containers that might not have fared so
16 well. And one of our big concerns was the emergency
17 response that actually took place at the Baltimore
18 train tunnel fire where according to some press
19 accounts the firefighters rushed into that scene
20 unnecessarily, given the circumstances, perhaps.
21 Although there was the concern that, you know, toxic
22 materials could be released and that's a concern with
23 nuclear waste transportation as well if firefighters
24 do stand off in a fire situation, what if the fire
25 reaches the container and radiation is released. Maybe

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1 they should intervene.

2 But the loss of the radiation shielding
3 and its impact on the firefighters is a big concern
4 that we have that I think is getting lost, especially
5 given how they did respond to this specific accident.

6 MR. CAMERON: All right. Thank you,
7 Kevin. And hopefully we can factor all this into the
8 test protocol.

9 Let's go to Fred and then Bob, and
10 Charlie.

11 Fred?

12 MR. DILGER: As so often happens, Bob
13 Halstead stole a lot of my thunder here. But I just
14 want to highlight, that speaking as someone who kind
15 of watched on the periphery as the controversy between
16 these two studies developed, I think that the very
17 useful result of these two studies is that we're going
18 to be able to get a very -- say with a very degree of
19 confidence, I think, about what the contributions to
20 safety the canister made in this incident. And I think
21 Bob is exactly right when he says that this might
22 point the way to certain regulatory action on the part
23 of the NRC, and certainly some activity on the part of
24 the Department of Energy as it develops its
25 transportation program for Yucca Mountain.

1 I think that getting the sets of analysts
2 together to talk about what the contribution to safety
3 provided by the canister was is extremely useful and
4 helpful. And it's something to consider for the
5 future.

6 MR. CAMERON: Thank you, Fred.

7 Bob?

8 MR. FRONCZAK: Just really quickly, Bob.
9 He mentioned, just kind of breezed through dedicated
10 trains, but to point out that tripropylene car would
11 never have been in that train or in that tunnel if
12 that would have been transported in a dedicated train
13 or a spent fuel had been transported in a dedicated
14 train.

15 MR. CAMERON: Okay. Thanks for that
16 clarification, Bob.

17 Let's go to Charlie and then over to Lisa.

18 Charlie?

19 MR. PENNINGTON: Just a couple of points.
20 The neutron shielding will be assumed to go away in
21 these fire accidents, but that's because it's
22 convenient, a convenient mechanism for doing a
23 conservative analysis of the number of tests involving
24 burn of this material that will allow us to draw some
25 pretty good conclusions about how this stuff survives.

1 It has pretty good burn characteristics. But even in
2 a charred condition, it displays a lot of the
3 characteristics that it has intact.

4 The second issue I would just like to ask
5 for personal information from the Department of
6 Transportation. Is a similar session such as this
7 going on for tripropylene tank cars?

8 Okay. Thank you.

9 MR. CAMERON: Right. Lisa?

10 MS. GUE: This is the second time I've
11 seen this presentation and the second time that I'll
12 make this comment. Just to pick on the conclusion on
13 page 19 where it's written that the fire would not
14 result in radioactive release. And you know one rem at
15 one meter is not zero. And I think just to echo
16 what's already been said very briefly, that it is
17 important to look at the impact on radiation shielding
18 in these studies and to communicate clearly what the
19 assumptions are. And therefore, the relevance of the
20 conclusions.

21 I think this is at the end of the day a
22 misleading statement on the page 19 conclusion.

23 MR. CAMERON: Okay. Thank you.

24 And let's have Chris come up to the table
25 for the fire discussion since comments like Lisa's and

1 others may factor into this.

2 And I think Charlie still has his card up.
3 Oh, Ray. Well, let's hear from the man from
4 Baltimore, I guess, before we start.

5 MR. MANLEY: Thanks a lot.

6 I'm speaking probably a little bit from
7 ignorance here, but what is the possibility of having
8 two car involved? I mean, we're talking about burning
9 time, one car lasting so long. The possibility of two
10 cars being involved at the same time.

11 MR. CAMERON: Now you're talking about two
12 cars of the tripropylene?

13 Bob?

14 MR. FRONCZAK: I mean, there's a
15 possibility of that, 3 cars, 4 cars, 5 cars. I mean,
16 the probability gets smaller, you know. But there's a
17 possibility. Probably LP gas would be a higher
18 probability of having multiple cars together. So
19 there's a very real possibility. But, again, if the
20 spent nuclear fuel was in a dedicated train, none of
21 that material would be in it.

22 MR. CAMERON: Right.

23 MR. MANLEY: I understand that. And,
24 again, I realize we're looking at realism as opposed--
25 real life as opposed to. But you also have to look at

1 what is the worst case possible scenario.

2 I mean this particular chemical, as you
3 indicated, are there other chemicals that become
4 involve that would create a more hazardous condition?

5 MR. CAMERON: Okay. Thanks.

6 We really need to get into Amy's
7 presentation now.

8 Kevin, real quickly?

9 MR. KAMPS: Yes, just a quick follow up.

10 This whole issue of dedicated trains and
11 mixed freight, it just gets back to the whole what's
12 most important. And saving money for the Department of
13 Energy or for the nuclear industry in mixing these
14 hazardous chemicals, explosive and such things. It
15 gets back to the same dynamic of Davis-Besse. It's
16 about saving money at what risk, that's the question.

17 MR. CAMERON: Okay. John, Bob and then
18 we'll go on.

19 MR. VINCENT: Very quickly. NEI has just
20 recently published a transport policy which includes
21 the use of dedicated trains when you've decided you're
22 going to use rail.

23 MR. CAMERON: Well, I guess that makes
24 sense.

25 Bob?

1 MR. FRONCZAK: A real quick response to
2 your comment, and I said it I think earlier or I
3 attempted to say it the first statement today. What
4 I think we need to do is we need to understand
5 ultimately, you know, what sorts of incidents, real
6 world incidents might lead to a cask failure, how long
7 it might take to reach that and try to either mitigate
8 that from occurring or be able to respond to the
9 result.

10 MR. CAMERON: Okay. And with that is a
11 nice segue into perhaps -- Amy, could you talk to us
12 a little bit about the fire aspects and then we'll
13 have a discussion?

14 MS. SNYDER: Good afternoon. I'm Amy
15 Snyder.

16 NRC appreciates your participation in this
17 workshop, and I am glad to have this opportunity to
18 discuss with you the fire testing protocols this
19 afternoon.

20 We just finished a discussion of what we
21 learned about the Baltimore tunnel fire and how it
22 compares to the Package Performance Study test
23 protocols. As significant and severe as the Baltimore
24 tunnel fire was, it was not a fully engulfing fire.
25 The fire conditions were not as severe as compared to

1 the regulatory fire.

2 We saw this morning in Mr. Sorenson's
3 presentation that we plan on performing calorimeter
4 testing, testing that is necessary to obtain
5 background data such as temperature and flux that will
6 be used to benchmark the code that we plan on using to
7 more accurately model the fire environment.

8 Then we are going to do modeling to
9 determine the response of the cask to the fire
10 environment. We'll make predictions.

11 Then we'll do the physical testing and
12 compare the results.

13 Now I want to review with you the staff's
14 proposal for the fire test. The staff is proposing
15 full scale testing. This is one of the things that we
16 have learned that through the public meetings in 1999
17 and 2000 that was something that the public wanted,
18 full scale testing. We actually planning on doing
19 physical testing conducted on real certified casks.

20 Second, the staff believes that the staff
21 should be a fully engulfing optically dense
22 hydrocarbon fuel as. As Dr. Murphy described to us
23 this morning, that means the fire surrounds,
24 completely surrounds the cask. You cannot see through
25 the fire and the fuel source is hydrocarbon or jet

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1 fuel in the test protocol.

2 And thirdly, the staff proposes to conduct
3 the fire test for more than 30 minutes. The duration
4 of the fire has not yet been determined, but that's
5 open for discussion.

6 Next slide, please.

7 There are many ways in which fire testing
8 can be conducted. We would like to know what you
9 think about these two questions and we value your
10 input.

11 And we also anticipate that your comments
12 could result in worthwhile changes to the underlying
13 test approaches and plans.

14 The fire test modeling in the test
15 protocols report examine changes in temperature in the
16 heat flux modeled from zero to 60 minutes. However,
17 no specific duration for the fire testing has been
18 proposed yet by the staff. But the staff suggests more
19 than 30 minutes.

20 You saw from Mr. Sorenson's presentation
21 this morning that there are three different positions
22 that were modeled. The casks were preliminarily modeled
23 with cask on the ground, cask one meter above the fire
24 and the cask positioned above the vapor dome. What
25 should the position of the cask be relative to the

1 fire for the fire test?

2 Next slide, please.

3 Your comments, concerns, ideas and
4 suggestions are welcome and we will consider all your
5 comments.

6 Thank you.

7 MR. CAMERON: Okay. Thank you very much,
8 Amy. And it is getting late. Amy's put some questions
9 before us. You've seen what's in the draft test
10 protocol already. I guess I would look for what your
11 opinion is of what's in there and do you have any
12 ideas on these other issues. And let's go to Bob
13 Halstead.

14 Bob?

15 MR. HALSTEAD: Thank you, Chip.

16 As I said earlier, we have done some work
17 with Dr. Miles Griner at the University of Nevada,
18 Reno, regarding both the logistics of extra-regulatory
19 fire tests and the costs and some of the issues
20 involved with modeling those tests. And so I'd just
21 like to make a couple of comments, and I will talk
22 about some specific temperature and position issues.

23 One of the things that I am convinced of
24 from Miles' work is that this is an area where in
25 constructing a good full scale test, you're probably

1 going to spend a fair amount of money doing
2 simulations to develop your target failure threshold.
3 That's really for us the issue here. I'm going to
4 speak strictly about extra-regulatory testing.

5 Secondly, there are some concerns about
6 the limitations at specific facilities, and there are
7 some issues about the relative value of a fire test
8 pit versus a furnace test.

9 And thirdly, as far as actually specifying
10 the peak temperature and duration engulfing fire, and
11 understand there are some interesting issues related
12 to cask impingement on the edge of a wind driven fire
13 that aren't addressed here, and also some issues
14 involved in torch fires which I think a lot of us have
15 a greater appreciation of as a result of the
16 conditions that occurred in the Wisconsin propane
17 derailment accident a few years ago. But if we just
18 look at the engulfing fire, which is traditionally how
19 we've approached this issue, we're considering three
20 different approaches. And, frankly, we're going to
21 need to have some help from the NRC staff. We're going
22 to have to find a way to do it on our own short term
23 in modeling the failure thresholds.

24 The first way we would approach this is to
25 take the performance envelop analyses that Griner

1 developed for DOE for the engulfing regulatory fire,
2 800 degrees C, 1500 Fahrenheit. And there for the
3 truck cask you're probably looking at fairly short
4 duration for an intact cask, somewhere between 30
5 minutes and a couple of hours of maybe as high as 6
6 hours. For the rail cask we're looking somewhere in
7 the area of 6 to 12 hours.

8 And, again, all of these are just as the
9 NRC staff has said in their proposal, these are just
10 the options that we're looking at now that we have the
11 draft protocols in hand.

12 The second thing that we're looking at is
13 modeling a failure threshold for a hotter fire,
14 somewhere in the range of 1000 degrees C to 1200
15 degrees C. And, again, model a failure threshold --
16 and I must tell you I knew this number this morning
17 but I'm too tired to remember it and too tired to find
18 the notes. So you'll just have to trust me that there
19 are some curves here that are of value.

20 And by the way, I note, Ken, that somehow
21 I neglected to send you the study that Miles did for
22 us when were sending documents. And I want to take
23 this opportunity to acknowledge the way that Sandia
24 has done a good job of making transcripts available
25 and reports available, and I'll make that available.

1 Now the third area where we really don't
2 have a lot of guidance is simply to take an undamaged
3 cask and properly instrument it and run either the
4 regulatory fire, 1475 degree Fahrenheit or some extra-
5 regulatory temperature threshold and instrument the
6 cask for readings, one that would represent the fuel
7 cladding temperature, one that would represent the
8 temperature in the seal region and one on the surface
9 of the cask. And simply run a fire until our
10 instruments told us that we had reached some
11 predefined threshold.

12 Now, until I talked to Charlie a few
13 minutes ago, I thought 750 degrees C on the fuel
14 cladding was probably a number most people would agree
15 would lead to catastrophic burst rupture, is a pretty
16 good target. So Charlie said well maybe you should
17 look at that. You've got to look at some different
18 numbers for the gap inventory of cesium and rethink
19 what you want to prove. And I'm opened minded and
20 we're going to look at that.

21 But basically those are three approaches
22 that we've looked at. And I think it will be useful
23 when we send the report that Miles Griner did and add
24 that to the literature that's available.

25 MR. CAMERON: Okay. Thank you, Bob. Bob,

1 once again, has given us a comprehensive suggested
2 approach on this. And I would ask others around the
3 table to not only think about what's in the NRC draft
4 protocol, but also what Bob suggested.

5 Kevin?

6 MR. KAMPS: Yes. I mentioned earlier today
7 the misuse of films from earlier Sandia tests to lobby
8 in favor of legislation and such on Capitol Hill. So
9 my question is what is this about the optically dense
10 layer and what's the significance of that? And is it
11 just for public relations purposes to have an
12 engulfing fire to impress the public with?

13 MR. CAMERON: Okay. The technical basis
14 for optically dense fully engulfing. Chris?

15 MR. BAJWA: Actually, optically dense
16 really has nothing to do with public relations. What
17 it means is think about this: If you were on the
18 inside of that fire and you couldn't see out, it means
19 that all you're seeing is the flame of that fire. And
20 think of it this way. The cask is in that fire and it
21 can't see out. So all it's seeing is fire. There are
22 no gaps. And so the full brunt of the flames that are
23 around that cask are putting heat into it. That's what
24 we mean by optically dense.

25 MR. KAMPS: And will these tests be

1 filmed?

2 MR. BAJWA: I don't know. I guess they
3 would be.

4 DR. MURPHY: Definitely.

5 MR. KAMPS: What will the uses be of the
6 films?

7 DR. MURPHY: Public confidence in addition
8 to documenting what has happened with the test.

9 MR. CAMERON: All right. Bill Sherman and
10 then Lisa.

11 Bill?

12 MR. SHERMAN: I have a question, and that
13 is in the report even though your slide is saying a
14 duration greater than 30 minutes, not that slide but
15 your slide, a duration greater than 30 reports. Your
16 report is a dummy amount of one hour. And you
17 indicated on page 53 that that represents 82 percent
18 of all train fire accidents.

19 Have you translated that into a
20 probabilistic number like you did the 75 miles per
21 hour for the impact test. 75 miles per hour I believe
22 you said earlier was ten to the minus 7. So have you
23 converted the one hour fire duration into a
24 probability?

25 DR. MURPHY: No, we have not at this time.

1 MR. SHERMAN: But could easily?

2 DR. MURPHY: Yes, it could be done.

3 MR. SHERMAN: And so it's too bad that you
4 don't have that, because I'd like to compare what the
5 one hour compares with probabilistically with the 75
6 miles per hour probabilistically. I suspect that the
7 one hour is a lot less, less or greater. You have
8 trouble when you start talking to ten to the minus.
9 But my sense, and I didn't state this before, is that
10 my sense is that the 75 miles per hour is high but a
11 reasonable compromise based on the test -- the results
12 that you want to get. It would be interesting to
13 compare a fire duration probabilistically.

14 DR. MURPHY: Very definitely. The appendix
15 A to the report, test protocol report, was intended to
16 indicate that we would be looking at what we call the
17 mechanistic aspects of the accidents and also
18 tempering that with realism for the frequency with
19 which those would be occurring.

20 So it would be our intent that for the
21 detailed test plans that there would be an indication
22 of how we made our decision, and that would include
23 the frequency of occurrence. So those numbers we plan
24 to generate and have available at that time.

25 MR. CAMERON: Okay. Lisa?

1 MS. GUE: I think there's a very low
2 probability that Bill and I will agree on the
3 appropriate use of probabilistic analysis in this
4 report.

5 I had 3 questions and then 2 comments.

6 First of all, I just note that there
7 doesn't seem to be a discussion of a proposed
8 temperature for this fire nor is there a specific
9 invitation for comment on that point, although I can
10 assume it's there, I suppose, even if we don't see it.
11 But I guess, I mean on the one hand that perhaps it's
12 an indication of openness when NRC staff doesn't come
13 with a specific proposal. But on the other hand, if
14 this is the last document that's available for public
15 comment, it gives no idea of where the NRC is at on
16 this and nothing to react to. So that's a bit of a
17 problem.

18 And secondly, in terms of the sequencing
19 of these tests. Again, I don't want to leave my
20 earlier comment that I think more than just the
21 temperature and impact testing is necessary in the
22 sequence. But I was also wondering if there's any plan
23 or if there's already been done analysis of what the
24 most damaging would be? Whether the most damaging
25 sequence is an impact and then a fire or if a fire

1 damaged cask would be more damaged by an impact
2 accident subsequently. That would be also useful
3 information.

4 And my third question was about the
5 animation that Chris played showing where the
6 temperatures were hottest on the -- well inside the
7 cask. And that showed the assemblies at the very top
8 center of the cask seemed to be the hottest during
9 that fire. But then I would expect that during the
10 impact test that we discussed previously, that the
11 most damaged parts of the cask might be on the end or
12 for a back breaker test probably at the bottom.

13 So I guess this is just leading into a
14 question about where is that surrogate assembly going
15 to be placed and how appropriate is it to have only
16 one surrogate assembly for those two different tests
17 or what I hope will turn out to be more than 2
18 different tests? And I'm wondering if it would be
19 more appropriate or more useful then to have the cask
20 fully loaded with surrogate assemblies rather than
21 just the one?

22 And then just for onto the two comments
23 very briefly here. First of all, I think that the
24 discussion between the different analysis that have
25 been presented over the same event really serves to

1 highlight the need for more physical comprehensive
2 tests in addition to modeling. And I want to
3 emphasize that from our perspective advocating
4 physical testing as a condition for licensing is also
5 with the greatest respect for the sophistication of
6 the models that are employed, but knowing that models
7 answer the questions that you remember to ask in the
8 way that you ask them. And that's why we're convinced
9 that physical testing does have a value in addition to
10 these sophisticated models.

11 And finally, I think the assumptions about
12 dedicated trains, and I'm very interested to see NEI's
13 new transportation policy on that point as well, but
14 it seems that it would be more responsible for the NRC
15 as the regulatory agency to incorporate into its
16 regulations around nuclear waste transportation these
17 assumptions that are being used rather than turning
18 always to the industry groups to essentially hold the
19 high bar for those regulations if that's what's needed
20 to guarantee the kind of safety we're after. Again,
21 we'd advocate that being incorporated into NRC's
22 regulations.

23 MR. CAMERON: Okay. Thanks, Lisa. And I
24 guess I would just put two questions out here.

25 One, can we say anything to Lisa about her

1 question of the absence of a proposed temperature and
2 what we would like people to tell us on that? And I
3 guess on the last comment about the NRC taking lead on
4 things such as the NEI, what's in the NEI policy. And
5 I don't really know the answer to this, but I thought
6 it might be worthwhile just seeing if we could find
7 out. Is that the type of regulatory activity that's
8 within our jurisdiction or is that a DOT and we can
9 all point to Rick Boyle.

10 But could we go to the temperature
11 question and then to the jurisdictional question? Who
12 wants to do temperature? Andy. And then we'll go to
13 Bill on the jurisdictional.

14 DR. MURPHY: I'll do the temperature one,
15 because that's the easiest one all day. We
16 unfortunately fell into a trap of jargon. The
17 hydrocarbon fire that basically burns at pretty much
18 one temperature, 1475, yes, it is at a particular
19 temperature.

20 Now Bill can have the difficult one.

21 MR. BRACH: The question about NRC
22 regulation. To essentially incorporate a requirement
23 for use of dedicated trains, Rick Boyle when we were
24 going around earlier in introductions this morning,
25 Rick Boyle from DOT identified that in the area of

1 radioactive material transportation there are two
2 agencies involved in this regard, and one is NRC and
3 the other is DOT. And regulations of the railroads is
4 an aspect of regulatory authority that is the
5 responsibility of Department of Transportation.

6 And I believe Bob Fronczak as well as
7 mentioned from American Association of Railroads the
8 positions taken by AAR with regard to use of dedicated
9 trains for the transport of spent fuel. And I've just
10 earlier today as well from John Vincent from NEI that
11 NEI has offered a similar policy statement as well.

12 MR. CAMERON: And Lisa, your point is well
13 taken about government taking initiative on there's no
14 action in the industry, and you may not have been
15 saying that. But I just wanted to make sure that
16 people understood what the framework was.

17 Rick, do you want to add anything before
18 we go to Abby?

19 MR. BOYLE: Thank you. Just for
20 clarification. It is the Federal Railroad
21 Administration would make the determination on
22 dedicated train, the use of it or if you don't have to
23 use it as well as the configuration of what the train
24 would look like. And it's long overdue, so it's a
25 little tongue in cheek. But they have a dedicated

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1 train study that's due to come out, I think it was
2 supposed to be the end of last year, but it hasn't
3 come out yet. They say it's in final editing. I
4 believe that's going to be their position, something
5 similar to what NEI said is this is what we believe
6 should happen as far as dedicated train and spent
7 fuel. So when that becomes available, I'll certainly
8 share that with the NRC team that is putting this
9 together.

10 MR. CAMERON: That's great. And I would
11 note that we did have Claire Orth from the Federal
12 Railroad Administration slated to come today, but she
13 was unavoidably detained and had to miss the meeting,
14 and she could have shed some light on that.

15 Let's go to Abby and then to Mark.

16 MS. JOHNSON: Rick, can DOT compel the
17 Department of Energy to use dedicated trains?

18 MR. BOYLE: Yes. Federal Rail if they say
19 spent fuel will move in dedicates in train, it will
20 move in dedicated train.

21 MS. JOHNSON: That's new information.
22 We've been asking the Department of Energy for several
23 years to give us their thinking. We, just as a modest
24 local government, on whether they're considering
25 dedicated trains. And they kind of, you know, just

1 shrug and they're not clear on it. So this is new
2 information for me. This is very helpful.

3 But that's not what I was going to say.

4 MR. CAMERON: All right.

5 MS. JOHNSON: What I was going to say is,
6 getting back of course to public confidence, page 70
7 has a statement that is the sort of thing that is to
8 be avoided by a regulatory agency. "Because these
9 tests will exceed the regulatory limits containment is
10 not going to be verified after the fire tests."

11 Now, I know that makes sense to all of
12 you, and I understand where you're going with this.
13 But to the public that says oh, we're going to do the
14 test. Containment is going to be breached and we don't
15 get to know about it because that's bad information
16 that you don't want us to know. You don't think we're
17 mature enough to know to handle the information about
18 when the container is breached. And so I just wanted
19 to point out that that's the kind of thing that sets
20 our teeth on edge and that's probably going to be
21 edited out of the final document.

22 MR. CAMERON: Thank you, Abby.

23 Mark? And then we'll go to Bill and over
24 to Bob.

25 Mark?

1 MR. HOLT: Just had a quick question. In
2 reading the document it wasn't clear to me whether a
3 fire test is supposed to be done on the same casks
4 that that the impacted test were on.

5 DR. MURPHY: Yes, they will be done on the
6 same -- that is our proposal to do the fire tests on
7 the impacted casks.

8 MR. CAMERON: Bill and then go to Bob.

9 MR. SHERMAN: I just wanted to second
10 Amy's comment about the containment not being
11 breached. We had the same view that you did.

12 MR. CAMERON: And Abby.

13 MS. JOHNSON: So there is some connection
14 between New England and Nevada after all.

15 MR. CAMERON: Bob, comment, question?

16 MR. HALSTEAD: First, I'm sorry, Rick, I
17 missed your comment on dedicated trains. Could I just
18 ask you to repeat that and I wanted to make an
19 additional comment.

20 MR. BOYLE: Comment that Federal Rail is
21 completing a study and it should be out shortly and
22 we'll communicate it.

23 MR. CAMERON: That's one.

24 MR. BOYLE: Is that the one you missed or-

25 -

1 MR. HALSTEAD: That's the one I've been
2 waiting for ten years, my friend, but it's well worth
3 waiting for.

4 MR. BOYLE: That's maybe why Claire didn't
5 show up today, because she knew you'd be waiting.

6 MR. HALSTEAD: Thanks.

7 I do want to say that I think it's real
8 significant that NEI is taking this position when we
9 see it, and it's certainly something that we've
10 advocated for a long time. And I know there are many
11 people in the department, both at DOT and DOE, who
12 think it will happen but for some reason we haven't
13 had a policy statement from DOE, where I think they
14 could have taken an initiative, even though there
15 isn't a regulatory imperative.

16 But that said, the other issue with fire
17 testing that I wanted to address, the position of the
18 cask in the test in the fire test. We're looking at
19 the zero point 3 meters right now, but that's one of
20 those details to be worked out. But another set of
21 details to be worked out is the whole question of
22 instrumentation.

23 And, again, I don't want to keep us here.
24 I think the best way to handle this would be if we
25 could deal with this as one of the really important

1 issues that we didn't have time to deal with properly
2 tonight and either in Nevada or in Chicago be prepared
3 for a larger discussion of instrumentation, and
4 particularly for the fire test but also for the
5 impact.

6 Thank you.

7 MR. CAMERON: And I think that probably
8 would be the Chicago meeting for many reasons. But
9 that's a good suggestion that we perhaps focus in on
10 some of these things that we don't get a chance to
11 discuss at another meeting.

12 We have John and then Fred. John?

13 MR. VINCENT: Just a quick follow up on
14 Bob's comment.

15 I think we heard this morning that we were
16 going to get the chance to put our eyes on and comment
17 about the actual test plans and the test procedures.
18 And those will no doubt detail exactly what Bob is
19 asking for.

20 MR. CAMERON: And let's make sure we know
21 what's going on there so that there's no dashed
22 expectation in the future. When we do have the
23 detailed test plans and, Andy, correct me if I'm wrong
24 on this, you said that they wouldn't be going out as
25 a draft for comment, but welcome comments from people

1 on that. Is that correct?

2 DR. MURPHY: That is correct.

3 MR. CAMERON: All right.

4 DR. MURPHY: It is not our plan at this
5 time to publish them as we did with the test
6 protocols, but ask for public comment. They'll be
7 published, made available. If there are comments, send
8 them in to us.

9 MR. CAMERON: Okay. And you know perhaps
10 one other issue that we could have more discussion on,
11 and this might be appropriate for Nevada that ties
12 into this issue of looking at the detailed plans, is
13 Fred had mentioned the model of continuing stakeholder
14 involvement in the TRUPAK situation. And I don't think
15 we're going to get a chance to discuss that today, but
16 that might be something else.

17 Fred, if you want to say anything more
18 with your comment here, go ahead.

19 MR. DILGER: Just very quickly. I agree
20 with Bob Halstead's comment. One suggestion perhaps
21 for next week's meetings might be to swap the fire and
22 the drop test discussions to have the fire discussion
23 first to get a little bit more dialogue about it next
24 week.

25 MR. CAMERON: Okay. That's a great

1 suggestion.

2 We have suggestions for Las Vegas and also
3 for Chicago. And Kevin?

4 MR. KAMPS: Just quickly. Just given the
5 hotter burning materials on the roads and rails, I
6 would encourage that a much hotter temperature be
7 considered than the hydrocarbon temperature.

8 MR. CAMERON: Okay. Andy?

9 DR. MURPHY: I got one comment to make for
10 sure before we wrap up, and that there is very
11 definitely one important question that apparently did
12 not get into our list, and I would like for everybody
13 to be thinking --

14 MR. CAMERON: And, Andy, could you talk
15 into the mike, please?

16 DR. MURPHY: I'm sorry about that. One
17 other item that I think we are asking for additional
18 comment on, and that is whether or not this should be
19 a test to failure without at this moment defining what
20 failure is. I think we've had considerable discussion
21 today on that point. It was not a point that we had
22 identified for comment, but I think very definitely at
23 this stage it's got to be identified. We got to think
24 about it. Comments would be appreciated.

25 MR. CAMERON: Anybody in the audience have

1 a comment? Okay.

2 We have two comments out here. Felix?
3 Felix Collar or however you pronounce it.

4 MR. COLLAR: Felix Collar.

5 I just wanted to make a comment, is that
6 I'm actually on a working committee for ASTM standard.
7 We're doing fire test type cask, as standard is close
8 to finalization, I do think it's something you guys
9 might want to take into consideration. And I'll make
10 that available to you.

11 MR. CAMERON: Thank you, Felix.

12 All right. One comment over here. And
13 please tell us who you are.

14 MR. LOPEZ: My name is Carlos Lopez. From
15 Sandia National Labs.

16 I just had a few comments, and I hope I
17 forward them all quickly.

18 Regarding the performance of a cask inside
19 the tunnel fire, I just did a paper for PATRAM 2001.
20 It's title is "Analysis of the Effects of Pipeline on
21 Railroad Fires on Legal Weight Truck Casks,
22 Transportation Casks." Legal weight truck,
23 transportation cask.

24 In this paper you will find at figure 15
25 of temperature history of a LWT type cask similar to

1 the NAC-LWT when analyzed a fully engulfing 800
2 degrees fire. And you don't see internal wall
3 temperatures exceeding 650 degrees C until 7 hours. So
4 650 degrees C should be a conservative temperature of
5 the internal wall, that's assuming that there's a 100
6 degrees C temperature difference between the wall,
7 inner wall of the cask and the center fuel beam. And
8 that is considerably large. So I suppose that this 7
9 hours prediction is rather conservative. That goes
10 along with what Chris said before that there was only
11 enough fuel in that Baltimore tunnel fire to burn for
12 about 7 hours. Therefore, even a truck cask is smaller
13 and will heat up a lot faster than a rail cask will,
14 will have survived such an environment.

15 And this is a fully engulfing, again, 10-
16 CFR fire without impact limiters, which is not what I
17 think a cask will have experienced inside this tunnel
18 due to the temperature differences all the way from
19 the bottom to the top of the tunnel. The oxygen
20 starvation will have made that flames quite a bit
21 cooler, combustion will be considered. In fact,
22 looking at the figures or pictures of the smoke coming
23 out very black, it's a very good indication of very
24 poor combustion going on.

25 And I just wanted to mention that on

1 temperatures. So even a truck cask will have survived
2 that environment in my opinion, and that's similar to
3 what Chris was saying, he was talking about 37 hours
4 for a rail cask, a truck cask we're talking over 7
5 hours. So I think we're fine there.

6 The other thing is on the probability of
7 fires, the same as part of a similar or same report
8 that we wrote inside Sandia, it was never published
9 but we actually published another paper in PATRAM
10 2001, too. This is by Dr. German Kovsky now retired.
11 He did the probability part of this study.

12 He has a section in this paper where he --
13 I suppose it's in the paper, too. If not, it's in the
14 draft report. I can make a copy available after we
15 publish this at Sandia. That shows that probabilities
16 of a fire or a cask being involved in a fire in a
17 train accident is in the order 3 tens to the minus 7,
18 just to give a flavor for probabilities.

19 One more thing is fire temperatures. You
20 cannot really play much with fire temperatures when
21 you do an open environment fire which will burn, in my
22 opinion, more efficiently than it will in a tunnel
23 fire. Therefore, comments that have been made before
24 during the day stating that the tunnel fire, it's
25 probably that one percent that the regulations don't

1 encompass, it's my opinion not true. I think that if
2 you want a worse case scenario, you want an open booth
3 fire with engulfing optical events.

4 To explain a little bit on the optical
5 events item. If the cask cannot see the environment,
6 it cannot lose heat to the environment. And that is
7 what that's all about. It's inside this plain and it
8 cannot see environment, it can only receive heat, not
9 give any heat.

10 I think that's all I have for now. I
11 would love to talk about the instrumentation issues,
12 but I think that is for another meeting. So thank you
13 very much.

14 MR. CAMERON: Thank you. And if people
15 want to see a copy of those PATRAM papers they could
16 talk to you and perhaps get a copy. Good.

17 Oh, God, I hate to say this but --

18 MR. HALSTEAD: Could we ask that those
19 papers be added to the materials on the website.

20 MR. CAMERON: Great. Good. We'll look
21 into that.

22 MR. HALSTEAD: Yes, but I forgot about the
23 damn copyright issues. So, of course --

24 MR. CAMERON: We're ready to close now.

25 And I just want to thank all of you for your

1 intensiveness and preparation, and also for following
2 the ground rules, too.

3 And I just want to ask are there any other
4 burning issues? I'm sorry for that bad pun.

5 MR. HALSTEAD: I'm sorry, are you leaving
6 fire and going to your close out discussion? Or is
7 this your close out?

8 MR. DILGER: Yes. This is it. This is it.

9 MR. HALSTEAD: All right. Let's talk about
10 one issue that we didn't really talk about, and we're
11 not going to talk about it tonight, but you need to
12 think about talking about it in Chicago.

13 And that's the issue of the deep immersion
14 test because of the proposal that DOE made in the
15 final EIS for considerably large numbers of barge
16 shipments, including the potential for a fairly large
17 number of barge shipments on Lake Michigan where there
18 are in fact canyons that are deeper than the 200 meter
19 depth that's reflected in the IAEA standard for the
20 deep immersion tests.

21 And, you know, certainly we've raised it
22 in the past. I honestly don't know how it should be
23 folded into this large discussion. But I think it
24 would be well for you to come to Chicago prepared, at
25 the very least to talk about how cask licensees

1 typically comply with the deep immersion test as part
2 of the certification process and what the alternatives
3 are there.

4 And the other thing I want to say is on
5 public participation generally, I really appreciate
6 the way that this has started. The good news for NRC
7 is that the Turkish parliament apparently has not
8 requested a role in approving these test protocols and
9 related documents, but the bad news is that your
10 stakeholders now do expect a large role. And indeed,
11 Ken and Andy, I think you're going to have to expand
12 your thinking about the public role and maybe be
13 thinking already about a public meeting on your
14 detailed test plans. I don't know if this is to end in
15 this fiscal year exactly, how you've scheduled this.
16 But I think that would be a good thing to think about.

17 And I said before, I personally appreciate
18 the way that this portion of the NRC's interaction
19 with the public has been carried out. And I would very
20 much like it. I'm not expecting much yet, but it would
21 be so nice if this were the way we normally dealt with
22 one another instead of the way that we have dealt with
23 each other over many issues, not only in the past but
24 unfortunately in the recent past.

25 Thank you very much.

1 MR. CAMERON: Very helpful, Bob. Thank
2 you.

3 And let's see if anybody else has any
4 final comments. And I want to ask Bill Brach to close
5 the meeting for us when we get there as our senior
6 manager.

7 Anybody else have anything they want to
8 say on the record before we close?

9 And we thank you for suggestions about the
10 agendas for the future meetings that we're going to
11 do. Because that's helpful.

12 Abby Johnson.

13 MS. JOHNSON: I have two comments. One is
14 that probably because of the late start that we got
15 today due to the security stuff, we probably didn't
16 have as thorough a discussion of the overarching
17 issues as we probably should have.

18 But my other comment is that, Chip, I
19 really echo what some of the other people said about
20 future meetings. That you may want to look at shaking
21 this agenda up a bit and moving things around to make
22 it a little less dense for depending on what meeting
23 you're structuring it for.

24 I'm just saying, you know, just because
25 you have this thing typed up for here and for

1 Illinois, it's not fixed in stone.

2 MR. CAMERON: Yes, we have it on the word
3 processor. We do have those.

4 MS. JOHNSON: Because I think maybe if you
5 play with it a little bit, I agree with moving the
6 fire stuff up.

7 MR. CAMERON: Yes. We'll move the fire
8 stuff up and perhaps is there an indication that maybe
9 for some of the other meetings we don't need to get as
10 technically deep on things or --

11 MS. JOHNSON: I'm not sure. I'm not sure.
12 I think each one is going to be very different. And
13 so I think in Nevada you're going to have the usual
14 suspects. And their interests are going to be
15 different and in general what they want to say is
16 going to be different than what a lot of people at
17 this table want to say.

18 MR. CAMERON: We might anticipate in
19 Nevada that perhaps overarching issues might be given
20 more attention and process, public participation.

21 MS. JOHNSON: I would think so. I would
22 sort of defer to my Nevada colleagues here to see what
23 they think. But, I don't know.

24 MR. DILGER: I would just say that I think
25 that the audience in Las Vegas will be very interested

1 in hearing a clear expression of what NRC's testing
2 strategy is and what they hope to get out of the
3 testing. What they really want to accomplish.

4 MS. JOHNSON: I would agree.

5 MR. DILGER: Just to give the context for
6 these other more detailed technical questions.

7 MR. CAMERON: Okay. That's very helpful.

8 Anybody else?

9 Okay. Well, I have to thank you. Great.
10 Ask Bill to close the meeting up.

11 MR. BRACH: Thank you, Chip.

12 It's clearly been from my perspective a
13 long but a very, very productive day.

14 One advantage of sitting this way, I've
15 been watching as the audience has been dwindling, and
16 (1) I want to thank those in the audience that has
17 persevered and are still here. But really, most
18 importantly, I want to thank all the members on the
19 panel. The dialogue we've had, I think, was most
20 productive.

21 IF we go back to the slide in my opening
22 discussion, and I think it was the last slide I used,
23 I said what do I see as a success for today's meeting
24 and I made reference to dialogue, expression of views,
25 comments, suggestions. And clearly from my

1 perspective and listening, and I think on all the
2 parts of NRC and our NRC contractors has been very
3 productive.

4 The dialogue that's has exchanged and
5 flowed across and around the table, expression of view
6 points. Many of those viewpoints not necessarily in
7 sync. Some were representing different spectrums of
8 views. But that's the purpose of the workshop is to
9 have the opportunity for and to put those comments on
10 the table for consideration both for us as well as you
11 on the panel. And I appreciate and thank you, thank
12 you very much for that.

13 The suggestions for the meetings coming up
14 in Las Vegas adn Pahrump and Chicago in the next two
15 weeks are one, very much appreciated and we will take
16 those into consideration as we're looking at revamping
17 to the extent that we can, some of the schedules for
18 those activities. And as Chip had said, it's on the
19 word processor. So it's similar to the comments I
20 mentioned this morning when I think Bob Halstead asked
21 me, on behalf of NRC, are we locked in on decisions
22 with regard to the draft test protocols. And the
23 answer is clearly no. And the same goes for, with
24 regard to the agenda for the next two weeks. Those
25 agendas are flexible and we'll attempt to fashion them

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1 to meet and provide for as much input and opportunity
2 for input as we can.

3 So with this I realize that it's getting
4 late. And on behalf of NRC, I would like to thank all
5 of you all for your attendance here, your
6 participation and your support and your input. And
7 thank you and look forward to additional productive
8 dialogues in future meetings as well, as you take the
9 opportunity to provide additional comments to us
10 between now and the May 30 time frame. Thank you very
11 much.

12 (Whereupon, the above-entitled matter was
13 concluded at 5:50 p.m.)

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