

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

1		Administration
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
10		Waste Division
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
25		Commission, Office of Nuclear

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1		Regulatory Research
2	CHARLES PENNINGTON	NAC International
3	BILL SHERMAN	Vermont Department of Public
4		Service
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		

# A-G-E-N-D-A

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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 of  
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

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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

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

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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.

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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

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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

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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

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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.

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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

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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.

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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



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

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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

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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

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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,

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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

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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

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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.

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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

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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

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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.

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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

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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

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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.

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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

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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

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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

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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

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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

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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

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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

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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.

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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

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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

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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

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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.

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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

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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?"

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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.

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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

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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

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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

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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

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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.

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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.

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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.

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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.

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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

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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

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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

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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

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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

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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

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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.

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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,

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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

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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?

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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

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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

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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 commentators, 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.

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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.

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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

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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

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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,

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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

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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.

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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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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

1:52 p.m.

MR. CAMERON: Welcome back from lunch.

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

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

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

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

I think we've attracted a bunch of 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

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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

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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.

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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

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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 --

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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

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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

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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

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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

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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?

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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

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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

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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

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

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

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 --

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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

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.

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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

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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.

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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

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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

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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

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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

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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

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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 derailling 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.

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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

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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

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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

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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

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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 then 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

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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

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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.

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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.

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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

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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

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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

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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.

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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.

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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.

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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

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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

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

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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

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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

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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

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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

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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

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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

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

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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 models. 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

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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.

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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,

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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

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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

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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

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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

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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

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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 dedicated 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

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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

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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

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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

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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.

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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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