

UNITED STATES  
NUCLEAR WASTE TECHNICAL REVIEW BOARD

WINTER BOARD MEETING

January 28, 1997  
Bob Ruud Community Center  
150 N. Highway 160  
Pahrump, Nevada

BOARD MEMBERS PRESENT

Jared Cohon, Chairman, NWTRB  
Jeffrey J. Wong, Session Chair  
John W. Arendt  
Clarence R. Allen

INCOMING MEMBERS

Alberto Sagues  
Priscilla Nelson  
Debra Knopman  
Norman Christensen  
Florie Caporuscio  
Daniel Bullen

OUTGOING MEMBERS

Edward J. Cording  
Donald Langmuir  
John J. McKetta  
Ellis D. Verink  
Patrick Domenico

SENIOR PROFESSIONAL STAFF

Daniel Fehringer  
Russell McFarland  
Leon Reiter  
Daniel Metlay  
Victor Palciauskas  
Sherwood Chu  
Carl DiBella

## NWTRB STAFF

William D. Barnard, Executive Director, NWTRB  
Michael Carroll, Director of Administration  
Paula Alford, Director, External Affairs  
Frank Randal, Assistant, External Affairs  
Helen Einersen, Executive Assistant  
Linda Hiatt, Management Assistant

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

2           COHON: Good morning. As you're moving to your seats,  
3 please let me inform you we're expecting a rather large  
4 turnout today, unlike some other meetings. This might  
5 actually be a full house. And because not everybody of  
6 course arrives at 8 o'clock, if you could fill up the front  
7 part of the room, so that late arrivals can sit down  
8 gracefully in the back, it would be appreciated.

9                   My name is Jared Cohon. I'm the Chairman of the  
10 U. S. Nuclear Waste Technical Review Board, and it's my  
11 pleasure to open this meeting and to welcome all the members  
12 and staff, program members, consultants, the public and other  
13 visitors to this meeting.

14                   Let me say on behalf of the Board how pleased we  
15 are to be here in Nye County and in Pahrump, and our thanks  
16 especially to the people who made available the cookies and  
17 snacks and coffee, not a typical thing you get at our  
18 meetings. It's a very nice touch. Thank you very much.

19                   I'd like to call on Nye County Commissioner Ira  
20 Copass, who is going to welcome us officially to Nye County.  
21 Mr. Copass?

22           COPASS: Thank you very much. My name is Ira, but  
23 everybody calls me Red. As you can tell, I've got red hair.  
24 I was telling a gentleman a while ago about the fact that

1 many fraternal organizations have a graying problem, and  
2 sometimes I think politicians and others do, too, but that's  
3 beside the point.

4           But anyhow, I'd like to welcome the NWTRB, which is  
5 the full board, to Nye County, and especially here in  
6 Pahrump. I understand this is some of the new board members,  
7 and it's one of the first meetings this year, and I must tell  
8 you being here in Nye County is quite an adventure and I hope  
9 you also find it so. And believe me, I don't know whether  
10 you realize it or not, but it's very important for the people  
11 of Pahrump to have you people here. And without trying to  
12 get into somebody else's, whatever they want to say, I think  
13 I'd better shut up and get off the air and say welcome to  
14 Pahrump and I hope you do good.

15           Thank you very much.

16           COHON: Thank you, Mr. Copass.

17           This is a time of change and transition both for  
18 the Nuclear Waste Program and for the Nuclear Waste Technical  
19 Review Board. That statement is not a new one; it seems to  
20 me that ever since I joined the Board about a year and a half  
21 ago, every one of our meetings has been opened with a comment  
22 like that. It's a time of change, it's a critical time, it's  
23 a crucial time, and it was always true when that was said  
24 before, but it's especially true now.

25           I don't need to tell the people directly involved

1 in the program either about the changes that have occurred or  
2 the changes that we might be going through. I'd like to tell  
3 you about how critical this is. You've all noticed I'm sure  
4 that it's 1997. My guess is that the people who work in the  
5 Nuclear Waste Program are not guilty of writing 1996 by  
6 mistake on their checks and on their memos. I think they're  
7 keenly aware of the year, and that 1997 is only T-minus-one,  
8 as it were, 1998 being such a critical milestone in the year.

9           The Board has undergone dramatic change, the most  
10 dramatic change since it was created. I stand before you as  
11 the new chairman. That's change in and of itself. But in  
12 addition, we have several new members, and that means as well  
13 several departing current members. I want to take this  
14 opportunity to introduce you to the new members, but also to  
15 acknowledge the departing members at the same time. I'm  
16 going to introduce everybody, so don't be put off by this,  
17 members.

18           Clarence Allen. You have to raise your hand,  
19 Clarence. Thank you. That's all you have to do. Professor  
20 Emeritus of Geology and Geophysics at Cal Tech.

21           Ed Cording, Professor of Civil Engineering at the  
22 University of Illinois. Pat Domenico, Professor of Geology  
23 at Texas A&M. Don Langmuir, Professor Emeritus of  
24 Geochemistry at the Colorado School of Mines. John McKetta,  
25 Professor Emeritus of Chemical Engineering at the University

1 of Texas. Ellis Verink, Professor Emeritus of Metallurgy at  
2 the University of Florida.

3 Two of our members who are ending their terms could  
4 not be with us today, but I want to acknowledge them as well.

5 Garry Brewer, Professor of Resource Policy and Management at  
6 the University of Michigan and John Cantlon, retired  
7 chairman, Professor Emeritus of Ecology at Michigan State  
8 University.

9 These men have provided outstanding service to this  
10 Board. It's been a pleasure and a privilege for me and for  
11 the other continuing members and the staff to watch these  
12 people perform, watch what they've done to shape this Board,  
13 watch what they've done to educate all of us, members, staff  
14 and people involved in the program as well. They are large  
15 16 shoes to fill indeed. We will do our best.

16 Please join me in acknowledging and thanking these  
17 people for what they've done for us.

18 (Applause.)

19 COHON: Well, John and Jeff, we are now the old men on  
20 the Board. And I would like to introduce them to you, though  
21 most of you know them already. John Arendt. John is a  
22 specialist in the nuclear fuel cycle and inspection of  
23 radioactive material transportation, and has worked in those  
24 fields for many decades.

25 Jeff Wong, who you'll be seeing more of shortly,

1 John as well. He is science advisor to the director of the  
2 Department of Toxic Substance Control of California  
3 Environmental Protection Administration.

4           Now, as I mentioned, we have several new members,  
5 six in total, with, we expect and hope, two more to be  
6 announced soon. These six people were appointed by the  
7 President ten days ago and we rushed to get them plane  
8 tickets and get them to clear their calendars so they could  
9 be with us today. Three of them are actually in this room  
10 and you'll see them in a moment.

11           The other three are in the State of Nevada but not  
12 here. They happen to be in a big tunnel that you all dug not  
13 so long ago, and they'll be joining us tomorrow, and tomorrow  
14 I'll ask them to stand up so you can see who they are as  
15 well.

16           Let me introduce the missing members anyhow at this  
17 time. Florie Caporuscio is senior geochemist in the Los  
18 Alamos Office of Informatics, formerly Advanced Sciences,  
19 Inc. He received a Bachelor's Degree in Geology at the  
20 University of Massachusetts in 1977, and a Ph.D. in Geology  
21 from the University of Colorado in 1988.

22           Before assuming his current position, he served in  
23 a variety of capacities, as a geologist at the Los Alamos  
24 National Laboratory, as a Post Doc at the University of Pavia  
25 in Italy. He was acting section chief for the WIPP Technical

1 Review at EPA, and he took up his current position in 1993.  
2 His focus is on nuclear waste, and has been his career,  
3 particularly in characterization of geologic media.

4           Norman Christensen is dean and professor at the  
5 Nichols School of Environment at Duke University. Norm  
6 received his Bachelor's in Biology at Fresno State in 1968  
7 and his Ph.D. in Biology at Santa Barbara, U.C. Santa  
8 Barbara, in 1973. He's been at Duke ever since, rising  
9 through the ranks and became dean, his current position, in  
10 1991.

11           Norm is an ecologist who focuses on disturbance and  
12 its effects on the structure and function of ecosystems and  
13 especially shrub lands and forests.

14           Debra Knopman is Director of the Progressive  
15 Foundation Center for Environmental Economics. She received  
16 a Bachelor's Degree in Chemistry from Wellesly in 1975, a  
17 Master's Degree in Civil Engineering at MIT in 1978, and a  
18 Ph.D. in water resources and geology from Johns Hopkins  
19 University in 1986.

20           She's had a varied career. I didn't say checkered;  
21 varied career. After receiving her Ph.D., she worked for Pat  
22 Moynahan as an assistant for two years before becoming a  
23 professional staff member with the Senate Committee on  
24 Environment and Public Works. She then put in a stint with  
25 USGS where she was staff hydrologist, rising through the

1 ranks to Chief of Systems Analysis Branch at the Survey from  
2 '91 to '93.

3           From '93 to '95, she served as Deputy Assistant  
4 Secretary for Water and Science in the Department of  
5 Interior. That's the branch of the Interior that has the  
6 Bureau of Reclamation, USGS and the Bureau of Mines under  
7 them.

8           Debra is an expert in ground water and policy.  
9 She's focused particularly on ground water monitoring network  
10 design and in other capacities on water policy.

11           The other three members who are with us today in  
12 this room, Daniel Bullen, and Daniel, now you have to stand  
13 up. They have to see the full body.

14       BULLEN: Thank you.

15       COHON: Thank you. He's Program Coordinator and  
16 Professor of Nuclear Engineering at Iowa State, where he also  
17 received his Bachelor's Degree in 1978, after which he got a  
18 Ph.D. in nuclear engineering at Wisconsin in 1984.

19           He's worked at Lawrence Livermore National  
20 Laboratory and in private industry. He started his career in  
21 academics at N.C. State in 1989, followed by Georgia Tech,  
22 and then returned to Iowa State in 1992 to assume his current  
23 position.

24           Believe it or not, he's an expert in performance  
25 assessment, as well as barrier systems in nuclear waste

1 disposal. He's worked and works on the radioactive effects  
2 on materials as well. Welcome Daniel.

3           Priscilla Nelson is a Professor of Civil  
4 Engineering at the University of Texas. She's currently on  
5 leave from that position to serve as the Director of the  
6 Geomechanics, Geotechnology and Geo-Environmental Systems  
7 Program at the National Science Foundation.

8           Priscilla received her Bachelor's Degree in  
9 Geological Sciences at Rochester in 1970, a Master's in  
10 Geology from Indiana in 1976, an M.S. in Structural  
11 Engineering from Oklahoma in 1979, and a Ph.D. in  
12 Geotechnical Engineering at Cornell in 1983.

13           She's a Peace Corps volunteer in Equador. She  
14 worked for a private company in Alaska out in the field. She  
15 took a job teaching in Texas in 1983, where she's been ever  
16 since, except for her current stint at NSF. She's an expert  
17 in rocks and underground construction, and we're very pleased  
18 to have her join the Board.

19           I should point out that she's also a member of the  
20 National Academy of Science's Board on Radioactive Waste  
21 Management.

22           Alberto Sagues is a Professor of Civil and  
23 Environmental Engineering at the University of South Florida.  
24 He received his Bachelor's Degree in Physics from the  
25 National University of Rosario in Argentina, from where he

1 hails, in 1968. He received a Ph.D. in Metallurgy at Case  
2 Western Reserve University in 1972.

3 He's been at South Florida since 1985. Prior to  
4 that, he had a stint as a visiting scientist at the Nuclear  
5 Research Center in Germany. He worked at Argonne National  
6 Laboratory. He was on the faculty at the University of  
7 Kentucky before taking up his current position. He's an  
8 expert in corrosion.

9 Welcome again to all our new members. We know we  
10 have a challenge before us, but we look forward to it.

11 Let me turn now to the meeting itself, now that we  
12 have the introductions behind us. We designed this meeting  
13 keeping in mind the fact that we would be in Nye County. We  
14 wanted to choose topics and expose them and pursue them in a  
15 way that is especially relevant to the people who live here.  
16 We chose, therefore, today total system performance  
17 assessment and transportation. Those will be our two major  
18 focal points.

19 As you know, total system performance assessment  
20 has emerged as a key element in the DOE program, as it must.  
21 It's become a focal point for viability assessment and a  
22 focal point for suitability determination. It's become the  
23 basis for the revised site characterization criteria and it's  
24 certainly the focal point for NRC and EPA in thinking about  
25 their standards. It's, therefore, critical that we be, and

1 the citizens of Nye County, be fully informed about TSPA.

2           If a repository is opened in Nye County, there will  
3 be a substantial number of shipments, as there must be, of  
4 nuclear waste to get it to the repository. Transportation is  
5 a key issue, therefore, and one that is receiving increased  
6 attention by DOE. It always has received attention, but that  
7 has picked up in activity, raising some interesting questions  
8 about the role of the private sector, among others, and we'll  
9 be exploring that this afternoon.

10           Tomorrow, which we'll get to when we get to  
11 tomorrow, but I just want to preview for you, we'll be  
12 receiving presentations on some of the key technical  
13 investigations that DOE has been carrying out at Yucca  
14 Mountain. And in particular, we'll be focusing on the plans  
15 to reduce the uncertainties associated with the hydrology in  
16 that portion of Yucca Mountain where spent fuel and high  
17 level waste is being placed, if it is placed.

18           Before I turn the meeting over to my colleague,  
19 Jeff Wong, let me just point out some logistics. There will  
20 be a public comment period at the end of both days. And if  
21 Mr. McGowan is here, let me assure you we know about your  
22 time constraint and we will accommodate you.

23           Because several of the Board members, three to be  
24 exact, are visiting the site today and could not be here, we  
25 elected to videotape this meeting. Don't be put off by that,

1 but you want to make sure you look your best when you're up  
2 here.

3           Finally, microphones are very important, and it's  
4 also very important that for the benefit of the people  
5 transcribing and recording this meeting, that you identify  
6 yourself before you start speaking. Okay? Those are the  
7 ground rules, and if you break them, we will remind you.

8           With that, let me please ask Jeff Wong to take the  
9 podium.

10          WONG: Good morning. Can you hear me out there? My  
11 name is Jeff Wong, and I got to be the session chair today  
12 because now I guess I'm one of the old members. I find that  
13 kind of amusing. And I'll be the chairman for this morning's  
14 session, and since I'm from California, in the tradition  
15 found in the west, I'm going to change the order of the  
16 agenda. I'm going to ask that Dr. Paul Stern and Dr. Abe Van  
17 Luik change places, so Dr. Paul Stern will be first.

18           I'd like to say that I do appreciate the hard work  
19 that goes into this agenda. This is not a rock concert of  
20 the Grateful Dead, so there are no warm-up acts. Each one of  
21 our presentations are important to all of us in understanding  
22 what the TSPA and the role it will play in site suitability.

23           TSPA is taking on a critical role in the civilian  
24 and radioactive waste management program. The DOE is  
25 currently performing the fourth generation of TSPA. It will

1 be released as a part of its viability assessment. The DOE  
2 has currently proposed revisions in 10 CFR 960 and its role  
3 in the site suitability decision. Again, if adopted, those  
4 guidelines will be used to decide whether or not to recommend  
5 Yucca Mountain as the site for development as a repository.

6           Also, we understand that the NRC is considering  
7 revisions to its regulations; that it will make the yet to be  
8 promulgated EPA environmental standard. These revisions may  
9 also rely heavily on the TSPA.

10           Over the years, the Board has recognized the value  
11 of conducting such analysis. Yet it also realizes that the  
12 way in which they are performed can make an enormous  
13 difference, both in terms of their technical quality and in  
14 terms of their credibility within the technical and lay  
15 community.

16           Today's session looks closely at the question of  
17 how to make the TSPA as transparent as possible. We have a  
18 number of excellent presentations that will examine this  
19 question from a variety of perspectives. It's our hope that  
20 the DOE will find some of this information useful in terms of  
21 its lessons and how they can be applied to their effort as  
22 they carry out performance assessment during the next few  
23 years.

24           So our list of speakers includes Dr. Abe Van Luik  
25 from the DOE and Dr. John Austin from the NRC, Pierre Barber,

1 Gerald Ouzounian from France, Dr. Paul Stern from the NRC,  
2 and Ms. Judy Treichel from the Nevada Nuclear Waste Task  
3 Force.

4           So with that, I would like to invite Dr. Paul Stern  
5 up here to give our first presentation. Dr. Paul Stern is  
6 with the National Research Council, the operating arm of the  
7 National Academy of Sciences, and the National Academy of  
8 Engineering.

9           He has recently published about six months ago a  
10 major study entitled Understanding Risk. This study, which  
11 Dr. Stern directed, formulates ways, important ways how risk  
12 assessments ought to be conducted. The key idea that came  
13 from the study is that risk assessment must be a  
14 deliberative, analytical process in which the public has a  
15 central role in all the states.

16           Dr. Stern?

17           STERN: Thank you. I guess as my first visual aid, I'll  
18 wave a copy of the report. There it is. I'll talk about it  
19 some, and I am going to be going back and forth from time to  
20 time to the transparency projector.

21           We produced the report Understanding Risk was a  
22 result of a request from quite a variety of federal  
23 government agencies, this is a list of the members of the  
24 committee, to look very broadly at the question of how do we  
25 make informed decisions about risk to human health, safety

1 and the environment. The responses included the Nuclear  
2 Regulatory Commission, the Department of Energy, but they  
3 also included the Department of Agriculture and the Center  
4 for Disease Control, and on and on. The EPA sent lots of  
5 responses.

6           And because this is a broad scope, we put together  
7 a committee with a broad range of people, some who are  
8 familiar with the nuclear waste issue, but also people who  
9 are familiar with other kinds of things. We've got  
10 ecologists and epidemiologists and toxicologists and  
11 expertise in physics and chemistry, communication, and we  
12 even have a philosopher of science, somebody who studies  
13 science policy, quite a range of expertise in different kinds  
14 of risk.

15           The context of the study was a continuum of  
16 dissatisfaction and controversy over risk decisions, and a  
17 widespread belief, at least in a number of federal agencies,  
18 that risk characterization somehow was at the center of the  
19 problem, that clear and concise characterizations of existing  
20 information about risks, costs and benefits would lead to  
21 informed and acceptable regulatory decisions.

22           There was a presumption on the part of a lot of  
23 people that when the committee formed, as committees  
24 sometimes to, it questioned the question, questioned the  
25 presumption, and wound up through deliberations restating the

1 problem as not as many saw the problem of how to translate  
2 existing information from the language of scientific and  
3 technical experts, to the language of other kinds of people,  
4 including the heads of government agencies, not so much a  
5 translation problem, but a problem of how to develop decision  
6 relevant understanding. It's not quite the same thing.

7           The committee paid a lot of attention to what kind  
8 of a process could produce decision relevant understanding,  
9 and concluded that only the process that did that would lead  
10 to good risk characterization. So there's a strong focus on  
11 the process, as a result of which the committee came up with  
12 a slightly reformulated definition of risk characterization.  
13 It might look familiar, but when I go into it in a little  
14 bit more detail, you'll see how it's somewhat different from  
15 the old view.

16           Risk characterization is a synthesis and summary of  
17 information about a potentially hazardous situation that  
18 addresses the needs and interests of decision makers and of  
19 interested and affected parties. The idea is that in a  
20 democracy, anybody who cares enough about the issue has the  
21 ability to get involved at some point or another, and they  
22 are decision makers, or potential decision makers.

23           Risk characterization is a part of decision making  
24 and depends on an iterative, analytic-deliberative process.  
25 That's a bit of jargon, and I'll explain as I go along.

1 There are several implications of that definition that  
2 deserve to be elaborated. One is that a risk  
3 characterization has many users. It's not used only by  
4 legally designated decision makers such as government  
5 officials, but also by anybody who might be interested in or  
6 affected by the ultimate decision and can become involved in  
7 the decision.

8           So risk characterization should be useful to  
9 multiple parties with different interests, concerns and  
10 information needs. It should be basically user-driven or  
11 decision-driven rather than being determined by available  
12 information.

13           Secondly, risk characterization requires broad  
14 understanding of the relevant losses, harms or consequences  
15 to the interested and affected parties. For some decisions,  
16 the only things that matter to anybody are consequences to  
17 human health and environmental quality, but sometimes there  
18 are other kinds of concerns, including things like  
19 geographical, racial or economic equity, informed consent and  
20 so on.

21           So it's necessary for understanding risk not only  
22 to get the science right, but to get the right science so we  
23 address the needs of those who are involved in the decision  
24 and their concerns.

25           The third point is that effective risk

1 characterization depends upon the process involving iteration  
2 and feedback. Now, those are a lot of jargony terms. One  
3 way to think about it is to contrast what the committee is  
4 talking about with this familiar diagram that many of you  
5 have seen before about risk assessment and risk management  
6 that has risk characterization down here, and it is basically  
7 an effort to summarize available scientific and technical  
8 information on these things. It's fed across this line into  
9 a decision process where public officials consider basically  
10 the science as well as the stuff on the left here, and the  
11 other issues that are involved in decision making in making a  
12 decision. And it's kind of a linear process. Everything  
13 feeds into this funnel and this funnel, and the decision  
14 comes out.

15           What the committee came up with is another diagram  
16 that was their attempt to describe a somewhat different kind  
17 of process that's not linear and in particular, is  
18 characterized by feedback. And there's a lot of loops here.  
19 There are a few things to be stated about the diagram, and I  
20 think they'll come out here. If not, you'll ask me.

21           Now, again, iteration and feedback contrasts with  
22 the common notion of a linear process where there's an  
23 analysis and then a risk characterization that feeds into a  
24 decision. The risk decision process does include several  
25 steps that can be arranged in a logical progression. You see

1 them going from left to right, and the top half of the big  
2 arrow on the left. But there are also important feedbacks.

3           The demands of risk characterization, that is, the  
4 need to inform the participants in the risk decision, should  
5 affect the steps that precede the act of summarizing the  
6 scientific information, such as formulation and information  
7 gathering. But before you do that, you need to think about  
8 what the decision requires, what do the people involved in  
9 the decision need to know.

10           The next major point is that risk characterization  
11 depends on an analytic-deliberative process. We see analysis  
12 and deliberation going through the whole process in the  
13 diagram. Analysis involved systematically applying theories  
14 and methods from natural science, social science,  
15 engineering, decision science, mathematics, logic and law.

16           Deliberation includes the methods by which people  
17 build their understanding or reach consensus through  
18 discussion, reflection, persuasion and other forms of  
19 communication. And it may include interaction between  
20 experts and others. Scientists deliberate, politicians  
21 deliberate.

22           To understand risk, you tend to need a deliberative  
23 process, and it includes lots of kinds of people. As you see  
24 on the left of the diagram, public officials, natural and  
25 social scientists and interested and affected parties all

1 have roles to play in the process that leads to understanding  
2 risk.

3           The next point is that problem formulation is of  
4 paramount consideration. To address the needs of decision  
5 participants, you need to get the right science, which means  
6 asking the right questions. Often it's not obvious how to do  
7 that. Hazards can have multiple effects and different  
8 participants in the decision may be concerned about different  
9 ones. A set of realistic options may determine the  
10 information needed, and a set of realistic options might be  
11 in dispute.

12           Consequently, the questions that are asked of  
13 analysts need to be determined in consultation with the  
14 decision makers and the interested and affected parties.  
15 This is one of these loops. You need to think about the  
16 decision before you start on the science in order for the  
17 science to be decision-relevant.

18           The next major point is that effective risk  
19 characterization depends on appropriate representation,  
20 involvement and participation of the interested and affected  
21 parties, involving an understanding of risk by helping  
22 develop an acceptable formulation of the problem, identifying  
23 the issues that cause greatest concern and for which analysis  
24 is needed, providing information for improving the analyses,  
25 deliberating about the meaning of the information and helping

1 to determine how to summarize information useful, resourceful  
2 and addresses the parties concerns. It can also help ensure  
3 that those who may be affected by the risk decision are  
4 sufficiently well informed and involved to participate  
5 meaningfully in the decision.

6           And a final general point about this model is that  
7 the appropriate level of effort for a risk characterization  
8 is situation specific. The committee believes that analysis,  
9 deliberation and participation have too often been  
10 inappropriately restrictive in the processes leading to risk  
11 characterization. But at the same time, the most extensive  
12 and expansive conceivable efforts in these directions are  
13 only rarely warranted. Judgment is critical in determining  
14 the amount, content and timing of analysis, deliberation and  
15 participation. They're appropriate for supporting a  
16 particular risk characterization.

17           I should not stop here without saying to this  
18 audience that when the committee was considering the  
19 different kinds of risk decisions that are made in society  
20 and trying to come up with a classification of types, the  
21 type that we refer to as the wide-impact decision, of which a  
22 permanent nuclear waste repository is considered to be a  
23 paragon example, is the kind of thing where you're most  
24 likely to need the greatest amount of coordination,  
25 involvement, deliberation at various steps in the process.

1 And if anything needs it, this needs it.

2           The committee identified five criteria for  
3 successful risk characterization, and there they are. First  
4 is get the science right. It should go without saying to a  
5 group like this, but it's very important. The analysis  
6 that's done should meet high scientific standards, taking  
7 into consideration the level of effort that's possible for  
8 the analysis.

9           Secondly, which doesn't without saying, get the  
10 right science. The analysis should address the significant  
11 risk related concerns of public officials and the spectrum of  
12 interested and affected parties, with emphasis on the issues  
13 most relevant to the decision. To get the right science, you  
14 have to find out what gives you the answer.

15           Thirdly, get the right participation. The  
16 analytic-deliberative process should have sufficiently broad  
17 participation to ensure the important decision-relevant  
18 information and user process, that the important perspectives  
19 are considered, and that the parties' legitimate concerns  
20 about inclusiveness and openness are met.

21           The fourth criteria is to get the participation  
22 right, which means that the analytic-deliberative process  
23 should satisfy the decision makers and the interested and  
24 affected parties that it's responsive to their needs, by  
25 adequately taking their information and concerns into

1 account, consulting, and then want them to affect the way  
2 risk problems are defined and understood.

3           And, fifth, developing an accurate, balance and  
4 informative synthesis. The risk characterization should  
5 reflect the range of knowledge and perspectives, satisfy the  
6 parties that they've been adequately informed, and treat the  
7 limits of scientific knowledge with an appropriate mixture of  
8 analytic and deliberative techniques. And we can come back  
9 to that in the question period if anybody wants to.

10           The five criteria are related to each other. To be  
11 decision-relevant, risk characterization needs to be  
12 accurate, balanced and informative. That requires getting  
13 the science right and getting the right science.  
14 Participation helps ask the right questions of the science,  
15 check the plausibility of its assumptions, and ensure that  
16 any synthesis is both balanced and informative.

17           Finally, some implications for organizations that  
18 are responsible for characterizing risk. The first is that  
19 those organizations should begin by developing a provisional  
20 diagnosis of the decision situation so that they can better  
21 match the analytic-deliberative process to the needs of the  
22 decision, particularly in terms of the level and intensity of  
23 effort and representation of the parties.

24           They need to consider what kind of a decision it  
25 is, what the type of risk is, the state of knowledge, who the

1 affected and interested parties are, what their likely  
2 concerns are, legal constraints, organizational issues, and  
3 doing a characterization of available time and resources, and  
4 so forth.

5           They need to tentatively plan the level and type of  
6 effort appropriate for the situation. I'll throw up one more  
7 transparency here. I'm not going to talk about it, but it  
8 identifies the range of questions that need to be considered  
9 in the diagnostic process.

10           They need to consider whether routine procedures  
11 can appropriately be applied, or whether the procedures  
12 should be modified or new procedures developed. And the task  
13 that's facing you, in each situation, it doesn't probably  
14 make a lot of sense to directly adopt something that's been  
15 used somewhere else.

16           The responsible organizations need to secure the  
17 appropriate participation, involvement or representation of  
18 the spectrum of interested and affected parties. In  
19 assessing the risk characterization, the organization should  
20 consider who needs to be involved. The operative question  
21 should be not whether to involve the parties, but how to  
22 involve the parties and in what steps.

23           The process needs to be designed so as to integrate  
24 analysis and deliberation at all steps, and to make the  
25 deliberation appropriately broad. It's important to

1 emphasize proper formulation. This has been a particular  
2 sticky point with the work that you are doing.

3           It's important to build an appropriate possibility  
4 in the process leading to risk characterization and to plan  
5 for iteration and for revisiting things if some new  
6 information comes out. The original diagnosis of the  
7 situation is only provisional. When the parties are fully  
8 participation, there might be good reason to modify the  
9 process.

10           It's also important to enhance the organizational  
11 capability to conform to the principles of sound risk  
12 characterization. To organize the full range of analytic-  
13 deliberative processes, the organizations responsibly may  
14 need to make special efforts to acquire analytic expertise  
15 with regard to ecological, social, economic or ethical  
16 outcome. It might turn out to be important to make  
17 organizational changes, and especially to learn from  
18 experience such as with research and evaluation efforts.

19           Unfortunately, the committee was not able to write  
20 a prescription for how to organize an analytic-deliberative  
21 process. It really is situation-specific. There's not a  
22 whole lot of research on how to do it well, and we need to  
23 learn as we go.

24           Finally, it's important to consider the analytic-  
25 deliberative process in terms of the potential benefits and

1 costs to the organization's budget and to society.  
2 Organizations should be prepared to incur short-term costs or  
3 delays in the process leading to risk characterization if  
4 they judge that these roles incur more serious difficulties  
5 with decision making later on.

6           And the committee quotes the old carpenter's maxim,  
7 "Measure twice, cut once; measure once, cut twice," and it  
8 advises that a lot of effort be made to get it right the  
9 first time.

10           I think I'll stop here. There's a lot more to say,  
11 but I'll try to be responsive to people's questions. I see a  
12 hand back here. Who can I recognize?

13           WONG: All right, do we have any questions for Dr.  
14 Stern? We'll take comments or questions first from the  
15 Board, Board Staff, and we'll take comments later from the  
16 public at the end of the session.

17           STERN: At the end of the morning session?

18           WONG: Yes.

19           STERN: Okay. I won't be around at the end of the  
20 afternoon, so if that's an issue, you need to know that.

21           WONG: Okay. We'll get to you, sir.

22           COHON: Did the committee discuss the consequences of  
23 not following the kind of process that you laid out? And if  
24 there are some past examples that the committee discussed or  
25 identified?

1 STERN: Of not following the process?

2 COHON: Right, what kind of disasters may happen.

3 STERN: Boy, is that a question. No, and I'll tell you  
4 why. The issue of a permanent repository for high level  
5 nuclear waste concerns at least a number of people on the  
6 committee, the classic case of what happens when somebody  
7 figures out what analysis needs to be done.

8 It seems to some people on the committee, I don't  
9 know the situation in detail, that the history of this  
10 particular problem has been one where a decision was made  
11 about what kind of analysis is needed, namely a whole series  
12 of technical issues about the geological and other kinds of  
13 permanent ability of a particular site to contain the  
14 radioactivity and so forth.

15 Without checking to see what the concerns are, you  
16 know, other kinds of concerns keep coming up. And it's even  
17 more complicated than that, of course, because by act of  
18 Congress, there was a restriction on what could be analyzed.  
19 You now have to look at one site, and it's separate from the  
20 question of the risks associated with the alternatives to  
21 putting a repository at that one site. But I'm not going to  
22 try to pass judgment as a non-expert in this on this  
23 particular problem, but it's one that's been contentious for  
24 a long time and it's likely to continue to be contentious for  
25 a long time.

1           I think in the opinion of a number of members of  
2 the committee, one of the reasons for that, but not the only  
3 one, was the use of a kind of a linear model where you say we  
4 do the technical analysis, then we get the results, then we  
5 give it to the political process and they deal with it from  
6 there, and we get reactions from that.

7           COHON: Just to pursue my question, what you just said  
8 was valuable and I'm glad you said it, but it's not what I  
9 asked you.

10          STERN: Okay.

11          COHON: What I wanted to know is whether the committee  
12 identified any other problems that needed to be handled in a  
13 linear fashion that resulted in either disaster in the  
14 decision making sense or a difficult process.

15          STERN: EPA deals with a lot of issues where the result  
16 is years and sometimes decades of information focused on  
17 details of risk assessment. You know, they may be in the  
18 middle of this with dioxin where you have a generic risk  
19 assessment, but is a particular problem because it's supposed  
20 to be useful for a wide range of decisions, where each  
21 decision has a bunch of concerns of the interested and  
22 affected parties.

23                 But the EPA dioxin risk characterization was also  
24 this kind of thing where you need to know what the health  
25 effects, and then more recently, some of the ecological

1 effects of dioxin are, and the presumption is that once we  
2 know that, everybody involved will feel sufficiently informed  
3 that they can make decisions on policies related to dioxin.

4           But EPA runs into this all the time. That was an  
5 agency that was very much in the minds of a number of  
6 committee members, DOE as well.

7           LANGMUIR: I was interested in the approach and request  
8 for the systematic way of doing the thing. What concerns me  
9 is the reality of it, the fact that essentially every risk  
10 you approach with this methodology has already been analyzed  
11 in some way, usually incorrectly, by politicians and reacted  
12 to by special interest groups. You have all that baggage to  
13 walk into with this approach. And even if you didn't have  
14 that baggage, if you start out on a new problem that had  
15 risks with this approach, how would you keep it from getting  
16 to the news media, to the special interest groups and having  
17 them mess up the nice objective way that you view the  
18 problem, and make it very difficult for you to bring closure  
19 on this approach.

20           STERN: Well, the committee thought about that a lot,  
21 and there's a chapter in the report on implementation, which  
22 unfortunately doesn't have a silver bullet. You know, no  
23 matter how well you do it, there's always some potential for  
24 somebody, and there were some cases that the committee looked  
25 at where, for example, there was a case where EPA tried to

1 organize a regulatory negotiation on the effect of by-  
2 products on water, where they were going to try to come up  
3 with a standard.

4           There was analysis built into that, but they got a  
5 whole bunch of stakeholders around the table and they tried  
6 to figure out what kind of a standard there should be and  
7 what kind of additional analysis they ought to have so that  
8 they could revise the standard in the future if the analysis  
9 showed a need for that.

10           And it worked very nicely, except that one of the  
11 stakeholders boycotted the process and waited for it to act  
12 and then went to Congress and tried to undermine the result.  
13 That does happen, you know, and it tends to happen with  
14 highly contentious issues, and you're dealing with one.

15           Another thing that tends to happen is that there's  
16 always at least one interested and affected party in the  
17 process that benefits from dragging the process on, and they  
18 would like to deliberate ad infinitum if they could. And we  
19 thought some about how you--when to do the enclosures.  
20 Ideally, what you want to do is try to come up with some  
21 rules for closure in advance that all the participants will  
22 sign onto so that they'll be embarrassed if they go back on  
23 their word.

24           Sometimes you can't and sometimes the agency is  
25 responsible for the process, has to make a unilateral

1 decision, and we thought a little bit about that and other  
2 defensible criteria for doing that, and came up with some.  
3 You know, when the deliberation stops bringing in new  
4 information that you need to consider for the analysis, you  
5 seem to have come to a point of diminishing returns and you  
6 can maybe defend closing the process up.

7           But there are no guarantees. The hope is, and it's  
8 based more on the lessons of bad examples than on the lessons  
9 of good examples, the hope is that if you have a process like  
10 this, you're less likely at the downstream end of it to have  
11 parties who are so dissatisfied that they're going to tie the  
12 thing up endlessly.

13           You know, you folks are dealing here with probably  
14 the most difficult risk management problem facing the  
15 country, and I was saying to Dan Magley the other night the  
16 country has sort of dug itself into a big hole, in a manner  
17 of speaking, with this one. You know, it will take some  
18 creativity and there are no guarantees, but that gives you  
19 some idea of the committee's thinking on the practicalities  
20 of it.

21           CORDING: Cording, Board. One of the technical or  
22 practical details is how to convey technical information to  
23 non-technical people who are participants in the process.  
24 Did the committee discuss that?

25           STERN: It did, but mostly in terms of process. I mean,

1 we did not try to come up with some kind of a manual for how  
2 to summarize the information. In fact, we drew on a previous  
3 study of risk communication that also wound up looking at the  
4 process, and they recognized that in a sense whatever summary  
5 you come up with with problems like this where there's  
6 scientific dispute and uncertainty, it's always possible to  
7 do more than one summary that's equally true to the  
8 information.

9           And, you know, when you have a contentious  
10 situation, you're likely to get that. You know, if one  
11 agency comes up with what it feels to be a fair and accurate  
12 summary of the scientific information, it's possible that one  
13 of the stakeholders will come up with a fair and accurate  
14 summary of the scientific information that gives non-experts  
15 a very different impression. And given that that sort of  
16 thing can happen, what it seems that you need to do is to try  
17 a process that involves a range of people to do something  
18 that in some sense builds people who speak to particular  
19 constituencies, can carry a message back in their own way.  
20 And if you do it well, the different messages that you will  
21 inevitably get won't be as conflicting as they have been by  
22 the other process.

23           CORDING: Just a question regarding how one looks at  
24 risk depending on the person and the experience with it.  
25 There are many times in major projects, engineering projects,

1 for example, that the problem is treated somewhat differently  
2 depending on what your experience is and whether you're  
3 working within the range of your previous experience or  
4 extrapolating beyond it. How do you test the assumptions?  
5 How do you observe conditions if one needs to, or in a  
6 situation where you're not certain? Those are all things  
7 that we think about normally as we handle more routine, let's  
8 say, projects. And I wonder if you had some discussion of  
9 that sort of issue.

10 STERN: Extrapolation is one of the areas. In fact,  
11 deliberation always goes on, and it's normally one of the  
12 technical experts. You know, the case that's the most  
13 prominent case that I can think of is in the risk of cancer  
14 from exposure to chemicals, you know, where you have a whole  
15 set of data and animal models with high doses in the  
16 different species and you have to extrapolate to low doses,  
17 and there's scientific dispute about that. So there's a  
18 discussion among technical experts.

19 Now, in other cases where you need to make  
20 assumptions, there's also a dispute, and I'm trying to think  
21 about some of the kinds of things that you face, you know,  
22 where you may need more than technical experts, the one that  
23 comes to mind is you have transportation problems where you  
24 need to make assumptions about human behavior basically. You  
25 know, what happens in transportation systems and how the

1 equipment is likely to be handled, where it may be helpful  
2 for deliberation about what kinds of assumptions to make for  
3 the analysis to be informed not only by people who know about  
4 trucks and trains and caskets, but also about--sorry, that's  
5 not my field. But, you know, also by people who know about  
6 the behavior of those who manage and operate transportation  
7 systems.

8 I hope that's responsive.

9 CORDING: It's a big topic. I don't have further  
10 questions. Thank you.

11 WONG: All right, I have just one comment. I look at  
12 your process up there, and I think a lot of the community and  
13 interested public excluded in the present process, could be  
14 excluded even greater in the process that you propose up  
15 there, because many communities and some of the interest  
16 public do not have the time or the resources to meaningfully  
17 participate in that resource.

18 The EPA experimented with these technical  
19 assistance grants, but stepped back on that, and I know my  
20 own agency has also participated in providing that kind of  
21 assistance to communities so they can participate. What were  
22 your thoughts on that?

23 STERN: The committee did think about that, and had a  
24 little bit to say about it, and realized that there are  
25 interested and affected parties who don't have the time, who

1 don't have the resources, sometimes you have the expertise,  
2 and there is some discussion in the report and it's important  
3 to get that input somehow, and sometimes you may need to do  
4 those sorts of things.

5           I should also say that there are different ways to  
6 get the participation and representation of the interested  
7 and affected parties, and sometimes it may mean that you need  
8 a farmer at the table and sometimes it may mean that you need  
9 an ecologist who has spent a lot of time talking to farmers  
10 and understands what their situation is. You know, that will  
11 depend on what kind of a decision you're deliberating about.

12           But the committee did consider that and it said  
13 that sometimes you need to put some resources into making  
14 sure you get that input.

15       WONG: I know that we're trying to keep to the schedule,  
16 and I'd like to entertain one more question, and that was  
17 from the gentleman who came up from the back.

18       MC GOWAN: Thank you for your consideration. My name is  
19 Tom McGowan. I'm a member of the interested and affected  
20 human and universal public. I say that for a specific  
21 reason. My question has to do with is it limited to a finite  
22 context or does it extend into infinity. In my view, it is  
23 infinite, in which case how does the public and the future  
24 generations participate, at what point and at what means.  
25 And if not, how is this a tool to assist in performance

1 assessment with genuine public input.

2 STERN: The committee did think about that, and  
3 obviously in one way, there's no answer for, you know, how  
4 can an unborn population speak for themselves. They can't  
5 speak for themselves. And what we need to do is to find some  
6 people who will try to speak for them and to consider that.  
7 Ultimately, it's the people who are alive who have to make  
8 the decisions, and if there are enough of us who care about  
9 the future generations that would try to imagine what they  
10 will care about, we will do it, we have no alternative.

11 WONG: Thank you.

12 (Applause.)

13 WONG: Thank you, Dr. Stern

14 Okay, we're again trying to keep to the schedule,  
15 and our next speaker will be Dr. John Austin. He's the Chief  
16 of the Performance Assessment and the High-Level Waste  
17 Integration Branch with the United States Nuclear Regulatory  
18 Commission. John will talk about the types of issues that a  
19 regulator thinks about as he views the performance  
20 assessment. We appreciate John coming here today, and I'll  
21 turn the podium over to John.

22 AUSTIN: The TRB staff asked that I give some specific  
23 examples of where performance assessments have not been  
24 transparent. And if I could have the second chart?

25 Today, I'll be describing NRC's review of DOE's

1 TSPA-95. I will identify the five key topical areas that we  
2 selected for a detailed review so that we could give DOE a  
3 prompt feedback. These five topical areas were ones that  
4 have major influence on total system performance.

5 I will then make some general observations about  
6 the transparency of performance assessments, and I'll get  
7 into some details of three of the major issues that we  
8 examined in TSPA-95. Those three key areas were the total  
9 system performance, infiltration and deep percolation, and  
10 the third was groundwater dilution.

11 Finally, I'll make some suggestions on how  
12 performance assessments might be made more understandable and  
13 credible. The third chart?

14 For our audit and review of TSPA-95, NRC selected  
15 five very specific topical areas of key importance. We held  
16 a technical exchange with DOE in May of 1996. We think that  
17 there was a very positive exchange, that we learned a lot,  
18 and I think DOE learned a lot in that effort.

19 We transmitted a summary of our comments to DOE in  
20 July, 1996, followed by details that deal with the five key  
21 areas, which were sent in November of 1996.

22 We are currently wrapping up a broader review of  
23 TSPA-95 and expect to transmit those comments to DOE in March  
24 of 1997. The thought is that as much feedback as the  
25 regulator can give to DOE early, the greater the chance we

1 have for influencing the TSPA viability assessment in 1998.

2           We had addressed, or we will be having a technical  
3 exchange with DOE on April 10, 1997. We believe that DOE is  
4 addressing many of the concerns that we have expressed. This  
5 is based on our review of the TSPA, VA plan that DOE has  
6 published, as well as some of our what we call Appendix 7  
7 visits with DOE.

8           Chart 4, again, the five topical areas that we  
9 reviewed in detail were total system performance,  
10 infiltration and deep percolation, groundwater dilution, how  
11 DOE calculated the temperature and relative humidity, which  
12 is very important for the onset of waste package degradation,  
13 and finally we reviewed the waste package failure modes, what  
14 failure modes should be included and what possible modes  
15 could be excluded from a total system performance.

16           General observations about performance assessment  
17 transparency. First and foremost, I believe one needs to  
18 have clear and accurate documentation of decisions made and  
19 of the rationale supporting those decisions. This is very  
20 important, because in our experience primarily in the reactor  
21 world, incomplete documentation frequently leads to  
22 significant problems in contentious cases. Where there is  
23 not a clear flow of documentation, hearings, contested  
24 hearings can drag on for many years while the documentation  
25 is attempted to be generated or straightened out.

1           We have sent this message to DOE numerous times and  
2 we're very encouraged to learn that DOE has drafted a  
3 position for documenting their decisions. That is under  
4 review. One suggestion I would make is that that document be  
5 reviewed by those who have experience in litigation, because  
6 that is where the adequacy of the documentation will be  
7 tested. It will be tested in the hearing process.

8           Finally, I would note that the Nuclear Energy  
9 Agency, Performance Assessment Advisory Group has a draft  
10 report out for comment, where they observe that incomplete  
11 justification and documentation are relatively common in  
12 performance assessments, and that includes NRC. I would hope  
13 that we are getting better. It is very important not only  
14 for DOE to have a transparent performance assessment; it is  
15 important for the regulator to have transparent reviews and  
16 comments on that. We can learn from today's proceedings as  
17 well as DOE, I think.

18           And the sixth chart, I'll now be entering some of  
19 the specific issues and examples of the lack of transparency.  
20 In TSPA-95, the results were presented as complementary  
21 cumulative distribution functions of total radionuclide  
22 release and doses. These are very critical to a compliance  
23 determination, particularly as we go into the new arena of  
24 possible dose based standards.

25           In the results, DOE had varied heat load, backfill,

1 infiltration ranges and thermohydraulic models. However,  
2 there was never an explanation of the results in terms of  
3 what factors or basic performance indicators were driving  
4 those results. That would be very helpful in terms of being  
5 able to follow the logic, follow the reasonableness of the  
6 results, and to try to duplicate aspects leading to the  
7 results.

8           In TSPA-95, it was very difficult to determine the  
9 correctness and the reasonableness of the results and,  
10 therefore, we are performing independent calculations to see  
11 if we can reproduce TSPA-95 results.

12           On the seventh chart, TSPA-95 identified  
13 distribution of percolation flux as the primary site  
14 characterization issue. Infiltration and deep percolation  
15 are important for waste package degradation and radionuclide  
16 transport through the unsaturated zones. We could not  
17 reproduce the results based on the information in TSPA-95.

18           Another example here is that there was what we  
19 think is an unsupported assumption that fractures must be  
20 completely saturated for movement through the fractures and,  
21 therefore, they under-predicted the velocity of moisture  
22 flowing through the fractures.

23           We found that there was not a full correspondence  
24 between the results of their process models and their  
25 abstracted models, detracting from the confidence that we

1 have in the overall results.

2           Because of this, we are not sure whether the  
3 results of TSPA-95 are conservative or are they optimistic.  
4 This also led to some of our technical experts having a very  
5 difficult time following the logic in TSPA-95.

6           On Chart 8, we selected the groundwater dilution as  
7 an issue to review because this is extremely important in a  
8 dose based calculation. What one considers by way of  
9 dilution of dissolved radionuclides flowing through the  
10 unsaturated zone and reaching the groundwater, how much  
11 dilution you get there is essentially linear to what the dose  
12 is. If there is substantial dilution, the doses will be  
13 substantially lower than if there is not substantial  
14 dilution.

15           We had difficulty with some of the models that were  
16 in TSPA-95. The stirred tank model was not adequately  
17 supported. There was what we think is basically an  
18 assumption that when the moisture reached the saturated zone,  
19 that it mixed in the top 50 meters of the groundwater.

20           The advection and dispersion model did not consider  
21 the full range of field data. If you cannot check a  
22 calculation against the data, that draws into question the  
23 transparency and adequacy of the models and calculations.

24           On the other hand, DOE did not consider the  
25 potential for dilution at the pumping end of the analysis.

1 That is, in order for there to be a dose associated with the  
2 repository, the water must be pumped from the water table to  
3 the surface, and realistically performing that calculation,  
4 there should be a significant dilution factor. Pumps will  
5 not pump solely from the contaminated zone. There will be  
6 quite a depth from which there would be water pumped, and  
7 that will provide basically a natural dilution of the  
8 radionuclides. DOE is reconsidering the models they used  
9 here.

10           Finally, I'd like to talk about making performance  
11 assessments more understandable and credible. First and  
12 foremost, they must be logical. Whenever anyone views any  
13 document or reads a novel, one is looking for logic. If you  
14 don't see the logic there, you soon lose interest.

15           There needs to be clear documentation of what data  
16 is to be used, what significant data should be excluded and  
17 why. Clear documentation of all of the assumptions that are  
18 significant to the analysis, and a justification for models  
19 used and for incredible or possibly credible models rejected.

20           Third, one must think of who is the audience. Is  
21 it the regulator? Is it policy makers or is it the public?  
22 The regulators, we think in terms of adjudication. Can we  
23 defend what we do? Can we understand what DOE has done. For  
24 policy makers and the public, the story is quite different.  
25 In the technical community, scientists tend to talk to other

1 scientists, and they're very reluctant to back off from  
2 scientific elegance and scientific precision. But when one  
3 gets away from the scientific community and tries to convey  
4 what is being done, I believe the scientists must give up the  
5 elegance and the precision and seek authority and  
6 communication.

7           Fourth, for credibility, it is important that all  
8 legitimate concerns be addressed in some fashion somewhere.  
9 Failure to address the concerns, legitimate concerns of  
10 interested people just detracts from credibility of the  
11 analysis.

12           Finally, I'd like to give a couple suggestions on  
13 how to improve the understandability of performance  
14 assessment. Yesterday, I visited the Science Center for  
15 Yucca Mountain in Las Vegas, and found that a very  
16 educational experience. They've had tremendous efforts  
17 trying to translate very complicated subjects into language  
18 and videos that high school students can understand, lay  
19 people can understand.

20           I think a possible logical next step that could be  
21 taken is to develop a story book of processes, events,  
22 features 10,000 years in the future, as well as 10,000 years  
23 in the past, the thought being that, one, here is what will  
24 happen progressively, end of institutional control, migration  
25 of water into the repository, whatever number of thousands of

1 years, degradation of the waste package, migration into the  
2 groundwater. In 10,000 years, spent fuel maybe looks like--  
3 just giving this picture. But few of us can really  
4 understand what 1,000 years or 10,000 years, what it's really  
5 all about. To give perspective, go back in history. We all  
6 have read history, and here is what happened 1,000 years ago,  
7 5,000 years ago, just to give a perspective on what a  
8 repository is all about.

9           Another suggestion is that recognizing that  
10 computers can generate animated films. Computers can  
11 simulate nuclear weapons phenomenon. Why can't computers  
12 simulate in a three dimensional fashion what a repository is  
13 doing over the performance period to give a better  
14 visualization to the public and to the policy makers as to  
15 what all of these equations the scientists are solving, to  
16 give a better picture of what it's really all about. This  
17 could be interactive, in which a person could vary the  
18 parameters from high to low. If they want to go outside of  
19 the range program, hit another button and there would be a  
20 lay description of why the range was selected and why we  
21 shouldn't go outside the range.

22           And finally, the suggestion is that perhaps  
23 intelligent but non-technical people should prepare summary  
24 of a complicated analysis. This has been done, is being  
25 done. Westinghouse at Savannah River had a group of about 15

1 high school students summarize their environmental report in  
2 language that everyone could understand.

3           DOE has an EIS on bringing back spent fuel from  
4 research reactors. Non-technical people wrote the summary of  
5 that, and I'm told that it was very, very understandable.

6           And finally, I'd like to close by just pointing out  
7 I had one copy and an original of the document prepared by  
8 NRC on communicating risk issues to the public. If you'd  
9 like more, let me know and I'll arrange to have that happen.

10           Thank you.

11           WONG: Thank you, John. Questions from the Board? Pat?

12           DOMENICO: You referred to infiltration and deep  
13 percolation and groundwater dilution, arguably two of the  
14 most important--we discussed dilution and were examined by  
15 simple models, but these are both very difficult problems to  
16 understand. Does NRC have any position on utilization of  
17 simplified models?

18           AUSTIN: Yes, we recognize that performance assessments  
19 are basically a higher approach on that issue, take your data  
20 and develop process models, very complicated issue, try to  
21 examine what are the key variables, and from that, abstract a  
22 faithful model that would be used in TSPA itself. So, yes,  
23 we recognize the need to develop simplified models, but that  
24 in that simplification, there needs to be a flow of logic and  
25 rationale on why the simplification is faithful to the

1 science and to the data.

2       DOMENICO: Just the demonstration that it's not  
3 sufficient unless it reproduces something we observe?

4       AUSTIN: Demonstration that they are conservative is a  
5 suitable approach. The problem with relying solely on  
6 conservatism is that it can drive you in an inappropriate  
7 direction. Just as a hypothetical, if you become too  
8 conservative, one might ask for four or five areas within the  
9 repository. If you're more realistic, perhaps two would  
10 suffice. So conservatism can lead to unnecessarily  
11 significant increases the cost. So there is that trade-off.

12       DOMENICO: Thank you.

13       WONG: Any other questions from the Board?

14       ARENDT: A non-technical question that has to do with  
15 transparency. Is this an NRC term or is it a DOE term,  
16 number one. Number two, or is it defined? Number three,  
17 when you're trying to communicate with the public, why do we  
18 use terms like transparency? I saw the term up there as  
19 understandable and critical. I assume that's what  
20 transparency is, is understandable and credible. And if it  
21 is, then why don't you use it in the first place?

22       AUSTIN: Transparency is not my word. I don't know  
23 where it came from and I consciously do not use the word  
24 transparent for the reasons you're alluding to. But  
25 understandable and credible is what I think transparency

1 means. Transparency has too many meanings.

2 COHON: I have several questions. I find your  
3 presentation very important, giving us this very pointed  
4 criticism of TSPA, which as has been noted, has become the  
5 centerpiece of DOE's program.

6 First, as a point of clarification, on your  
7 seventh, I guess I won't call it a transparency, if we say  
8 could not reproduce transport simulator based on information  
9 in TSPA-95, does NRC run its own models, their own version of  
10 DOE models?

11 AUSTIN: We are developing our own performance  
12 assessment. We have gone through two iterations. I think  
13 DOE has gone through three on theirs. And we are embarked on  
14 Version 3 of our performance assessment code.

15 But one of the reality checks we try to go through  
16 is if we were to take DOE's data and put it into our code,  
17 would we come up with the same result. And if not, why not?  
18 Or does DOE have a model approach that we find acceptable so  
19 much so that we can stop this. But, yes, we are developing  
20 our own performance assessment code so that we may make an  
21 independent judgment on the suitability of the application  
22 and suitability of the mountain as a possible repository.

23 COHON: I believe I heard that NRC was cutting back its  
24 expenditures, its program for Yucca Mountain. Is that  
25 correct?

1           AUSTIN: Our appropriation has been cut back. NRC is  
2 not cutting back. The appropriation has been cut back.  
3 Without getting into carryover and all that, it is down  
4 several million dollars from the starting point of 22 million  
5 from the nuclear waste fund. What we are appropriated for  
6 high level waste, we spent.

7           COHON: Will you be able to continue this work on TSPA?

8           AUSTIN: The TSPA effort is one of the highest priority  
9 efforts because of its importance to compliance  
10 determination. So our whole program is being restructured to  
11 focus on those aspects that are most important to  
12 performance. We've broken it into ten key technical issues.  
13 With the budget reductions, we have stopped work at the  
14 Center for Nuclear Waste Regulatory Analysis on three of  
15 those key technical issues, with the rationale that we may be  
16 able to catch up at application time, assuming the budget  
17 request. But performance assessment would be the last to go.

18          COHON: Back on your overhead Number 7, the poor  
19 statistical correspondence between process-level and  
20 abstracted calculations. This surprised me because my  
21 understanding is that the abstracted models are derived  
22 basically from process-level models, specifically to achieve  
23 a certain statistical correspondence. So if my understanding  
24 is correct, for this observation to be made is to basically  
25 say the whole procedure they went through is knocked out. So

1 is my understanding correct, and second of all, if it is,  
2 what is your observation?

3       AUSTIN: There are a variety of methods of going from a  
4 process model to an abstracted model. The more complicated  
5 the process model, the more challenging it is to go to an  
6 abstracted model and still be faithful. These are pioneering  
7 efforts, unprecedented efforts, and I am not surprised that  
8 we found this area. We have difficulties ourselves going  
9 from process models to abstracted models.

10           And I should mention, you started out by saying  
11 it's very important about these pointed criticisms that I  
12 have made. First, I was asked to point out problems in  
13 understanding. Here is areas for improvement, but there are,  
14 I believe DOE has come a long way from TSPA-93. But, again,  
15 I'm not surprised of the difficulty going from the  
16 abstracted.

17       COHON: Do you mean that the degree of conservatism in a  
18 particular parameter, let's say, was unknown or that, which I  
19 find that that would be just not acceptable if that was the  
20 case, or do you mean that there's some derived level of  
21 conservatism based on a combination of various assumptions  
22 about parameters?

23       AUSTIN: Well, one thing, for example, narrow the  
24 parameter to a range, but to propagate that through to an  
25 ultimate result, may be a very complicated, lengthy

1 calculation. One could demonstrate that using the upper end  
2 of the range only with the simple model flowing through in  
3 the abstraction, that you have bounded the calculation, and  
4 DOE is free to lay out that kind of logic anywhere in the  
5 performance assessment.

6           On the other hand, if one has, for example, the  
7 stirred tank model with an assumption of 50 meter mixing  
8 without adequate justification, we know, or we would conclude  
9 that that is not conservative. Therefore, we would look to  
10 something different or a better justification. So that it is  
11 we, in making the reasonable assurance determination that the  
12 performance assessment bounds or faithfully gives a  
13 reasonable estimate of what the risk is, we look for areas of  
14 conservatism, reasonable conservatism, and areas for where  
15 there might be an optimistic--no infiltration would be  
16 optimistic.

17       COHON: But that's different from your point here.  
18 That's not how you know the degree of conservatism. That's a  
19 degree of conservatism that you don't find acceptable. You  
20 know what it is, but you don't like it.

21       AUSTIN: If, in a calculation involving many of these  
22 steps, it may be that some are conservative, some are non-  
23 conservative. What's the bottom line?

24       COHON: I think that's a crucial point, because it seems  
25 to me that the way the program is headed would be complete

1 reliance on TSPA for suitability determination. But the real  
2 question will be uncertain. I mean, that's the real  
3 quantification, and not whether a particular design meets the  
4 different standards and the degree of certainty with which it  
5 meets it or not. So I'm glad to have it. Thank you.

6       LANGMUIR: I'd just like to have you revisit, you were  
7 giving a specific example for purposes of affecting your  
8 points, and you happened to break one up that was interesting  
9 to a lot of us on the hydrology or chemistry side of things,  
10 and that is the DOE assumption of the 50 meter mixing zone,  
11 which is critical to the long-range dosage. I presume you  
12 have some folks in NRC's organization who would have some  
13 opinions of their own about this, and I was curious if anyone  
14 had expressed opinions within your organization or its  
15 contractors about the acceptable or the validity, if you  
16 like, of the 50 meter mixing zone, rather than simply  
17 reacting to DOE's proposal. Have you thought about it in  
18 your organization?

19       AUSTIN: We have hydrologists that have reviewed this.  
20 They were there, a technical exchange with DOE last year  
21 expressing the concerns of this assumption. We have  
22 documented that concern in May and in November of last year.  
23 But this issue may be moot, in that DOE is revisiting its  
24 dilution models in preparation for TSPA/PA.

25       But, again, even at the technical exchange, I think

1 DOE recognized the need for better justification. But we  
2 have continued on trying to document these concerns to give  
3 DOE a better feel for where the regulations are coming from.  
4 We feel that the more we have these kinds of feedbacks to  
5 DOE, and we learn from them through our feedbacks, that the  
6 greater the potential for success of complete application.

7 ALLEN: Clarence Allen. Let me ask a very general  
8 almost philosophic point of view here. Why should the  
9 public, why should our political leaders have any reason to  
10 believe your technical experts at the NRC any more than those  
11 from DOE, the State of Nevada?

12 AUSTIN: We take an oath of office to be independent  
13 regulators. The law says that NRC shall license any  
14 repository for high level waste and spent fuel. We have a  
15 hearing process which is composed of administrative judges,  
16 technical folks. Typically, it's a panel of three that sit  
17 as judges. We go under oath before those judges and DOE  
18 would go under oath before those judges to lay out the case.  
19 They must make findings of fact, findings of law, and we get  
20 judged upon the adequacy of the NRC's staff effort, the  
21 adequacy of the applicant's effort.

22 This then is all reviewable in the appeals court.  
23 It's part of the checks and balances to assure that there is  
24 reasonable assurance that the public health and safety is  
25 protected. We're independent. We're paid to do the job that

1 Congress has asked us to do, has told us to do.

2 ALLEN: Well, how can we be guaranteed you have the  
3 competence to do so, as compared to the other reasons?

4 AUSTIN: The capability and challenge of any of the NRC  
5 staff that goes into a hearing is challengeable. If a party  
6 does not think that they are qualified to speak on the  
7 subject, they can challenge them. It's almost like a court  
8 of law. I could not go in and testify on tax law. It would  
9 be found totally unacceptable by an opposing attorney. So,  
10 you know, the qualifications are reviewable when challenged  
11 in the hearing process, so the public will have a chance, we  
12 will lay our technical analyses and technical experts out  
13 there, and have at it.

14 DOMENICO: I think there are qualified people on both  
15 sides always.

16 AUSTIN: Yes.

17 DOMENICO: I don't think that's the issue. I think, for  
18 example, you said something about you could not reproduce the  
19 transport simulated information. Frequently, even the same  
20 processes will give two different results. So that's really  
21 not surprising. And another thing is I thought that when you  
22 talked about the degree of conservatism, you weren't talking  
23 about parameters, you were talking about the results.

24 For example, 50 feet mixing zone may certainly not  
25 be conservative, but the total aspect of the mixing model may

1 be conservative in itself, and just may be conservative  
2 enough to determine that. Now, I'm not saying that it's so,  
3 but it could be so, and that could be demonstrated eventually  
4 if we get some good results from the dilution tracing tests,  
5 and then you get to see what kind of dilution you're getting  
6 and then maybe you could say something about effective  
7 values. I would challenge efforts on either side. I think  
8 this is a very complicated problem and we're going to be  
9 doing things that brings up these differences in results that  
10 you get.

11 AUSTIN: I totally agree there are competent people on  
12 all sides of this issue. It is very healthy to have the  
13 exchanges that we have through this documentation. If we  
14 cannot reproduce the results, that is not necessarily a fatal  
15 flaw. We need to know the reason why it can't. If models  
16 produce different results, it is better to discuss them and  
17 understand why now rather than in a contentious lawyer-driven  
18 hearing process.

19 So, again, I think and I would hope all interested  
20 parties are building on their knowledge base as we go through  
21 each one of these iterations, and if we have some surprises  
22 and differences, let's work them out peacefully together and  
23 go on.

24 WONG: Okay, going from this Board to the other Board.

25 BULLEN: I'm Dan Bullen. I'm the Board designee. I

1 have just a couple of comments that you may not even need to  
2 respond to. Specifically with respect to your suggestion for  
3 improving transparency or improving understandability, your  
4 animated video was a great idea, but I'd like to toss a word  
5 of caution out. One of the favorite videos in my family at  
6 home is Jurassic Park, and my children are completely  
7 convinced that those dinosaurs are real. So whatever you put  
8 into an animated video may or may not be acceptable to the  
9 public.

10           And the second point I want to make is that I agree  
11 that to make TSPA transparent, you have to tell a story, and  
12 I think to tell the story, you have to start at the beginning  
13 with what are we trying to do, describe in layman's terms the  
14 assumptions that are made and the processes that you want to  
15 model, and then come up with a result and try and talk about  
16 the effects of that result on the population nearby. And if  
17 you make that story credible, it has to be able to be  
18 readable by my 13 year old daughter, and I think if you take  
19 a look at your story board and you make sure that whatever  
20 you put out for TSPA that's got to go to the public to be  
21 transparent, it has to tell the whole story, not in terms of  
22 equations or in terms of how many experts you have, but in  
23 what are we trying to model, what are the effects of the  
24 model and how convinced you are that this may actually be the  
25 case.

1           That's all I had to say. Thank you.

2           WONG: Are there any more questions? Leon?

3           REITER: Leon Reiter, Board Staff.

4           John, I just wanted to ask you one thing about the  
5 technical exchange also. Something came up that appeared to  
6 make me a little bit uneasy, and that was that apparently  
7 there was an attempt, because of difficulty in understanding  
8 parts of the TSPA-95, there were attempts by some of your  
9 consultants to contact people who had actually carried out  
10 the TSPA, and that was viewed negatively, direct  
11 communication, viewed negatively by the NRC. Am I correct on  
12 that?

13          AUSTIN: Well, unfortunately, I could not attend that  
14 technical exchange. And when I signed a letter transmitting  
15 the summary of our comments to DOE, it was May of 1996, I  
16 thought I was signing a letter that just said here it is, and  
17 for those receiving it, they read it and they seemed to think  
18 there was something very negative in it, which I didn't see.  
19 And the staff that worked with me in writing that letter did  
20 not express any negative thoughts about the exchange with  
21 DOE. In fact, the feedback I got from the technical people  
22 was that it was a very informative, positive, technical  
23 exchange.

24          We have varying personalities within the staff, as  
25 does DOE, and some people may naturally come across a little

1 more negative, when for those who know them, that's a  
2 positive.

3 REITER: I'm sorry, maybe I didn't make myself clear.  
4 The question is if the scientists at the Southwest Research  
5 Institute viewed the TSPA and didn't understand something,  
6 had a question, the logical thing would be call up somebody  
7 who conducted and carried out the TSPA and say what did you  
8 mean by it. And apparently, there's some objection from the  
9 NRC to doing these informational kind of clarifications.

10 AUSTIN: Good point. The Commission is committed to  
11 conducting the pre-licensing reviews of DOE and the public.  
12 We're a full disclosure agency. We try to have exchanges as  
13 much as possible in a public forum, none of this closed  
14 doors, behind the scenes, smoke filled rooms; that, you know,  
15 we get out and into the open. And, yes, there are phone  
16 calls between technical folks on what did you mean by this,  
17 but there is value in having a public record where these  
18 things are clarified as opposed to all right, I never need to  
19 bring this up again because so and so explained this to me  
20 over the phone.

21 That is not a document we could ever reference, and  
22 in fact in licensing reviews, I have had safety evaluations  
23 where it is a phone conversation that served as the basis for  
24 the judge. That's inadequate. We need to have a document  
25 that says here is how we resolved this. Here is the concern

1 and here is how we resolved it, so that anyone can go into  
2 the public document room and try to find the paper trail.

3       So, yes, it may be a little more painful and not appear  
4 to be efficient to raise these in a public meeting in Las  
5 Vegas as opposed to just getting on the phone and getting  
6 clarification, but they do happen, but it still has to be  
7 done in public if it's relevant or significant.

8       MC GOWAN: I'll be uncharacteristically transparent.

9             In view of the sequentially ordered determinations  
10 by DOE regarding suitability application, followed by EPA  
11 that was consistent to revise standards, compliance and  
12 followed thirdly very closely by U.S. NRC's licensing  
13 requirements, mandated as consistent with EPA, ergo also  
14 consistent with DOE, to what extent can you invalidate or  
15 independently clarify your independence and wholly objective  
16 process?

17       AUSTIN: Well, by law, we are independent. We have a  
18 lot of people checking us to see are we independent, are we  
19 keeping an arm's length from the applicant. We are  
20 professional technical people who take pride in reputations.  
21 We do analyses that are placed into the public document room  
22 where anyone at any time can review and check the validity of  
23 what we have done.

24             I think that if you see our analyses in performance  
25 assessment, they are not the same code or codes that DOE

1 uses. They are developed by NRC and its contractor in San  
2 Antonio, Texas. And we are ultimately checked by a licensing  
3 panel, the Commission itself and the appeals court, and I  
4 think all of that combined assures us that we are  
5 independent, and I think DOE would say we're independent,  
6 too.

7 WONG: Thank you, John.

8 I'd like to thank Paul and John for this morning's  
9 presentation. We will have the coffee break I guess until  
10 maybe five after 10:00, and we will return and talk again and  
11 hear presentations from the French program, DOE and the State  
12 of Nevada.

13 (Whereupon, a recess was taken.)

14 COHON: Please take your seats.

15 Some very important announcements, very important.  
16 I didn't intend to do this, but when I acknowledged the  
17 retiring Board members, I introduced for the first time at a  
18 Nuclear Waste Technical Review Board meeting the notion of  
19 applause. This is something that's foreign to us and we  
20 would prefer that henceforth, unless the Chair, me, starts to  
21 applaud, that you all hold your applause.

22 The reasons are clear. One, it takes so much time.  
23 The other is that if we get into this habit of applauding  
24 and then you choose not to applaud, and a third reason occurs  
25 to me, we tend to be so quantitative and analytical. I think

1 I noticed Leon out of the corner of my eye designing an  
2 applause meter.

3           So henceforth, please no applause. Thank you.

4           (Applause.)

5           COHON: That's very good. My introduction this morning  
6 was so long, it didn't leave time for me to acknowledge the  
7 superb staff--no applause--the superb staff of this Board.  
8 They are wonderful. They do all sorts of things from the  
9 highly technical to the incredible, like getting 30 plus  
10 people to Pahrump with no one getting lost, so far as we  
11 know.

12           I also erred in introducing Priscilla Nelson, for  
13 which I apologize, and I want to rectify and correct it right  
14 now. In fact, she has terminated her appointment at the  
15 University of Texas--sorry John McKetta, Texas will not be  
16 represented on the Board--and has become a federal employee  
17 effective in August with the NSF, as program director in  
18 civil and mechanical systems.

19           Also, I should point out that she used to be a  
20 member, is no longer a member, of the Academy's Board on  
21 Radioactive Waste Management, for reasons that are probably  
22 obvious.

23           Finally, in listening to the excellent  
24 presentations this morning, it struck me that there may be  
25 members of the audience at this meeting who are not clear on

1 what our Board is vis-a-vis DOE and NRC, so there are three  
2 entities at least here involved.

3           You've gotten a sense already of what NRC is.  
4 They're the ones who regulate and they must grant a license  
5 to repositories. DOE is charged with the responsibility of  
6 developing a repository plan. Our board is an independent  
7 board, and you've heard the word independent before. We were  
8 created by the 1987 amendments to the Nuclear Waste Policy  
9 Act, and we were created specifically to provide independent  
10 advice to DOE and to Congress. We are required by law to  
11 report twice a year to the Secretary of DOE, to the President  
12 and to Congress.

13           DOE does not have to listen to us, but in fact the  
14 law anticipated that and basically said something like they,  
15 Congress, would be surprised if DOE didn't listen to us, or  
16 something to that effect, but they're not obligated by law to  
17 do what we advise, unlike NRC, which has to grant a license.

18           Sorry for all these interruptions. Back to Jeff.

19           WONG: The new chairman has made his mark; the no  
20 applause rule. And he's once again put us behind schedule.

21           All right, in this part of the session, we're very  
22 fortunate to have two gentlemen from ANDRA, the French  
23 effort. We have Messieurs Pierre Barber and Gerald  
24 Ouzounian. They're from ANDRA. This is the organization  
25 that is responsible for the development of repository in

1 France.

2           In 1991, the French rewrote in fundamental ways  
3 their nuclear waste legislation. Volunteer communities were  
4 sought for two underground research laboratories, and greater  
5 emphasis was placed in this effort in involving the public at  
6 key steps in the decision making process.

7           Among other things, the French have recognized how  
8 critical it is that their performance assessment be viewed as  
9 credible by wide segments of the French public.

10           Messieurs Barber and Ouzounian will speak today on  
11 these developments in France, and I would like to thank the  
12 gentlemen for coming today. They have flown all this way to  
13 address us, and they're on a very tight time frame, and they  
14 will be returning to France tonight.

15           BARBER: Thank you, Mr. Chairman. Good morning, Ladies  
16 and Gentlemen.

17           First of all, I would like to apologize because  
18 during my presentation, I will use a curious language, which  
19 is neither French nor English. I name it Frenglish. So  
20 don't worry if you find some words which are not absolutely  
21 Oxfordian English.

22           Well, my problem today is to try to tell you some  
23 experience which has been raised in France. First of all, I  
24 set the scene. We are at the end of 1989. We are in France,  
25 obviously. And the organization in charge of radioactive

1 waste management, that is ANDRA, is trying to find all over  
2 France a location, a site, for high level waste. So the  
3 situation is at this time we have just finished siting design  
4 and construction of the low level waste site, that is the Op  
5 Center. It is almost ready to start, and we are starting to  
6 find a site for high level waste.

7           We are, in fact, at that time four potential zones.  
8 One is in granite, another one in salt, a third one in clay  
9 and a fourth one in schist, and we are technicians and we are  
10 trying to make some site experiments at different sites.

11           Well, setting up of the Op Center has given not too  
12 many problems, and we are in the sense period, that is, we  
13 are trying to solve the question which has been raised to us.  
14 And unfortunately, the public does not seem to understand  
15 exactly what we want, and we are encountering some quite  
16 serious difficulties on site, especially on one site, up to  
17 the point that the Prime Minister at that time, Mr. Ogarth,  
18 decided to stop all experiments and all testing on site. But  
19 stopping everything on site does not solve the problem. He  
20 was a clever guy and decided to ask one commission in order  
21 to propose something.

22           On the Parliament side, the office, while a part of  
23 the Parliament decided also to think of this problem and  
24 constituted a small commission to deal with the problem.  
25 Curiously, the two commissions issued almost the same type of

1 report, which gave verse to the law in 1991.

2           So we are in 1991. The Parliament has discussed  
3 the law and the law has been issued. This law gives one  
4 important idea. We have not yet the solution for high level  
5 waste, that is, we need to go on with research to really  
6 understand what this high level waste and how this level  
7 waste can be taken, and the Parliament will make a decision  
8 in 2006, in fact 15 years after the law. So we allocated 15  
9 years to make some research.

10           What is in fact inside the law? I told you this is  
11 a law of research and three different objectives for this  
12 research, separation and sorting of the various kinds of  
13 waste and potential transportation of those wastes, and this  
14 part of the research has been given to the French Atomic  
15 Energy Commission.

16           The second part of the research, second access of  
17 research, to find retrievable or known retrievable geological  
18 disposal. So this is the objective of the long-term, but up  
19 to 2006, we are to make research on at least two research  
20 underground laboratories, strengthen the processes for  
21 immobilizing the waste, and in order to, I would say a longer  
22 term surface storage, in reaching for another final solution.  
23 And this research is also given to the French Atomic Energy  
24 Commission.

25           So as ANDRA, that is the waste manager, we are in

1 charge up to now to conduct all the research on this deep  
2 geological disposal. So this is the first big point of the  
3 law.

4           The second point, the second point in fact is a  
5 question of organization in France. This law is setting up a  
6 world organization. The old law at that time was part of the  
7 French Atomic Energy Commission. We were, since 1969, one of  
8 the divisions of the French Atomic Energy Commission. And so  
9 it was we were I would say surrounded work from people in  
10 charge of military devices and I would say a culture of  
11 secrecy was really one of the points.

12           So the item which was requested by the law was to  
13 be open, to come from the cultural secrecy to an open minded  
14 type of work. And perhaps the important part of the law, the  
15 independence, and when I say independence I mean separation  
16 from the French Atomic Energy Commission, and that was also a  
17 question I would say of ethics. And it's difficult for a  
18 waste manager to ask a requirement and questions to its  
19 authority.

20           It's impossible really to have a full  
21 responsibility of waste when you are a member of a waste  
22 producer. And so we were separated from the French Atomic  
23 Energy Commission, and even almost the same statute as the  
24 CEA itself, but also as EDF, the big waste producer, or  
25 Cogima, the three main waste producers.

1           Another part is the external control. So now in  
2 France you are below, you are an organization in charge of  
3 managing waste and doing something, but this organization is  
4 fully responsible, but as fully responsible, that means also  
5 that it has to be controlled by the external, the  
6 environment. The environment I would say first technical  
7 control by our authority, that is in France, DSIN, and also  
8 by authorities, the OPRI in charge of the affect of ionizing  
9 radiation. So this is the normal control.

10           We are also controlled by the government, by our  
11 ministry. We are reported to three different ministers, the  
12 minister in charge of research, clearly this law is a law of  
13 research, so the minister in charge of research. We are also  
14 reporting to the ministry in charge of industry. Clearly,  
15 industry, that's EDF, EDF is prediction of waste, so we have  
16 a link. And we are also reporting to the ministry in charge  
17 of environment. And this was quite new in France at the  
18 time. There's a link between the waste manager and the  
19 environment. The commission which was set up inside the  
20 French Parliament is also existing, and I will note,  
21 controls.

22           What does openness mean? Openness means that  
23 globally speaking, we are in charge of issuing annually one  
24 big progress report. We are reviewed by a National  
25 Evaluation Board, and this National Evaluation Board is

1 almost as what I have in front of me now, it's I would say  
2 not the qualifications, the missions are almost the same. So  
3 we have to report to answer all the questions of this  
4 National Evaluation Board, and you will see that we have been  
5 asked a lot of questions.

6           But what is also inside this openness is a  
7 discussion with the local communities. And this is quite  
8 important, because in fact the objective is to build a good  
9 confidence with the local communities, with the public at the  
10 local level. Discussion with local communities means that by  
11 law, it is created at each potential site, a local commission  
12 in charge of checking what we are doing. In fact, this  
13 commission is able to ask as many questions as it wants. It  
14 is funded to do that. It's a local commission in charge of  
15 being the link between the future operator of the site, as  
16 the site is decided, and the local public.

17           And also the important part, we are again making  
18 research, and the objective is to a final governmental  
19 decision in 2006 after a debate in front of the Parliament.  
20 And if Parliament decides to do something really clear or to  
21 decide to build a repository or not to build a repository, it  
22 has to do so by a new law, which is important. So this is a  
23 full community, it's the French community which tackles the  
24 problem. It's no more a small part of technicians; it's  
25 really the community.

1           Again in this field of openness, the government  
2 decided to designate a negotiator. You know what a  
3 negotiator is in the U. S. You all had one. Our negotiator  
4 was in charge to find volunteer communities, and I insist on  
5 the word volunteer, and it received something like 30  
6 volunteer requests from local communities.

7           Well, these 30 requests were clearly not all  
8 suitable for a disposal for a site, due to the geology. The  
9 first screening has been done in view of the geology of the  
10 site. From these 30 volunteer requests, ten were remaining  
11 after this first screening, and Mr. Bataille, who was the  
12 negotiator, went personally to discuss with the ten local  
13 communities with the ten elected people, or the elected  
14 people of the ten communities with the local association of  
15 these ten regions, and he was in charge of choosing the most  
16 potential requests to design a site.

17           Well, how he chose, after discussing, he requested  
18 a vote from the local organization, and he chose the one  
19 where the vote was all unanimous, all unanimous, minus one,  
20 and this minus one means one abstention, that is, no negative  
21 votes. So he selected four sites, and I can give you the  
22 sites. Here's a map of France. He selected two sites, two  
23 potential zones in clay.

24           So you see this blue layer. This is the Meus  
25 Department and the Haute Marne Department. He selected also

1 a small part of the Gard Department, a small part which is  
2 somewhere here, and he selected also a part of this  
3 department in granite somewhere in this part. He selected  
4 these four potential zones, and proposed that to the  
5 government. And the government agreed, and we were requested  
6 by the government to start again, fortunately, after four  
7 years doing--I wouldn't say doing nothing--but after four  
8 years, we were requested to start again some research, some  
9 tests on sites. So in '94, we were able to go on site, and  
10 this was a big point.

11 I just would like to tell you a few words about the  
12 National Evaluation Board, your equivalent. There are six  
13 people, six experts, named by the Parliament and the Senate,  
14 and what is quite interesting is that there are at least two  
15 international experts. Up to now, there are internationals,  
16 I mean, there is one person from the OECD and one person from  
17 Switzerland. Fortunately, they speak French. And six other  
18 named by the government, four proposed by the Academy of  
19 Science, and two by the High Council on Information and  
20 Nuclear Safety.

21 What is the purpose of this Board? The Board is in  
22 charge of reviewing not only the deep geological disposal  
23 research, but the overall thing. And so it has to provide  
24 each year to the government an annual report giving the  
25 events of the three research directions, and is in charge of

1 setting up a global evaluation report in 2006. This global  
2 evaluation report being transmitted to the government and  
3 then to the Parliament in order to decide something.

4           What is the result of this organization? Up to  
5 now, we have been issuing four important reports, two  
6 scientific reports, one per year, and two reports to the  
7 government. I have used the word earring. It's not exactly  
8 an earring like this one, it's maybe a little closer, but we  
9 have had a hearing by this National Evaluation Board,  
10 something like once a month for three years now. And the  
11 result of this work is that now we are issued three  
12 application files for three potential laboratories.

13           In fact, I told you that we are to investigate four  
14 sites. Very clearly, the two sites in the north have a  
15 common border, the two departments have a common border and  
16 the geology does not respect the administrative limits and so  
17 we discussed with the local population to make only one  
18 proposal for that. So we have three potential sites, and the  
19 objective was out of these three, to reduce the number to  
20 two. But after all the investigation we have made, we did  
21 not find any reason to dismiss any of the three sites, so we  
22 requested the authorization from the government to present  
23 three, which authorization was granted. At the end of  
24 September or November, the last application file had been  
25 submitted.

1           Final result: the public inquiries will start in a  
2 few days in France on these three sites, and the objective is  
3 to start digging the laboratories the beginning of '98. We  
4 have three potential sites. We have three local inquiries.  
5 Nobody is able to tell exactly what will happen on the three  
6 sites. Maybe one will disappear due to maybe the opposition  
7 of local population or something else. But today, we have  
8 three sites.

9           I do think that Gerald will give you some idea now  
10 on the technical work.

11          OUZOUNIAN: Mr. Chairman, Ladies and Gentlemen, now as  
12 Pierre Barber told you, the French law decided to start or  
13 restart investigations in three different ways. The first  
14 one was partitioning and transmuting. The aim was to make  
15 sure that all of the possibilities have been investigated and  
16 are to be applied if technically and economically feasible.

17                 The second one is the underground deep disposal,  
18 and the third one is the long-term storage and the separation  
19 of the radionuclides. So ANDRA is mostly in charge of the  
20 second way, which deals with deep geological disposal. But  
21 we have very close links with the other ways in order to take  
22 account of the research of the other ways, let us say for  
23 example if there is a way to partition and transmute, for  
24 example, of americium, which takes account of known disposal  
25 of americium in the same conditions as actually. This is an

1 example.

2           The other one, a very easy one, is the long-term  
3 disposal, the long-term interim storage which can be part of  
4 the management before the geological disposal.

5           Now, about our research for the deep geological  
6 disposal, I give you the master plan for surveys and research  
7 on deep geological repositories. As Pierre Barber told you,  
8 we had two years of site surveys from surface, also with bore  
9 holes, but without mining, and this resulted in three  
10 applications for three different underground laboratories  
11 which have we call these applications DAIE in French. These  
12 files are being instructed by the administration, and public  
13 inquiries, as Pierre told, will start next week.

14           So we are waiting for the result by the end of '97,  
15 and we plan to start our mining and excavation works by the  
16 middle of '98, in order to get access to the underground  
17 laboratories between 2000 and 2001. At that time, we shall  
18 follow the investigations in underground laboratory, but also  
19 from the surface for hydrogeology, geochemistry and all  
20 investigations from the surface.

21           During this time, we have also to develop the  
22 concept for disposal. As you will see, our concept is guided  
23 first by your fundamental safety rules which give the general  
24 rules for the concept, and then is closely dependent from the  
25 characteristics of the sites and also from the packages, from

1 the waste packages. The concepts are to be chosen during  
2 this year, 1997, and then we shall proceed to the  
3 qualification of the concepts, first from paperwork and then  
4 from the underground laboratories.

5           The last part of our work is the performance  
6 allocations and the preliminary safety exercises, the safety  
7 assessment with safety exercises which results have been  
8 given in the application forms, and then the safety exercises  
9 will allow us to adjust the concept and also to design our  
10 experimental program. Then finally, by 2005, the final  
11 safety and demonstration exercise will allow us to assess all  
12 the work performed in the underground laboratory, and also in  
13 the other fields. All of this work will give rise to the  
14 report to the French government, which will be assisted by  
15 2006.

16           Just another word about the general methodology for  
17 designing the concept. As I told you, we have basic safety  
18 rules in France which define two things; first, the main  
19 characteristics for the geological sites, and we spent two  
20 years in order to understand how the sites were suitable for  
21 the works, and the second thing which is described by the  
22 safety rule is the basic concept, and I assure you an  
23 overhead a little later about the basic concept.

24           So this is the base of our work. We have then two  
25 main inputs which are the site characteristics, geological,

1 geometrical, hydrogeological, geochemical and so on, and also  
2 the characteristics of the wastes to be disposed of. Then  
3 from these two things, we cross it to the designing of the  
4 concept for the geological disposal. The results are  
5 assessed with safety assessment instrument. And at each  
6 step, we come back to the site characteristics and to the  
7 characteristics of the matrix of the waste matrix in order to  
8 adjust our concept.

9           I'll just show you about one site, the different  
10 characteristics which have been taken into account. So these  
11 characteristics are defined by the fundamental safety rules.  
12 First of all, we have the depth, which has to be higher than  
13 200 meters. We recognize this is for the east site. We  
14 recognized between 400 and 600 meters depth, 130 meters thick  
15 clay formation. There were no faults. This has been seen by  
16 three dimensional seismic geophysics. These are the  
17 characteristics which are still to be confirmed by further  
18 research.

19           The other favorable gained element was about  
20 hydrogeology. We had nearly no water in this formation, so  
21 no permeability, and no water even on the level above the  
22 formation. So we have to confirm the low vertical hydraulic  
23 gradients and we have to follow up the characteristics.

24           About the geological stability, no seismicity has been  
25 recognized and we have to confirm this.

1           About the important characteristics from this  
2 fundamental safety rule, we have to make sure that the  
3 mechanical and thermal properties are understood from the  
4 samples, from small samples recorded from the drill holes.  
5 We have to make sure that these characteristics are favorable  
6 for further development of the work on the site.

7           About the geochemical properties, I'm speaking here  
8 about two things; first for the water geochemistry and the  
9 second one, the rock geochemistry, and mostly the retention  
10 power of the rock for radionuclides. We could perform a  
11 series of tests from the surface, but as I told you, there is  
12 no water, so it's very difficult to characterize the water  
13 when there is no water.

14           So we performed a series of retention measurements,  
15 but here also, as we had no water, we had to use synthetic  
16 water. We have to confirm the characteristics about  
17 retention on site into the formation.

18           About natural resources, we did not recognize any  
19 natural resource on the site. We have to make sure that  
20 there is no natural resource. So this is just an example.  
21 We have the same kind of characteristics, and allows for all  
22 the three sites.

23           Now, coming back to the basic concept given by the  
24 fundamental safety rule, the basic concept requires that we  
25 work with a multi-barrier system. This multi-barrier system

1 is given by the waste package which represents the first  
2 barrier, and what we call a waste package is the matrix with  
3 the radionuclide content, and with the container. We have to  
4 consider an engineered barrier. At the present time we work  
5 with two kinds of engineered barriers. We tried to work with  
6 natural clays from the site, and we try also to work with  
7 concretes. So we are studying. We did not make any choice  
8 at this time. We are still studying the best engineered  
9 barrier. Within the engineered barrier, we can also be  
10 allowed to use another fact, mainly for reviewability  
11 considerations.

12           The third barrier is a geological one, and you can  
13 understand that this is the most important and the main  
14 barrier for the long-term safety. At the present time in our  
15 performance and safety assessment, we do not consider that we  
16 have a container, that the container has a role for safety,  
17 and we do not consider the biosphere as a retardation factor.

18           Now, how to describe our general objective for  
19 operations. If I summarize what we have to do, it's first to  
20 find a site, second to understand it. We have to make sure  
21 that the only way for the radionuclides to come back to the  
22 surface is water, so we have to understand the answer to a  
23 few questions. From where does the water come? How long  
24 does it take? Where does it go? How long does it need to go  
25 there? And what can be the chemical charge of this water in

1 the presence of radionuclides?

2           So these are the basic questions, but we have to  
3 understand and organize these questions, and in order to  
4 develop the deep geological disposal, we have to answer two  
5 questions. First of all, is it possible to demonstrate that  
6 the long-term containment capacity is possible in the  
7 formation. And the second question is is it technically  
8 possible to make a disposal in the formation.

9           So about the second one, I will not speak too much  
10 about the second one. It's mostly a question of engineering,  
11 engineering and cost. About the first one, and this is a  
12 priority, we have to demonstrate that containment can be  
13 achieved. We have two--the first one is the geological  
14 environment. As I told you, we have two series of inputs  
15 which are the geological survey as performed from '94 to '96,  
16 and second, the packages and the knowledge about the  
17 engineered barrier.

18           So from this input, we have the knowledge of the  
19 geological and environment to develop, and we have also to  
20 develop our knowledge about the packages. Between these two,  
21 as you have seen, we shall use engineered barriers,  
22 engineered systems and sealing systems, and our main  
23 understanding of the system will be through the understanding  
24 of the interactions between the different systems.

25           Which kind of interactions? These interactions

1 are, first, geometrical. Is it possible to put the amount of  
2 packages in the space given by the geological formation.  
3 Second, mechanical. Is it possible to have stable  
4 formations. Is it possible to have stability for a longer  
5 period of time with the constraint of heat. And the third  
6 and the most important one is the chemical interaction and  
7 the possibility of transportation interaction between water,  
8 packages, materials and rocks.

9           Just a word about retrievability. As Pierre told  
10 you, by law, we are requested to work about retrievable or  
11 non-retrievable deep geological disposal. The law does not  
12 say anything more. So we have to understand what  
13 retrievability or reversibility is, and our basic approach is  
14 to design a concept for each site which ensures the long-term  
15 containment of the radionuclides. And then about each  
16 concept, we try to define different steps of retrievability  
17 by deciding to close first the bore holes which contain the  
18 packages, second the galleries to transport the packages, and  
19 third, for example, to seal the complete system.

20           So today, reversibility or retrievability level is  
21 somewhere between the final disposal and interim storage. So  
22 we have to manage all our research programs in this field and  
23 the aim is to ensure the best safety for the system.

24           The determining factors for designing the concept  
25 of the deep geological radioactive waste disposal, we have

1 three determining factors. First, the waste stock and the  
2 expected production. That means the amount of radionuclides.  
3 The second one is the thermal load given by the radioactive  
4 wastes in order to design the most suitable materials and  
5 also to have the best emplacement for the different packages.  
6 And, third, the third determining factor is the  
7 retrievability or reversibility.

8           About the first one, the packages, just two words.  
9 In order to give you the amount of radioactive waste which  
10 will have to be disposed of, the production, the net product  
11 by 2020, which is based on the reprocessing of all or nearly  
12 all of the nuclear fuel, so the amount is 80,000 cubic meters  
13 of intermediate level wastes and 5,000 cubic meters of high  
14 level waste, which are vitrified.

15           By 2070, we shall have more than 80,000 cubic  
16 meters of intermediate level wastes, and we shall have about  
17 8,200 cubic meters of glass, in the case we decide to  
18 reprocess all the fuel. In the case we don't decide to  
19 reprocess the fuel from 2020, we shall stay at about 80,000  
20 cubic meters of intermediate level waste, 5,000 cubic meters  
21 of high level waste as glass, and 24,000 tons of spent fuel.  
22 So we did not translate the tons in cubic meters, as we  
23 don't know the kind of package we shall use.

24           Just a few words about the different research  
25 programs, about the knowledge of the geological environment

1 and structure. On this overhead, I gave the scope, the  
2 objective and the research topics.

3           About geology, the objective is to make sure that  
4 the geometric characteristics are possible, and that the  
5 tectonics are compatible and consistent with the system. The  
6 research topics are geophysical measurements and  
7 interpretations from the surface, and then in the underground  
8 laboratories.

9           About the geological evolution, the objective is to  
10 make sure that the long-term evolution of the sites will  
11 ensure a stable environment for the disposal. We have to  
12 understand the past events to try to understand if these  
13 events can come again, and measure the consequences for the  
14 disposal.

15           About geomechanics, we have to understand, except  
16 for the construction, which is a separate thing, but for the  
17 long-term, we have to understand the impact of very small  
18 constraints and very small movements on the long-term, and  
19 the impact on the disposal.

20           About hydrogeology, we have to measure the water  
21 fluxes and to understand the water movements in very low  
22 permeability systems, either continuous--that means porous  
23 systems--or discrete--that means fractured systems--  
24 continuous flow of the clay systems, discrete for the  
25 granite.

1           About geochemistry, the difficult part is to  
2 understand the chemical behavior of non-natural radionuclide  
3 elements which will be disposed of in the system.

4           About the packages, we have the same kind of  
5 questions, first of all, make sure that the inventories, that  
6 the amount of the content of radionuclides is well known.

7           About the canisters and the overpacks, we have to  
8 be sure to guarantee the safety, but we have also to design  
9 canister and overpacks in order to make sure that the short  
10 and medium-term mechanical strength is attained, is possible.

11          About the matrices, we have to understand the long-  
12 term behavior of the matrices to be disposed of. This is a  
13 source of our performance or safety assessment models.

14          About engineered systems, we have to design the  
15 most suitable engineered systems for the engineered barrier.  
16 We have to understand the material to make a choice about  
17 the material, to design the amount of material, to design the  
18 geometry and so on.

19          About the sealing, we have to also understand to  
20 make sure that the structure, the location and the material  
21 is able to ensure the long-term safety.

22          About the interactions, it's one of the most  
23 important, the interactions, here, I just give the research  
24 topics. I don't give the objectives because those are to be  
25 designed yet in detail during the year 1997. People know

1 more or less what they have to do. They know where they have  
2 to go, but they have to put the questions very clearly.

3           So the different types of interactions we studied  
4 and we have still to study are the radionuclides/water  
5 interactions; the package/water, that means corrosion,  
6 interactions; package and engineered barriers interactions,  
7 that means the stability during the time of the engineered  
8 barriers; engineered barriers and geological environmental  
9 interactions; sealing and geological environment. The  
10 problem is not only to achieve the right permeability of the  
11 sealing system, but also to make sure that we have no  
12 mechanical deformation behind it, the wall of the rock which  
13 has been excavated. Geological environment and air during  
14 the opening of the system, and last, the radionuclide, the  
15 interaction between radionuclides and biosphere, migration in  
16 the plants and the soils and in the animals for the last  
17 part.

18           I still have two overheads. I wanted to give just  
19 an idea about the link between our concept design and the  
20 industry.

21           We have to develop specifications for disposal  
22 about the waste packages. We cannot decide to accept any  
23 kind of package at any price for any condition. We have to  
24 define to make sure that we understand the system, what we  
25 have to dispose of packages, and from the characteristics of

1 the system, we have to give specifications to make sure that  
2 the long-term behavior of the packages will be achieved.

3           This is a general approach about this. This is the  
4 work performed by ANDRA about the packages, the preliminary  
5 specifications, long-term behavior understanding and  
6 specifications. Here, is the concept which is developed, our  
7 first choice of concept is being decided and we have until  
8 the end of '97 to make our definitive choice. And then our  
9 concept and feasibility will be given by 2005.

10           About the waste producers, at the present time, we  
11 used characteristics of the existing wastes, but very soon we  
12 shall define our preliminary specifications in order that the  
13 industrial options which are available or which will be  
14 available very soon will be taken into account into our  
15 design, and this will give a rise to the final specifications  
16 and to the characterization tests which will have to be  
17 performed by the producers. And then we shall start to  
18 approve the waste packages.

19           This morning, we had a series of presentations  
20 about total system performance assessment. I want to just  
21 give you not a total system performance assessment as a first  
22 illustration, but just the safety assessment of the  
23 geological part which has been used for our applications.  
24 This is, according to the time, this is the amount of  
25 radionuclides. Here are just the fission products. We have

1 the fission products entering into the geological barrier  
2 from the packages. So during the time, you see the amount of  
3 radionuclides entering into the formation from the package to  
4 the geological system.

5           Here, we have the same figure, but after the  
6 geological system, so maybe you remember in our fundamental  
7 system. In the upper one, in this one, this figure describes  
8 the amount of radionuclides from here to here. And here in  
9 this one, during the same time, we have the amount of  
10 radionuclides, just the fission products, coming outside the  
11 geosphere, the geological barrier, to the biosphere. That  
12 shows that we have a very big filter here. At the entrance,  
13 you can see that we have all the fission products, but at the  
14 outlet of the filter, this is like a chromatograph, we have  
15 just, if I remember, zirconium and technetium at very, very  
16 low levels.

17           Another scheme, but this time about total system  
18 assessment performance, this is an example which is from an  
19 exercise for actinides, and this time, we don't choose the  
20 chemical property of the system in order to assess it, but  
21 the impact as it's pressed by sieverts per year, and you can  
22 see that this was in granite. You can see that for  
23 actinides, we have very low levels of actinides, but at about  
24 1 million years or 10 million years, and this level at 10 to  
25 the minus 8 is at five orders of magnitude lower than the

1 limit given by the fundamental safety rules, which gives a  
2 quarter of milisievert.

3           So the last one, it's exactly the same exercise,  
4 but for the intermediate level wastes. You can see that  
5 iodine and cesium, which are mobile radionuclides, will reach  
6 the biosphere with 10,000 years, but even at three orders of  
7 magnitude lower than the limit given by the safety rule.  
8 This is a kind of very important result, but each time we  
9 give this result, we have and we do this, we have all of the  
10 hypotheses given linked to the table. And the results are  
11 just the reflect of the hypotheses we use and our hypotheses  
12 about the field are what we measure, and we try to make sure  
13 that we can reduce our uncertainty and go closely to the best  
14 suitable representation.

15           Thank you.

16       WONG: Thank you. Questions from the Board? Don  
17 Langmuir.

18       LANGMUIR: Dr. Ouzounian, it looks as if you have an  
19 excellent site. The clay sites appear to be very good in  
20 terms of type. My sense is that you're using performance  
21 assessment only on one piece rather than the whole system.  
22 From what you've described, it's being used only to look at  
23 the releases that might occur from the waste package. And in  
24 our system over the years, we've been evolving and it's been  
25 getting better, we think, I certainly think and I think most

1 of us do, to the point where TSPA, performance assessment is  
2 being used to determine what kind of research we should spend  
3 money on.

4           And your lists were all inclusive, the proposals of  
5 things that you might accomplish at the site scientifically  
6 reminded me of what this program was looking at around 1990,  
7 1991 when we had the site characterization program, books  
8 which were just full of things scientists would like to do,  
9 all of which could be argued would help isolate the waste.  
10 But then the question is how many do you have to do?

11           If the site is this good, shouldn't we be looking  
12 at total system as a way to eliminate some of these  
13 scientific studies that aren't needed because it's such a  
14 good site. Shouldn't we be looking at it in terms of cost  
15 and selection of activities? I'm wondering if you've gotten  
16 to that point yet.

17           OUZOUNIAN: Today, we have very good sites. That's  
18 true. We have very good sites mainly for the clay system,  
19 but also for the granite one, but it's much more difficult to  
20 make the demonstration for the granite system, as we have a  
21 fracture hydrogeological system. So what we do is to use the  
22 total system performance assessment in order to design our  
23 program in order to identify the highest uncertainties and to  
24 define the uncertainties which have to be reduced by  
25 priority.

1           So what I have shown here is just about the  
2 geological system, the performance assessment of the  
3 geological system, as we had authorities to make an  
4 application for the underground laboratories. So we did not  
5 take account of the packages and the engineered barriers of  
6 the biosphere for this application, but we did give the sizes  
7 in order to understand where are the points on which we have  
8 to focus our attention and to develop our research. This is  
9 our management tool for research, and this will become our  
10 assessment tool by 2005.

11         BARBER: I do think that there's a main idea to take  
12 from this presentation, and that is safety. System  
13 performance assessment is a tool, an iterative tool in order  
14 to predict what we need, what we need to do, and to focus,  
15 really to focus our attention on specific points, the  
16 objective being again to get a real safety assessment. But  
17 from the beginning, this system performance assessment is the  
18 indicator in which region we have to go in order to predict  
19 what we need.

20         LANGMUIR: I guess what I did not see was indication  
21 that there was a TSPA, total systems performance modelling  
22 approach which incorporated all of the features of a  
23 repository, including waste package and near field  
24 performance and corrosion and absorption and so on, which  
25 would then give you some idea of where you should devote your

1 energy and you efforts in terms of cost. I saw it only being  
2 used at the tail end in the dose discussions rather than in  
3 terms of the overall cost and selection of priorities within  
4 the program.

5       OUZOUNIAN: Yes, just a few words about this. What we  
6 can say is we will have this approach, which is explained  
7 with details. Our main approach is to say that the  
8 interaction of the exchanges, the migration will be through  
9 water, so we have our basic fundamental approach, which is  
10 based on the interactions between water and the geological  
11 system, natural system.

12               And then between this water and the engineered, and  
13 then between the water as modified with the engineered  
14 barrier with the canister and so on. And at each time, we  
15 reduce and make a reduction of our fundamental logical  
16 models. That means we reduce at the limits of validity of  
17 our models in order to make simple models to be taken into  
18 account in the safety and performance assessment system, and  
19 we developed a total system performance assessment system  
20 with small models, but which have very limited application.  
21 But if you are interested, I can send you some documentation  
22 about this approach.

23       WONG: Pat Domenico?

24       DOMENICO: You say there's no water present, or there's  
25 no water movement, I'm not sure, but my feeling about clay is

1 if you have water and it's held by capillaries and everything  
2 else, once you heat that medium up to the temperatures that  
3 you anticipate, you're going to have a porous medium, which  
4 will be an entirely different chronology than you're dealing  
5 with now.

6       OUZOUNIAN: No, no, you're right. So our experience is  
7 first from the Belgium system where we spent a lot of time  
8 for experiments. We have more than 20 percent of water in  
9 the clay formation, and we needed more than one month in  
10 order to recover 100 meters of water from the borehole.

11       DOMENICO: During a thermal test? Was this during the  
12 thermal test?

13       OUZOUNIAN: Yes, but we tried to freeze the formation  
14 and to recover the water. We tried to press the water, and  
15 so we tried many things. But this was just in the borehole,  
16 20 meters depth from borehole, and it was very difficult to  
17 recover water.

18               In our sample, we used all of these experiments in  
19 order to measure the amount of water in our clays. The best  
20 indication we have is that the water content is between 4 and  
21 8 per cent, and which is very closely linked to the  
22 structure. So it's very difficult to make this water move.  
23 I'm not sure that this is not water from the structure.

24               But now we have a--in order to understand, we have  
25 a convection system or diffusion system. So we think that we

1 have a diffusion one, but we cannot make sure at the present  
2 time.

3 DOMENICO: I couldn't tell from the map. It seems like  
4 you're getting pretty close to the German border with those  
5 clays.

6 OUZOUNIAN: In Germany it's salt.

7 WONG: Ed Cording?

8 CORDING: I was just--I was interested in whether you  
9 have some limitations or agreements regarding the use of the  
10 sites, the experimental sites, as potential candidates for  
11 the high-level waste. Can they be a candidate site  
12 ultimately, or is there a restriction on that--the present  
13 test sites?

14 OUZOUNIAN: No, they cannot be automatically disposal  
15 sites, but if experiments are performed, it's having in mind,  
16 and this is very clear, to go to disposal.

17 CORDING: So it could be at that site?

18 OUZOUNIAN: Yes, it's a possibility.

19 CORDING: It's a possibility?

20 OUZOUNIAN: Yes.

21 BARBER: Well, it's clear that your duty is to find a  
22 disposal site. We are trying. We have laboratories in which  
23 we make characterization of the site, and we decide either to  
24 go to the disposal or to do something else. But potentially,  
25 each site can be a disposal of the other.

1           WONG:  Okay.  One more, Don.

2

3           LANGMUIR:  A more specific question about the thermal  
4 loading.  You listed that as one of the items, one of the  
5 characteristics of the waste disposal system that you could  
6 adjust or modify, and my understanding is that you're dealing  
7 with waste that will be well below 100 degrees or below 100  
8 degrees.  And if they've been around for some long time in  
9 storage quite a bit below 100, when you look at thermal  
10 loading as an option that can be altered, are you speaking  
11 only then of the spacing between the waste packages?  What  
12 other approaches might you make to modifying thermal loading  
13 strategies?

14          OUZOUNIAN:  We have three ways of approach about the  
15 thermal load.  The first one is spacing in depth, but this  
16 means a very high cost.

17                 The second one is to space in time.  That means  
18 that we have to--interim storage room, turn to interim  
19 storage in order to gain a lot of thermal load.

20                 And the third way, and I think it's the most  
21 difficult, is to make sure that--we not be sensitive to the  
22 thermal load.  I think this last--this one is the most  
23 difficult.

24                 Today what we say is we try to work with a limit at  
25 100 degrees Celsius.  If we can manage 150, which I do, but

1 today we cannot give the demonstration. So all our concepts  
2 are derived for 100 degrees with an option to 150, today.

3       LANGMUIR: How long do you envision the repository to  
4 maintain those kind of temperatures? Are we speaking of  
5 thousands of years or 100,000 years?

6       OUZOUNIAN: No, the maximum of the thermal load is given  
7 at about 200 years. So, and then we have a very sharp  
8 decrease. That means at about 1,000 years, we have no  
9 thermal effect, nearly no thermal effect.

10       WONG: Okay. We will have one more question.

11       TREICHEL: As I understand it, these communities  
12 volunteered to be test sites or to be laboratories for this.  
13 If it's determined that one or more of these sites is to be  
14 built as a repository, does that community have the right to  
15 say no, and if they have the right to do that, is there a  
16 cut-off time, a time at which you no longer can vote this  
17 thing out?

18       BARBER: As I said, the site where the community--that's  
19 absolutely clear. Now, we are at the point to decide to have  
20 two or three laboratories, but it is a procedure which is now  
21 underway. In order to decide the site or the number of  
22 laboratories, the site themselves, involve the population,  
23 and the population at any time is able to say no. This is  
24 democracy.

25       TREICHEL: Even after you've started work?

1 BARBER: Without starting work.

2 TREICHEL: Without starting work, okay.

3 OUZOUNIAN: Yes, an important thing, we think about  
4 reversibility, and that also means that at each step of our  
5 process, we are able to stop our job if we find any  
6 characteristics which is not consistent with the  
7 requirements.

8 TREICHEL: But one of those characteristics wouldn't be  
9 refusal of the population?

10 OUZOUNIAN: For example, if we have water flex, much  
11 more important that--that what we vote before mining it. So  
12 at that time, we have a plan to stop our jobs and to close  
13 the system and to--how to say--to--

14 TREICHEL: Abandon the site is what they--

15 OUZOUNIAN: Abandon the site. Thank you.

16 TREICHEL: Thank you.

17 WONG: All right, with that, I wish to thank--

18 MCGOWAN: Point.

19 WONG: Okay. Real quick.

20 MCGOWAN: Very succinct. First of all, welcome to the  
21 United States, Pahrump. And I have a quick two-part  
22 question.

23 a) It is my understanding, and correct me if I'm  
24 wrong, that approximately 80 per cent of your electrical  
25 energy is produced by nuclear power, and the assumption,

1 obviously, would be that 80 per cent of your population, or  
2 thereabouts might be well nuclear power and pro your method  
3 of disposal.

4           Now, the second question is a little bit more  
5 pointed, and actually it's directed to anyone in this  
6 assembly. When and where will the next earthquake occur,  
7 either in France or anywhere on the planet, and if we don't  
8 know when and where, how can we tell when and where it won't?  
9 Thank you.

10          OUZOUNIAN: About the production of--the nuclear  
11 production in France. So what we do--what we have to do is  
12 take account of the possibilities for our design. So today,  
13 the nuclear production, the electricity from nuclear  
14 production is about 73 per cent, and we keep as a hypothesis  
15 that this will be the case for the 50 or 70 years to come.  
16 But this is, what we say--this is a maximum case we have to  
17 take into account in order to design our case. So, but this  
18 is independent from the policy--from the policy of energy.

19           About the second question, about the seismic.  
20 Okay, so one of the main requirements about our site  
21 selection is to make sure that we have--we are on sites where  
22 there is no seismicity.

23           So the first thing we have to do, and we did, was  
24 to reconsider the historical seismicity to make sure that the  
25 zones where we are working did not know seismicity by the

1 past, and then where we have--with the identification of all  
2 the faults and detection of the faults in order to see where  
3 the faults did work and where they are around the site. But  
4 we are very far from the seismic systems, or far enough.

5 WONG: Pierre, Gerald, thank you very much. Thank you.

6 You'll notice I wasn't clapping.

7 Our next speaker will be Dr. Abe Van Luik. He's a  
8 technical manager for performance assessment, U.S. DOE. Abe  
9 will talk about what the DOE's doing to increase the openness  
10 for the TSPA/VA. Abe has spoken before the Board a number of  
11 times on the subject of performane assessment, and again, we  
12 look forward to hearing his thoughts on the question of  
13 traceability and transparency in that effort.

14 VAN LUIK: I must say that I learned something this  
15 morning. I will get a copy of the report that you reference  
16 on risk and read it. And the French program I think has been  
17 very good in setting an example for us in the way that they  
18 treat their biosphere. I'm very impressed with your  
19 cooperative work with the Spanish, for example, where you  
20 have selected a couple of bonding cases, analyzed them and  
21 really answered the problem of, you know, you have an  
22 infinite variety of futures, and you've got a good handle on  
23 that somewhere.

24 So we do watch your program, and we're impressed  
25 with some of your work, and hopefully that goes both ways.

1           As far as the NRC talk, I'm kind of glad to be  
2 following it because it makes my talk easier. As I said, I'm  
3 Abe Van Luik. Here's my phone number.

4           But what I wanted to say is from having been on  
5 this program in various capacities since 1982 in various  
6 aspects of the program, it's very heartening to me to see  
7 that after Integrated Performance Assessment I and Integrated  
8 Performance Assessment II, and you may hold this against me,  
9 but especially after the Center came on Board and provided a  
10 good basis of expertise, the Nuclear Regulatory Commission,  
11 from my experience, has become a lot more understanding and  
12 reasonable in their expectations of us.

13           So I will applaud the fact that they are  
14 duplicating our efforts and really working at understanding  
15 what we're doing.

16           You'll be pleased that I define traceability, and I  
17 base my definition on our work in the Performance Assessment  
18 Advisory Group that John has also made mention to. It's a  
19 subgroup of the PAAG, the Performance Assessment Advisory  
20 Group of the Nuclear Energy Agency where it published  
21 performance assessments. If yours isn't published, it didn't  
22 make it.

23           And two of them were addressing Yucca Mountain, one  
24 by DOE and one by the NRC. And this is not a criticism of  
25 just the DOE and the NRC, but across the board, the subgroup

1 noted problems in clarity, readability and completeness, and  
2 by completeness they didn't mean, you know, the universe as  
3 described. By completeness they meant that here's a result,  
4 can you backtrack how that result came to be? And they call  
5 that traceability and transparency.

6           As a member of the subgroup, we wrestled with these  
7 definitions, and we decided that traceability is a complete  
8 and unambiguous record of decisions and assumptions and of  
9 models and data and their use in arriving at results. In  
10 other words, how did you get to this result you're showing  
11 me? Can I backtrack and look at all your assumptions?

12           Transparency, what is it? Well, we decided that  
13 that is giving the reader or reviewer a clear picture of what  
14 was done, what the outcome was and why, and it's in the "why"  
15 part I think that we--as John Austin's people have noted,  
16 that we have some failures.

17           Transparency is audience-dependent. What's  
18 transparent to a regulatory reviewer or an independent  
19 performance assessment team may not be transparent to a  
20 member of the public, and the PAAG group said, but it  
21 couldn't fit on here, and vice versa. Sometimes the public  
22 has insights that we, as specialists, completely gloss over  
23 because we have made assumptions that we learned about in  
24 school, and they may not fit the situation at hand.

25           The purpose of the reading itself, you know, if I

1 read their document to understand one thing or another thing,  
2 the transparency could change. If I'm reading to understand  
3 a conceptual model, that's very different from reading to  
4 repeat an analysis.

5           Okay. We've got it defined. How do you get there,  
6 and this is the type of wording that makes for adult  
7 presentation, so I'll try to make it fast. You achieve  
8 traceability through documenting, explaining all the  
9 decisions made as part of the analysis. If you do an  
10 analysis, you see that every step of an analysis is in  
11 essence a decision. You've got to document what you did.

12           The PAAG subgroup insisted on putting this bullet  
13 into recommendations, and I make no apologies for it, but  
14 they thought that aspects of traceabilities could even be  
15 proceduralized to be given a quality assurance pedigree to be  
16 audited and surveyed, and they thought that this would help.

17           Traceability and documentation is achieved if an  
18 independent performance assessment group can reproduce  
19 reported analyses, and what you heard from John in his talk  
20 is that there were some problems there. But it was also  
21 recognized that for--especially for a license application  
22 safety analysis, you may need to write supporting technical  
23 documents to allow independent reproduction of analyses for  
24 certain types of higher level total system analysis  
25 documents. In other words, sometimes the analysis is so big

1 that you just can't contain everything in one volume and  
2 still have it useful.

3           Transparency is addressed through ensuring  
4 completeness and using a logical structure. And, you know,  
5 this is where if somebody can follow it from beginning to  
6 end--I think John hinted at this a couple of times--to  
7 facilitate the in-depth review of specific issues.

8           This was an interesting observation on their part  
9 because when I read TSPA-95, I thought this is a good read.  
10 When I read it to answer their questions, and they had a list  
11 of hundreds of questions to be answered, it was a very  
12 difficult read because when you look at one specific  
13 technical subject, like the NRC was doing, you have to go to  
14 different places in the document to pick up different pieces  
15 where it was used in the analysis. The analyst writes  
16 according to what they did.

17           And so if you're just interested in an uncertainty  
18 analysis, there's plenty in TSPA-95 in uncertainty analysis,  
19 that you have to go through every chapter and look at the  
20 uncertainty section in that analysis.

21           And so, you know, there are aspects of the writing  
22 that need to take into consideration what the needs of the  
23 readers are. I won't go through this checklist. Any group  
24 that sits down and writes a checklist like this to address  
25 the completeness would come up with a different list.

1           Let me go to our experience with our own work. In  
2 TSPA-1991, an evaluation by the DOE, specifically Yucca  
3 Mountain. In 1993, in order to basically benchmark the code  
4 that would be used in TSPA-95, we in the M&O looked at the  
5 1991 TSPA document by Sandia National Laboratories and tried  
6 to reproduce that assessment using this different code. Of  
7 course, there were some conceptual model differences, other  
8 differences, but by and large, the traceability was very good  
9 because it took just minimum clarification from Sandia on  
10 some of their assumptions.

11           So from our perspective--now, again, this is  
12 speaking as performance assessment specialists, not as  
13 interested lay public or even the regulator, the traceability  
14 in that document was quite good.

15           This also, however, pointed out a problem with this  
16 definition of traceability. We could reproduce the results;  
17 however, the linkage of this model into the database and to  
18 the process level modeling was just not there yet. And we  
19 tried to do better in '95, and you've already heard from the  
20 NRC that we didn't do quite as well as we had hoped, but  
21 we're making progress. You did say that, yes.

22           If we look at TSPA-1993, the experience gets real  
23 personal because I tried to write a unified TSPA-93 document,  
24 and I did write it, but it was overtaken by events. By the  
25 time we finished it, we were well into TSPA-95, and the

1 analyses and the results were looking different enough that  
2 it really didn't makes sense to continue this. But I tried  
3 to create a single transparent document using these two  
4 documents. We had two independent analyses in TSPA-93.

5           And my experience writing that document was this:  
6 My overriding goal for the unified document, since we had the  
7 technical documents that each person could go to, was to  
8 write a transparent document for an audience that extended  
9 well beyond the regulatory and performance assessment  
10 community.

11           So I started out giving basically a primer on  
12 performance assessment, the nature of them, scientific terms  
13 and concepts that are specific to Yucca Mountain, talking a  
14 little bit about the nature of unsaturated zone hydrology, et  
15 cetera, and then I reviewed the results of 12--there has been  
16 a lot, and in fact my criticism that I got from some people  
17 is that I didn't include theirs. But I looked at 12 pre-1993  
18 Yucca Mountain specific system performance assessments that  
19 have been published and gave short overviews of what their  
20 approaches were and what they learned.

21           Then I went to traceability, and one of the reasons  
22 that I had to look at traceability is because I wanted to--  
23 like, for example, for the waste package degradation, I  
24 wanted to have one section that basically included the  
25 approaches from both, and I found that I had to write an A

1 and a B section a lot of times because the conceptual models,  
2 the--I mean, each document was a very good document, but the  
3 approaches to even a subpart of the analysis were different  
4 enough that I could not just create one table and say this  
5 was the common data set and the common assumptions that were  
6 used.

7           So the comparisons that I was making in this  
8 unified document were less clear and effective because of  
9 that, and I don't see any way around that except to only  
10 write one document and make it completely transparent and  
11 traceable.

12           Moving on to TSPA-95, our third project-wide  
13 evaluation, we did attempt to make it traceable and  
14 transparent, but experience on several fronts, and you've  
15 already heard from the NRC, showed that improvements are  
16 still needed, and I'll talk about these in some detail.

17           We had an excellent independent review from a  
18 Sandia expert. He happened to be the primary author, or the  
19 first author, of TSPA-93, and he pointed out several  
20 weaknesses, which I'll get into in a second. And then we did  
21 have the audit review, and you have already heard everything  
22 that you need to know about that.

23           This is not in your package, but at the request of  
24 one of your staff, I get into some details. The Sandia pre-  
25 publication TSPA-95 found four potential errors in the

1 documents, and this was pre-publication, so most of these  
2 were corrected. Four major disconnects in the documentation  
3 that needed at least acknowledgement, if not explanation. In  
4 other words, here was an expert reading a document, and as he  
5 was reading, he hit a place where he just couldn't figure out  
6 what we were trying to say. And then 63 places where  
7 clarifications were needed of a less important order; 22  
8 places identified were statements that we thought were  
9 obvious were potentially misleading, it could be read either  
10 way; 34 places where editorial changes could improve clarity.  
11 And like I said, most of these comments were addressed prior  
12 to publication.

13           Had we not done this review, John Austin's talk  
14 would have been twice as long.

15           John has already covered this, but I wanted to  
16 highlight that they put out an annual report, and I didn't  
17 get the title exactly right because I did this in the middle  
18 of the night. But it's new Reg CR 6513 No. 1, just came out  
19 last week, a very fine document, and Chapter 8 gives an  
20 overview of their TSPA-95 audit review.

21           Concerning technical differences, they noted that  
22 most were clarified--not that they were resolved, but  
23 clarified during the technical exchange and in some cases  
24 resolved. This is an indication that the document of itself  
25 was not sufficient to let them know enough that they knew

1 exactly what the issue was.

2           That same page also notes that, for example, why  
3 didn't TSPA-95 look at disruptive events like was done in  
4 1991 and 1993. They thought that just a statement that it  
5 didn't wasn't satisfying to them, and I would agree with  
6 that.

7           Pages 8 through--4 through 8 through show several  
8 instances, and I think John has already mentioned what they  
9 were, where the independent NRC calculations called into  
10 question our work and led to specific comments and  
11 recommendations from the NRC to us. And in four of these  
12 cases, the NRC staff commented that they noted with some  
13 satisfaction that we acknowledged receiving those comments  
14 and that we had planned to address their comments in the  
15 TSPA/VA.

16           So we see this audit review as a very valuable  
17 preparatory thing for the TSPA/VA, and we hope for the same  
18 kind of interaction to get us to the LA.

19           Several non-DOE readers, and I just picked two that  
20 were federal agency people to whom we have to pay some  
21 attention--I didn't want to identify the agency because that  
22 gives it all away. But one of them noted that there was no  
23 derivation or justification for the treatment of galvanic  
24 coupling in TSPA-95. We cited only a personal communication,  
25 and, you know, we know that there's a need to quantify this

1 process in future TSPAs. But to our credit I must say that  
2 it's because we did not have a firmer basis that we included  
3 this as a sensitivity study only and did not include this  
4 process in our base case. TSPA-90--I mean TSPA-98--TSPA/VA  
5 is what I meant to say, will, of course, show a basis for  
6 this process.

7           And another federal employee, and this one is more  
8 serious because in his conversations with me he used that  
9 three-letter word L-I-E, but he challenged my characterizing  
10 the saturated zone transport as being confined to a five  
11 kilometer distance and a 50-meter miracle mixing depth that's  
12 been referred to before. He said, no, that is not true.  
13 That's putting it nicely. It was unconstrained vertically  
14 and carried beyond five kilometer, and he cited 7.6 in TSPA-  
15 95.

16           I went back and reread 7.6, and it's clearly,  
17 knowing the document somewhat, clearly a sensitivity study  
18 addressing the importance of mixing depth to transport. In  
19 other words, it was a "what if;" you know, "What if it's  
20 this, what if it's that, and what if we go out a lot  
21 further." It was not part of the base case for any dose  
22 plots in TSPA-95. However, I must say it was identified as a  
23 sensitivity study on mixing depth in the middle of the  
24 section. If you just missed one little line, you would be  
25 totally confused, as this person was.

1           So these are good reminders of why we should use  
2 external reviewers and at least people not external to DOE,  
3 but when we prepare these documents, use reviewers outside of  
4 the PA community.

5           I'll skip the next one because I just said  
6 everything in there.

7           So what are we doing about it? Well, one thing  
8 that is striking fear into the hearts of some of our analysts  
9 is that the M&O has procured an attorney experienced in  
10 adjudicatory licensing processes, and he loves to ask--take  
11 each analyst and ask probing questions to teach the how to  
12 think--and this is important, how to think and write to  
13 anticipate the information needs of regulatory and other  
14 critical reviewers.

15           We have a major multi-tiered effort in progress  
16 involving the review of the process-level modeling inputs to  
17 TSPA. In fact, we have just established a peer review group  
18 that their first meeting is soon, and this group will be a  
19 long-term participatory peer review, ending with the document  
20 being in their hands to go into a classical peer review.

21           And the main thing that we want to learn from these  
22 people is what do we need to do differently in the LA. The  
23 LA, license application, is the primary focus in the long  
24 term. The VA is a step along that way.

25           We have a formal expert elicitation underway

1 addressing the site-scale unsaturated zone flow model, which  
2 we believe was the most important of the foundational  
3 process-level models. Other elicitations are planned, and,  
4 in fact, another one has just been kicked off on the--I  
5 believe it's the waste package degradation.

6 Okay. And what we hope to get from these is some concept of  
7 the bounds on the uncertainties and the identification of the  
8 uncertainties in the modeling.

9           And then we have a series of 11 internal process  
10 model abstraction and testing workshops in progress to  
11 address exactly the thing that John pointed up, is that in  
12 the--for example, in the saturated zone, we used the model  
13 that didn't seem to be clearly linked to the data in the  
14 process level modeling. These are in process and are trying  
15 to do exactly that as input to the TSPA/VA.

16           A few more words, identifying uncertainties,  
17 identifying available data and information, its status,  
18 identifying areas of potential weakness, and we will report  
19 those areas in the TSPA/VA, identifying areas of strength in  
20 which work is essentially done supporting an aspect of the  
21 modeling.

22           We are looking, in other words, with these two at a  
23 realistic status of what we know and what we need to know.

24           In terms of transparency, we continue to  
25 participate in the Performance Assessment Advisory Group, who

1 is looking at this exact issue from a larger experience base.  
2 The NRC is also a participant in this group, and we have  
3 other national regulatory authorities. In fact, the French  
4 regulatory ambassador to this group is a very reasonable  
5 person, and we don't envy you because we have very reasonable  
6 persons, also. But it's interesting to see the parallel  
7 thinking that is going on in the different nations who are  
8 struggling with these same issues.

9           And this initiative that I'm talking about here is  
10 one that I'm just kicking off. In fact, I've invited someone  
11 in to speak to me and probably to my bosses about looking at  
12 ways of presenting TSPA results in a more transparent and  
13 graphical fashion, largely for the non-performance assessment  
14 specialist. It's very difficult to get used to complimentary  
15 accumulative distribution functions as a way to look at the  
16 world. Once you have done it, you don't want to step away  
17 into anything else, but I realize that there's a big learning  
18 curve for anyone not familiar with the concept.

19           Let me go to my conclusion--no, I'll just do this:  
20 Other things, we have a lot of little things that may be  
21 important to transparency and traceability. For example,  
22 we're looking at the use of hypertexting in the TSPA/VA  
23 document to make it easier for the regulatory reviewer to  
24 click on a reference and go right directly to that reference  
25 rather than to have to wait two weeks to get the reference

1 and forget what the question was. And I would like to follow  
2 my presentation with a demonstration of that that's canned  
3 and ready to go and be very short.

4           Another system that we're looking at within the  
5 performance assessment community, to then move into the  
6 general database framework for the project, is one to help  
7 trace the decisions that go into selecting data from a  
8 database. So with your indulgence, after I stop talking and  
9 maybe after the questions, we could have those two  
10 demonstrations.

11           For conclusions, I personally, since this is a big  
12 ticket item for me, appreciate the reminder from the Board  
13 that we need to focus attention on creating a TSPA/VA in  
14 anticipation of the TSPA/LA that's both traceable and  
15 transparent. We feel that we already were heightening our  
16 awareness of this issue because of the increased scrutiny  
17 from the NRC staff, which strangely enough we do welcome, the  
18 increasing national awareness of an attention to the need for  
19 quality and performance assessment documentation, and this is  
20 coming about because we have participants in these  
21 international forums that have gone through licensing,  
22 intermediate level waste sites, for example, in Finland, and  
23 so there is an experienced body in these bodies about how  
24 you're going to be asked questions and how you need to  
25 prepare for that. And, of course, looking at other TSPAs

1 than our own, we are always learning.

2           And finally, and this is a big item, the  
3 experience of DOE's Waste Isolation Pilot project, as it  
4 enters its licensing process, has sounded a warning to us in  
5 this project. We do converse with those people, and they  
6 have said that they had to do a major effort unplanned, and  
7 they said it was difficult to exaggerate the manpower that  
8 went into that effort to recapturing and documenting the  
9 basis for numerous small assumptions and decisions that  
10 played a role in describing the site and evaluating its  
11 performance. And we will continue to monitor their  
12 experience and learn from it.

13           They were participants with us in our latest  
14 abstraction workshop and said things like, "If only we had  
15 done that, it would have saved us a lot of grief in writing  
16 our application to the EPA and answering their questions."

17           So I believe, you know, we're doing something  
18 right. It's painful. It's resource intensive, but I think  
19 we are addressing traceability and transparency.

20           And please allow time for my two demos.

21           WONG: Sure. So would you like to do the demo first or  
22 entertain questions?

23           VAN LUIK: Well, maybe we should entertain questions  
24 first.

25           WONG: Okay. Questions from the Board? Don Langmuir?

1           LANGMUIR: I think we've come to believe and have  
2 confidence that by and large, as we wished it to be, TSPA is  
3 the driver for the selection of priorities within this  
4 program. I wonder, though, if it's--let me ask you a very  
5 specific question: The Board has been concerned about DOE's  
6 understanding of the hydrologic properties of the repository  
7 block in total, and I wonder if TSPA was used as a basis for  
8 concluding you did not have to have an east/west crossing.  
9 How much uncertainty can you attach to not knowing the  
10 information you would gain from such a crossing, and is that  
11 uncertainty within the TSPA analysis?

12           VAN LUIK: That specific issue, if you've read TSPA-95  
13 and our subsequent work, was not addressed at the TSPA level.  
14 However, it was addressed in the process level model, the  
15 site scale model, and the result of that assessment was that  
16 there was a recommendation that, you know, as soon as we  
17 could get to it, we need an additional hole in the west side  
18 of the mountain. But to obtain data, you know, just  
19 basically to verify the predictions for that side of the  
20 mountain, there was not a conclusion that we had to drill a  
21 huge hole through the mountain to get to that little spot.

22           LANGMUIR: How about a little hole?

23           VAN LUIK: Well, being a large person, I think a little  
24 hole would not help me. But from the process level modeling  
25 point of view, this has been addressed, and I think, you

1 know, in Dennis' presentation later in this meeting, you can  
2 ask that question again.

3 WONG: Ed Cording?

4 CORDING: It does seem--the transparency really goes  
5 down, it goes in several levels, and it seems to me that a  
6 good program ultimately is something that is understandable  
7 and can be explained to people. But I think also there's  
8 the--the transparency is very much needed among the technical  
9 people as well, as you pointed out, the people that don't  
10 understand perhaps the--as much about performance assessments  
11 as those that are expert. But it's also, you know, a means  
12 of the people involved in the various portions of the  
13 discipline to be able to--the people on the hydrologic side  
14 to be able to come back in and say--to look for weaknesses in  
15 the TSPA and how it fits with their models.

16 And I think that being able to relate to some  
17 determinate type models, bounding sorts of things, an  
18 overview of a waste strategy, of an isolation strategy, if  
19 you can compare those things with your TSPA, it seems to me  
20 to be extremely important.

21 And I think your talk has been pointing in that  
22 direction, and I just wanted to see if you're--if what we're  
23 saying here is on track.

24 VAN LUIK: In fact, the issue you bring up about  
25 understandability, when I was talking about CCDFs and how

1 opaque they are until you really get to know them and love  
2 them, one of the things that we have learned and was  
3 recommended to us by the Performance Assessment Advisory  
4 Group, looking at 10 different performance assessments, even  
5 if you do a fully probabilistic analysis as we are doing, you  
6 buy a lot by doing a few deterministic cases that bound the  
7 problem, that show the expected value because people, even  
8 scientists, do not think probabilistically. They need to be  
9 shown, you know, if everything is what we think it is, this  
10 is kind of what the answer is, and then you can talk about  
11 the uncertainty bound. So we are learning and listening.

12       CORDING: The very problem of--the very thing that  
13 you're trying to do at TSPA is bringing things together, is  
14 part of the reason it's very hard to determine what's--and I  
15 think it's a tremendous effort that really I don't think very  
16 many people in this field have ever had to deal with before  
17 to this extent.

18       VAN LUIK: I agree.

19       WONG: Further questions from the Board? How about  
20 Board staff?

21               Okay. Entertain questions from the community?

22       MICHAELS: Yeah, I have a question--a comment and a  
23 question. Transparency should apply not--my name is Gordon  
24 Michaels. I'm from Oak Ridge National Lab, a member of the  
25 public. We're not involved in the program.

1           Transparency should apply not only to the  
2 calculations that you do, but to the answers that you  
3 predict. And as I've gone through the total system  
4 performance assessment, I am struck by the fact that the  
5 answers that you provide are given as a fraction of the EPA  
6 dose limit, and as a matter of fact, it's a dose limit that's  
7 been disestablished and was disestablished at the time that  
8 the report came out.

9           And as I apply EPA dose conversion factors on the  
10 regular nuclide specific basis to your projections, I come up  
11 with several hundred fatalities as the health impact. Now,  
12 the TSPA is the only probabilistic risk assessment I've seen  
13 personally published by DOE that does not list health  
14 impacts; you know, fatalities, cancer incidents, genetic  
15 effects. I can't calculate from your results what the cancer  
16 incidents rate is and what the genetic effects might be.

17           Would you comment on why you don't give health  
18 effects and whether you're going to be doing that in your  
19 next iteration?

20           VAN LUIK: Okay. I'll be happy to comment on that.

21           The EPA standard, as it was promulgated in 1985 did  
22 all that work for us to take the uncertainties out of the  
23 licensing process. In other words, they set a standard of  
24 what the allowable health effects would be from this  
25 repository, and then back calculated using a generic

1 conceptual model what the releases should be, and that's the  
2 EPA limit that you're looking at. They did that specifically  
3 to take that out of the licensing arena.

4           And what we are looking at now is for them to do  
5 that same type of homework and calculate instead--instead of  
6 us going completely to risk and having all of these variables  
7 open in the licensing procedure, I believe that they are  
8 moving towards, and I'm not sure yet, at least during the  
9 calculation from risk back to dose and giving us a dose  
10 standard. And I think we will show exactly that is the dose  
11 standard. We will not try to second guess mother nature and  
12 go into, you know, different age groups and all the health  
13 effects that it could probably have. I realize that there's  
14 expertise out there to do that.

15           MICHAELS: Yeah, I guess my comment--and the reason I  
16 brought it up as part of transparency is the document seems  
17 designed to satisfy a regulatory audience, but not a public  
18 audience. And for the public, the public wants to know what  
19 are the health impacts of the repository, and it just seems  
20 that from the point of view of making it transparent and in  
21 trying to gather public acceptance, that you're missing that  
22 last step that interprets the information in a way that  
23 people can understand it.

24           I personally don't think that a couple hundred  
25 fatalities over a 10,000-year period given 70,000 metric tons

1 of spent fuel is a very large number. I'm comfortable with  
2 that number, but others might not be. And it seems like if  
3 you're, you know, on a session on transparency, the  
4 interpretation into publicly understandable figures of merit  
5 is--you know, should be an open question here.

6       VAN LUIK: Yes, I think I understand the comment. In  
7 1992 we published a risk assessment that went to fatalities  
8 in fact, but decided that given the regulatory environment  
9 we're working in, that's not really necessary. My management  
10 and I will take this under advisement.

11       MCGOWAN: Tom McGowan, Dr. Van Luik. Excellent  
12 presentation. I am a member of the genuine public  
13 unaffiliated with anybody or NL, or whatever. And I concur  
14 with Dr. Michaels except for one point. I'm fully in favor  
15 of someone being impacted in the future as long as it's not  
16 one of my direct descendants. Yours is all right.

17       I have a two-part question. How does the strategy  
18 referenced in the first bullet under Arabic 1 transparency  
19 differ substantially from the realistic strategy of coaching  
20 the witness? And why is the public as external to DOE, and  
21 certainly the public is DOE's paymaster I recall, excluded  
22 from the transparency or review process when the public is  
23 the ultimate receptor you're attempting to persuade? If I am  
24 mistaken, please on the public record, so indicate in real  
25 time. Thank you.

1           VAN LUIK: I'm not sure what your first question refers  
2 to. Oh, the attorney. Oh, yeah, the attorney, we are fully  
3 aware that where the rubber meets the road is in the  
4 regulatory licensing process, which is an adjudicatory  
5 process, as we've heard before, and adjudicatory processes  
6 tend to probe very deeply into the basis for assumptions, et  
7 cetera, et cetera, and we are trying to use the attorney to  
8 prepare us to think in that mode. That's only one aspect of  
9 traceability and transparency.

10          MCGOWAN: I fully appreciate your understanding as you  
11 presented it. I would qualify it solely as follows, if you  
12 don't mind: We are apparently on a learning curve. This has  
13 been referred to as a historically unprecedented process  
14 anywhere in this history in mankind, and attorneys, like the  
15 rest of us, educated or otherwise, have an opportunity, as  
16 the saying, everybody gets one mulligan. I would prefer to  
17 see an attorney cope and come up with his solution rather  
18 than be managed to any extent in how to think. We assume he  
19 must know something about how to think or he wouldn't be an  
20 attorney.

21          VAN LUIK: Well, I think, you know, this is an  
22 interesting thing, but we see attorneys as part of the human  
23 race.

24          MCGOWAN: It's just a question of the--it's really a  
25 question of the efficacy of management because it's just one

1 step from there--

2 VAN LUIK: Yes.

3 MCGOWAN: Do you follow what I'm saying? We have to let  
4 some of these things happen even if they're wrong.

5 VAN LUIK: Right.

6 MCGOWAN: And then determine--

7 VAN LUIK: Let me get to the second part of your  
8 question.

9 The performance assessment that we will produce for  
10 the VA with some augmentation will show up in the  
11 Environmental Impact Statement. There the public is invited  
12 to comment, you know, to their heart's content. And so there  
13 is an avenue for public participation in this process. It's  
14 the avenue set by law.

15 MCGOWAN: We can describe that a little bit more fully,  
16 if you don't mind, as ex post facto non real time  
17 participation. It is not at the predecisional stage by any  
18 means. DOE is required by law to consider public commentary,  
19 but not necessarily mandated to include it. That's entirely  
20 a matter of discretion. They do not have to incorporate it  
21 in anything they're doing unless it furthers their position,  
22 and that's probably what they would do.

23 And so thank you very, very much for your succinct  
24 response. I feel much closer and have better understanding  
25 of the entire issue at this point. I don't think it could

1 have been achieved any other way. Thank you.

2 COHON: I just wanted to add one point. I agree with  
3 Mr. McGowan about the--or let me--I do agree with him, but  
4 let me convey this in a different way.

5 I had a similar reaction to your bullet about the  
6 attorney. I think it's a good thing that you hired the  
7 attorney to coach you, to work with you, thinking about what  
8 you will face when you get to that point with NRC. But  
9 sitting here reading that, I was wondering--and I kind of  
10 flipped ahead looking at other bullets looking for the  
11 investment in public participation, and it wasn't there.

12 So it invites this kind of reaction. There's  
13 nothing wrong with attorneys. In fact, you need them. But  
14 where's the proactive approach?

15 VAN LUIK: Well, yeah, my view is that in the draft EIS,  
16 you will see the TSPA in full glory, and it will go out to  
17 thousands.

18 COHON: Abe--

19 VAN LUIK: Yes.

20 COHON: --let me now appeal back to Dr. Stern's talk.  
21 The principal--the kernel of their idea, which is a very  
22 powerful one, is that to gain public confidence, you have to  
23 involve the public early and often and substantively.

24 VAN LUIK: I committed to read the document, yes.

25 COHON: The EIS is the end of the process after you're

1 done. You're not going to gain public confidence with that.

2 So by saying the public can be involved as much as they  
3 want at that stage is really not being responsive, and it's  
4 getting you--it leads you exactly on the linear path. In  
5 fact, how is it linear? But the length of that linear line  
6 is incredibly long, and I would propose that the longer that  
7 line is, the harder it is to get the public in.

8 WONG: Dan Metlay?

9 METLAY: I don't have anything further to say.

10 WONG: Well, Abe, you had a demonstration for us?

11 VAN LUIK: Yes.

12 WONG: Can it be done in four seconds?

13 VAN LUIK: No, about five minutes for one and six  
14 minutes for the other. Okay, too long? Okay, after the next  
15 speaker, that would be fine. That would be fine.

16 WONG: All right. So we had a vote up here, and Abe  
17 will be brought back to complete a presentation.

18 All right. The next speaker is Judy Treichel,  
19 Executive Director for the Nevada Nuclear Waste Task Force.  
20 Judy has been following the Yucca Mountain program as a  
21 concerned citizen for many years. She has often spoken to  
22 the Board from the floor during the public comment session.  
23 We've asked her to participate, to present her views as an  
24 interested member of the public who has invested considerable  
25 time trying to understand the key technical issues and

1 analysis of the Yucca Mountain project. Judy?

2       TREICHEL: My presentations are always a little  
3 different because I can't afford transparencies, and I also  
4 like when I can just talk off the cuff. But with a subject  
5 like this, I think I better read what I put down so that I  
6 don't get it wrong and I don't miss anything.

7               Firstoff, I am here for the Nevada Nuclear Waste  
8 Task Force. We are a non-profit Nevada corporation and have  
9 been working for about 10 years to promote public involvement  
10 in this program, to provide avenues for the public to  
11 interact either through putting on debates, forums,  
12 encouraging people to file comments and answering an awful  
13 lot of questions. Most of what we do is on the phone, and  
14 it's answering every wide range of question. So for the new  
15 Board members, that's a little bit about who we are.

16               The civilian radioactive waste management program  
17 plan, which is this document, it was published in May of  
18 1996, and it defines the objective of a TSPA as the  
19 evaluation of the probable behavior of the potential  
20 repository. More specifically, it refines performance  
21 evaluation by considering both normal and disrupted  
22 conditions from events such as earthquakes and volcanism.  
23 Additionally, it makes predictions about performance by  
24 considering the levels of uncertainty in key areas, such as  
25 groundwater flow, thermal effects, corrosion, et cetera.

1           But it's important to note that when members of the  
2 general public hear the word repository, they think only in  
3 terms of the natural site.

4           At the beginning of site characterization at Yucca  
5 Mountain--some of you are old enough or have enough stamina  
6 to be here since the beginning. Many public meetings were  
7 held, and there was a lot of media attention given to this  
8 project in an effort to inform the community about what the  
9 program was and what was going to happen out at Yucca  
10 Mountain. People were told repeatedly that Yucca Mountain  
11 would be the most intensely studied real estate in the world,  
12 and that "If it can't meet the regulations, those that were  
13 in existence and still are, or if it doesn't fit the  
14 requirements of the guidelines, we'll walk away."

15           Specific statements were made such as "If it's  
16 found that the groundwater can travel to the accessible  
17 environment in less than a thousand years, if it's 999 years,  
18 we abandon the site." And that was why I made that statement  
19 when I was at the microphone before. We heard a lot about  
20 abandoning the site.

21           The public was led to believe, both in face-to-face  
22 meetings with the project officials and through many media  
23 reports, that Yucca Mountain could and would be disqualified  
24 as a repository site if any one of the qualifying conditions  
25 could not be met or if any one of the disqualifiers was

1 there. Never was it mentioned during that time of frequently  
2 held public meetings and updates that disqualifiers could be  
3 fixed or mitigated or averaged against other factors.

4           So the existing public conception of what this  
5 project is about and how it's conducted is not the result of  
6 misunderstandings or being misinformed or the result of  
7 uneducated deductions. It comes from clearly stated  
8 information that the Department of Energy widely disseminated  
9 for many years, and then to graduate from that originally  
10 stated definition of site characterization to the current  
11 plan for a total system performance assessment as seen by an  
12 already skeptical community as a double cross. It directly  
13 feeds into the long existing public distrust and lack of  
14 confidence, both in the Yucca Mountain project and also in  
15 DOE itself.

16           In fact, this change in site evaluation was  
17 mentioned at a recent public hearing on the guidelines  
18 changes, and the commentary said that we were led to believe  
19 that if the site flunked earthquakes, it would fail. She was  
20 saying that probably TSPA was more in line for a high school  
21 student than it was for a repository evaluation, that we had  
22 always thought that if it flunked earthquakes or flunked some  
23 other important thing, it would fail. But now we find it can  
24 pass in other engineering areas and wind up with a passing  
25 grade point average, and it will graduate.

1           This can be tolerated with high school or college  
2 students. They may turn out to be lousy employees, but they  
3 won't be a real threat to society. Not so with the nuclear  
4 waste repository.

5           In the case of TSPA versus the existing guidelines,  
6 there seems to be a weird sort of circular and flawed logic  
7 in play. A revision of the guidelines leads to doing a TSPA,  
8 and TSPA then requires a change in the guidelines. And this  
9 sort of thing has been going around in a circle as we've  
10 listened to the rationale for the guidelines change.

11           All that I've said so far is to explain that here  
12 in Nevada, and elsewhere I'm sure, the public feels deceived  
13 and manipulated. They express angry opposition and adamant  
14 disapproval about this project, not because they don't  
15 understand, but because they understand very well what's  
16 happening and what's continuing to happen.

17           So as to the subject of this session of the  
18 meeting, the transparency of TSPA-1997, it's not difficult to  
19 explain in layman's terms what a TSPA is and what it's for.  
20 It's a document that describes the ability of Yucca Mountain  
21 with a lot of engineering assistance to contain high-level  
22 nuclear waste through predictions made by computer models.  
23 But you wouldn't know that from reading all or part of any of  
24 the previous TSPAs.

25           The 1996 program plan states that TSPA will

1 evaluate the possible range of performance caused by  
2 uncertainty. I think this is another weird statement or an  
3 application of weird logic. Performance is what it's going  
4 to be. What varies are the predictions about the performance  
5 due to the huge range of uncertainty in understanding the  
6 natural conditions at Yucca Mountain. And it is the  
7 uncertainty factor that's made the previous TSPAs so  
8 difficult to decipher. The document that was produced in  
9 1995 is so muddled and mired down in the consideration of and  
10 attempts to bound uncertainties, that it's really quite  
11 incomprehensible.

12           Considering the level of uncertainty that existed  
13 when that document was published, the whole exercise was  
14 premature. It may well be that it's premature to prepare a  
15 TSPA in 1997. In any case, it could be understandable to  
16 both the technical experts and the public if a clear  
17 description was given about the known conditions at Yucca  
18 Mountain from verified data collection, and then the  
19 uncertainties can be described and a range of predictions can  
20 be made with the computer models. But the results will not  
21 and should not be accepted by the public or the experts as  
22 reliable rationale for confidence. They are guesses, no more  
23 and no less.

24           If, as the 1996 program plan states, an important  
25 objective of performance assessment modeling is to identify

1 the significance of the current uncertainty in processes,  
2 models and parameters, then the TSPA can be useful. But for  
3 it to be of value, it must be used to understand what is not  
4 known rather than as a basis for confidence in predictions of  
5 repository performance. The TSPA should be a tool and not a  
6 product. However, just the opposite is occurring.

7           The Technical Review Board, this Board, has been  
8 saying since it came into existence that DOE should be using  
9 performance assessment to help guide decisions on what site  
10 characterization work needs to be done in order to replace  
11 the uncertainty. The Department has begun work on a  
12 viability assessment that will be completed in 1998. The  
13 center piece of that is the TSPA-1997. Many of us fear that  
14 the viability assessment will be misinterpreted and misused  
15 as a site suitability document, and that's--that's come up  
16 here, and that phrase has been used.

17           It will consist of four parts. There's the  
18 repository and waste package design, license application  
19 plan, repository cost and schedule, estimates and the TSPA.  
20 The TSPA will probably dictate part of the design decisions,  
21 as well as cost and schedule determinations. And in  
22 addition, it could become the part of the viability  
23 assessment that provides the illusion that there's enough  
24 reliable data in existence to determine suitability.

25           So the necessity for TSPA to be transparent, and

1 especially to be put into its proper context, is not only  
2 important for the public audience, but even more so for the  
3 decision makers. If, in fact, it becomes a product rather  
4 than a tool, it will not just circumvent and conceal the need  
5 to do additional vital scientific investigation at the site,  
6 but it will also provide the ultimate seal of approval.

7           In the case of the student who failed some  
8 important classes, but manages to slip through with a barely  
9 passing grade point average, that graduate can be trained  
10 later on the job or most likely will wind up taking work  
11 that's less demanding and has less responsibility.  
12 Similarly, we're used to accepting engineering fixes and even  
13 failures. We can all think of things that "just never worked  
14 out or turned out the way that we thought that they would."  
15 The world is full of examples, and, unfortunately, there are  
16 many such examples in existing DOE waste sites that are now  
17 clean-up sites.

18           This project promised to be a departure from that,  
19 and, in fact, as we all know, the model for this one is do it  
20 right the first time.

21           Concerned citizens have believed for a long time  
22 that the program at Yucca Mountain is geared toward and aimed  
23 at building repository rather than conducting a research  
24 product. The way in which this TSPA is done and written can  
25 make or break that argument. If it's written properly so

1 that it is understandable with clear descriptions of the  
2 areas and levels of uncertainty, it will both show the public  
3 and the decision makers where the next site--next steps in  
4 site characterization should be.

5           However, if the uncertainties are disguised as  
6 manageable weaknesses that result in layers of assumption  
7 that ultimately create the illusion of confidence and  
8 accuracy, it will be the same as the previous TSPAs. It  
9 won't be understandable or transparent, and it will cancel  
10 necessary site characterization and prove that the skeptics  
11 are right.

12           My assignment was to talk about TSPA, and there are  
13 other sessions that are going to deal with repository siting  
14 guidelines, but I find it impossible to talk about those two  
15 topics separately, especially now when the guidelines are  
16 proposed to be abandoned in favor of TSPA.

17           According to the Nuclear Waste Policy Act, there  
18 should be strict guidelines, probably even more restrictive  
19 than the current ones. A continuing series of TSPAs would  
20 then be done to enable both the decision makers and the  
21 public to see if new data showed that the guidelines could be  
22 met. It's likely that with the new streamline program, this  
23 could be the final TSPA, and it alone would serve to  
24 determine site suitability and/or license ability, which  
25 would violate the intent of the Act.

1           In the conclusion of the 1995 TSPA, there's a  
2 discussion of eight significant questions regarding the flux  
3 and flow of water through the engineered and natural barriers  
4 of Yucca Mountain and resulting release of radionuclides to  
5 the environment and to individuals who may extract water from  
6 the aquifer. It ends by saying, "Information on the  
7 distribution, the amount and rate of water movement through  
8 the various scales relevant to the prediction of post-closure  
9 performance remains the key need to enhance the  
10 representativeness of future iterations of TSPA."

11           Since this document was completed, we've learned  
12 that water moves through the mountain to the repository level  
13 much faster than was ever predicted when it was written.  
14 There's no doubt that a few years from now many of the  
15 assumptions used in TSPA-1997 will have to be changed.

16           A major remaining unknown, due to lack of data, is  
17 what will be the acceptable thermal load. The current  
18 deception has little to do with the waste isolation  
19 capability. It is instead based on repository capacity  
20 needs. This uncertainty won't be made clear in TSPA-1997.  
21 It must be clearly understandable to people that big changes  
22 in predicted performance may be made in the future, and this  
23 is part and parcel of being transparent.

24           Thank you.

25           WONG: Thank you. Questions from the Board? Jared

1 Cohon?

2 COHON: Thank you for your presentation. I found it  
3 very valuable and thought provoking.

4 It seems to me that there's an essential  
5 fundamental question, one that I'd like to focus on to see if  
6 we could get you to say something about.

7 It cannot be avoided that a decision about  
8 suitability will have to be made without all of the  
9 information anybody would like to have to make that decision;  
10 that is, it's in the nature of this problem that we will  
11 never have sufficient data to be absolutely confident or  
12 absolutely certain about the outcome. This is a classic case  
13 of decision making under risk, and that can't be changed  
14 unless, of course, we waited 10,000 years to make the  
15 decision.

16 That being the case, I wonder if you could see  
17 yourself being comfortable with a bigger role for TSPA than  
18 the one that you circumscribed for it; that is, TSPA is a  
19 tool which--that I completely agree with, I think that's  
20 exactly right--but more than just a tool to identify what we  
21 don't know, but rather as a tool to quantify our level of  
22 confidence, which I think one could claim is kind of the flip  
23 side of quantifying what you don't know. Do you see my  
24 point?

25 TREICHEL: Yes.

1 COHON: And could you see yourself, given all that you  
2 know about this project and all that you've been through with  
3 it, could you see yourself accepting that role for TSPA?

4 TREICHEL: Speaking in terms of just being a part of  
5 Nevada's residence, part of the community, no, I don't think  
6 so because you've got special problems with this situation,  
7 and that's why it was so interesting to listen to the French  
8 representatives here. You've got a population that did not  
9 volunteer, a population that doesn't have a compelling need  
10 to see nuclear waste go in the ground. You've got a  
11 situation where--and I was interested in hearing the  
12 presentation on risk where the problem hasn't even been  
13 defined.

14 And I don't--I'm not buying this sense of urgency.  
15 I'm not saying that you leave it sitting in a pool for  
16 10,000 years, but an awful lot has happened in the last 50  
17 and 100 years, and when the suggestion was made about making  
18 a video or a story board, this would be the stuff in probably  
19 20 years of the atomic cafe or the AEC training films that we  
20 watch now, and, you know, think how could they have possibly  
21 thought--there's so much in this that's changing, and it's  
22 relatively new, and it's incredibly important.

23 So when you look at--you've got 50 years really of  
24 investment and experience in this technology, and you're  
25 looking out 10,000 years to take your best shot. People here

1 will not buy that.

2 COHON: Thanks.

3 WONG: Other questions from the Board? Questions from  
4 Board staff?

5 TREICHEL: I knocked them out.

6 WONG: Questions from the community?

7 Thank you, Judy.

8 WONG: We promised Abe time to complete his  
9 presentation, and so, Abe, I would like you to complete it.

10 VAN LUIK: We will hear from Claudia Newberry at the DOE  
11 first, and after that we will hear from Rally Barnard of the  
12 performance assessment staff at Sandia National Laboratory.

13 And, Rally, you will need a microphone before you speak.

14 This was Abe Van Luik.

15 NEWBERRY: Okay. Well, I'll start. Some of you may know  
16 me as the person who coordinates meetings with the NWTRB  
17 staff, but I have a real job, too, and this is part of it.

18 About a year ago our project manager came to me,  
19 and he said he wanted to know where all the data was on the  
20 program, and I said it was transparent to me. It was in  
21 these big notebooks. We had a listing of it. And he said,  
22 "No, that's not what I mean, and it's not transparent."

23 So this is the table of contents that I've  
24 developed, or had people develop for him, to try and find out  
25 where all the data on the program was. And about three or

1 four months ago, we did kind of a right-angle turn and said,  
2 you know, this is a great idea for how to put together  
3 information for a license application, and TSPA is part of  
4 that. Let's take a look at how we can use Web technology,  
5 the stuff that everybody surfs the Net on, and you stick your  
6 CD ROM in your computer and look at the whole encyclopedia  
7 on; let's try and use that for a license application so  
8 people can walk through and see our thought processes in  
9 developing a license application.

10           So what I want to do is walk through one of those  
11 little lines through here. It won't be the performance  
12 assessment one because the environmental one, it turns out,  
13 has a lot more of the stuff that I would like to show.

14           So this is not the real Net, but a fake version of  
15 it, and I'm going to go over here to the environment section  
16 and take a look at it. And what I get is a short table of  
17 contents of the various things that are in the environmental  
18 program, and for this type of demonstration, I'm going to  
19 go to meteorology, I'm going to call it Met, and their  
20 quality data, and up comes a site under construction, as all  
21 these always are, and it provides a brief description of the  
22 field programs for environmental programs; who uses the  
23 information, the size of their database, the purpose of it.  
24 So this is a very high level summary type thing that might be  
25 accessible to the public and understandable to them.

1           Now, if we want to go down another level and say,  
2 well, whoa, 100 megabytes of Met data, let's see what's  
3 there, you can click on it, and it will take you down to a  
4 discussion of the actual Net field programs. And again,  
5 there's a brief description, and it says here that the Met  
6 program has nine sites at Yucca Mountain. Well, that's  
7 interesting. Here's a map that shows where those nine sites  
8 are. Now you've got it in context. If you want to go  
9 through that and take a look, you can see the Exile Hill and  
10 the various sites in that area. And then you can go back and  
11 say, well, that was okay.

12           It says each program is controlled by plans and  
13 procedures. What are those plans and procedures? If I want  
14 to know, I can click on it, and here's the controlling  
15 documents, and these are study plans. Again, I've provided  
16 at this site, at this stage, a brief abstract that explains  
17 what that study plan is.

18           But what if you really want to see the study plan?  
19 What I can do is this has taken us to something called  
20 RISweb, which is the Records Information System. It's an  
21 index of every record that was ever created on the Yucca  
22 Mountain project. And we've gone to the particular one  
23 that's the study plan for the meteorology program, and you  
24 can find out what type of record it is, the date of that  
25 record, various information, and then if you really want to

1 see the study plan itself, we have imaged or are in the  
2 process of imaging all of our records.

3           And this is the actual table of contents as it was  
4 printed out for that study plan, and each page would be in  
5 there. That's part of something that's required for the  
6 licensing support system. They require both the image and  
7 ASCII text so you could download it and import it, a lawyer  
8 could, into his argument.

9           I'm going to go back up again, and down here, site  
10 information, histories of each site. And what you have here  
11 is a list of the nine meteorological study sites, and this is  
12 Site 1. It's a brief description of it. Not only do I have  
13 a description of it, but if I scroll down, and you can see  
14 more than just the tower, you can take a look at that site.  
15 This is a hard copy image, but you could also put in a video  
16 tape if you wanted to, and you can see the site in relation  
17 to its surroundings. So it gives you a better idea of where  
18 you are collecting data and what it might look like.

19           Now, you might want to know the exact location, so  
20 we've provided the coordinates and UTMs and state plank  
21 coordinates and latitude and longitude. Again, if you're  
22 interested in the data itself, it says they were collected at  
23 this site. Here's a list of the data variables that were  
24 collected at the site, and this is transparent to a  
25 meteorologist, 60 MS--MWS, but not to me, and it describes it

1 as wind speed measured at the 60 meter level. That gives us  
2 all a little better understanding. But what exactly were  
3 they measuring? This is the calculation method they used.

4           So you can step down on through and understand at  
5 whatever level you choose the information that's provided.

6           This shows that they collected data, and in a  
7 minute I will show you a record of that data.

8           We're going to go back on up, and we looked at most  
9 of this, but it also says that some reports were produced,  
10 and this is a summary report for all the data that was  
11 collected from December, '85, to December, '91.

12           I'm going to go to one particular input from that,  
13 and this is a data tracking number. It keeps an index. This  
14 is part of the indexing system for the actual data that was  
15 collected on the site. So you can see the description of the  
16 data. It was the Met data for September through August, '89,  
17 who collected the data, when it was submitted, what governing  
18 plan controlled it, whether or not it was qualified; that is,  
19 collected under a quality assurance program, how it was  
20 acquired; parameters, what exactly it is that you're looking  
21 at with this data set, the location where the data was  
22 collected, starting and ending periods. And this is the  
23 records accession number so that you could go into the  
24 records program and pull out a picture of that data, or at  
25 this point, you could actually connect into our technical

1 database and pull up the actual data. It doesn't do that  
2 here, but it could.

3           So with that kind of an idea, what we thought we'd  
4 do is start a program, and we're doing two prototypes. One  
5 is, we will take a document that already exists and put it  
6 into this hypertext version so we can connect to the actual  
7 records down through the data so the people can follow down  
8 our thought processes.

9           One of the key points here is that you can't just  
10 put in the information that supports your point of view. You  
11 can't just reference the good stuff. What you have to talk  
12 about is everything that you knew about at the time, what you  
13 discounted and what you used, and make sure you keep  
14 references to all of that so that other reviewers can take a  
15 look at what you didn't use and decide for themselves whether  
16 or not that was appropriate.

17           The other thing we're going to try and do is take a  
18 document that we are now writing and see how it works to  
19 write in hypertext. Does it make sense? A lot of people  
20 don't think linearly, and they're not automatically putting  
21 in these links as they're going along, but they need to go  
22 back through. So what works best for the people involved?

23           And in discussions with the NRC, the other one  
24 point I want to make is, they've asked that--well, one person  
25 has asked that for our first prototype, the existing

1 document, we do this with something they've already reviewed  
2 and then ship them the hypertext version and see what they  
3 think about it, whether or not they find this an easier way  
4 to review a document. And, of course, once we publish  
5 documents and most of this information is available to the  
6 public, we can put it on Web sites and make it generally  
7 available.

8           And that's my demo.

9           WONG: Don, let's let them go through.

10          BARNARD: There, that's not bad. I'm Rally Barnard from  
11 Sandia Labs, and I have been helping to develop the PAWDS,  
12 the performance assessment working data set. And the reason  
13 this came about was that after TSPA-93 when we were writing  
14 the report, which described in more detail the hydrologic, in  
15 particular, data that we used, we discovered that we were not  
16 really comfortable with the degree of traceability, to use  
17 our favorite word of the day, of these data.

18                 Sometimes the assumptions that we had made were not  
19 clear. Sometimes we weren't quite happy making sure that we  
20 knew what we used, how we could relate that to the original  
21 data and so forth.

22                 So we set about to come up with a scheme where we  
23 would have very good traceability in both directions for any  
24 data that we used. By both directions I mean if you start  
25 with raw data and you use a prescribed method of analyzing

1 those data, you will come up with the same answer every time  
2 you use the same raw data.

3           Conversely, if you are given a result, for example,  
4 a probability distribution function of hydrologic data, and  
5 you are told the method that is used, you can back up and  
6 figure out which raw data those came from.

7           So with that, let's take a look through the  
8 performance assessment working data set. This one is also a  
9 Web browser application, and in hopes that the people in the  
10 back of the room can read it, I made the type a lot bigger  
11 than it is on your normal screen. But we cover the purpose  
12 of this, properties information and parameters; in other  
13 words, the raw data and the final product.

14           So looking at the properties, we have four  
15 categories here. We have matrix properties, fracture  
16 properties, bulk properties, and then the codes that we use  
17 to determine them.

18           Again, because this is just a demo, we'll move  
19 through and see what we can look at here.

20           Under matrix, we have bulk density, porosity and  
21 saturated hydrologic conductivity, as well as the Van  
22 Genuchten water retention parameters.

23           Let's look at porosity, and throughout this, there  
24 is an attempt to provide two sources of information. The  
25 first source of information is for the people who think they

1 know what they're doing and just want to zip right down to  
2 the data. They have a defined path to get there. But for  
3 those--the attorney types of this world who want to know  
4 where those data come from, we attempt to provide  
5 documentation which is going to tell them where those data  
6 come from, and it always tracks with the actual data so that  
7 that information should always be available.

8           So let me illustrate this by bringing up the  
9 document which describes information on the matrix porosity.

10           Slow computer. The matrix porosity data for the 10  
11 hydrologic units that are used are listed in the PAWD  
12 sources; for example, SEPDB. The SEPDB, in case there aren't  
13 any old-timers in the room, is one of the earlier databases  
14 that the project set up, and those are the ones--this is from  
15 TSPA-93 that we captured and included in here. This happens  
16 to be a link in this document to the SEPDB data. So by  
17 clicking on that, we bring up SEPDB data characterized either  
18 as being in boreholes and surface samples. So we'll look at  
19 SEPDB source data for matrix porosity. And now you can see  
20 that it is done according to the different boreholes that are  
21 available.

22           So we'll look at one of them. Okay, now you're  
23 finally down to the real data. For example, this is Hole  
24 UE 25 a 1. Here you have the depth and here you have the  
25 porosity value, but most importantly, for the sake--

1 standpoint of traceability, over here in the column on the  
2 right is the PAN, the PA number. And if you notice, it  
3 happens in all these samples that the PA number is the same  
4 for every data record. However, it doesn't need to be, and  
5 these are hot links so that if you click on that, you  
6 discover that PA data--PAN No. 2, which is the one we looked  
7 at here, the source is Flint and Flint, 1990, and it refers  
8 to these two boreholes.

9           What's Flint and Flint, 1990? There's the source  
10 document, a citation of the source document, including the  
11 NNA number, the record accession number that the project has  
12 used.

13           Okay. One more thing. That essentially is an  
14 illustration of the traceability. If we look at parameters,  
15 we can talk a little bit about the clarity of what we present  
16 or the transparency. And so here we have some set DB  
17 porosity data.

18           Now, the first thing I want to say, and I think we  
19 all understand it, is that clarity is strictly in the eye of  
20 the beholder. But what we can do is attempt to present the  
21 information in as many ways as possible so that somewhere,  
22 somehow, sometime, somebody's going to understand what we're  
23 doing.

24           So what I have here is a table, which is kind of  
25 tricked up for the purpose of this display because the TCW

1 values in that unit, the Tiva Canyon are done in green, and  
2 the PTN are done in blue, and we'll get a little farther down  
3 here. And here are the TSW units, are done in red.

4           And again, we have a link here, a hypertext link,  
5 that will allow us to see these data have been collected from  
6 possibly many different boreholes. So this could be, for  
7 example, all the information on the Topopah Springs welded  
8 porosity data.

9           And so, for example, over here, we have descriptive  
10 statistics of porosity, and over here, most importantly, we  
11 have a graphic representation of what we have.

12           And although this looks like just a simple visual  
13 of this, as an aside comment I'd like to point out that when  
14 we were talking with experts about what they felt a proper  
15 PDF, probability distribution function, should be for  
16 properties such as this, we found that presenting them with a  
17 graphic representation was highly effective at having them  
18 say, gosh, you know, I think this looks okay, but I really  
19 think, for example, it would be better if it had a longer  
20 tail on the high side.

21           So although this may look like a simpleminded  
22 presentation, a graphical presentation, it has turned out to  
23 be very useful because we are able to quantify, redo this  
24 graph, for example, to make it satisfy the experts' perceived  
25 notion of what it like, and then we have numbers which allow

1 us to use this PDF and have it fairly well obey the experts'  
2 notion of what it should like.

3           So that's it. Thank you.

4           WONG: All right. I thank both of you for that  
5 presentation. I know that Don has one question, but I have  
6 orders, and those orders are to end this session.

7           LANGMUIR: It's a short question.

8           WONG: Okay, short question.

9           LANGMUIR: This question is for anybody up there I  
10 think. I'm enthusiastic and intrigued by what you're doing.

11 A lot of us are aware, also, that there are National Lab  
12 Web pages through which you can get access to National Lab  
13 data and reports and download the reports, in fact. And I  
14 wondered if you had thought in this effort to hyper-link  
15 yourself to those interfaces so one could get complete  
16 information from the lab sources as well. Are you going to  
17 try to duplicate what's available through those sources?

18           BARNARD: No, I didn't have time to mention. Right now  
19 what you see is available only to Sandia analysts, PA  
20 analysts. But by the time TSPA/VA comes around, this will be  
21 fully available on the entire Internet and people in Israel,  
22 if they want to get this information, can use it.

23           WONG: All right. Thank you.

24           I'd like to thank all of the speakers for this  
25 morning's session. They've done a very good job, and they've

1 made my job easy. So thank you all.

2                   Lunch will go from one hour from this point in  
3 time.

4                   (Whereupon, a luncheon recess was taken.)

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AFTERNOON SESSION

5 COHON: Good afternoon. I hope everybody noticed that  
6 there is a Marquis outside, and it says on it, "Welcome  
7 NWTRB." And I believe it's the first time in this Board's  
8 history that we made it to the big lights. I liked it.

9 This afternoon we turn our attention to  
10 transportation. Board member John Arendt will be the chair  
11 for this afternoon's session. John?

12 ARENDT: Good afternoon. If you'd all just look at your  
13 agendas, and we're starting at 2 o'clock rather than 1:30, so  
14 just add roughly 30 minutes to each of the agenda items, and  
15 we'll be about on track.

16 I was looking for our three other new Board  
17 members, but I guess they haven't gotten back yet.

18 So I'm John Arendt, and I'm Chair of the Board's  
19 panel on transportational systems. This entire afternoon  
20 will be devoted to the important subject of transportation,  
21 specifically on the issue of how spent fuel will be moved  
22 from the individual reactor sites to a centralized storage  
23 facility, if such a facility is mandated by Congress.

24 We will first hear from the Department of Energy on  
25 an update of the approach that it will use to accomplish

1 this, mainly the so-called market-driven or private sector  
2 initiative.

3           We will then obtain from both the state of Nevada  
4 and the affected units of local governments their respective  
5 views and concerns about transportation.

6           After a break, we will have a round table at which  
7 these issues will be explored further. The afternoon  
8 speakers will then be joined by a number of other  
9 participants.

10           As is our practice at these Board meetings, time  
11 will be provided at the end of the afternoon for a public  
12 comment.

13           Tom McGowan has asked to make some comments, and in  
14 order to meet with his schedule, we will schedule him right  
15 after--or right before the break. So he will be--he will be  
16 heard at that appropriate time.

17           We have a full schedule ahead of us, so let's get  
18 started. Our first speaker this afternoon is Dwight Shelor.  
19 He is the Deputy Associate Director for Waste Acceptance,  
20 Storage and Transportation at DOE. He will give us the  
21 update on the DOE transportation program.

22           Dwight?

23           SHELOR: I'll just test this very quickly.

24           In the interest of trying to keep us on schedule,  
25 this is going to be a real interesting experiment. I notice

1 some of the Board members haven't returned, neither have my  
2 transparencies. So it's going to be a little difficult.  
3 However, I hope that you were able to obtain copies of my  
4 presentation.

5           So I'm going to start, and if my transparencies  
6 return, then I'll get back to that so that we won't lose a  
7 lot of time because I have a lot of material that I would  
8 like to cover.

9           This afternoon--here they are now. I will provide  
10 an overview of our approach to transportation services  
11 acquisition, what we planned, and describe the relationship  
12 between the transportation services in a federal facility, or  
13 an interim storage facility if one is designated, and  
14 obviously to try and provide insight into the objectives and  
15 some of the rationale that we have used in development of  
16 this approach.

17           Okay. Now, we're back at it. Very good.

18           I think it's important to, first of all, summarize  
19 the Department's overall goals and privatization, obviously  
20 to sharpen the mission focus, which it does very nicely,  
21 improve the quality of performance and improve long-term cost  
22 effectiveness, and I'd like to emphasize, while maintaining  
23 environment, safety and health excellence.

24           I think it's also important to have at least a  
25 working definition of what privatization is. The one that we

1 have used or are using at the present time is the  
2 substitution that whole or in part of private market  
3 mechanisms and entities for one of more of the traditional  
4 government roles of developer, financier, builder, owner and  
5 operator.

6           In the Office of Civilian Radioactive Waste  
7 Management, two major goals in our overall mission. One is  
8 obviously to maintain the momentum at the Yucca Mountain site  
9 characterization activities, and secondly, to develop and  
10 implement a market-driven approach that relies on the private  
11 sector for waste acceptance and transportation services.

12           With respect to the federal facility, if the  
13 Congress and the Administration cannot come to an agreement  
14 on an interim storage facility, this is the approach that we  
15 would propose for transporting commercial spent nuclear fuel  
16 to the repository. Obviously, if there is general policy  
17 direction to implement an interim storage facility operation,  
18 this would be used at that federal facility.

19           Our objective in developing this approach, we're to  
20 come up with a practical and implementable approach that uses  
21 the private industry to the maximum possible extent, provide  
22 flexibility for innovative approaches in carrying out this  
23 function, minimize the OCRWM involvement, and rely on utility  
24 cooperation and participation, and not least important, to  
25 rely on performance-based contracts with the private

1 industry.

2           So our philosophy, then, is, first of all, keep it  
3 simple, keep it focused, adhere to the spirit of  
4 privatization, provide a good deal for the government, and  
5 make it attractive to the industry and to the utilities, or  
6 our customers.

7           The situation then comes down to the fact that the  
8 Department currently has contracts, as described in  
9 10 CFR 961, with primarily the nuclear utilities, the owners  
10 and generators of spent nuclear fuel and high-level waste.  
11 That contract has two parts to it, obviously. If you'll  
12 remember back to the old contract law, the contract calls for  
13 the Department to accept and dispose of their spent fuel, and  
14 in exchange for that, they pay a fee, and that fee has been  
15 paid into the Nuclear Waste Foundation.

16           Now, what we're proposing to do in this approach is  
17 to contract through competitive contracts with the private  
18 industry to essentially accept and transport this spent fuel  
19 as required by the standard contract to a federal facility,  
20 whether it be an interim storage facility or a repository.

21           Very quickly, major functions that the contractors  
22 would be performing would be, first of all, to service the  
23 purchasers of the standard contract per the OCRWM waste  
24 acceptance schedule, purchase or lease transportation casks  
25 and equipment, accept the spent nuclear fuel as an agent of

1 OCRWM, transport the spent fuel to a federal facility using  
2 applicable NRC, Department of Transportation and selected DOE  
3 regulations, using standard commercial nuclear practices.  
4 The contractor and the carrier would select the routes and  
5 provide notification to the appropriate people, and to  
6 perform intermodal transport as necessary. This is pretty  
7 much a start-to-finish operation. They would accept it, the  
8 spent fuel, at the current storage facilities and deliver it  
9 to a federal facility. And in addition, at least in the  
10 initial contract period, to provide compatible storage  
11 systems for use at the federal facility.

12           For purposes of contract definition, we have laid  
13 it out in basically three phases, A, B and C. Phase A is  
14 pretty much preparing the business plans and the management  
15 plans. Phase B is to establish the capability and  
16 essentially mobilize their resources and the equipment, get  
17 ready to transport. Phase C, then, is actual operations.

18           In this, our infamous home plate diagram that we  
19 use to examine the interfaces of the RSA contractors with the  
20 rest of the world, including DOE products delivered to the  
21 states and tribes, products delivered to the federal  
22 facility, equipment and services acquired by a regional  
23 servicing agent, I've neglected to answer that, and the NRC  
24 Department of Transportation interface, and products and data  
25 provided by the purchasers of the standard contract.

1           I think it's also vitally important that we  
2 recognize and understand what these performance requirements  
3 are. As we know, in the draft RFP, performance requirements  
4 will be and are consistent with the NRC and DOT regulations.  
5 These regulations provide for the protection of the public  
6 health and safety and the environments, and the contractors,  
7 hopefully, will base their fixed price bids for these  
8 services on those requirements.

9           I point out that at the present time with the  
10 current national emphasis on reducing the role, size and cost  
11 of government operations, there must be a broad consensus or  
12 support for any initiatives that go beyond those specifically  
13 outlined in the regulations.

14           And furthermore, and justification will be required  
15 for those to pursue specific actions above and beyond those  
16 required in the regulations and for us to seek the necessary  
17 budget authority to fund those activities.

18           Since we have--I've leaped ahead a couple of times,  
19 but we're proposing to divide the country into four  
20 geographical regions. These four regions currently  
21 correspond to the four NRC regions that have been established  
22 by NRC. In these, we would anticipate having a single  
23 regional servicing agent for each region to pick up, will  
24 accept and transport spent nuclear fuel from the plants in  
25 that region to the federal facility.

1           I want to emphasize and point out to you at this  
2 point that I have not told you where that federal facility is  
3 yet because we don't know.

4           Major milestones. I think, one, we have to look at  
5 two things together--actually, it's three--1998. We have  
6 talked about the Yucca Mountain viability assessment being  
7 available. We are doing some contingency planning on an  
8 interim storage facility and also looking at how we could  
9 arrange the transportation activities to be consistent in the  
10 event that an interim storage facility was sited in this time  
11 frame.

12           This chart is not meant to depict any fixed time  
13 schedules, but only to put things in a perspective relative  
14 to each other.

15           Again, this is a busy chart. Again, I'd like to  
16 point out that Phase A we would anticipate lasting about one  
17 year where the contractors would put together their plans.  
18 Phase B would actually then have about an eight-year period,  
19 and it would overlap Phase C, wherein Phase B they continue  
20 their management and planning, the mobilization, acquisition  
21 of hardware and the initial storage stems. Phase C then  
22 would be--we're proposing a five-year period for that  
23 contract. Longer periods are more--probably more cost  
24 effective. At the same time predicting or making fixed price  
25 bids for periods longer than five years is very difficult.

1           So we settled on a five-year period. Obviously, if  
2 one were to look at the rates that were proposed in S-1936  
3 and the last Congress where they started out at 1,200 metric  
4 tons per year, increasing over a five-year period to 3,000  
5 metric tons per year, this activity would repeat itself for a  
6 period of three to four decades.

7           Let's talk for a moment about our risk-sharing  
8 objectives. And when we set up a privatization concept of  
9 this type, what we want to do is to allocate the risk between  
10 the financial, regulatory, performance and operations so that  
11 DOE and its contractors can have a reasonable balance of  
12 risk.

13           Again, we want to minimize DOE's involvement in a  
14 regulatory environment, and as normal, the Price-Anderson  
15 indemnification would be passed on to the regional servicing  
16 agents.

17           This period that we've gone through in the  
18 government in the last couple of years is kind of a re-  
19 inventing government contract reform. In the past, the  
20 government essentially was self-insured and assumed virtually  
21 all of the risk. There was very little risk allocated to the  
22 contractors.

23           This contract we would anticipate would be fixed  
24 price, privately financed, and this is a major deviation from  
25 the standard M&O type contracts that the Department has where

1 DOE pays all the costs and assumes essentially all the risk.

2

3           In our approach, we're essentially proposing that  
4 we cost share Phase A where we would pay for the Phase A  
5 deliverables, but we would not pay the full cost.

6           Phase B, we would not make any payments, and the  
7 contractors, then, would only recover their costs in the  
8 prices that they would bid for the delivery of the spent  
9 nuclear fuel. For example, they would be paid in terms of  
10 dollars per metric ton spent fuel delivered.

11           In the draft RFP, which was essentially noticed on  
12 December 27th, you can look in Section H.8, Special Contract  
13 Requirements of the draft RFP, to see how we're beginning to  
14 manage and allocate risk.

15           In the draft RFP, I think you can--if you go  
16 through the clauses in detail, you can begin to see how we  
17 are beginning to balance the risk that the contractors would  
18 take versus what the government normally had been taking.

19           For example, in economic price adjustment, it does  
20 provide the contractor with some inflation protection, and  
21 that would be a DOE risk. And then in more quantities, we  
22 would establish minimum orders so the contractor would have  
23 some basis to recover his costs. That's a DOE risk.

24           Permits and applications, we would anticipate that  
25 the contractor would be responsible for obtaining and being

1 in full compliance with all of the requirements, state,  
2 federal and local, and that would be a contractor risk.

3           Insurance and indemnification, the contractor would  
4 be required to maintain insurance and indemnify the DOE  
5 against claims arising from non-nuclear incidents. It's a  
6 contractor risk.

7           Termination for convenience settlement, as in any  
8 government operation, there is a clause where the government  
9 can terminate for its convenience. We would provide for and  
10 make the contractor whole in terms of his accrued cost to  
11 that point, and that would be a DOE risk.

12           Performance guarantee, we talked about this for  
13 some time. Originally, we talked about performance bonds.  
14 We felt that a performance guarantee by a parent corporation  
15 would be more satisfactory than performance bond in this  
16 particular case.

17           With respect to interim storage contingency  
18 planning, we would anticipate at this time--in fact, our  
19 contingency plans are for the if an interim storage is  
20 designated by policy direction, that we would implement that  
21 in two phases, where the Phase I basically for the first two  
22 to three years would accept only canistered spent nuclear  
23 fuel, and then as Phase II became operational, we would begin  
24 to accept uncanistered spent fuel.

25           To summarize this, we believe that this approach

1 does, in fact, maximize the use of private sector and private  
2 industry capability, provides a focus period for the regional  
3 servicing agent utility cooperation. I didn't go into it,  
4 but I might point out here that we are anticipating that  
5 prior to implementation of this contract period, that the  
6 regional servicing agent and the utilities would come to some  
7 agreement as to the location of the spent fuel to be picked  
8 up and the allocations and the rates to take care of the  
9 partial cask problem and brokering the vellication rights  
10 prior to commencement of operations.

11           This approach does allow RSAs the flexibility to  
12 purchase or lease different casks to meet the needs in that  
13 particular region. And when we say purchase or lease the  
14 different casks, this essentially is the reusable  
15 transportation overpack, if you will. And the interesting  
16 part about this approach, when the contractor goes to the  
17 private sector markets to raise capital for this and make the  
18 investment, then they will be responsible for this. They  
19 will have to make their normal business decisions as to what  
20 is the salvage value and the potential follow-on use and all  
21 of the other business decisions involved with a capital  
22 investment.

23           And, obviously, this does minimize the OCRWM  
24 involvement. I think it maximizes the use of the private  
25 market forces. When these entities go out into the capital

1 formation market to finance this particular activity, they  
2 will have very close oversight by the lenders, and probably  
3 closer oversight than the government normally gives a  
4 contract of this type.

5           Finally, this is a procurement of services, not  
6 necessary equipment, except for the storage modules, and we  
7 would intend to monitor progress and performance, but we will  
8 not be involved directly in telling the contractors what to  
9 do.

10           Did I go fast enough? Okay. Thank you very much.

11           ARENDT: Dwight, I have several questions, and I'm  
12 wondering, are you going to be furnishing--this is Arendt,  
13 the Nuclear Board.

14           Are you going to be furnishing a specification or  
15 some kind of information for the RSAs to get on? I'm  
16 concerned about uniformity and standardization, and how are  
17 you going to--how are you going to assure or at least bring  
18 about that there will be some form of standardization?

19           SHELOR: It's our expectation in this initial five-year  
20 period that not knowing for sure when it's going to start,  
21 but in the initial five-year period, it's our intentions to  
22 allow for the maximum involvement of the current nuclear  
23 industry vendors. There are several different technologies  
24 that have been approved, certified by the Nuclear Regulatory  
25 Commission for dry storage. Many of the utilities that we

1 will be servicing in this period already have dry storage  
2 installations. We want to take advantage of those  
3 technologies that are currently in place and that can be  
4 implemented with very little change.

5           For example, in the first initial or Phase I, that  
6 we would anticipate using canister spent fuel. Virtually any  
7 dry storage installation that had already implemented in a  
8 dual purpose canister that's certified for transportation can  
9 be used. We would not have to develop a new design and have  
10 it certified.

11           I think the way we're going to phase in, as the  
12 receipt facility develops a capability for handling  
13 uncanistered spent fuel, then we can begin to standardize the  
14 storage canister or disposal canister for uncanistered spent  
15 fuel, and at that time, we will have a single standard.

16           ARENDR: Okay. I'm thinking now about standardization  
17 of quality assurance plans, emergency preparedness  
18 activities, emergency response, the outreach activities.

19           SHELOR: Okay.

20           ARENDR: Are you going to just leave it up to each of  
21 the RSAs to develop their own--their routing, for example? I  
22 could see that there would be four different approaches at  
23 quality assurance, for example, four different approaches to  
24 routing, within the regulations.

25           SHELOR: Okay. Let me address those individually. I

1 think quality assurance is a very important aspect. Don  
2 Horton is probably here. I was at one time the director of  
3 the Office of Quality Assurance in OCRWM, so it's very near  
4 and dear to me, and I think it's very important.

5           The recent statements by the Nuclear Regulatory  
6 Commission to both the nuclear industry vendors and to the  
7 users, the utilities themselves, they have put the industry  
8 essentially on notice that the NRC does require approved  
9 quality assurance programs for vendors and for the utilities,  
10 obviously, in their operation. The Nuclear Regulatory  
11 Commission has stated that if a utility intends to use a  
12 vendor's product on his site, that he has a QA oversight  
13 responsibility of that vendor. We're going to apply that  
14 same philosophy to the RSA contractors. If we have four RSA  
15 contractors, their QA programs will be approved by us, and we  
16 will do QA oversight of each one of them according to our  
17 current program.

18           In addition, if it turns out that some of this  
19 equipment may be used by a utility in this operation, which  
20 it will be because the utilities are responsible for loading  
21 the canister, then they have an oversight responsibility for  
22 that QA program on the vendors, also.

23           So the QA is an important aspect, and it will be--  
24 it doesn't have to be identical, but it will be uniformly  
25 implemented according to approved plans.

1           ARENDT: How about financial risk? As a scenario, let's  
2 assume that the RSA in Region 1 provides information. He's  
3 planning, say, to transport X number of tons of uranium and  
4 RSA. In Region 2, plans to transport, say 500, and it turns  
5 out--and they base their price, their unit price, on those  
6 numbers, and it turns out that they only, say, are able to  
7 transport half for one reason or another. How are they able  
8 to recoup that money? It looks to me like there's a risk  
9 there that I wonder whether the people will be willing to  
10 accept it.

11          SHELOR: No, we didn't think they would. That's why we  
12 included it in the special clauses, a minimum or a quantity.

13          ARENDT: I see.

14          SHELOR: So it will be a minimum ore that they would  
15 base their prices on.

16          ARENDT: Okay. One other question. There are a number  
17 of people who feel that if an interim storage area were to be  
18 established next week somewhere in the U.S., that we could  
19 start transporting spent fuel immediately and maybe even  
20 transport sizable quantity, and I wonder if you could give us  
21 a feel for how much--assuming the casks that are currently  
22 available, how much spent fuel could be transported, say in  
23 three or four years, approximately?

24          SHELOR: It would be small.

25          ARENDT: Two hundred tons? Less than 200 tons?

1           SHELOR: Okay. You're testing my memory. Assuming that  
2 I won't be held to it, I think it's in the order of a couple  
3 of hundred tons over a two or three-year period.

4           ARENDR: A very small quantity?

5           SHELOR: A very small quantity, yes.

6           ARENDR: Okay. And the only way to get that up to some  
7 sizable quantity, you'd have to have a tremendous effort in  
8 building casks in the total infrastructure, which these days,  
9 I'm not sure you could bring something like that about.

10          SHELOR: I think you have to have--you have to put the  
11 market forces to work. You have to have--and this is why we  
12 call this a market-driven approach because other than the  
13 relatively small quantities that are being transported today,  
14 there's no real market. If we receive policy direction to  
15 transport to a federal facility, that will create the market,  
16 and then we can put the market forces to work.

17                 Our comments that we received last summer on the  
18 draft statement of work at the pre-solicitation conference in  
19 July, we specifically asked the industry if this was asking  
20 too much of them, and they came back emphatically saying, no,  
21 it's not. You give us an order, and we'll put it together.  
22 We'll supply the equipment.

23          ARENDR: My last question: The navy has a great deal of  
24 experience in transporting spent fuel to INEL very safely,  
25 without incident, and that's been going on for some 20 odd

1 years. EM has got experience within DOE. How are you  
2 utilizing that experience, or will you be utilizing that  
3 experience?

4 SHELOR: We'll be utilizing it to a certain degree.  
5 First of all, we work very closely with EM and the navy and  
6 the Transportation External Coordination Working Group, what  
7 we met in Charleston, South Carolina, two weeks ago, and,  
8 also, we have their other cooperative groups that we fund  
9 jointly with EM to provide information and education to many  
10 of the parties that will be involved in the eventual  
11 transportation.

12 I think that the experience that EM has had,  
13 particularly the navy relative to their working with the  
14 railroad industry, which I can't comment on too much now  
15 because there's a lawsuit that they're talking about, is in  
16 the process now. We work closely with the navy and the EM  
17 people.

18 The EM people are in a transition mode right now.  
19 They're reorganizing. They're--it's my understanding they're  
20 giving serious consideration to privatizing certain of those  
21 functions, also.

22 ARENDT: Okay. Questions from the Board? Don?

23 LANGMUIR: I'm just interested as a potential investor,  
24 which I'm likely to be. But you're asking some companies to  
25 wait a long time to get their money back?

1           SHELOR:  Yes.

2           LANGMUIR:  In other words, there's going to be a lot of  
3 capital investment in this program within each group, with  
4 one year here, eight years there, five years there.  How many  
5 years into this program do you anticipate that these  
6 contracts will have recovered their cost and be looking at  
7 profit?

8           SHELOR:  They would basically--there would be about a  
9 three-year waiting period where they accumulate cost before  
10 they begin to receive payments, and their cost recovery,  
11 then, would have to take place over a five-year period.

12                   We've talked about that.  We have some capital  
13 investment advisors.  We have talked with them.  This is not  
14 unusual.  The industry is confident and comfortable with  
15 that.  As a matter of fact, in the Hanford tank privatization  
16 contracts that were let this past fall for the vitrification  
17 of the high-level waste in Hanford, that period there is  
18 about nine years before they recover the cost.  So it appears  
19 to be a reasonable time period.

20                   And one thing I didn't point out and I'd like to  
21 take this opportunity now, it's a little bit of a risk, but I  
22 think the Federal Register Notice should be out today or  
23 tomorrow, indicating that we planned a pre-solicitation  
24 conference where we can describe and receive additional  
25 comments and offer more explanations.  It will be on February

1 25th in Washington, D. C., at the Commerce Building  
2 Auditorium.

3       ARENDT: I do have another question on system  
4 integration or coordination. And I assume that DOE is not  
5 going to do much, or OCRWM is not going to do much in regard  
6 to system integration, as I understand it. One way that one  
7 could do this is to have a contractor who would be  
8 responsible for system integration and coordination and then  
9 have four subs underneath who would be responsible--who would  
10 be for the RSA activity. How are you going to coordinate or  
11 integrate these activities?

12       SHELOR: Okay. That's a very, very good question, and  
13 it was an approach that we seriously considered because we  
14 could have easily done this using an M&O contractor,  
15 basically giving him the responsibility for subcontracting.  
16 We felt, however, that it was important to make this a DOE  
17 procurement because that puts us directly in charge, not so  
18 much in control, but it puts us in charge of these contracts  
19 and the contract terms and the contract administration.

20             What we plan to do is two things: We're going to  
21 utilize our federal staff more. When you have an M&O  
22 contractor, many times all they do is look at what the M&O  
23 contractor is doing.

24             In this approach, we're going to use our federal  
25 staff to essentially do the contract management, and they

1 will assisted by our M&O contractor.

2 ARENDT: Did you do any kind of cost benefit analysis in  
3 determining what approach you should use?

4 SHELOR: It's very difficult to do. It's a good  
5 question, and I wish I had a definitive answer. But when you  
6 sit down and look at this in terms of what should it cost if  
7 all the contracts were cost reimbursable versus what should  
8 it cost if they're fixed price--now, typically, on a fixed  
9 price contract, you're going to pay a little more, and you  
10 run a risk of major changes in a fixed price contract. This  
11 usually opens the contract up to re-price it when you make  
12 major changes. That's why we feel it's important to talk to  
13 as many people as we can now, get as many comments as we can  
14 to help us define this contract before we put it on the  
15 street.

16 But the tradeoffs come in if it truly is a fixed  
17 price performance-type contract and the requirements are  
18 sufficiently well known for them to make reasonable fixed  
19 price estimates. I believe that will be our lowest cost  
20 because if it's cost reimbursable, then you probably have  
21 another layer of management in there, which begins to  
22 accumulate quite rapidly.

23 ARENDT: Other questions from the Board?

24 COHON: Cohon, Board.

25 Have you thought about using the contracts to

1 convey incentives to the RSAs other than cost incentives,  
2 like a safety incentive?

3       ARENDT: At the present time, no. Let me explain why.  
4 The Department is responsible for implementing and operating  
5 a system to perform these functions. The Department of  
6 Transportation and the Nuclear Regulatory Commission have the  
7 responsibility for the public health and safety. They  
8 promulgate regulations and standards and certify equipment  
9 designs and operations. We will be in full compliance with  
10 those regulations and standards. I don't believe there is a  
11 safety issue that we would have to address.

12       COHON: Yeah, and I think you're probably right, but I  
13 think you'd be wrong if you proceed in that way because I  
14 believe there's a large perceived safety issue by the public.  
15 Furthermore, it's humans who are going to handle the waste  
16 and humans who are going to drive the trucks or conduct the  
17 trains, and accidents will happen. I mean, when you think  
18 about it, all the shipments are going to happen over decades.  
19 There are going to be accidents. And all it takes is one  
20 serious one, even with no radioactive release, and that's why  
21 I think--I know that's what's behind your statement there's  
22 not a safety problem.

23       But even without a release when that accident or  
24 accidents happen, it's going to shake public confidence in  
25 the system.

1           So it just seems to me that given the--what I would  
2 hope would be perceived as an overriding federal interest in  
3 being as close to risk-free as possible, that you would think  
4 about, since you're being very creative here in using the  
5 private sector in this way, you would think about private  
6 sector incentives, the sort the private sector responds to,  
7 to go beyond compliance so that the companies see tremendous  
8 economic gain for every hour they go without having that  
9 accident.

10           And I think you would be missing a great  
11 opportunity here to do something really interesting and  
12 really important if the DOE stance was, well, that's DOT's  
13 and NRC's responsibility, and the real risk is zero or close  
14 to zero because both things get in our way of achieving what  
15 is the goal.

16           SHELOR: I agree with you, and certainly that's an  
17 extremely important approach, and we can accommodate that.  
18 And I suspect that we probably will before we go final, as  
19 that particular incentive in terms of a monetary incentive  
20 for accident-free performance is a critical part.

21           BULLEN: Bullen, Board designee.

22           How many current utilities have dual-purpose casks  
23 and could ship?

24           SHELOR: Right now, one.

25           BULLEN: Okay. And if you talk to the utilities, are

1 they interested in shipping stuff that's already in dry cask  
2 storage, or are they interested in clearing out their spent  
3 fuel pools?

4 SHELOR: They want to clear out their pools first.

5 BULLEN: So the answer to this is that you really want  
6 to ship uncanisterized spent fuel because the stuff that's in  
7 dry storage isn't a problem for them? That's not what's  
8 limiting their operation, and that's not what they're  
9 screaming to get out? They want to clear out their spent  
10 fuel pools so they could--

11 SHELOR: That's correct.

12 BULLEN: Okay.

13 SHELOR: You know, we're not going to tell them--

14 BULLEN: No, I understand.

15 SHELOR: --what spent fuel that we want or what they  
16 have to give us, but I suspect that when they have an  
17 allocation, they're going to want to get more space in their  
18 operating pools put where it's possible.

19 BULLEN: So my next question was, who buys the canister  
20 that you ship in if it's a dual purpose? Is it the utility  
21 that buys it, and then you take it and ship it away, or do  
22 you buy them the canister and they ship?

23 SHELOR: The RSA contractor would provide the canister  
24 to the utility.

25 BULLEN: Okay. But they're responsible for the loading?

1           SHELOR:  Yes.

2           BULLEN:  Okay.  And then I guess the question is already  
3 asked, but you'd expect it would take a long time for this to  
4 come on line?

5           SHELOR:  No, I'm not trying--but I believe that that  
6 capability could be put in place and mobilized by the time we  
7 had a federal facility ready to receive it.

8           BULLEN:  Okay.  But further down the road then you're  
9 going to have to repackage all the stuff that's already in  
10 dry cask storage?

11          SHELOR:  Quite possibly, particularly if it's store  
12 only.

13          BULLEN:  Yes.

14          SHELOR:  Yeah, that's correct.

15          BULLEN:  Thanks.

16          ARENDR:  Don Langmuir?

17          LANGMUIR:  Just a more general question from a non-  
18 expert.

19                 Looking at the servicing regions account, which is  
20 probably incorrect, but qualitatively, it looks as if you  
21 have eight facilities and no reactors in the southwest region  
22 and 32 reactors in one facility in the southeast region.  The  
23 regions are much different in size, as well as in facilities  
24 they have.  This is Overhead 14.  And I just wondered what--I  
25 would assume you had to deal with each region rather

1 differently in terms of your expectations of the regions and  
2 what they might be trying to do and how they might accomplish  
3 it, and given the differences in the locations at which the  
4 fuel exists in the form of the fuel.

5       SHELOR: That's correct. We're going to shift most of  
6 that burden to the regional servicing agent because there is  
7 a mix in each region. Some of them are--and, in fact, Morris  
8 is not even an operating reactor. It's a storage facility.  
9 But there will be a mix of PWRs and BWRs, different types of  
10 plants in each region, as well as the location.

11           Part of your question, I have some back-up slides,  
12 a little more detail in Region 1. This information, by the  
13 way, is in the draft request for proposals. If you look at  
14 Region 1 and go down through the purchasers, what the  
15 reactors are, and then if you use the 1,200--1,200, 2,000  
16 rates that were in the S-1936 last year at the higher rates,  
17 you would get in Region 1 550, 360, 830. Anyway, over a  
18 five-year period, it would be around 3,000 metric tons from  
19 that region, and that would be a mix of PWRs and BWRs.

20           Region 2, without going through all of it, at the  
21 same time goes up to about 2,500 metric tons.

22           Region 3, over that same five-year period, is about  
23 2,660.

24           The biggest deviation is in Region 4, it drops down  
25 to just under 1,000.

1           Now, if you'll look at the next five-year increment  
2 using the same allocation, oldest fuel first, Region 4 then  
3 comes up.

4           So the regions are not--are reasonably well  
5 balanced in terms of total quantities over a five-year  
6 period.

7       WONG: Any other questions? Staff?

8       CHU: Yeah, this is Woody Chu on the staff.

9           On the dual purpose canister question, Dwight,  
10 since they are of such capacity, you are envisioning then  
11 pretty much rail carrier at the--one of the interim storage  
12 facility, right?

13       SHELOR: I would think, and we use that as an  
14 opportunity to say--and I'm sure we'll get some comments on  
15 it. But in the draft RFP, we have not provided either a  
16 requirement or an incentive to maximize rail cask shipments,  
17 and I think we'll get some comments on that.

18           It's my feeling, and I was probably the one  
19 responsible for it, that if you go to a competitive base with  
20 multiple contractors competing and are able to maintain that  
21 competitive base over a period of several decades, that the  
22 cost or the price competition will drive the--yeah, anyway, I  
23 believe the cost competition will drive the RSA contractors  
24 to the largest possible capacity on each shipment.

25       CHU: Yeah, but incentive aside, if your assumption is

1 that Phase I at the federal facility will be only--during  
2 Phase I rather, that the federal facility will only be  
3 accepting canister fuel, you're saying that you're only going  
4 to be carrying canister fuel; is that right?

5 SHELOR: All right. Well, we could say that, Woody, but  
6 I think that we might be infringing on the flexibility that  
7 we tried to leave to these contractors. If these contractors  
8 can work out a deal, however they do it, to take a facility  
9 like Ginna, which is a trump site--

10 CHU: Right.

11 SHELOR: --and ship that to another utility and  
12 consolidate it in large canisters that can be shipped on  
13 rail, that's an idea.

14 CHU: Okay.

15 SHELOR: It would significantly reduce the number of  
16 truck shipments.

17 CHU: Okay. Following that, when the shipment--well,  
18 once it's in transit, sort of in line haul, then it is in  
19 rail. That's what you're envisioning because the federal  
20 facility is taking only canister fuel.

21 SHELOR: In the first--

22 CHU: In the first two years.

23 SHELOR: In the first two years, that's correct.

24 CHU: And if the federal facility does not have rail  
25 access as some candidate facility does not have, then you

1 will have to go into heavy haul?

2 SHELOR: That's correct.

3 CHU: And the transfer facility will be the  
4 responsibility for the vendor that the RSAs--

5 SHELOR: We haven't really gotten into that, but in  
6 terms of our contingency planning, in some cases I could  
7 envision where the transfer facility from rail to heavy haul  
8 at some terminus could, in fact, be a contractor-operated  
9 facility. It's simply providing a service of transferring  
10 the cask from rail to heavy haul.

11 CHU: Well, it will be more than just transfer. It will  
12 be actually breaking the contents from the larger capacity  
13 canister into smaller capacity truck cask?

14 SHELOR: No.

15 CHU: No?

16 SHELOR: No.

17 CHU: Oh, heavy haul, okay.

18 SHELOR: If you go with heavy haul--

19 CHU: Very heavy haul.

20 SHELOR: --and my definition that that's--you know,  
21 there could even be a few-day storage at that site. But that  
22 storage is incidental to transportation. The package itself  
23 containing the canistered or uncanistered spent fuel would  
24 not be opened.

25 CHU: Okay. And a quick follow-up on the risk question

1 when you said there is a minimum order. In other words, the  
2 RSA is required to build up a capability to carry so much.  
3 If that market doesn't develop for whatever reason, then what  
4 he will be at risk for s what is required minus whatever the  
5 minimum is?

6 SHELOR: That's correct, but I don't believe he would  
7 ever ramp up to the maximum before the minimum quantities  
8 kicked in.

9 WONG: One last question, Mike Carroll?

10 CARROLL: Mike Carroll from the Board staff.

11 Based on your presentation last week or the week  
12 before in Charleston at the Technology Working Group, I think  
13 it's safe to say that the one thing that really didn't go  
14 over too well was privatizing the institutional  
15 responsibilities, routing and that sort of thing. And I was  
16 wondering whether baaed on that or other comments you've had,  
17 there's some possibility that you may pull that out of the  
18 privatization plan or that's pretty well in there?

19 SHELOR: I won't speculate on the possibilities right  
20 now, but our comment period on the draft RFP doesn't end  
21 'till March 31st. There's been some request, verbal request,  
22 from the people to extend that comment period, which I'm sure  
23 we will.

24 How we would address that, let me turn it around a  
25 little bit. What we're proposing to do is to have the RSA

1 contractor implement the DOT NRC regulations, which basically  
2 says that the RSA contractor is going to contract with a  
3 carrier. It may be a railroad or it may be a trucking  
4 company. They, then, go to the DOT regulations on routing  
5 and look it up, and basically if the state has a preferred  
6 alternative to the routes that are currently approved by DOT,  
7 if we talk about truck routes, it's basically an interstate  
8 highway system or a State-designated alternative. The State  
9 has the right to say don't take it on that route, we'd rather  
10 have you take it on this one.

11           Now, there is a requirement once that route's been  
12 selected to essentially notify the Nuclear Regulatory  
13 Commission, and the Nuclear Regulatory Commission approves  
14 that route based on criteria that have been established for  
15 safeguards. They don't approve the route based on what the  
16 route is, but only for safeguards.

17           Now, what more do we need to do?

18       COHON: Coordinate.

19       SHELOR: Coordinate, certainly. The RSA contractor  
20 would coordinate with a state or local community--

21       COHON: No, no, no, let me interrupt. What I mean is  
22 what if RSA's 1, 2 and 3 all want to ship through St. Louis,  
23 which is not unlikely?

24       SHELOR: Not unlikely.

25       COHON: So the State of Missouri is sitting there

1 wondering what the heck is going on. They've got one company  
2 after another approaching them about routes, and they want to  
3 know, you know, is the federal program here? Where does it  
4 come together? Where is it coordinated so that there's a  
5 realization here that the three--four, I'm sorry, RSAs might,  
6 in fact, be better off working together in certain cases or  
7 avoiding each other in other cases.

8       SHELOR: Yeah.

9       COHON: There's this cumulative effect of two or three  
10 or four companies, each acting independently, that you have  
11 to worry about.

12       SHELOR: Okay. That's a good point, and I'm not trying  
13 to weasel, but I think the reasonable and appropriate form to  
14 address that in its global context is the Environmental  
15 Impact Statement. Before this material moves, there will be  
16 a requirement to fully comply with the National Environmental  
17 Policy Act, which we will. If, as I mentioned earlier, there  
18 is no policy direction for federal interim storage and that  
19 eventually we take this to a repository, wherever that it is,  
20 there will be an Environmental Impact Statement for that  
21 repository before anything is shipped. Same way if there is  
22 an interim storage facility, there will be an environmental  
23 impact statement for an interim storage facility in which the  
24 transportation, national transportation impacts, will be  
25 evaluated. And I think that's a very good form because that

1 --that gets us out with scoping hearings and gets the public  
2 involved.

3 ARENDT: Dwight, I thank you very much.

4 SHELOR: Okay. Thank you.

5 ARENDT: We'll continue now. All right.

6 MCGOWAN: Tom McGowan. Mr. Dwight, in my opinion, legal  
7 requirements are a minimum, not a maximum, nothing--the  
8 minimums as a matter of responsible discretion, and that  
9 covers a lot of ground.

10 There are multiple flaws in the transportation  
11 plan. I saw that right out in front. The performance base  
12 line is essentially left to the initiative and integrity of  
13 the field of carrier contractors, rather than being prior  
14 established by DOE, and in the worst case scenario,  
15 notwithstanding prior establishment by DOE.

16 Now, No. 2, the transportation paradigm is tri-  
17 elemental, where DOE's responsibility is linked to the point  
18 of departure and the point of destination receipt, but  
19 advocates responsibility to the discretion of the carrier on  
20 route between the two, notwithstanding Albuquerque  
21 headquarter communication and both DOT and State Department  
22 of Transportation oversights.

23 Also, there is no demonstrated, as insured  
24 effective guarantee that first on the scene local response to  
25 emergencies will perform as anticipated, although we wish

1 them well.

2           And finally, DOE audit and compliance monitoring at  
3 transport departure points is cursory at best and  
4 predominantly reliant upon the honor system, which does not  
5 involve a high degree of public confidence and total quality  
6 assurance, creates the perception of the economic expediency  
7 based educational responsibility in avoidance of liability.  
8 There are tradeoffs here. You can save a dollar, but it may  
9 cost you ten to do it at some point.

10           Thank you.

11           ARENDT: Thank you very much.

12           The next speaker was to have been Bob Loux,  
13 Director of the Nuclear Waste Project Office. Unfortunately,  
14 Bob, or Mr. Loux, won't be here because of a sudden death in  
15 his family. So we will turn immediately to Mr. Halstead who  
16 will make the presentation.

17           HALSTEAD: Let's see if my Super Bowl announcing voice  
18 can come through to you.

19           This is the fourth time in six months that Dwight  
20 and I have discussed the Department of Energy's privatization  
21 proposal in a public meeting. I thought it might really  
22 spice things up if I offered to give Dwight's presentation  
23 today and he offered to give you my critique. But,  
24 unfortunately, I have a little heavier burden than Dwight  
25 today because I'm trying to catch you up on the work that the

1 State has done in the area of transportation risk and impact  
2 assessment, and I was surprised when I looked back and  
3 realized it had been six-and-a-half years since we briefed  
4 the Board on our work in these areas in a full and formal  
5 way. Obviously, we've had many informal discussions at your  
6 meetings.

7           So I'm delighted to have this opportunity to be  
8 here. Having just watched the Super Bowl in a small town in  
9 Wisconsin with my mother-in-law, who's a very enthusiastic  
10 Packers fan, I guess I'll try to put some of the burden that  
11 I have in perspective. On the one hand, of course, there was  
12 jubilation throughout the upper Midwest over the Packers  
13 victory, and my condolences to the Patriots fans here.

14           And immediately on the accomplishment of this great  
15 sports victory, you all of a sudden heard Packer fans  
16 complaining that the coach should be fired because he didn't  
17 find a way to get Jim McMahon to back up the quarterback in  
18 the game. And maybe to show you how this can be taken in its  
19 extreme, yesterday, the day after the Super Bowl, the  
20 Milwaukee Journal ran a headline that said, and I'm quoting,  
21 "Half time Lacked Substance," peculiar to think what kind of  
22 substance they expected, and I'm sure that I will not be as  
23 entertaining as the Super Bowl half time. I will try and  
24 share with you some substance in these four critical areas  
25 relating to transportation risks and impacts.

1           The way I structured my talk today is to try and  
2 break these topics into four mini presentations of eight to  
3 ten minutes each. I've given you in the handout much more  
4 detail, of course, than I intend to speak about. Alice will  
5 remember some of the exchanges that Woody and I have had, and  
6 I remember when I talked to Woody about preparing, he said,  
7 "Bob, remember your tendencies." So I'm going to try and put  
8 about four hours of material into a shorter presentation, and  
9 I provided these handouts hoping they will perhaps inspire  
10 you to ask me some tough questions. And if you don't ask me  
11 tough questions, that will be just fine.

12           Rail and highway access to Yucca Mountain is our  
13 first topic. Secondly, we'll talk about the outlook for  
14 shipments to repository or a storage facility. Third, we'll  
15 talk about unresolved safety issues. Finally, I hope to  
16 spend a fair amount of time elaborating for you the large  
17 number of recommendations that the State has made over the  
18 last half dozen years to the Department of Energy on  
19 virtually all aspects of their transportation program, we're  
20 not shy, including the privatization proposal, but certainly  
21 not limited to the privatization proposal, firstly.

22           Transportation access. Many of the problems that  
23 the Department of Energy is confronted in developing the  
24 transportation program for Yucca Mountain reflect the  
25 peculiarities of this site from the standpoint of

1 transportation access. I want to review for you DOE's  
2 initial plan for transportation to Yucca Mountain, their  
3 current plans and some perspectives that the state has.

4           This is the approach--this is the map really from  
5 the 1986 environmental assessment that the Department  
6 prepared, and initially, the Department's plan was to build a  
7 rail spur from Dike Siding in north Las Vegas. That was the  
8 most direct, arguably easiest and cheapest rail spur, except  
9 for land use conflicts in the north Las Vegas area, and for  
10 highway shipments, the Department proposed to use the  
11 existing interstate, I-15 into US-95 connecting at a  
12 notorious, locally notorious intersection, called the  
13 Spaghetti Bowl in downtown Las Vegas.

14           Now, I won't belabor you with all the details, but  
15 the bottom line is from the very beginning, anybody who read  
16 all the DOE transportation documents, and actually, I think  
17 they did a very good job in 1986, the evidence is clear that  
18 Yucca Mountain was selected for a repository site in spite of  
19 and not because of its transportation conditions. It is  
20 clearly on all the key measures that DOE evaluated the worst  
21 of all the sites in terms of ease and cost of transportation  
22 access.

23           In addition to some more generic issues, cost of  
24 construction, distance from the load center of the current  
25 storage locations, there is one unique potentially adverse

1 condition here that was identified by DOE, and that was the  
2 proximity of the rail spur to the bombing ranges used out of  
3 the Indian Springs Air Base, and really, this is a situation  
4 that applies to almost all of the highway and rail access  
5 routes because of the number of flight corridors, the  
6 activities that occur at the Nellis Ranges, and indeed the  
7 connections between the naval operations out of Fallon, as  
8 well as the Air Force operations out of Nellis.

9           For many years when we would go to a meeting with  
10 DOE, Katy Grassmeyer (phonetic) or Paul Standish (phonetic)  
11 or Bill Andrews or someone would have a slide up, and they'd  
12 have a target date for the promised report on the military  
13 aircraft overflight issue that was going to resolve the risks  
14 potentially of a cask being struck with military explosives.  
15 I mean, the kind of materials that aircraft delivered and  
16 knockout tanks and bunkers and so forth. And I suppose we've  
17 let them off the hook easily, but I do want to make a point  
18 that this is one of the types of unique risk and impact  
19 issues we have with the site. It has not been resolved, this  
20 issue of military aircraft overflights.

21           After discussions with us and discussions with  
22 local government and Indian Tribe representatives and the  
23 public, discussions with their own consultants, the  
24 Department of Energy evolves some different approaches to  
25 highway and rail access.

1           In the highway area, they decided to look at the  
2 alternative routes that the State had identified under a  
3 direction from the State Legislature. So there are a number  
4 of routes that are identified that would avoid shipments  
5 through the Spaghetti Bowl in downtown Las Vegas.  
6 Unfortunately, as we'll see, most of them involve some other  
7 safety tradeoffs.

8           The route that has often been considered the most  
9 likely to be designated for truck shipments coming in from  
10 the east is the so-called B Route coming down from I-80 in  
11 Utah, Wendover, taking U.S. 93, U.S. 6, U.S. 95 across the  
12 center of the state.

13           The so-called A Route that goes through the  
14 northern Las Vegas suburbs I think probably would be the  
15 lowest priority of these options.

16           Other options are the so-called back door route  
17 that would come off of I-15 at Barstow and come through Death  
18 Valley Junction up to Amargosa Valley.

19           And then many of you drove State Highway 160. The  
20 most recent communication by the Nevada DOT to the California  
21 Highway Patrol is, if they don't cooperate with us in finding  
22 a way to make this route usable, we might designate I-60, and  
23 that would possibly lead to the rerouting of the majority of  
24 truck shipments across country on I-40 to Barstow, picking up  
25 I-15, coming back to Nevada taking I-60. Any of you who have

1 driven that road know it's certainly not an optimal route.

2 That's State Route 160, pardon me.

3           Again, there are a great many issues that are  
4 cross-cutting for highway and rail access. We expect to  
5 address most of these issues in the Environmental Impact  
6 Statement, as well as in transportation program meetings.  
7 The risk and impact tradeoffs really come down to this: Do  
8 you use the better quality interstate highways that have  
9 better safety design features through highly populated areas  
10 in spite of their traffic congestion or do you use two-lane  
11 federal highways characterized by short shoulders or no  
12 shoulders, sharp curves, steep grades through mountain passes  
13 with a history of bad weather conditions, in many cases  
14 through environmentally sensitive areas?

15           At the current time, four rail routes are under  
16 consideration. My understanding is that DOE is going ahead  
17 with these studies even though they understand that Congress  
18 may impose some other path on them, but the current plan is  
19 to develop rail access. The legislation that's been  
20 considered over the last couple of sessions of Congress in  
21 some cases precluded building a rail spur, in other cases  
22 encouraged, and in other cases it was too confusing to figure  
23 out whether heavy haul transportation was a short term stop  
24 gap measure until a rail spur was constructed or whether the  
25 Department would actually be precluded from it.

1           The key issue here is that the short routes go  
2 through either Las Vegas or through very difficult  
3 mountainous terrain between the place where we're standing  
4 now and the Union Pacific mainline, or whether you look at  
5 longer, more circuitous routes, 300 or more miles in length;  
6 in some cases, perhaps costing a billion dollars to  
7 construct.

8           These routes briefly are primarily off of the Union  
9 Pacific mainline through southern Nevada, Jean. The Dike  
10 Siding option is very similar to the modified Valley option,  
11 the Caliente option here, and the Carlin option is really a  
12 series or really a very broad corridor series of potential  
13 routes that could come down from the north.

14           The State has not taken a formal position on which  
15 of these routes would be a preferred route. Frankly, that's  
16 premature, given the lack of information we have, and  
17 secondly, there are some legal issues about whether we could  
18 advocate for a route without giving up some of our legal  
19 oversight rights.

20           Nonetheless, we have encouraged the Department to  
21 give a higher priority to studying routes that would come in  
22 from the northern Union Pacific line because it would be  
23 virtually impossible for shipments to that spur to be routed  
24 through downtown Las Vegas. Any of the spurs off of the  
25 southern line, as we'll see in a minute, could put a large

1 number of shipments through Las Vegas.

2           My understanding is that there have been some local  
3 discussions in the last couple weeks with people in the  
4 Pahrump area about the possibility of a rail line coming  
5 through this community.

6           Again, the tradeoffs are similar. Here I would  
7 call your attention to the issue, not only a human issue of  
8 impacts on Las Vegas, but Native American land claims and  
9 cultural resources are going to be a much bigger issue than I  
10 think most people have considered when it comes to actually  
11 getting approvals for rail corridors in rural areas. You  
12 know, most of the river valleys that allow you to get lesser  
13 grades are places that were neat places to live hundreds of  
14 thousands of years ago, and they are filled both with  
15 actively used cultural sites, and in many cases archeological  
16 sites that are waiting to be discovered. Many  
17 environmentally sensitive areas are there also.

18           The limited economic development opportunities are  
19 a factor here as well. There aren't a lot of economic  
20 development benefits that would offset the impacts on land  
21 use; for example, fencing open range or having to force both  
22 range animals and migratory big game animals to use  
23 underpasses under a rail route that will have to be secured  
24 both for safety and safeguards purposes.

25           The Air Force overflights are a generic concern for

1 all of the rail routes.

2           I just want to show the location of particularly  
3 the Moapa River Reservation, the Las Vegas Colony, the  
4 Duckwater Reservation, the various colonies and reservations,  
5 including Pyramid Lake on the northern half, and also to  
6 remind you that the Western Shoshone National Council does  
7 claim a very large portion of central Nevada under the  
8 Treaty of Ruby Valley, and that also will potentially pose  
9 some concerns in terms of securing title to those lands.

10           This is a map that shows some of the heavy routes  
11 that DOE is studying. A heavy haul intermodal facility at  
12 Caliente, of course, has been considered. If State roads are  
13 used, those shipments could come along a circuitous route  
14 around the test site or they could come down into the north  
15 Las Vegas suburbs.

16           There have been some--there's been some  
17 consideration of putting an intermodal facility in Las Vegas,  
18 north Las Vegas, or west of Las Vegas, and the road that many  
19 of you may have heard about across the test site that was  
20 proposed in one version of the legislation, to come across  
21 this area.

22           The heavy haul issues are, again, similar to risk  
23 and impact tradeoffs to others. I would go to one issue,  
24 which is cost. Many people are promoting heavy haul  
25 transport for cost reasons, and the Department of Energy has

1 come up with some numbers that make the life cycle cost of  
2 the heavy haul operation at somewhere in the neighborhood of  
3 150 to 180 million dollars look pretty good compared to a  
4 billion dollar rail spur. I personally believe those numbers  
5 are way low. There is an assumption that many of these  
6 highways through high mountain passes will simply need to  
7 have extra resurfacing.

8           In our opinion, and in the discussions we've had  
9 with the Nevada Department of Transportation, I believe there  
10 are many stretches, in some cases stretches--well, you know,  
11 coming through the initial leg out of Caliente, for example,  
12 where I could certainly easily imagine somewhere in the  
13 neighborhood of 12 to 15 miles of an additional lane being  
14 required, and at Hancock Summit and at Coyote Summit similar  
15 concerns.

16           So I really think that we have a burden, as well as  
17 the Department, to look very critically at these heavy haul  
18 costs before Congress, you know, charges ahead with this  
19 idea.

20           Well, that's pretty good. I'm only four-and-a-half  
21 minutes over where I was supposed to be on the first section.

22           Let me turn quickly to my second topic, and then I  
23 want to show you a few transparencies that actually  
24 illustrate some of these route conditions.

25           Because of our uncertainty about the transportation

1 impacts that are route specific, we have over the last few  
2 years commissioned a series of reports developed by Planning  
3 Information Corporation in Denver with some input from other  
4 contractors to provide us our own working estimates of the  
5 best case and the worst case, if you will, of what the  
6 transportation logistics might look like, both with specific  
7 routes and specific shipment numbers.

8           And without going into too many of the details,  
9 we've looked at two scenarios, the current plan, a repository  
10 at Yucca Mountain, which we assume would be almost a 90 per  
11 cent rail, 10 per cent truck scenario, new high capacity  
12 casks, a rail spur, and we've estimated the shipments looking  
13 at the actual capabilities at the 80 shipping sites around  
14 the country.

15           And this is, in our opinion, a credible best case.  
16 Now, there are some scenarios that try to get the modal mix  
17 up to as high as 95 or 96 per cent rail. In our opinion,  
18 those are overly optimistic. And again, there are many  
19 reasons we could talk about this. We think this 90 per cent,  
20 more or less rail, 10 per cent truck, is an appropriate  
21 target to shoot for, and it has been the informal, and on  
22 some occasions pretty formal policy objective of the  
23 Department's transportation program for most of the time that  
24 I've been familiar with it, and I've been working on these  
25 things since 1978 to maximize the use of truck.

1           A credible worst case shipment scenario would occur  
2 with early shipments to an interim storage facility according  
3 to the provisions of the legislation that have been proposed.

4           Now, note, we're not saying it would be 100 per  
5 cent truck. We're saying that when we look site by site, it  
6 looks to us like 35 per cent of the spent fuel would come by  
7 truck and 65 per cent by rail. If we assume current cask  
8 designs and intermodal transfer at Caliente, we get a much  
9 larger number of shipments and much greater shipment impacts.  
10 In parentheses here, I've given the lower numbers if we  
11 assume the high capacity truck casks like the GA-4 and the  
12 GA-9 are used.

13           The point here is that you get somewhere from a  
14 threefold to a fivefold increase in the number of shipments,  
15 if you have this early start-up and you operate under a  
16 system that does not attempt to maximize shipments by rail.

17           We've also looked at cross-country routing from two  
18 standpoints: One, the standpoint of shortest, quickest  
19 routes consistent with the regulations for highway, shipments  
20 according to the preferred practices of the railroads  
21 minimizing the number of carrier interchanges for rail  
22 routing. And if we assume what we would consider something  
23 like a market-driven approach to routing, the route maps look  
24 like this. The major highway corridors are I-80 and I-70,  
25 the major rail corridor is the Union Pacific with two of

1 their main lines from Kansas City and Chicago carrying the  
2 majority of shipments.

3           We've also looked at what might happen if there  
4 were prescribed routing, routing, for example, by a DOE  
5 contractor that wanted to minimize the number of affected  
6 states, minimize the winter weather disruptions of shipments  
7 through I-80 and I-70 through the Rockies. We've also tried  
8 to consider the impacts of the recent rail mergers,  
9 particularly the Union Pacific, Southern Pacific and the  
10 Burlington Northern/Santa Fe in the west, and, of course, I'm  
11 sure many of you may own stock in Con Rail, maybe watching  
12 the debate over whether the Norfolk Southern or CSX will  
13 acquire that system.

14           In a merged rail environment, we believe there will  
15 be an incentive both for the carriers and for contractors  
16 under a DOE privatization system to look at some different  
17 options, and these we think--originally when we did this, we  
18 were primarily looking at the Burlington Northern Santa Fe  
19 route out of Kansas City, and now that we've studied this  
20 some more, we also think that the so-called Sunset Route from  
21 El Paso to Los Angeles would look like a very strong  
22 alternate choice.

23           And then we've tried to look at what the impacts of  
24 these different routing approaches would be in Nevada so that  
25 we can make our impact assessment as location and route

1 specific as possible.

2           And under the market-driven approach, we see heavy  
3 shipments on Las Vegas coming in from the west, heavy impacts  
4 on Caliente coming in from the east, and under the southern  
5 routing approaches, we see the possibility of very heavy  
6 impacts on the Las Vegas metropolitan area.

7           Without getting too far afield, one of the tasks we  
8 gave our consultants was to actually look at who owns the  
9 spots on the queue to ship under the existing utility  
10 contracts, look at their modal capabilities and see how they  
11 would ship. And so we actually have plotted out what the  
12 first three years of operations might look like, and when you  
13 put these reactor sites and these batches of fuel that own  
14 the early shipping routes, assuming 1,200 MTU of fuel is  
15 shipped in the first year, which anyone, of course, who  
16 seriously knows, knows that this is only a theoretical  
17 capability. You know, I would agree with Dwight that  
18 certainly we're talking about no more than a couple of  
19 hundred MTU in the first year, and I would argue even a  
20 smaller number of, frankly, largely symbolic shipments.

21           But nonetheless, this is what the route map for the  
22 first year would look like, and one of the things that is  
23 immediately apparent is that from the beginning of shipments  
24 to an interim storage facility, you have almost 40 states and  
25 many Indian tribes and hundreds of local governments

1 involved. So those institutional burdens are going to be  
2 very great at the beginning of the program.

3           This is a terrible slide. I don't mean to make it  
4 look grainier and scarier. This looks great in a slide.  
5 This is the Spaghetti Bowl in downtown Las Vegas.

6           This is the area around Tropicana on the strip  
7 where the New York/New York development is, and right here is  
8 where I-15 and Union Pacific Mainline are well within a one-  
9 mile corridor if an evacuation were necessary, not to mention  
10 Highway--and this is what Gridlock looks like on I-15 Labor  
11 Day two years ago.

12           And this is the Union Pacific Mainline in downtown.  
13 This is the Union Plaza Hotel here. If you're ever in there  
14 watching an ice show, you'll be real aware of how close you  
15 are to the main rail link between Salt Lake City and Los  
16 Angeles.

17           Now, what are the options? This is a pretty  
18 typical stretch. I think this is White Horse--this is a  
19 downgrade from White Horse Summit on U.S. 93, and you see  
20 what a twisting U.S. highway in central Nevada looks like,  
21 and that's pretty typical. Actually, the DOT guys could be  
22 proud of this. This is typical of what it looks like just  
23 after it's been resurfaced. I hate to say it doesn't always  
24 look quite this good.

25           One of the issues along these proposed alternative

1 routes will be that towns grew up along these highways, and  
2 if we were to try to designate this route, U.S. 6 through--  
3 will be a concern, as it's part of the main street of the  
4 town--of the city.

5           And again, I don't mean to make this slide look  
6 worse than it is. If you saw it in slide, it would still be  
7 pretty scary. This is U.S. 6 at Current Summit during, you  
8 know, a pretty typical winter storm.

9           Before we go on to this, one of the reasons that we  
10 may appear at the State level to be vacillating on this  
11 question of route designation is simply this: We know that  
12 alternate route designation, every state where it's occurred  
13 that I know of, it's been a highly political event, and it  
14 has generally involved the export of risks from politically  
15 powerful urban areas to less politically powerful rural  
16 areas.

17           The lawsuit in Mexico that held the city of Santa  
18 Fe liable for property damages resulting from lower property  
19 valuations as a result of perceived risk is a development  
20 that many of our friends in the rural areas have thought  
21 about.

22           And so in addition to the technical issues, when  
23 you designate the kind of route alternatives that we're  
24 talking about here, like 360 miles of U.S. highway to  
25 substitute for an interstate connection, there's going to be

1 a very rigorous burden of proof. It may indeed involve into  
2 a full inconsistency hearing before the U.S. Department of  
3 Transportation.

4 I certainly believe it is conceivable that the  
5 American Trucking Association or one of the contractors who  
6 wins a bid from DOE, if given a free hand, might decide to  
7 challenge the State's right to designate a rural alternative  
8 through Las Vegas, or they may challenge us on the technical  
9 documentation that under Appendix A of Docket HM-164, we're  
10 required to prove with data and analyses that routes are  
11 safer than another.

12 So this whole issue of designating routes that  
13 avoid Las Vegas is much more complicated than it appears at  
14 first.

15 This is one of those great mountain passes, Hancock  
16 Summit on State Route 375, and this is the route that the  
17 heavy haul trucks would take from Caliente.

18 If you'll pardon me if I take just a sip of water  
19 here.

20 We could spend a lot of time talking about  
21 unresolved safety issues. We've documented these concerns in  
22 a number of our reports. We've probably given the best  
23 summary of them in the comments that we submitted to the  
24 Department of Energy on their draft scoping notice for the  
25 Yucca Mountain EIS, and I'm sorry, I was not able to bring

1 copies of that with me today, but I will as a follow-up to  
2 this meeting provide you with a copy of that chapter on  
3 transportation, as well as a copy of the Planning Information  
4 Corporation Report that we just discussed.

5           I want to move very quickly through these issues  
6 because it's very easy to get bogged down in these, and it's  
7 certainly not because I don't think we have some serious  
8 arguments here, but I want to end up not so much by talking  
9 about the problems, but by talking about the solutions that  
10 we've recommended to DOE.

11           In the area of the relevance of the nuclear  
12 industry's past safety record, some of the key issues are the  
13 potential increase in the amount of waste and the number of  
14 shipments. Over the last 30 years or so of nuclear industry  
15 operations, we basically shipped about 3,000 MTUs of fuel and  
16 about 27 or 2,800 shipments. There are different definitions  
17 of what constitutes a shipment. And it's one of the ironies  
18 of this whole issue that no one can agree on how to define a  
19 shipment for database purposes. That's one of the reasons I  
20 didn't take the time to actually flush out the numbers here.  
21 We're in the process of doing this now because some new NRC  
22 data has come out.

23           The key issues here are the past record of the  
24 industry has been good in terms of not having severe  
25 accidents. It's been so-so in terms of having of what we'll

1 call routine accidents relative to the number of shipment  
2 miles. Basically, their accident rate is somewhere between  
3 about 0.6 and 3.0 accidents per million miles traveled, which  
4 is about the same as what you expect for big commercial  
5 trucks, and for rail shipments, it's much higher. Of course,  
6 you have a much larger amount of fuel moving at a time, but  
7 it's surprising high. It's about 10 accidents--if you  
8 actually make a calculation, it's about 10 accidents per  
9 million miles traveled.

10           Now, in the future there are going to be lots more  
11 shipments, and in the future, there are going to be different  
12 characteristics. On average, both the rail and truck  
13 shipments are going to be four times longer than in the past,  
14 and we think DOE has not paid enough attention to the  
15 opportunities for equipment failure and human factors, that  
16 the sheer increase in distance and hours, and indeed the  
17 implications for work rules on the railroads, and perhaps the  
18 way that drivers will have to be spelled and platooned.

19           Another issue, which is frankly a pretty recent  
20 issue, has to do with the financial pressures on the nuclear  
21 utilities and on DOE, for different reasons. For the  
22 utilities, it's deregulation. The implication when I first  
23 started working as an energy planner in 1978, I worked on the  
24 implementation rules for PERPA (phonetic) that allowed  
25 independent power producers to compete with the utilities.

1 Nobody appreciated what breaking the monopoly, regulated  
2 monopoly, financial stability of the nuclear utilities might  
3 mean for their attitude towards spending dollars on extra  
4 regulatory safety enhancements. At DOE, clearly the pressure  
5 is coming from the Congress, and we're even seeing this in  
6 areas where DOE has previously agreed to some very, very  
7 strong safety enhancements.

8           Radiation exposures from routine operations. We're  
9 going to move through numbers. It really comes down to this:  
10 There are small exposures that are likely for the workers  
11 who are engaged in transportation, people who are for some  
12 reason in proximity to a cask when it's refueling or in a  
13 repair situation, or most significantly, in the so-called  
14 Gridlock incident, which members of this Board, frankly,  
15 pushed this issue with DOE back in 1990, where DOE  
16 acknowledged that in a transportation Gridlock situation,  
17 members of the public could receive doses in the range of 40  
18 millirem.

19           Now, I pick up that much extra exposure every  
20 month. My physiological and psychological reaction to that,  
21 however, might be quite different, as I fly around in a lot  
22 of airplanes. And one of the issues here is the way that we  
23 deal with these low-level radiation exposure risks. Frankly,  
24 the State's approach for the most part has been to go along  
25 with the mainstream view of most health physics experts and

1 basically argue that these routine exposures are not so  
2 significant. We've recently been challenged by a radiation  
3 health effects working group that's been put together for our  
4 agency to take another look here, and also to look at the  
5 perceived risk issues that are a result of these routine  
6 exposures.

7           Let's shoot all the way down here. Third issue:  
8 Probability and severity of transportation accidents. This  
9 discussion almost always hinges in any technical forum on how  
10 you feel about a study prepared for the Nuclear Regulatory  
11 Commission at Lawrence Livermore Lab, referred to in  
12 shorthand as the Modal Study. The long and the short of it  
13 is we've prepared detailed critiques of the Modal Study. We  
14 would argue that this is a major area of uncertainty, and in  
15 particular, we feel it is inappropriate for representatives  
16 either of DOE or the industry of the NRC to stand in front of  
17 the public and give a precise numerical estimate that says,  
18 yeah, probability of an accident that could breach a cask  
19 happening every year is  $10^{-7}$ , to give the implication that  
20 these precise quantitative risk estimates really will stand  
21 scrutiny, based either on review of the models, the data or  
22 the sensitivity analyses.

23           Let's move on.

24           Cask performance in severe accidents. The analysis  
25 that has been used for the most part by DOE and by the State

1 of Nevada was prepared in 1985 by Roger's Engineering  
2 Associates, and it basically looks at a high speed rail  
3 impact followed by a long duration, high-temperature fire  
4 that results in a small fraction of 1 per cent release of  
5 cask contents. Of greatest concern, the less than 1 per cent  
6 of the Cobalt 60 and the Cesium 134 and 137, and the modeling  
7 that was done. And we've looked at this using some different  
8 models, suggested the potential for contaminating a 42-square  
9 mile area to an extent that would involve a 460-day clean-up  
10 effort and a \$620 million in 1985 dollar cost.

11           The reason I put this up is this: We're not sure  
12 that this is the worst imaginable, the most credible  
13 accident. We don't have the resources right now to do these  
14 calculations on our own. We've raised this issue in the EIS  
15 forum, arguing with DOE this is the kind of analysis we  
16 expect to see from them.

17           Another area has to do with cask performance in the  
18 event of a successful terrorist attack. Again, some of the  
19 issues are the same and some are different. And a terrorist  
20 attack, for example, unlike a large fire, you wouldn't expect  
21 a large plume that would provide an atmospheric transport  
22 mechanism for fine particles of fuel.

23           What's interesting about the sabotage issue,  
24 however, it's one of the few places where DOE actually  
25 sponsored a full scale test at Sandia in the early '80s, and

1 the results of that test showed that terrorists using a  
2 military explosive could cause massive damage to the fuel  
3 inside a cask, as well as creating a pathway, and basically  
4 cause a 1 per cent release of cask contents.

5           In analyzing these results, the Nuclear Regulatory  
6 Commission focused solely on the very small aerosol,  
7 respirable aerosol that would be released, and really ignored  
8 the larger implication of five to twenty or thirty pounds of  
9 spent fuel being distributed over the blast zone, perhaps 100  
10 meters in radius. And that's an area where the State is also  
11 developing a whole range of approaches both to looking at the  
12 studies that were done for the NRC and also looking at other  
13 scenarios that look at more recent concerns, like the use of  
14 armor-piercing weapons.

15           Actually, I was going to tell you a lot about the  
16 fight that we're going to have with the NRC over the issues,  
17 but we're going to publish that very shortly. So I want to  
18 turn to the last set of--yes, the last set of issues I want  
19 to bring to you.

20           We've made a lot of recommendations to DOE. I  
21 would argue if they had taken our advice, Dwight and I could  
22 be here giving each other's presentations today.

23           Let me, first of all, show you how we've approached  
24 the risk assessment issue. We've argued that a comprehensive  
25 risk assessment approach that looks at consequence analysis,

1 as well as probabilistic analysis, is key, and we've also  
2 argued that the EIS ought not to be just a process of jumping  
3 over some NEPA hurdles, but you ought to look at this as an  
4 opportunity to develop a living risk management plan for your  
5 project that would be used for the life of the project.

6           To this end, we've commissioned some work,  
7 particularly at the risk assessment study program at Clark  
8 University, to actually lay out the methodology for doing  
9 comprehensive risk assessment, and we've also put it in a  
10 much less academic approach. This is a handout that I gave  
11 at the last EIS scoping meeting. And by the way, I want--you  
12 know, we don't often have our opinions say, you know, many  
13 good things about the Department of Energy. I really thought  
14 that while there were issues that could have been done much  
15 better in terms of more meetings in Nevada, the Department of  
16 Energy did a fairly credible scoping job and allowed lots of  
17 material to be put into the record, like our concerns. And  
18 so I'm hoping now that as work on the EIS picks up, that they  
19 will actually go back and look at these issues.

20           This is a way of summarizing issues for the lay  
21 public. These are the 10 questions that that risk assessment  
22 should answer in plain language.

23           We've made many recommendations regarding rail  
24 transport. The bottom line to us, rail is the mode of  
25 choice. We want to see a reduction in the number of

1 shipments, the use of dedicated trains in large capacity  
2 dual-purpose casks. We want to see dedicated trains  
3 operating under AAR-approved protocols, and we want to see  
4 the normal institutional relationships that we've argued for  
5 addressed as early as possible.

6           We've argued for full scale testing of shipping  
7 casks and also argued that it has to be part of a larger  
8 process that involves a re-examination of the adequacy of the  
9 NRC cask performance standards, and in addition to regulatory  
10 testing, I think there is a need to at least evaluate the  
11 potential benefits of randomly selecting a production model  
12 cask and testing it as well.

13           The State of Nevada has worked very closely with  
14 the Western Governors Association. Indeed, we've co-chaired  
15 their WIPP Transportation Technical Advisory Group for most  
16 of the last five years to jointly develop a set of  
17 transportation safety protocols for truck shipments of waste  
18 to the New Mexico facility. I've given here some of the  
19 general concerns. The next slide shows some of the specific  
20 things. We've basically looked at all the nuts and bolts  
21 issues from carrier selection, emergency response equipment,  
22 how to do inspections, down to developing program evaluation  
23 measures to make sure that we're spending federal money  
24 wisely.

25           That, I believe, is the best example of where

1 there's been cooperation between states and DOE, and we would  
2 argue that this model, which uses regional organizations like  
3 the Western Governor's Association of the southern states'  
4 Energy Board is a much better model than an open-ended  
5 privatization approach.

6           Regarding implementation of the requirements in the  
7 Nuclear Waste Policy Amendments Act for financial assistance  
8 to states to provide training both for accident prevention  
9 and for response to accidents, we are sadly disappointed with  
10 the approach that the Department is taking here.

11           They've argued that they don't have to implement  
12 this program through rule-making. They argued that they  
13 don't have to find an adequate amount of money to actually  
14 meet the needs. They just have to figure what reasonable  
15 amount of dollars they can get from Congress and then come up  
16 with a fair allocation process. And, indeed, we're  
17 constantly struggling with them over issues like whether they  
18 should restrict our ability to buy radiation detection  
19 equipment or clean-up equipment to 10 per cent of our  
20 allowable grant. And for the life of us, we cannot  
21 understand why state emergency management organizations  
22 should be micro-managed on issues like that.

23           And so then when we turn to some of the detailed  
24 issues that we've raised, again, we've tried to lay out for  
25 DOE the nuts and bolts of how a technically safe

1 transportation program can be built, and do it in a way so  
2 that it's not only technically safe, but so that it's  
3 perceived by the public as being safe.

4           Finally, privatization. I guess the saddest thing  
5 I have to report is that I don't see any evidence at any of  
6 the issues that the State of Nevada or other stakeholders  
7 have raised with DOE that have actually been considered so  
8 far. In fact, you know, when you're reading RFP language,  
9 it's often confusing, and one of the key issues between  
10 Nevada and DOE is this regional approach. And when I finally  
11 saw the draft RFP, the provision for regionalization was  
12 written so quirkily, that I called my boss and said, "Hey, I  
13 think we won one," and I was really deflated when I brought  
14 that question up with Dwight and he said, "No, we haven't  
15 changed our approach. We are looking to break the country  
16 into four regions and have at least two contractors, that no  
17 contractor would have more than two regions.

18           So process wise, I would argue that DOE defeated a  
19 lot of the good work that they've done through their regional  
20 organizations, through the transportation coordination group,  
21 through the transportation external coordination working  
22 group by unilaterally laying these ideas, that it would have  
23 been much better if they had come to us and said, you know,  
24 we're under all this pressure from Congress to come up with  
25 privatization. How should we approach this in a way that

1 would be acceptable to all the stakeholders?

2           It's sad to me that after almost 20 years of  
3 locking horns over this and thinking we've made some progress  
4 on process--and I'm not blaming Dwight. It was probably the  
5 legal department because they're usually the folks who make  
6 those decisions as to how you will put forward the language,  
7 particular with federal procurement, which is a very  
8 difficult issue.

9           So I am sensitive to the constraints they operate  
10 in, but they missed a big opportunity here.

11           In terms of specific issues, maybe the single most  
12 important problem here is what DOE doesn't want to tell the  
13 contractors to do. We don't have any problem with telling  
14 the contractors we're going to set performance standards. We  
15 want to see you maximize the use of rail. We want to  
16 minimize the number of truck shipments. That's the approach  
17 that we think. If you take an open-ended, market-driven  
18 approach, we're very concerned that not only will there be a  
19 large number of shipments by truck, but that when we look at  
20 the coordination problems, that raises both real safety and  
21 perceived risk and public acceptance issues.

22           Uncertainty about state oversight rights is another  
23 issue. This is a difficult one to explain shortly, but in  
24 both the '82 and '87 federal legislation, there are all kinds  
25 of provisions that require DOE to do things, develop

1 transportation plans, work with the states, and a lot of the  
2 state oversight role has evolved from programmatic provisions  
3 and is not embedded in regulations. And we're afraid if you  
4 go to this privatization approach, our influence could well  
5 be minimal.

6           The regional approach to contracting. I hate to  
7 pick on you on this, Dwight, but I asked, I said, look, what  
8 if one vendor clearly submits a superior proposal for each of  
9 the four regions? How are you going to deal with that?" He  
10 looked me in the eye, and he said, "We would have to repeat  
11 the procurement."

12           Well, first of all, that's not an efficient way to  
13 do business, and secondly, it tells me that this notion of  
14 trying to keep cost competitiveness alive is more important  
15 than excellence. I don't think that's a standard that DOE is  
16 going to want defend in public meetings in Pahrump or Kansas  
17 City or Chicago or Denver, along the transportation  
18 corridors.

19           Coordination in the real sense is a big concern  
20 because the RFP only applies to the civilian spent fuel  
21 shipments. Also coming to the repository will be thousands  
22 of shipments of DOE-owned spent fuels, DOE-owned high level  
23 waste, so-called miscellaneous waste requiring geologic  
24 disposal. At the same time, DOE will also be operating other  
25 shipping campaigns through the EM program, in particular tens

1 of thousands of truck shipments to the WIPP facility in New  
2 Mexico, in many cases using the same corridors, the same  
3 routes through the same states. They haven't thought through  
4 all the coordination issues. Perhaps when we write our  
5 comments, we'll persuade them.

6           Finally, there are many unresolved issues, safety  
7 issues, Yucca Mountain access issues, and we're concerned  
8 that instead of trying to work those out with the states, and  
9 particularly with the state of Nevada, DOE intends to throw  
10 this to contractors. We think that would be a big mistake  
11 for all the bad feelings, for all the adversarial  
12 relationship that exists between the State of Nevada and DOE.  
13 The State of Nevada has separated our concerns about  
14 repository siting from our concerns about transportation.  
15 Absolutely, we're not doing anything to help DOE get a  
16 repository license for Yucca Mountain.

17           But transportation is the area where we believe  
18 we're most likely to be adversely affected by this project.  
19 So it would be stupid for us not to consider the possibility  
20 we're going to get stuck with the repository, so we're trying  
21 very hard to participate in the development of the  
22 transportation program as it applies to the privatization  
23 approach and as it applies to the other areas I've talked to  
24 you about.

25           I apologize for going over that extra 10 minutes.

1 I very much appreciate this opportunity, and I hope from now  
2 on out that we won't go so long without spending more of this  
3 kind of time in each other's company.

4 Thank you.

5 ARENDT: A couple comments. One is, it doesn't have any  
6 relation to what we're here for, but had I known you were a  
7 Packer fan, I would have brought you my Chiefs hat.

8 Now, you have presented a great deal of information  
9 that's going to require a great deal of thought on our part  
10 in evaluation of it. You run over much, much, much material.  
11 And I don't have any real questions, and I don't really have  
12 any responses, except that I will see myself that we will  
13 evaluate what you have presented.

14 Are there any other questions? Yes, Dan Bullen.

15 BULLEN: Dan Bullen, Board designee.

16 First, I'd like to thank you because we did get a lot of  
17 information, and I found out that the train that carries the  
18 waste is going to go about 20 blocks from my house, which  
19 doesn't bother me, by the way, but I think you should notice  
20 that.

21 The second thing that I want to ask you is that,  
22 you know, I'm very interested in your risk assessment, and I  
23 want to know if the State of Nevada has done the same type of  
24 risk assessment for hazardous waste materials and hazardous  
25 materials that are shipped through the country, and if they

1 have, are those data kind of available, and if they haven't,  
2 when are they going to do it?

3       HALSTEAD: Well, that's a real good question, and that's  
4 a fair question. My argument, and I've been involved not  
5 only with nuclear waste transportation for a lot of the last  
6 two decades, but involved a lot with one slice of the HAZMAT  
7 industry, petroleum, particularly petroleum fuels. I think  
8 it's about time we start regulating everyone else to the  
9 standards that we've attempted to regulate radioactive  
10 materials. And I think that's, in fact, what you see  
11 happening.

12               For example, in the HMTUSA, Hazardous Materials  
13 Transportation Uniform Safety Act of 1990, which has  
14 promulgated rules for the routing of the most highway  
15 hazardous categories, you know, inhalable toxics, for  
16 example, that are basically modeled on the processes that  
17 were developed in HM-164 for routing nuclear materials, I  
18 think the real problem here, frankly--well, actually there  
19 are two problems. One is lack of funding at the State level.  
20 We've had difficulty in this state, as other states have  
21 had, levying fees on private industry in those areas where we  
22 haven't been preempted by federal regulation to actually have  
23 independent funding that work.

24               And secondly, we've both had interagency overlap at  
25 our own state and local level, and it's compounded by federal

1 pre-emption.

2           For example, I'm not sure how--well, let me give  
3 you an example to show you what we've tried to do. The state  
4 of Nevada's Public Service Commission is responsible for  
5 regulating rail shipments of hazardous materials, and there's  
6 a famous inconsistency ruling where we tried to argue that  
7 carriers should not be allowed to leave boxcars of Class A  
8 and B explosives on sitings without some security, like a  
9 fence around them or guards. And we got preempted at the  
10 federal level for trying to develop those types of safety  
11 regulations.

12           But I think many people do have a double standard.  
13 They want to be harder on nuclear materials and other HAZMAT,  
14 and I think what you're seeing, particularly with things like  
15 the petroleum tank car study that was mandated in the HMTUSA,  
16 you're seeing a move in the opposite direction, to take the  
17 strict approach and apply it to everything else.

18           BULLEN: I just applaud your efforts, and I just would  
19 like to see them extrapolated because, you know, the safer,  
20 the better for the entire nation.

21           ARENDR: Are there any other questions? If not, thank  
22 you very much.

23           HALSTEAD: Again, thank you for the opportunity to be  
24 here.

25           ARENDR: The next speaker--I've lost him for a moment,

1 but I'll find him--Brad Mettam.

2           METTAM: You only lost my name. I was still here.

3           As you said, my name is Brad Mettam. I represent  
4 Inyo County, which is a California County, and is one of the  
5 10 counties that were and are still considered the effective  
6 units of local government.

7           We were asked to come and present the local  
8 perspective on the privatization issue, and we have involved  
9 three of the counties that still have programs involving  
10 Yucca Mountain in place. As you may know, there was no  
11 funding in the last two years for local government  
12 involvement, so there were just a few of us still hanging on.

13           We'd like to talk a little bit about--am I loud  
14 enough back there? Okay. That's strange, I can't hear me.

15           Okay. We'd like to talk a little bit about what we  
16 see that is potentially wrong with the RFP, key elements of a  
17 process that might work, and the benefits of using such a  
18 process. We consider our views to be representative of local  
19 governments virtually anywhere, although what you find here  
20 are local governments that have gotten expertise on the  
21 issues and have retained that, at least for awhile.

22           We don't see privatization by itself as being the  
23 problem. If you look across what's going on at Yucca  
24 Mountain right now, you'll see that most of the people  
25 working there are already contractors. You know, this is not

1 a DOE intensive operation. If all the DOE people went away,  
2 most of the workers would still be there.

3           The problem really isn't privatization. The  
4 problem is that you're privatizing the transportation policy,  
5 as well as transportation operations.

6           In our view, the privatization of transportation  
7 policy decisions, along with the transportation operations,  
8 is just not going to work. The RFP in its current form  
9 leaves most of the major decisions in the hand fixed-price  
10 contractors, without providing any policy direction.

11           In any privatization effort, we see that the agency  
12 must provide the policy direction to the contractor at the  
13 onset. If you don't do that, then you have some real  
14 problems.

15           Some of the areas where you have to provide policy  
16 would include interim storage options, whether you be on site  
17 or off; mode and cask choices, you know, do you go by rail,  
18 do you go by highway, what size cask do you use, do you go  
19 with existing cask or not? Clearly, to us, a campaign of  
20 this magnitude--in a campaign of this magnitude, regulatory  
21 minimal compliance is not sufficient, especially in the area  
22 of routing.

23           We also feel that interaction with local government  
24 is not appropriate to be done in the hands of several varied  
25 contractors, and we'll talk about that in a moment.

1           As we see it, the current proposal does not  
2 identify optimal interim storage or transportation  
3 strategies, it does not allow the development of an efficient  
4 national routing plan, and it does not demonstrably minimize  
5 risk.

6           We feel that it's important that you not rely on  
7 minimal regulatory compliance to create a safe program. And,  
8 in fact, as we'll talk a little later, other programs, both  
9 within the Department and in the industry, have not relied on  
10 minimum regulatory compliance.

11           The regionalization, the breaking the country up  
12 into regions and not requiring or not really coordinating  
13 that effort, means that decisions will be made by fixed-price  
14 contractors, based almost entirely upon minimum regulatory  
15 compliance. It also means that corridor states, counties and  
16 local communities will be required to deal with up to four  
17 different RSAs.

18           If you take the diagram that Dwight showed earlier  
19 and you start drawing on that diagram the transportation  
20 routes, you realize that there are a lot of communities along  
21 those corridors that are going to be dealing, as was  
22 mentioned by the chairman, with many different RSAs, with  
23 different policies, different methods of interacting. All of  
24 those things that are not defined in the RFP will be  
25 developed independently by each of the RSAs.

1           A few of the implementation realities of what we  
2 see as a 40-year national transportation campaign, you're  
3 going to be starting from 80 counties. You are going to  
4 cross at least 800 counties, and that's using the MPC base  
5 case, which is likely not to be the actual transportation  
6 case.

7           In each of those counties, you're going to be  
8 interacting with the local populous, and you're going to be  
9 interacting with local officials. Those people exert  
10 influence at both state and federal levels. In essence, what  
11 we're saying there is, if you do not develop a policy, you  
12 will find a policy developed for you, and I don't think  
13 that's the approach you want to take.

14           You have to develop a campaign that will be  
15 acceptable, or at least tolerable, by answering some very  
16 specific questions. The question of modal choice, why are  
17 you shipping it that way? Why, in this instance, for  
18 example, are you using truck and in another instance you're  
19 using rail? Why are you shipping it through our community?  
20 How did you develop the routing strategies? And is there a  
21 safer way to ship it?

22           You will also have to make certain that the local  
23 emergency management and emergency response community  
24 considers itself trained and prepared and is willing to say  
25 so to its own constituents.

1           You should note that in the RFP, DOE has retained  
2 the 180C provisions as something of their own responsibility,  
3 which means that in addition to dealing with up to four  
4 different RSAs, you're going to have another layer,  
5 potentially--certainly not closely coordinated with the RSA  
6 work, that we'll have to deal with as well.

7           We think that other programs and other shipping  
8 campaigns have either recognized this problem from the outset  
9 or have learned it as they developed. I note a few of them  
10 on the slide there.

11           Some of the key lessons that we think are learned  
12 there, and this is not by any means an exclusive list, is  
13 that a negotiated decision process is more likely to engage  
14 the stakeholders. Early route selection narrows the field of  
15 impacted parties and allows focused efforts, that state and  
16 local jurisdictions know their own transportation systems  
17 best, and finally, that perceived problems are still  
18 problems.

19           We think that DOE must develop a system that  
20 demonstrably reduces both risk and uncertainty, and that the  
21 only way to effectively do that is a systems approach. You  
22 have to address such issues as interim storage strategies,  
23 both on-site storage and off, mode selection and modal mix, a  
24 priority in the reduction of the number of shipments, a  
25 national route selection process, and the potential to

1 consolidate routes across the country, practical public  
2 safety protocols, such as bad weather protocols around the  
3 routes.

4           We feel that there are key policy issues that need  
5 to be resolved and that stakeholder involvement prior to  
6 tasking a contractor is required.

7           Jim Williams, who is representing Nye County, will  
8 talk a little bit about what that process might be, and then  
9 later we'll have Clark County.

10           Jim?

11           WILLIAMS: I'm Jim Williams, and my role in this little  
12 tag team we have organized here is to try to answer the--or  
13 provide an answer to the question if the current process  
14 won't work in our opinion, what process might?

15           And our answer in basic terms is that a process  
16 that might work is one that provides convincing answers to  
17 the kinds of questions that Brad raised; have the risks been  
18 minimized? Is there a safer way? Why are you shipping this  
19 way? Why shipping at this time? Why shipping through my  
20 community? Have all interests been heard; have they been  
21 considered? And it provides those answers to the key  
22 stakeholders in the process, including utilities, including  
23 DOE, including host state and corridor communities, state  
24 commissions and others.

25           Our perspective on this is the perspective of a

1 corridor community. It could be those that are represented  
2 here today, or it could be 800 or so others across the  
3 nation. We are also, in these communities, are anticipating  
4 some decisions regarding transportation. They will consider  
5 a significant momentous of local import and need a context in  
6 which to make those decisions. It's difficult to operate  
7 without that.

8           We're also aware that the state of Nevada would  
9 observe that locating centralized storage in Nevada has been  
10 illegal for a decade or more, and there's no necessary reason  
11 to assume that such a facility would be up the road from  
12 here. And we've noted the NWTRB's position that centralized  
13 storage is needed, but perhaps not now.

14           So what sort of process might provide these  
15 convincing answers to the questions? And our notion there,  
16 and this is for discussion, but our answer to that question  
17 is a systems planning process at a sequence of decision  
18 levels, each of which is designed to provide a useful context  
19 for the next decision level, each involving major  
20 stakeholders participating under ground rules negotiated.

21           For discussion, we've identified four sequential  
22 levels. One is a set of national policy guidelines. A  
23 second is the specification of those four particular sites,  
24 and for corridor communities across the nation. That might  
25 set the context, a useful context, for the identification of

1 transportation corridors in the host state, which in turn  
2 might provide a useful context for transportation decisions  
3 in the host state corridor and site communities--and requires  
4 a credible information basis, which is somewhat more  
5 systematic, somewhat more detailed, somewhat more  
6 comprehensive and more interactive than what has been  
7 provided here for.

8           I'll go through and explain a little bit about what  
9 we mean about the information basis and then address the  
10 decision process.

11           The topics in the information basis include a lot  
12 of particulars, cast loading limitations at the various  
13 sites, site infrastructure limitations, interim storage  
14 options, the dual cask issues that we were discussing,  
15 shipment mode options, acceptance and so forth.

16           Some of these are features of reactors, some are  
17 features of pools with vast storage facilities, and others  
18 are features of the reactor sites.

19           The implications, and this is the next one, Fred,  
20 --thank you--all right--are numerous. They have to do with  
21 the inventory. This is beyond pool capacity of the site, the  
22 inventory that needs to be stored after reactors shut down,  
23 the cost of this both for the Nuclear Waste Fund and to  
24 individual rate bases, the implications of certain cost  
25 adjustment processes that might be identified, the number of

1 shipments, the kind of material that Bob Halstead was talking  
2 about of a particular type on particular route segments at  
3 particular time periods, and the management emergency  
4 response aspects of all of this.

5           The information sharing is among the--in our  
6 concept, is among the stakeholders at any particular decision  
7 level. Those stakeholders would define a manageable number  
8 of scenarios; out of myriad alternative assumptions, a  
9 manageable set of scenarios, which could be--which would  
10 include all the topics, all the implications and would be  
11 updated with some regularity.

12           And stakeholders might use the same process to  
13 develop scenarios of their particular interest, all of which  
14 would be shared in hard copy and electronic form and with  
15 feedback from the participants and stakeholders in the  
16 process, be they utilities or corridor communities, that  
17 builds a robust national database to manage such a campaign.

18           The status of all this, and on the topics, much of  
19 that data exists. Not all is updated, not all is validated.  
20 On the implications, there have been studies, such as the  
21 state study that have developed much of this, but there are  
22 portions that have not been developed.

23           On the sharing, there's the technical external  
24 committee that DOE has formed and sponsored. It's a major  
25 organizational resource, but it has not been used for nitty-

1 gritty negotiation of decision processes.

2           Now, we'll get to the next one. And on the  
3 decision levels, these are the decision levels that we've  
4 thrown out for discussion, each of which is designed in our  
5 view to provide the context for the next in the process.

6           The whole process, we feel, requires a convener, a  
7 convener that identifies the policy assumptions and variables  
8 at each decision level, that identifies and invites  
9 stakeholders to that level, that conceives and designs the  
10 ground rules that are--that think through the basic issues  
11 that need to be resolved at one level in order to provide a  
12 useful context for the next, that moves that process at an  
13 appropriate strategic pace from one decision level to the  
14 next, and that oversees the procedural fairness of the entire  
15 enterprise.

16           Each of the several decision levels, we've  
17 mentioned four, would itself have a convener. It could be  
18 the overall convener or it could be another convener  
19 identified for a particular process, whose meeting it would  
20 be. Each would have its own group, appropriate group of  
21 stakeholders, necessary and appropriate to that level of  
22 decision. They would negotiate their decision ground rules  
23 and specify their issues to be resolved and their agenda and  
24 schedule for which to resolve it.

25           We think, and have no contentions otherwise, that

1 the process would be pretty tough and pretty tricky, and  
2 would require some very effective people who had a certain  
3 degree of authority and a willingness to try on this.

4           We've looked in, you know, very rough terms at the  
5 basic direct cost over the next three years of a process like  
6 we've identified, and it adds up to about seven-and-a-half  
7 million dollars. We've compared that with another extremely  
8 rough estimate of a more adversarial process, which includes  
9 the Phase A of the proposed privatization at about five  
10 million and a series of interventions by utilities and state  
11 commission, perhaps by corridor states and localities,  
12 perhaps by the host state, perhaps by the host state  
13 localities. And our observation is that a systematic  
14 decision process needs only a small amount of money to be  
15 worth it just in dollar terms, not considering the political  
16 terms and the schedule terms.

17           So now Bart is going to talk about what the  
18 substantive benefits might be.

19           DI BARTOLO: My name is Russell di Bartolo. Jim  
20 referred to me as Bart because that's what most people do.

21           Inyo County is in California here. Jim has just  
22 represented Nye County, and here's Clark County. So we  
23 pretty much cover the southern part of Nevada and a fairly  
24 good portion of the southeastern part of California.

25           I am an Oakland Raider fan, formerly a Buffalo Bill

1 fan, so this leaves me with the mop-up operation.

2           I would like to very much validate what has been  
3 said already by my colleagues in the county, and also  
4 especially by Dr. Stern in the first presentation, which I  
5 believe took place yesterday morning, or at least it seems  
6 that way. I think it was Sunday.

7           What I would like to do, just to reiterate before  
8 our roundtable discussion, what the potential benefits would  
9 be of a system planning or decision process, and even though  
10 they are showing up on the slide, I just want to say what it  
11 will do primarily for the counties, it would help increase  
12 certainty about the program. That is certainty about policy,  
13 certainty about management and operations, and certainties  
14 about institutional interactions especially.

15           We know we have seen a lot of changes, a lot of  
16 back sliding without a comprehensive noticeable obvious  
17 policy with regard to transportation. We've seen some back  
18 sliding, for example, with regard to changing the priorities  
19 for minimization of shipments by using rail. It's been  
20 thrown in the hands--it's been thrown into the privatization  
21 program. But we do feel that if the process that Jim  
22 provided or described, outlined, would be put into effect,  
23 DOE, in fact, because of the buy-in and the cooperation of  
24 the stakeholders, would have a very efficient interim storage  
25 transportation system, and the Nuclear Waste Fund monies

1 would be spent on steps or programs that would work because  
2 they would be if not acceptable, at least tolerable.

3           DOE would have a basis for its privatization  
4 procurement process that, again, is acceptable or at least  
5 tolerated.

6           Utilities would benefit because they would have  
7 more certainty or commitment with regard to scheduling. They  
8 would have--in the process we would have already talked about  
9 the cost for utilities after the 1998 date and after the  
10 reactor is shut down because that's all part of the plan.

11           Primarily, though, we are very interested in  
12 minimizing the number of corridor states or communities that  
13 would be affected in the national routing plan. We would get  
14 answers--we would be more certain about how or whether the  
15 risks had been minimized. In fact, one of the notes that I  
16 wrote the earlier presenter had to do with a definition of  
17 risk. What we find, for example, is that the scientists,  
18 technicians and so on define risk in the long term, latent  
19 cancer fatalities, for example, where people in the  
20 communities define risks as current and hazards in the near  
21 future; how can this affect us now?

22           So there's a little bit of a disconnect with regard  
23 to what we even mean by risk.

24           We had discussed in the communities and state the  
25 whole idea of how the term risk or the concept of risk fits

1 into the whole idea of impact. We tend to look at impacts  
2 and consequences because that's what we can see and feel.

3           So we have taken up very enthusiastically the  
4 critique and commentary on any EIS that comes out because  
5 that begins to tell us what it is that the Department of  
6 Energy is thinking about when they are dealing with risk  
7 and/or impact.

8           So I think that a process, as Jim described, would  
9 help us with those definitions, and it's very, very important  
10 to us.

11           One of the things we know that would decrease risk  
12 and impact is the minimization of shipments. Given that the  
13 route plans are made and acceptable or tolerated, we then  
14 know where to provide the resources with regard to public  
15 safety, emergency management training, infrastructure  
16 improvement and so on, and would be able, no doubt, to reduce  
17 costs.

18           The fact is that no matter what the costs are, if  
19 it turns out that shipments would be made on roads, say  
20 highway, through our community, even--whether or not we have  
21 funding for emergency management, emergency preparedness,  
22 training, infrastructure improvements, we have to do it  
23 anyway. So there is a problem in some cases with unfunded  
24 mandates for local communities in the state, and that's  
25 something that's very serious to us. So the cost impact to

1 the local government is very important.

2           And if you would go to the last slide, Fred? I  
3 mentioned already that we feel that given a process as  
4 described, we would either maintain or establish a clear  
5 delineation of roles and responsibilities among and between  
6 governmental agencies, utilities and other stakeholders.  
7 Sometimes that disappears. It appears to be disappearing  
8 again with the privatization issue. We're not sure where we  
9 stand again with regard to the institutional interaction.  
10 That's a very important point for us.

11           Given early identification of highway or rail  
12 routes, we would be very--it would be very, very good for us  
13 so that we can do our planning with regard to protecting the  
14 public, which is a mandate of a local government.

15           And another thing that we need--that I sort of  
16 alluded when I was talking about definition of risk has to do  
17 with the idea of developing a common frame of reference,  
18 without going into detail, and possibly we may talk about in  
19 the roundtable, we have begun to talk again about a common  
20 process or acceptable process within U.S. DOT guidelines,  
21 with DOE proactive activity to deal with the process for  
22 identifying routes. How far along that's going to go, I'm  
23 not sure. But we are beginning again to talk about common  
24 processes, common databases, common frame of reference for  
25 any of our analyses or actions, and I think it's most

1 important.

2           And given all this with regard to routing and  
3 database, we then will have a framework. We will have an  
4 identifiable framework that we could hang on to. Right now,  
5 the target keeps moving.

6           I thank you for your attention.

7       ARENDT: Thank you, Bart.

8           And with that, I'll open it up for questions, and  
9 if you direct them to me, I'll probably deflect them to one  
10 of the others.

11           Any questions from the Board?

12       COHON: Cohon, Board.

13           First, I want to compliment you on the excellent  
14 set of presentations. I'm from a part of the country where  
15 it's a rare event for three counties from the same state, let  
16 alone from two states, to cooperate on anything, let alone  
17 something that's complex and potentially contentious as this.

18           I have a suggestion that I hope you'll follow up  
19 and discuss during the roundtable, and no need to comment on  
20 it now. In fact, I guess I prefer you don't even react to it  
21 now, but rather chew on it.

22           The process you propose is a very top-down process  
23 that looks a lot like the kind of big government, we're from  
24 Washington, Carson City, Sacramento, and we're here to help  
25 you approach, which some of us don't really object to. But,

1 you know, it's kind of the times, and we're trying to find  
2 other ways.

3           The key points, it seems to me, are a) that the  
4 criteria by which things like routes will be determined may  
5 not include your interests, and likely won't because, as you  
6 pointed out, it's based on a private company's push to  
7 maximize profit within a compliance framework, but compliance  
8 does not minimize--so point one is criteria.

9           The second point you made is coordination. We need  
10 a systems approach here. You made some very good points  
11 about other forms of waste shipments that haven't been taken  
12 into account in other waste coordination. That, too, there's  
13 no evidence that the private approach that DOE is discussing  
14 is going to achieve that.

15           But the question then becomes how do we achieve  
16 those two things, or better criteria and a better  
17 coordination, and whether it's necessary to go to such a  
18 hierarchical process of the sort that you developed. I  
19 wonder if there's some middle ground here that has more of  
20 the--to the private sector post-modern approach to government  
21 feel about it that DOE is trying to achieve and still  
22 accomplishing what you're trying to do. And I think there may  
23 be something there and think this could be an interesting  
24 creative roundtable.

25           METTAM: Thank you. And I think what I'll do is task

1 Jim to do that at the roundtable.

2 ARENDT: Other questions? Staff?

3 Well, that concludes this portion of the program,  
4 and I thank you very much.

5 COHON: We're going to break in about five minutes and  
6 30 seconds. I have a 30-second thing to do first, Mr.

7 McGowan.

8 I told you about three of our new members, but I  
9 couldn't show you them because they were in the ESF earlier  
10 today. To show you what kind of troopers they are, as well  
11 as the staff along with them, and I see other people  
12 similarly dressed, they're back here attending a meeting,  
13 which I think is marvelous. It shows their spirit and  
14 enthusiasm.

15 I would now like to show you these people, as well  
16 as introduce them.

17 The deal is, when I call your name, you have to  
18 stand up and turn around so people can see you.

19 Norman Christensen, he's the guy from Duke, you  
20 remember. By the way, I have to explain the new members. We  
21 had a little tiff earlier about applause, and we've all  
22 agreed there will be no more applause at any of our meetings  
23 forever. Welcome, Norm.

24 Florie Caporuscio, he's the guy from Infermatics in  
25 New Mexico. Welcome Florie.

1           And Debra Knopman, now running a policy center,  
2 former Deputy Assistant, Secretary of Interior, staff  
3 hydrologist at the GS, et cetera. Welcome, we're delighted  
4 to have you. Our full compliment. It's nice to see you all  
5 sitting there.

6           The other business before our break is, as was  
7 mentioned earlier, there will be a public comment period, and  
8 it's on our agenda, and we will get to it, and we will stay  
9 here as long as we have to and accommodate all who want to  
10 speak.

11           However, to accommodate Tom McGowan's schedule,  
12 which doesn't allow him to stay here for the public comment  
13 period, we've invited him to speak for no more than five  
14 minutes, and he has sworn at least three times, and even  
15 shook my hand on it, that he would limit his comments to five  
16 minutes.

17           MCGOWAN: As the Baptist minster said, I couldn't say  
18 hello in five minutes or less than an hour, but thank you  
19 very much. My name is Tom McGowan, and thank you for your  
20 kind consideration, and I promise to cut out the part about  
21 criminal conspiracy. We'll just stop just short of  
22 underground auto catalytic criticality. So just enough to  
23 raise the juices.

24           It's rudimentary that the whole is equal to the sum  
25 of the parts, not--to some, but not all of the parts, and

1 hence, any expediently contrived composite study comprised of  
2 intentionally minimal, selectively limited, incremental  
3 addressed of certain preferred tangible geophysical  
4 components, with the exclusion of all others, and is  
5 expediently coupled with any intentionally minimal,  
6 selectively limited, incremental addressed in simulation of  
7 other preferred components, via stochastic and thereas  
8 unreliable, hypothetical, statistical, probabilistic  
9 modeling, inevitably obtains as the board of any extent of  
10 independently verifiable, as of insured and during the valid  
11 and reliable scientific certainty whatsoever. But rather,  
12 the hole is, indeed, equal to the sum of its parts, and not  
13 to anything else or ever anything less.

14           Consequently, notwithstanding the expedient claim  
15 of study context as an evolving process, contingent upon the  
16 accumulation and selective correlation of preferring  
17 scientific data derived from an unspecified series of  
18 sequential iterations of said composite and geophysical  
19 components and hypothetical simulations, none of which is  
20 realistically foreseeable as insured invariably  
21 scientifically valid and reliable and enduring thereas in  
22 perpetuity; a purportedly total system performance  
23 assessment, the void of real time concurrent inclusion and  
24 the address of the entirety of intrinsic and externally  
25 pertinent--thereas further securely constrained as a limited

1 incremental finite micro-cosmic temporal, instant specific  
2 and site specific, special aerial context, in contrast to the  
3 vastly greater encompassing macro-cosmic, spatial, aerial  
4 domain and vastly greater and enduring term of the geologic  
5 time scale continuum, is not only scientifically impossible  
6 to achieve and thereas fraudulent in extreme, and I cleaned  
7 that up. But also obtains as the classic paradigm of the  
8 intentional absence of personal and professional integrity  
9 and scientific objectivity, particularly as guys in the  
10 damningly transparent armor of those masquerading as  
11 unavoidably and expediently--being forgivably uniformed, were  
12 nevertheless persistent, starkly arrogant defiance of the  
13 fact that essentially and ultimately unity is plural, to the  
14 best of my understanding.

15           Since the term viability is both indicative and  
16 securely contingent upon the--capability of an entity or  
17 system to obtain and sustain invariably in context as wholly  
18 independent of any and all external stimuli, impetus and  
19 interactive and no interim active phenomenal whatsoever, is  
20 scientifically impossible for an underground permanent  
21 repository facility to either obtain or invariably--sustain  
22 as independent of a contiguously encompassing host geologic  
23 and hydrogeologic domain and of the series of concentric and  
24 sequentially greater encompassing host domains, respectively  
25 comprised of planetary solar systematic, galactic and

1 universal context.

2           Notwithstanding any extent of--agenda driven--  
3 subjective agenda driven, I beg your pardon, unscientific as  
4 being the rationale--implications and interim act of  
5 consequences of however currently configured is potentially  
6 divergent and seemingly innocuous, geophysical and  
7 hydrogeologic phenomena are nevertheless subject to  
8 egregious perturbations in the instance of an artificially-  
9 induced thermal loading impediment, whose--may readily  
10 accelerate the cooling intrusion and emerge in process and  
11 make sure the premature release of migratory transport of  
12 toxic radionuclides via an expanding wake impact in both the  
13 surficial biosphere and subsurface ecological root systems,  
14 as well as the groundwater and downslope human accessible  
15 environment, encompassing and impacting all burrowing and  
16 tunneling vertebrates and invertebrates and--micro-organisms  
17 inclusively, hence and total obtains the scientifically and  
18 technologically insuperable over any substantially enduring  
19 term, and for the simple reason that not the however fervent  
20 postulations of the DOE OCRWM--but irrefutably, change is  
21 ordered universal constant, as is abundantly having to do all  
22 but the certifiably comatose and as a scientifically  
23 observable from the micro-cosmic, sub-nuclear scale to the  
24 macro-cosmic universal scale inclusively. Therefore, it's  
25 axiomatic. Please don't cry, just a song, that the

1 underground geophysical domain is naturally ordered as in the  
2 state of variable dynamic flux, ongoing and continuum from  
3 inception to eventual cessation, currently projected to occur  
4 in approximately four-and-a-half to five billion years  
5 henceforth, which not incidentally coincides with the initial  
6 active half-life term of duration of Uranium 238--I said  
7 initial. There's about 10 more.

8           Consequently and scientifically and technologically  
9 impossible to guarantee the safe, secure and intrusion or  
10 disposal of toxic radioactive, high-level nuclear waste and  
11 spent nuclear fuel in an underground permanent repository via  
12 any combination of waste isolation whatsoever, and any  
13 combination of natural--bearers whatsoever, over any enduring  
14 term whatsoever, and on the basis of any hybrid compositive,  
15 historical, scientific evidence and hypothetical statistical  
16 problems of modeling whatsoever, and our expediency based  
17 inherently fraudulent, total system performance assessment  
18 and viability assessment whatsoever, and as invariably  
19 insured securely subject to institutional control over any  
20 substantially enduring term whatsoever, reliant upon the  
21 persistence of any man-made law and are sovereign  
22 jurisdiction whatsoever, either at Yucca Mountain, Nevada, or  
23 elsewhere nationally, or anywhere within the terrestrial,  
24 geophysical domain. And this is my final 10 seconds, or  
25 yours, one or the other.

1           Therefore, in reiteration, don't star it and eject  
2 into the human accessible environment. Simply eliminate it  
3 completely and permanently from the terrestrial geophysical  
4 domain.

5           Mr. Chairman, there are a few seconds remaining.  
6 You've been very, very kind. I respectfully request that the  
7 chairman provide you unequivocal real time response on the  
8 public record to the following question. Precisely, what is  
9 it that the leading scientific technological and academic  
10 minds of our time do not fully understand about the  
11 fundamental difference between right and wrong? It's quite  
12 that simple. Thank you once again, all of you.

13          COHON: Thank you, Mr. McGowan. I just want to know  
14 when it is you wrote that, Mr. McGowan. I mean, you've been  
15 participating in this meeting all along. Thank you very  
16 much.

17          We will adjourn now for a break until a quarter to  
18 5:00 by that clock.

19          (Whereupon, a break was taken.)

20          COHON: Would the roundtable participants, please come  
21 to the front and take their seats.

22          We're missing Mr. di Bartolo and Mr. Mettam.

23          ARENDR: Well, welcome back. It's about 10 minutes to  
24 5:00. We were supposed to start at 4:30, so we have--we're  
25 20 minutes late, and we're due to finish at 5:30. So why

1 don't we just assume that everybody wants to stay until the  
2 end, and so we'll continue the roundtable to around 6 o'clock  
3 or maybe 10 minutes to 6:00, something on that order.

4           We'll now continue our discussion of the  
5 transportation in a more informal roundtable format. Our  
6 earlier speakers are now being joined by a number of other  
7 guests with an interest in this subject. They will start  
8 this part of the session by giving us their views in a brief  
9 five-minute opening statement.

10           We will begin first, however, by going around and  
11 let our new guests introduce themselves. And as far as I  
12 know, the only new guest we have is Fred Millar. Would you  
13 please--

14           MILLAR: I'm Fred Millar with the Nuclear Waste Citizens  
15 Coalition.

16           FRONCZAK: And I'm Bob Fronczak with the Association of  
17 American Railroads.

18           ARENDR: And we will now hear the opening statements,  
19 and we'll begin with you, Bob. Do you want to start?

20           FRONCZAK: That's fine.

21           My name is Bob Fronczak. I'm Executive Director of  
22 Environmental Affairs for the Association of American  
23 Railroads, and we represent the Class I railroads, people  
24 like Union Pacific, Santa Fe, CSX, Co Rrail, the railroads  
25 that are going to be shipping spent nuclear fuel over the

1 longest distances.

2           I, like Bob, have about four hours of material to  
3 present in about five minutes, so I'll be as brief as I can.  
4 If I could have the first slide, please? And if you think  
5 it's late, my watch says 8 o'clock, and I've got a flight to  
6 catch back to Washington tonight.

7           I'd like to just briefly cover our objectives and  
8 talk a little bit about background, although I'm going to  
9 breeze by most of that in the essence of time; talk about  
10 railroad operating trends and this whole risk management  
11 approach, and we feel that there's several opportunities  
12 technologically to address risk. And we think that's  
13 addressable through the cask, the cask and car as a unit, and  
14 the cask in the car in the train carrying spent nuclear fuel.  
15 Then I'll have a few brief conclusions.

16           Our objective is safe and efficient transportation  
17 of spent nuclear fuel by rail, and I would argue that  
18 currently it's safe, and I'm not quite sure that it's  
19 efficient right now. And as I mentioned, we feel that it's a  
20 three-component system, including the cask--the cask and the  
21 car and the train. Once again, goals are efficiency and  
22 safety, and in order to achieve that, we need a common  
23 understanding of the issues involved.

24           Just a brief background, and Bob already mentioned  
25 this. Depending on which estimate you look at, up to 90 per

1 cent of spent nuclear fuel has been estimated to be shipped  
2 by rail in the future, and that's going to mean about 400  
3 casks; once again, depending on what type of cask is  
4 involved.

5           Now, to put that in perspective--and if I could  
6 have the next slide--that is a very small amount of business  
7 for the rail industry. Our largest carload commodity that we  
8 track is coal, and that's in the 25 per cent range. The  
9 smallest commodity that we track is freight for the  
10 shipments. I think that's 1 per cent. Spent nuclear fuel is  
11 estimated to be .0017 per cent. So it doesn't really matter  
12 if 50 per cent or 90 per cent of it is shipped by rail. It's  
13 still a minuscule amount by carload.

14           If you look at that from a revenue standpoint,  
15 because hazardous materials have a little bit higher revenue  
16 than other materials, coal is still our largest commodity by  
17 revenue, but a smaller percentage. And the smallest material  
18 or commodity that we track is metallic ores at 1.2 per cent,  
19 I believe, and spent nuclear fuel, I believe that's .068 per  
20 cent, is our projected revenue, and that's using some of the  
21 costs of the three-mile island shipping campaign. And  
22 freight rail rates at least have gone from that time. I just  
23 kept it a flat projection.

24           As far as railroad operating trends, trains are  
25 longer and heavier than they've ever been. Freight cars are

1 also heavier than they've ever been. A typical freight car  
2 when NRC standards were first developed was probably 70 tons.  
3 We're consistently running 100 tons now. Some of the unit  
4 trains that we run are up to 125 tons, the unit coal trains.  
5 And the car that we're looking at here, you're looking at,  
6 at least what I've seen on the drawing board, 200 tons.

7           In addition, traffic density is also increased.  
8 The freight rail network is working harder than it ever has  
9 been in the past, moving more freight with less--at less cost  
10 than we ever have.

11           Once again, we feel that in order to achieve safe  
12 and efficient transportation, in an incident-free  
13 transportation system you have to look at the car, the cask  
14 and the train as a unit.

15           We feel that from the car design standpoint, that  
16 you need to minimize the possibility of a derailment to the  
17 extent possible, and there's a bunch of ways you can do that.  
18 The other thing we think is you ought to be able to limit  
19 the damage to the cask in the event of a derailment. In  
20 order to do that, you need to look at the cask and the car as  
21 a system.

22           The Peace Keeper-Rail Garrison project was an  
23 example of using best available technology to the extent  
24 possible to prevent that heavy piece of equipment from  
25 derailling in rail transport. So we think it's very possible

1 that we can do it with spent nuclear fuel shipments.

2           In addition, we feel that there's going to be a  
3 sufficient volume of spent nuclear fuel shipped in the future  
4 to make a dedicated fleet of vehicles readily available and  
5 doable.

6           As far as car design goes, once again, we feel that  
7 there are things you can do to reduce the risk of a  
8 derailment. Some of those things are premium suspension  
9 components. This car is going to be heavy enough that it  
10 will require a three-axle truck; in other words, three wheels  
11 under each side of the car, and there are--there is  
12 articulated truck technology in use on locomotives today. We  
13 feel that ought to be employed in this system.

14           We also think that we need to analyze the car  
15 design for derailment modes. As far as the privatization  
16 effort goes, at least in the MPC/RFP there was mention of the  
17 car having to meet AAR interchange, freight car design  
18 standards, and what's called Chapter 11 testing to prove that  
19 that rail car meets those standards. We feel that that ought  
20 to be incorporated in the privatization effort. We don't  
21 think that just regular meeting DOT standards is enough. We  
22 have 150 years of rail operating experience, and we feel that  
23 some of that experience ought to be employed in the design of  
24 the system.

25           Things like program maintenance ought to be

1 considered. I can't read that from here. Oh, yeah, we need  
2 to minimize the probability of a derailment to the extent  
3 possible. I think Bob mentioned in the past, or earlier,  
4 that if we have a derailment involving spent nuclear fuel, no  
5 matter if the car ruptures or not, it's going to be  
6 potentially a very major incident, and from our standpoint,  
7 we're concerned about how long our track is going to be out  
8 of service because every time you have one section of track  
9 out of service, it affects the entire rail transportation  
10 network.

11           And, also, we feel that there are some things that  
12 you can do to the car that incorporates protection of the  
13 cask, things like double shelf couplers where the cars don't  
14 come detached from each other so that you minimize the  
15 potential for cars crashing on top of each other, for the  
16 couplers impinging on the side of the cask, those types of  
17 things.

18           As far as the train design goes, we feel that you  
19 don't want to just throw in a very heavy specialized design  
20 cask and car in any old freight train, which is the way at  
21 least we're forced to handle some shipments today or we're  
22 asked to handle some shipments today, that it ought to be  
23 designed as a unit train or dedicated train. Once again,  
24 that would be mixing a fairly high-tech car that you don't  
25 want to derail in with freight cars that have been in service

1 for 50-some years.

2           It minimizes train handling force, as I've already  
3 talked about, you know, the fact that you don't want to  
4 really mix a 200-ton load in with fairly light loads, 100-ton  
5 to 70-ton loads.

6           We feel that buffer cars ought to be designed as  
7 part of the train and be of similar weight at least in train  
8 handling characteristics.

9           Having a dedicated train allows you to also utilize  
10 electronic braking technology, which is readily available or  
11 currently available in the rail industry. In the past--I  
12 mean, all freight trains today run on pretty much air brakes,  
13 which requires a signal of air to travel from the locomotive  
14 to the end of the train. It takes quite a while for that to  
15 happen, and it can take up to a mile to stop a freight train,  
16 a long freight train today. With electronic brakes, the  
17 brakes are applied throughout the train instantaneously,  
18 reducing the stopping distance significantly.

19           And we also feel that a dedicated train allows the  
20 use of defect detection equipment, things like wheel bearing  
21 --hot wheel bearings, brake failure, coupler failure. That  
22 all can be monitored throughout the train on the locomotive,  
23 and if we use satellite tracking technology, that could be  
24 satellite transmitted back to some central location.

25           We feel that, once again, the dedicator or unit

1 train concepts would minimize the amount of time in  
2 transportation and make that transportation system more  
3 efficient and effective. Currently, a car switched through a  
4 rail classification yard could take several hours, up to  
5 several day to switch through the yard. We don't think we  
6 want these cars standing in rail yards for that amount of  
7 time. It will offer high-priority scheduling. You can  
8 bypass the classification yards. A short train would allow  
9 for faster accelerating and quicker stopping.

10           And once again, armed escorts, I don't think we  
11 want the armed escorts in major metropolitan areas spending  
12 days in freight classification yards.

13           Hopefully, I've raised some questions in the  
14 audience and we can address them later. I guess what I'd  
15 like to say is we need to understand what the cask is capable  
16 of so that we can design a transportation system as far as  
17 what the train looks like, what the cask and the car looks  
18 like and what sort of operating restrictions we may need to  
19 undertake.

20           And once again, the system needs to operate as a  
21 system.

22           I thank you, and I went over my time limit. I  
23 apologize.

24       ARENDT: Dwight, do you want to make some comments?

25       SHELOR: Yes, I would. Not in addition to my

1 presentation, but just as a follow-up, one thing I was  
2 remising earlier, and that was talking about the relationship  
3 of this so-called Section 180C to the transportation services  
4 effort and the potential for an interim storage facility or  
5 repository.

6           I just want to point out that in the Section 180C  
7 where we were required to provide funding to states, tribes,  
8 so that they could in turn ensure that safe normal  
9 transportation and emergency response awareness training was  
10 available to the affected local communities and states, we've  
11 gone through a process in terms of the policies and  
12 procedures on that. We've issued a draft. We've gotten  
13 several really good comments. We're in a process now of  
14 considering all of those comments, even to the point now  
15 where we're considering issuing another draft on the policy  
16 and procedures for that.

17           I think the comments were very good. I think we'll  
18 always have a problem recognizing the absolute amount that  
19 any one state or tribe would receive, but I think the  
20 process, based on the comments, could be definitely improved.

21           And I also just wanted to note the fact that Bob  
22 Halstead and I do talk to each other. We're very good  
23 friends. I think Bob has pointed out some things. I hope  
24 that many of the things that he's pointed out can be  
25 addressed in the comments on the draft RFP and accommodated.

1           Lastly, and maybe to encourage a panel discussion,  
2 I'd like to say that the concepts presented by the gentlemen  
3 from the counties is a concept that we had talked about. I  
4 believe, and I think I would like to see some discussion on a  
5 very difficult part, and that's who is the coordinator and  
6 which is the key to that type of process taking place.

7           It has to be at, unfortunately, in my view,  
8 probably a high level, but it has to be done by someone who  
9 can make a commitment. It's the--making commitments of  
10 funding activities is the key to that whole process, and the  
11 challenge to us is hopefully to have that process take place  
12 before we issue an RFP for a service contract on a fixed  
13 price so that we can tell them what the policy direction is  
14 and be able to implement it in a structured manner.

15         ARENDR: Fred Millar?

16         MILLAR: I'm Fred Millar, and I'm the Washington  
17 Coordinator of the Nuclear Waste Citizens Coalition. I don't  
18 have any slides, but I'd like to be able to see everybody I'm  
19 talking to here.

20           One of the things we've been mainly doing is trying  
21 to fight off S-1936 and the other bills that would ship all  
22 kinds of spent value out for a parking lot, basically is the  
23 way we call it, and we only very narrowly escaped those bills  
24 being passed in the last Congress, and now there's another  
25 one that's been introduced this time. S104 has already been

1 brought to the Senate and is on a real fast track to move.

2           So there's a kind of a baseline issue I wanted to  
3 chat with Board members about, and this comes from talking  
4 with some of you, and that has to do with kind of a threshold  
5 question, and that has to do with some of you may be under  
6 the impression that the court case against DOE has settled  
7 the question of whether DOE has to start transporting spent  
8 fuel in a big hurry starting in 1998 as by their contract.

9           I mean, I had a Senate aide of a very key Senator  
10 last week tell me, "That court case settles things. You  
11 know, now we know DOE has got to start shipping waste to an  
12 interim storage site in Nevada." Well, the court case  
13 doesn't say that. The AP story says that, however. The  
14 Associated Press story does say that that should happen, but  
15 that's not the way the court case came down. The court case  
16 does say that DOE has to compensate the utilities for  
17 breaking their contracts in 1998. The court case defines  
18 "disposing of waste" in broad and vague terms, but it's very  
19 clear that it could include such things as DOE, instead of  
20 taking trucks to the reactor sites, they could take bags of  
21 money to the reactor sites and say, we are going to pay you  
22 for on-site storage as a way of compensating you for our  
23 breaking the contract.

24           Now, I'm not recommending that or advocating that.  
25 I'm just saying that it is a misperception to think that

1 this court case has settled all this, and I hope that--I  
2 mean, I just thought that some Board members might find it  
3 useful to have that sort of clarified. The Board clearly--I  
4 mean, the Court clearly quoted the current law that says DOE  
5 does not have to take title to the waste until a repository  
6 is operating.

7           So DOE could conceivably pay the utilities out of  
8 the waste fund for on-site storage while not taking title to  
9 the waste.

10           Okay. So I just want to try to make clear that  
11 that's sort of a current legal situation from the Court point  
12 of view.

13           Now, at the risk of trying to tell Board people  
14 more that you should be doing, I think it's fair to review a  
15 little bit about the transportation side of things in this  
16 way: As we have learned, in the act that sets up the Board's  
17 responsibilities--I'm indebted to the staff people for  
18 helping me with this analysis--there's only two examples that  
19 are given of what the Board might be doing. One is analyzing  
20 site characterization, and two, is analyzing transportation.

21           Well, let me point out that as far as I can tell,  
22 the vast majority of the Board members have been chosen for  
23 their site characterization expertise, and as far as I know,  
24 there's maybe only one that has sort of been chosen  
25 specifically for transportation expertise. And I think it's

1 fair to say that the transportation side of things has been  
2 very neglected up 'till now, and I think that there's a  
3 reason for that. And the reason is that I think the Board  
4 has sort of systematically, but in a non-scientific way,  
5 accepted the assumption that the risks in transportation are  
6 negligible.

7           Now, Lord knows that's what the NRC says and the  
8 DOE says and the utilities say, but it's not a very good  
9 posture for the Board to say, as they do in their most recent  
10 report, that numerous analyses say that the risks are  
11 negligible, right? The fact is that there's been no Board--  
12 there's been no Board review of the major technical documents  
13 on transportation, the Modal Study, NUREG 170, any of those  
14 things. You all haven't reviewed any of those things, and so  
15 you're sort of in the position of not having very much  
16 traceability or transparency about this, okay, to use some  
17 terms from the earlier discussion today. I mean, the Board  
18 is not in a very strong position about saying we are giving a  
19 technical review to the technical issues of risk.

20           Now, I'm not talking about institutional stuff and  
21 perceptions and all that, but in your most recent report, you  
22 just blow this off. You say there aren't any technical  
23 issues. There's no safety risk. It's all perception of  
24 risk. Well, I mean, if you want to say that, I think you  
25 ought to show it, right? I mean, I think you ought to have

1 to defend your blowing off of that whole thing and your  
2 acceptance of what I would call the establishment's framework  
3 for all of that.

4           Now, I mean, just to give an example from one of  
5 your--in your recent report, you said, for example, there's  
6 been no serious accident over the decades in the United  
7 States where radioactive waste has been shipped. There's  
8 been no serious accident, as if that was a significant  
9 statement. The fact is, there's only been 2,400 shipments.  
10 I mean, ask Mr. Fronczak, is that a pitiful small number of  
11 shipments or what compared to the amount of hazardous  
12 materials that he ships? It is a pitiful, small database,  
13 and if you did a statistical analysis, how many serious  
14 accidents would you expect to occur in 2,400 shipments in the  
15 United States? I mean, probably not one, right?

16           And so the fact is, there's no significant database  
17 here. Having no accidents in 2,400 shipments is no help.  
18 There's been no accident that tested the integrity of the  
19 casks. I mean, the most serious accident was where a truck  
20 rolled into a ditch and the cask, you know, slid along in a  
21 ditch. I mean, that is hardly running broadside into a  
22 bridge or anything that would test the cask integrity.

23           Another example just of sort of maybe unbuttressed  
24 assertions, is that in the report, the Board asserts that  
25 they believe that a centralized storage facility could really

1 enhance the operations of the repository system. I mean, you  
2 go on for about four pages about how you believe this and you  
3 believe that, about how, you know, a centralized storage  
4 facility could help. You don't cite a single source. I  
5 mean, you haven't cited a single story that you've looked at.  
6 You haven't reviewed, as far as I can tell, any serious  
7 discussion about that. In fact, it's kind of a nice idea,  
8 but, you know, it doesn't--I mean, you don't show that you've  
9 actually looked at this in any technical context of  
10 logistics, or whatever.

11           So just for what that's worth. That's just another  
12 traceability and transparency problem.

13           You know, the shipment of nuclear waste in the  
14 United States is being held up by the utilities and DOE.  
15 It's something that ought to go on as routine. It ought to  
16 be just a routine part of the system. In fact, as Mr.  
17 Fronczak knows well, the railroads fought vividly against  
18 that nuclear establishment for years about trying to require  
19 special train service and so forth, instead of making it just  
20 routine, and they lost. I mean, the nuclear industry and the  
21 utilities have won the principle that they can ship  
22 radioactive spent fuel trucks through Manhattan. They can  
23 ship anytime of day or almost any route and with no dedicated  
24 trains, et cetera. They want it just to be routine. They  
25 want it mixed in with any old cargo, and the principle is,

1 once we put it in the cask, it is safe.

2           Okay. So I don't think that's going to be  
3 politically sustainable. I don't think that the fact that  
4 DOE has not chosen except the safest routes is going to be  
5 politically sustainable. And so I think that what we're  
6 faced with is the choice of whether we're going to have to  
7 look at transportation of radioactive waste as more of a kind  
8 of an emergency situation requiring unit trains and special  
9 train treatment and so forth. I mean, that is the cutting  
10 edge question that I think the country faces about  
11 radioactive materials transportation.

12           And in my mind, there's two main bases to this  
13 question. One is the technical studies that have been done,  
14 which I've just referred to and which I wish you'd at least  
15 express your position on whether you ought to review them or  
16 not, and secondly, there's the propaganda films, you know,  
17 the crash test films and all that. I mean, you all haven't  
18 also done any studies on what would be a respectful set of  
19 crash tests; you know, what would be--I mean, what can those  
20 crash test films show us besides wonderful visuals. You  
21 know, sometimes I wonder whether the next set of crash test  
22 films are not going to be sort of holograms that some high-  
23 tech company produces.

24           The fact is that those are technical questions that  
25 I'm not worried about. I think that the two bases that we

1 have for public acceptance of radioactive waste  
2 transportation are the technical studies and the propaganda  
3 films. And in both of those cases, there are technical  
4 issues which a Board that was really serious about  
5 transportation could be looking at. The State of Nevada has  
6 done studies on those issues, and I refer some of those  
7 studies to your attention. And just for what it's worth, I  
8 mean I think a vigorous discussion about that might be useful  
9 in your transportation committee.

10 ARENDT: Thank you, Fred.

11 Bob Halstead?

12 HALSTEAD: Well, I've already had a lot of time, and I  
13 just want to add a few things that I don't normally get to  
14 talk about that have to do with transportation safety, risk  
15 analysis and so forth.

16 One is, I am amazed that after now going on more  
17 than 19 years of working with these issues, I find myself  
18 debating the same issues with people, and how little  
19 resolution there have been on certain issues. Like, for  
20 example, it seems to me to be the absolute common sense  
21 notion that spent nuclear fuel in rail commerce should be  
22 shipped in dedicated trains.

23 And even when I discussed this issue with people  
24 from the Nuclear Energy Institute or the Nuclear Electric  
25 Utilities, even the ones who in their own operations would

1 never think of shipping any other way are opposed to a  
2 requirement or a policy objective that says DOE will ship  
3 this way. And I have to say, I've still not figured out what  
4 the reasons are except that recently I had this discussion  
5 with one of the Nuclear Energy Institute guys that said,  
6 well, you know, the problem is if we require the use of  
7 dedicated trains, the railroads are going to railroad us on  
8 tariffs. They're going to charge us 400 percent of cost.

9           So one of the issues that I'm kind of bewildered  
10 about how to resolve are safety issues where an operational  
11 fix seems obvious. In my opinion, the costs are reasonable  
12 and can be controlled through the long term contracts, and  
13 yet, you know, we continually debate dedicated trains. And  
14 then if you don't assume dedicated trains, I have to consider  
15 much more horrendous types of worst case accident situations  
16 that if we were strictly talking about shipments in dedicated  
17 trains.

18           I also share the concern about transportation risk  
19 assessment, particularly probabilistic risk assessment in  
20 which the risks are so marginalized that transportation risk  
21 then doesn't become a useful determinate in making policy  
22 decisions, or within risk management decisions, if you assume  
23 that the risks of rail and highway transportation are equal.  
24 I think it tends to--the way that we do probabilistic risk  
25 assessment tends to obscure rather than help the way risk

1 assessment should be used in risk management.

2           And the example I'm always drawn to--this is not  
3 just a problem in dealing with the nuclear industry and with  
4 DOE and the NRC, but when you get really experienced state  
5 emergency management and safety inspectors together and you  
6 talk to them--well, you know, when we start this mix  
7 shipment, for the first couple of years, we're going to have  
8 to inspect every shipment and do everything just right, and  
9 then once the public gets calmed down, we can back off and we  
10 won't have to spend that money and do that.

11           And then I remember, you know, it wasn't until  
12 about the 8,000th shipment out of Alaska that the Exxon  
13 Valdez disaster occurred, and this phenomena that Freudenburg  
14 has--that's jargon, and I don't know if I'll get--but the  
15 phrase is the "organizational atrophy of vigilance," that the  
16 longer you're successful with something, you start to get rid  
17 of things. So with the Alaskan oil tanker shipments, because  
18 they had been so successful, they eliminated all the  
19 redundant safety programs, the radars, the things that would  
20 have contained that accident. And so that's a concern to me.

21           Finally, the issue of how we address human factors  
22 in system design, and particularly in the early stages of  
23 equipment design troubles me. DOE and General Atomics have  
24 gone very far, for example, in designing a new generation of  
25 high-capacity trucks casks, and in order to get a fourfold

1 increase in capacity, they've made all kinds of, in my  
2 opinion, safety tradeoffs, which they wouldn't have needed if  
3 they had been willing to settle for a threefold increase in  
4 capacity.

5           In order to keep within the legal weight limits,  
6 for example, they have done things like go to one fuel tank  
7 instead of two fuel tanks, not thinking about how that  
8 increases the number of stop times for refuelings, increases  
9 the risk of getting on and off the interstate, or haven't  
10 looked at--although they are looking at some of the other  
11 issues I'm pleased to say, like, for example, the use of the  
12 cab-over-engine tractor and the way that the additional  
13 fatigue and noise may be a safety factor for drivers on very  
14 long hauls. And many of these truck drives are going to be--  
15 some of the reactors, if they come--I mean, if this fuel  
16 comes to Nevada, some of the reactors they have to ship by  
17 truck are the ones maybe like Turkey Point that are farthest  
18 away. We actually have a 3,000-mile truck journey. So, you  
19 know, the drivers have been on the road maybe for 80 hours by  
20 the time they get on those mountain passes through Nevada.

21           So they're really, and I'm not just faulting DOE  
22 for this, but the general issue of how we do a systems  
23 analysis of human factors early enough in systems planning  
24 that we can address those issues and make tradeoffs when  
25 we're designing equipment, I think down the road would save--

1 and some of these issues are so esoteric. You know, I'd have  
2 to spend an hour probably talking about the truck cask and  
3 rig design to make those points.

4           But thanks for the opportunity to add a few other  
5 issues in there.

6           ARENDR: Thank you. Bart?

7           DI BARTOLO: Thank you. I would like to mention just a  
8 couple of things. I'll be very quick. We would like in  
9 Clark County to have the Department of Energy recognize its  
10 power; that is, in the last few years with the Western  
11 Governor's Association, the Western Interstate Energy Board,  
12 and most recently two weeks ago at the Transportation  
13 External Coordination Working Group, we talked in a routing  
14 subcommittee about a cooperative process for route  
15 identification. We used to call it route designation  
16 selection, but in deference to the Department of Energy, we  
17 call it route identification.

18           And those guidelines, those net process would be--  
19 very simply would be based upon U.S. DOT guidelines that have  
20 been established for hazardous materials shipments and  
21 highway route control quantities.

22           And if Jozette Booth, DOE, or someone on your  
23 committee would be able to--your Board would be able to--you  
24 should be able to get those minutes within the next couple of  
25 weeks. Is that right, Jozette?

1           BOOTH:  Yes.

2           DI BARTOLO:  I think that would be very important for  
3 you to look at because the second part of that would be that  
4 we have proposed that the Department of Energy, through  
5 contracting or other means, should be able to direct carriers  
6 to use the routes that have been chosen through that process.  
7 We think that would be a significant step in the process.  It  
8 would be a significant way that we, as stakeholders, would be  
9 able to provide meaningful input.

10                   With regard to meaningful input, I'd like to also  
11 talk about route--route selection is very important to us  
12 because under current regulation, all highway shipments to  
13 Yucca Mountain and rail shipments to Yucca Mountain, if there  
14 were a line, would come through the Las Vegas Valley.

15                   Well, I know that does affect a lot of other  
16 cities, especially with regard to rail, but the fact is that  
17 our economy in southern Nevada and Nevada as a whole has to  
18 do with gambling.  That supports us.  In any one day, we have  
19 200,000 or so visitors in this town or in this area.

20                   Interstate 15 travels within a quarter to a half  
21 mile--the rail and Interstate 15 are within a half mile of  
22 the Las Vegas strip.  In and of itself, that is no big deal,  
23 but the fact is that maybe--here is where perceived risk may  
24 come in.  I would like to say that the way that our decision  
25 makers work is that they will take a look at what the

1 scientists call the first stage risk assessment, and that is  
2 hazards analysis.

3           What I have found in my experience, in our  
4 experience in Clark County and other jurisdictions is that  
5 once a comparison is made among perceived and calculated  
6 hazards or noticeable hazards, that the decision or  
7 negotiations begin from that point. And I would like to  
8 point out that here's where perceived risk can be used as  
9 inputs, where the idea of perceived risk has been very  
10 difficult, how do you quantify it and so on. But it could be  
11 used as an input factor to any decision, especially with  
12 regard to hazards analysis.

13           One example is that the City of North Las Vegas,  
14 this does not have to do with high-level nuclear waste, but  
15 it had to do with shipments that were going to the Nevada  
16 test site, shipments that were sponsored by the Department of  
17 Energy. They did hazards assessment along Craig Road. They  
18 approached the Department of Energy, said, this is what we  
19 think: We think that you shouldn't use this road for these  
20 reasons, and they pointed out a number of hazards, like the  
21 number of schoolchildren in the area at any given time, a  
22 pipeline, hazardous materials, et cetera, et cetera, things  
23 that were important to the local community.

24           And, you know, the Department of Energy changed its  
25 mind. However, they changed its mind because they did not at

1 that point have a policy. Then they went through the  
2 Spaghetti Bowl, which is exactly where we don't want them,  
3 but they did make a change in their routing. It was sort of  
4 a shortcut that took them across the Valley.

5           But the fact is that this is how we make decisions.  
6 We would like input with regard to the process that is used  
7 for risk assessment, so that the risk assessment results are  
8 meaningful to us.

9           ARENDR: Okay. Thank you very much.

10           Brad?

11           METTAM: I'd like to make just two quick comments. One  
12 is in response to a question from a Board designee about the  
13 hazardous materials and whether or not similar studies have  
14 been done.

15           Under HMTUSA a lot of local governments have done  
16 flow studies of hazardous materials, and I'm not certain if  
17 that information is available in any one place, but there  
18 were grants provided through the local emergency planning  
19 committees to do those types of studies. So there is  
20 information out there on other hazardous materials flows.

21           The other comment I'd like to make is in response  
22 to Dwight's comment. We did think long and hard about who  
23 should be the convener, and, in fact, an earlier iteration of  
24 our presentation had a lot more detail on how that process  
25 would work, and we felt that we were perhaps being too

1 strict--prescriptive at that time, and that perhaps it would  
2 just bog us down on the details. But in those, we suggested  
3 that it would be potentially either the Office of the  
4 President or of the Vice President, and we specifically  
5 excluded the Department of Energy who is in essence an  
6 advocate in this process and would not then be a convener--in  
7 the image of a convener as an honest broker.

8           Thank you.

9           ARENDT: Jim?

10          WILLIAMS: I'll try to do a part of an answer to your  
11 question, that the process that we were discussing seems top-  
12 down and doesn't fit the current mode of distrust in the  
13 government, especially the federal government.

14           I think our motivation here is to suggest some kind  
15 of an alternative to a process that we think is about to be  
16 embarked upon in Phase A privatization plus Senate Bill 1936  
17 for shipment. That won't work, and it will cause a lot of  
18 cost in money and in time and in acrimony. And we don't have  
19 a position against privatization of Phases B and C of the  
20 proposed process.

21           Now, I think that any such process that we--such as  
22 we were trying to suggest the various outlines o,f would  
23 need, you know, some substantial and some very--a joint kind  
24 of strategic thinking about, you know, what really needs to  
25 be decided at what level by whom to set an appropriate sort

1 of sequence of decisions in which the decisions at subsequent  
2 level can build on and work in the context of those that go  
3 before.

4           I think that it's in--that if that were done, and I  
5 don't claim that we have done that, that there would be--  
6 there is in the nature of this problem certain levels of  
7 decision that involved--that need to look at the overall  
8 system, including interim storage on site and off in  
9 combination with transportation on an integrated basis and  
10 certain policies. And the NWTRB has made judgments on that  
11 matter and so forth. They need to be resolved among the  
12 stakeholders in this process before the site-by-site decision  
13 at sites could really be done, before utilities can make the  
14 investments that they need to make to make rail possible, for  
15 example, and so forth and so on.

16           So part of my answer is I think that in the nature  
17 of the decision, that there are certain portions of this that  
18 need to be made on the whole systems level to provide the  
19 context for portions that occur further down the system.

20           Now, that's the decision levels, not necessarily  
21 the stakeholders and the process that are involved in those  
22 levels. And so it would be contrary to our proposal to  
23 conceive the first level decision being made by let's say DOE  
24 in collaboration with the utility industry.

25           And the same thing with regard to the guidelines in

1 which those decision levels would be worked out. It would  
2 not be the current process. It would be something  
3 significantly, we thought, from the current process.

4 ARENDT: Okay. Before I make some summary comments of  
5 this session and the afternoon session, I'd like to ask the  
6 Board, the staff, the audience, do you have any particular  
7 question that you'd like to pose to the panel or even pose  
8 that ought to be looked at?

9 Yes, John.

10 MCKETTA: My name is McKetta from the Board.

11 Bob Fronczak, I don't know anything about real  
12 chemical--but if you thought you were making alcohol or let's  
13 say I had a small refinery, 50,000 barrel a day refinery, and  
14 I'm using sweet crude, and if somebody offered me 10 times  
15 more to add five barrels of sour crude, I just would turn  
16 them away. Why in the hell would you look for a job where  
17 you're going to make 0.06 per cent more a month? If you  
18 would play it right, I think these guys may come on their  
19 hands and knees and beg you to make 2 per cent--

20 FRONCZAK: I wish that were the case. Unfortunately,  
21 there's something that we call common carriers, and as common  
22 carriers, we are required to transport materials that are  
23 offered to us, as long as those materials are offered in--

24 MCKETTA: But they said you're going to do this on a bid  
25 basis; isn't that what I heard from you guys?

1           FRONCZAK: I think that the privatization effort has the  
2 potential to resolve a lot of the issues. But it only has  
3 the potential to resolve issues if we are a partner in the  
4 process and we're able to be a part of the contract. If the  
5 contractors in providing the system design and build that  
6 system without our input and without a contract and then just  
7 say, okay, here it is, guys, you're going to haul it for a  
8 tariff rate, we're going to have a lot of problems with that.

9           ARENDR: I thought you were going to talk about all the  
10 hydrogen fluoride and chlorine that the railroads transport  
11 around the U.S. or all the gasoline that's transported on the  
12 highways.

13                   Are there any other comments?

14           I want to thank you, all the people that  
15 participated in this session, all the comments that were  
16 provided by the audience, the staff, the Board. You have  
17 made some very good points. You've indicated some areas that  
18 need to be looked at, and although I don't have a specific  
19 action to recommend at this time, but I will say that what I  
20 look forward to doing, though, is to either convene a  
21 workshop or some kind of a panel where we will have you  
22 people as representatives on there, and we'll have a real  
23 roundtable, and we'll provide the experts that will hopefully  
24 answer maybe some of the questions that you've raised.

25           Fred, the question that I--let me ask you about the

1 2,400. I didn't get that. Was that 2,400 of what?

2 FRONCZAK: It was 2,400 shipments of spent fuel in the  
3 United States over a 30-year period.

4 ARENDT: Okay. Now, I think in the regard, there are  
5 many thousands more shipments of radioactive materials in  
6 Type B packages that I think get factored into this, and we  
7 must not forget about that.

8 The safety of the transport of radioactive  
9 materials is in the package, is in the testing of the  
10 package, and I won't say any more about it than that. But  
11 that's what I plan on doing, is to get with other members of  
12 the Board and staff, and we will convene. I would prefer a  
13 workshop where we really get in and talk about the risks and  
14 answer the type of questions that you raise. It's our job to  
15 make sure--at least to help to make sure that the public  
16 understands that--I don't say that we've got a risk-free  
17 transportation effort, but my own views are that we're fairly  
18 close to that because of all of the engineering and all the  
19 integrity that goes into the testing of Type B packages and  
20 so forth.

21 I know there is a question of quarter-scale testing  
22 versus full-scale testing. I personally was involved with  
23 that 20 years ago, I think. The question was asked, well,  
24 you know, why do we--in fact, I even asked it; why full-scale  
25 testing or why quarter-scale testing? I don't know that we

1 really got a--I think there's a response, but we need to let  
2 the experts tell us what that is.

3           So again, I thank you all very much, and you'll be  
4 hearing something from us I suppose within the next few  
5 months.

6           COHON: Let me add my thanks on behalf of the whole  
7 Board for this excellent afternoon session. My thanks to  
8 John Arendt for doing such a good job of chairing it and to  
9 John and his staff for most simply validated organizing. It  
10 was excellent, and I think, as John indicated, there's a  
11 great deal of follow-up for the Board to think about. I  
12 think we clearly have a role that we can play here and need  
13 to play.

14           Two housekeeping announcements for the Board  
15 members, both new and old, incoming and outgoing, current and  
16 designated, whatever you call yourself. You have to check  
17 out of the hotel tomorrow. This road show moves to Las Vegas  
18 tomorrow for tomorrow night. So you've got to check out and  
19 check out before you come to tomorrow's meeting. Check-out  
20 time is 11:00 at the Saddle West. So you're advised to check  
21 out before you depart for the meeting tomorrow.

22           Oh, let me point out that if you have no incidental  
23 expenses on your room bill, you can just check out by  
24 checking at the front desk and leaving the key on the T.V.  
25 Those are their instructions. If you do have incidental

1 expenses, you've got to settle up at the desk.

2           Vehicles; you should, unless something's happened  
3 in the interim, go in the vehicle that you came in in the  
4 first place. No? Yeah? Yes. That's a good idea, okay.  
5 Don't change vehicles whatever you do. So tomorrow morning  
6 you make arrangements with your driver and the appropriate  
7 vehicle, get bags in it before you come here and then come  
8 here.

9           Okay. These are the kinds of important things that  
10 chairs have to deal with.

11           We now come to part of every one of our meetings,  
12 which is very important to the Board, and that's the public  
13 comment period. This is a chance for members of the public  
14 to come in on any aspect of the Nuclear Waste Program, not  
15 just things that we've covered today, and for the Board to  
16 hear this.

17           We've had four people sign up in advance for this  
18 period. As I call your name, please come to the microphone  
19 in the middle aisle there. Even though I've called your  
20 name, I'd like you to identify yourself again for the record,  
21 indicate any institutional affiliation that's relevant that  
22 you care to, and then if you could limit your comments to no  
23 more than five minutes, if possible, that would be  
24 appreciated.

25           Sally Devlin.

1           DEVLIN: Thank you, Mr. Chairman. My name is Sally  
2 Devlin. I'm a professional stakeholder. I've been visiting  
3 with the Boards, telling them good jokes--good jokes, guys--  
4 for over three-and-a-half years. I have attended every DOE,  
5 DOT, DOD, you name it, and were there. And I do want to say  
6 something. Two of our town board members were here to greet  
7 you. They never got the opportunity. Charles Grondin  
8 (phonetic) and Gary Hess (phonetic) will be here tomorrow,  
9 and they're new, and they're very interested in this process.  
10 I don't think anybody from our County Commission Board is  
11 here.

12                   The other thing is that I do want to say to Helen,  
13 who after the March meeting in Vegas, was brave enough to  
14 come over the hills and peruse Pahrump and see if we were  
15 acceptable. And here you are. I can't believe it. Thank  
16 you, Helen. We had a great visit.

17                   And thank you, Carrie, and your friend, for  
18 providing the food and beverages, and they've done a splendid  
19 job. So now I can start my little thing and welcome you as  
20 the new chairman.

21                   Everybody knows what I'm going to say. I took off  
22 my earmuffs, so you know it's me. But anyway, my feeling is  
23 very strong about this stuff, and especially for Ed sitting  
24 there avoiding my eyes.

25                   Anyway, if DOE streamlines--it's some Guidelines--

1 and I'm talking about 10 CRF Part 960, and I did testimony on  
2 this, and focuses on the concepts relative only to waste  
3 containment, long-term isolation at Yucca Mountain and risk  
4 assessment, in my opinion, and this is very serious, it will  
5 kill the entire staff of Nevada and its main industry,  
6 tourism and gaming, and this has been presented in many a  
7 report.

8           The reason that I say that is some of the Board,  
9 and I'm going to reminisce because I'm old and I'm allowed,  
10 and I'm going to not iterate, but I'm going to reiterate,  
11 something that happened at the San Tropez board meeting when  
12 we had the sociological meeting, and this was held because in  
13 Brazil, in a city of a million people, somebody ran off with  
14 a kilo of Cesium, and people were killed and so on. And the  
15 city became a pariah to the country, if you remember that,  
16 guys.

17           And what happened was they wouldn't let them out of  
18 the city. They wouldn't bring in stuff. It was a big  
19 tourism thing, a manufacturing city, and for many years this  
20 went on. And finally now, they have turned what was a  
21 tragedy into a tourist attraction.

22           Now, this is applicable to Las Vegas, and, of  
23 course, Reno, and, of course, now that you've seen our  
24 beautiful downtown Pahrump. And my feeling is that by  
25 something like this, and we're talking transportation and

1 we're talking risk perception and we're talking all of these  
2 technical things, I was going to talk about the migration of  
3 Neptunium 237, and I've learned all these fancy terms. But  
4 you're talking to the public. You're not talking to someone  
5 who reads like myself.

6           And my contention has been, as I did at that  
7 sociological meeting, to do just a little real scenario and a  
8 worst case scenario in the transportation, and all I did at  
9 my public comment was stand up and say, "A 95 without any  
10 notification on a two-lane highway, which is a nine hazard,  
11 which I am quoting from the NTS/EIS, there was what is going  
12 usually through Pahrump, and I hope not today because we  
13 didn't have any accident, but liquid cyanide and liquid  
14 nitrogen. And these can make a big hole in the ground and  
15 kill you very dead.

16           And, of course, there is no FEMA training. There  
17 is no emergency preparedness. There is nothing. So I ran  
18 that little story.

19           The next one was with the Forest Service who gave  
20 me all their books to read, and they didn't have, like you  
21 guys here, only three alternatives, no action, some action  
22 and full action. They had 11 alternatives. And that was a  
23 lovely presentation because they want everybody to be happy  
24 in Las Vegas with recreation. And I wrote to them, and I  
25 said, "You gave a lovely plan and consideration for the

1 public and their trails and their roads and so on, but may I  
2 ask you the question where those Forest Service land and BLM  
3 land begin?" And, of course, they said they never thought of  
4 that. I said, "What if you had an airplane crash, or one of  
5 our DOE--full of hot stuff, what would you do? Of course,  
6 they had no answer.

7           And, of course, I'm getting back to my original  
8 point and what I have yelled at you guys for three-and-a-half  
9 years, and that that is there is no communication. To me,  
10 Yucca Mountain is at our Nevada test site. It is part of the  
11 1,350 miles of test site. And you don't communicate. How  
12 can you say the water from this goes through here because it  
13 comes from elsewhere, and I save on the 10-year plan, that Al  
14 Ohms is trying to clean up all these sites.

15           I'm just going to read you this: "Privatization of  
16 tritium removal and sale. A study was recently completed by  
17 NRAM, estimated there is \$200 million worth of tritium  
18 located on the test site. Why not remove the tritium now so  
19 that it's in a concentrated state and removal technology  
20 exists? If it's left in the ground for 100 years, it will  
21 migrate. How can DOE privatize tritium removal and sale?  
22 What procedures can be used?"

23           Now, whether we're talking DOE talking to DOE, we  
24 know the tritium has moved, and just where is the guy from  
25 U.S. Ecology, from Beattie? Twelve miles and 12 years.

1 Their water is totally poisoned.

2           This is reality, and you're not talking about it.  
3 You're no talking about the liquid cyanide running into this.  
4 We're talking about 400,000 pound canisterization and trains  
5 and so on, and you forget the floods that we have here. You  
6 forget that there is no communication between DOD and our  
7 Sheriff's Department saying that high-level waste or any kind  
8 of waste is going through. The new rules for the labels on  
9 the trucks, you can't even see it because there's no  
10 courtesy.

11           Now you've seen Pahrump. You've seen Beattie. And  
12 I'm not going to yell out any acronyms. I've learned lots of  
13 new ones, I want you to know, but I want you to know I feel  
14 very strongly about this. I do not know how you can look at  
15 Yucca Mountain in isolation without considering everything  
16 else that goes on to the test site. And I include the  
17 military in my yelling at you all because they brought in  
18 double tax. They never informed anybody they were bringing  
19 in better than Class C. I see all these reports from all  
20 over the country, and they say, we're going to clean this up,  
21 we're going to clean that up, and so on, and then they want  
22 to dump the rest of the stuff at NTS.

23           Well, I resent it. That's 30 miles from my door,  
24 and I am terribly afraid. I'm trying to get declassification  
25 on the regular activity out at the farm. I can't get it. I

1 want declassification on the plants. If one of the Farrow's  
2 plants are all highly radioactive, ours our, too. Our  
3 rabbits are, our plants are.

4           So I want you to see these things. We are the  
5 people who live here, and we are the people who will die  
6 here. And I'm scared to death of the stuff that you're  
7 talking about. There is no consideration for the population.  
8 There is no consideration on the risk perception for our  
9 number one industry, and I think it's about time you all got  
10 together with everybody that is involved in the test site,  
11 and put the signs to the true test. You're not doing it.  
12 That water comes from outside of Yucca Mountain. I could  
13 show you the geological faults and fractures and fissures.  
14 France has a fit of this. They don't allow anything where  
15 there are faults and fractures and fissures and ponds and  
16 volcanic action and all the rest of it.

17           I saw it in my geology course last year. All the  
18 figures of risk perception on radiological and biological  
19 desks are fellatios because nobody knows why someone gets  
20 cancer.

21           And I'm going to leave you with one other thought,  
22 and this came out at the NRAM meeting. Nevada has the  
23 highest incidents of cancer in the world, and since we don't  
24 know why people get cancer, it only takes one--to affect one  
25 cell and then travel and you're dead, maybe not today, but 20

1 years from now, and it's a painful death.

2           These things should be considered, and I don't feel  
3 that you're doing your job. I'm sorry, but I love you  
4 anyway, and I hope you'll come again.

5           COHON: Thank you, Ms. Devlin.

6           Hal Rogers?

7           ROGERS: Hi, I'm Hal Rogers, and most of you have seen  
8 me before. I'm co-chairman for the Nuclear Waste Study  
9 Committee. We've got 15,000 members more or less in Nevada,  
10 with a few members in California and some of the other  
11 surrounding states.

12           I have some comments, I guess, rather than a  
13 statement.

14           When I was with the General Electric Company, we  
15 moved quite a few cask loads of spent fuel from Kansas to our  
16 independent storage facility in Illinois. These were all  
17 moved in IF300 rail casks on special trains, and I didn't  
18 know until this afternoon that rule by the railroads had been  
19 overturned. I thought they were still going to have to move  
20 them on special trains.

21           When this was planned, when this move was planned,  
22 there was a big uproar along the proposed route. As I  
23 recall, the route went through three states, and the various  
24 county governments and local governments were going to have  
25 ordinances to prohibit it going through and so on and so

1 forth.

2           So they put together a team that included  
3 representatives from the railroad, from DOE, from NRC, from  
4 the State Governments and from the General Electric Company.  
5 And they went in and visited every town along the route.  
6 When they got through, there wasn't a single move to prohibit  
7 the shipment of that fuel.

8           They encountered all kinds of interesting things,  
9 including one area where the State Government opposed the  
10 movement because they said if there's any accident, those  
11 fuel pellets will be scattered all over. And it wasn't until  
12 they were assured by I don't know how many different people  
13 that you can't get the fuel pellets out of the fuel rod after  
14 it's been irradiated. It's just an impossible thing.

15           But these are the kind of things that you can  
16 encounter if they don't go through a lot of the integration  
17 and coordination that needs to be done along these routes,  
18 whatever they may be.

19           I'll have to once again ask the same question that  
20 we've asked before and that we have not yet received a good  
21 answer to. To the best of our knowledge, no one, the DOE,  
22 the NRC, nor anyone else, has been able to describe from an  
23 engineering viewpoint, has been able to describe an accident  
24 that would cause a rupture or a release from one of these  
25 shipping casks. None of the railroad accidents that have

1 occurred over the past two years or so have been severe  
2 enough. And once again, before we start hollering about how  
3 hazardous this is, somebody has got to describe an accident,  
4 a good credible accident that would cause the kind of damage  
5 that we're talking about.

6 Thank you very much.

7 ARENDT: Thank you, Mr. Rogers.

8 Grant Hudlow.

9 HUDLOW: I'm Grant Hudlow. I'm from Pahrump in Nye  
10 County. I'm a chemical engineer with nuclear engineering  
11 training and experience.

12 As I understand it, the NTRB is charged with with  
13 writing haired on the technical performance of the DOE.  
14 Maybe that isn't exactly accurate, but it's something along  
15 those lines. So I'd like you to consider that. So far I've  
16 heard you limit your talks to site characterization and  
17 transportation, and there are some other things that you can  
18 be looking at, and the reason you should be looking at them  
19 is DOE has--follows the NRC rules on the transportation on  
20 truck transportation, where they're allowed to expose anybody  
21 within three to six feet or 20 millirems an hour of  
22 radiation. And it doesn't take a rocket scientist to figure  
23 out if you happen to get stuck in traffic in a traffic jam  
24 alongside of one of these for a little more than an hour and  
25 15 minutes, everybody on both sides of the truck has an

1 illegal dose of radiation because the EPA rules only allow  
2 the public to be exposed to 25 millirems a year.

3           So you're talking about being negligible risk on  
4 transportation, on the truck transportation anyway. The only  
5 way that I see this being able to skate by is if it takes 20  
6 years for those people who got exposed to die, and the chance  
7 of getting caught with that particular truck or the truck  
8 driver or the DOE or anybody else is very remote.

9           We see the DOE killing its own people at a pretty  
10 good rate out here at the test site. Where are the facts and  
11 figures on that? They're hidden also, and that's in  
12 violation of both OSHA and EPA laws that require you to keep  
13 track of making people sick and killing them.

14           The NTRB I think needs to hold DOE's feet to the  
15 fire in these areas.

16           DOE rules require proven commercial technology  
17 before they do anything. I'd like you to show me a burial  
18 that's proven anything, let alone the seven billion years  
19 that it's going to take before U235 is harmless. I'd like  
20 you to show me a government that's lasted for the seven  
21 billion years to control this burial so that nobody will get  
22 into it. So, obviously, the DOE is violating its own rules  
23 there.

24           There is proven commercial technology available,  
25 and the NTRB I think should be looking into that. Sally

1 mentioned one system for cleaning up the test site that looks  
2 interesting. There's also classified information that was  
3 done in Livermore. They went through the entire periodic  
4 table in the '60s and showed how to destroy any kind of  
5 radioactivity. There are a quite a number of reactions.

6           And this is proven commercial technology I said  
7 because it's in orbit around the earth right now. The  
8 military is using it. That's also classified. So we need to  
9 get that stuff declassified to the extent that we can use it  
10 to solve this problem.

11           Once we have that, then we don't need  
12 transportation of this stuff anymore. These are small units.  
13 They can be put right on site and destroy the radioactivity  
14 right there instead of, you know, stacking it up. What do  
15 have, 72,000 tons, 126,000 tons? It depends on who you  
16 believe, and how much more are we going to have before they  
17 start shipping it into Yucca Mountain, and then what are we  
18 going to do with it?

19           And, of course, the DOE does not have the expertise  
20 to handle this technology. I've had several DOE officials  
21 express some interest in it, asking how it worked and so  
22 forth, but they do have procedures of how to handle something  
23 when they don't have the technology, and that's, again, where  
24 NTRB comes in. It's very simple. You go out and privatize  
25 it. You go out and ask for--you put out RFPs. You get the

1 engineers in to show you how it's done. You get the  
2 contractors in to build it and do it, and the DOE doesn't  
3 have to do anything at all except sit back and watch it done.

4           I do a similar thing with environmental work with  
5 solid waste and waste water both, and one of the problems I  
6 run into is that the bureaucracy cannot do something like  
7 this. They're allowed to, but they won't. So I have to go  
8 to the political figures above them and then when the  
9 political figures tell them to do it, then they will  
10 authorize me to go ahead and handle it for them.

11           The DOE is no different. They will not do  
12 something like this because they don't have the expertise.  
13 What are they going to use to judge it, and they're not going  
14 to do something they can't judge, that they can't even  
15 imagine, yet alone do it.

16           So the NTRB in charge in looking over the shoulder  
17 of the DOE needs to hold their feet to the fire and get this  
18 into the political arena and get it solved.

19           The other thing that's happening is that for the  
20 reasons I just mentioned, all of this information seems to  
21 fall on deaf ears, especially in the DOE, and so people are  
22 looking at the legal remedies. The Attorney General of  
23 Nevada spoke the other day and said that she's gong to follow  
24 suit.

25           One of the problems with that is I was talking to

1 the nuclear--one of the nuclear lobbyists, and he explained  
2 to me that the fix is already in. The Federal Courts are not  
3 going to stop the nuclear waste from being put in Yucca  
4 Mountain.

5           So that leaves us with criminal charges, then,  
6 against the various DOE officials that are violating the EPA  
7 and OSHA laws.

8           COHON: Excuse me. I'm sorry, Mr. Hudlow. It's not  
9 that you brought up criminal charges. It's that time is  
10 getting on. Are you close to wrapping up?

11          HUDLOW: Yes.

12          COHON: Okay. Good, thank you. Sorry to interrupt.

13          HUDLOW: That's all right. The thing I'd like to ask  
14 the NTRB is what is your criminal liability for allowing the  
15 DOE to go unchecked into these areas? We're talking prison  
16 terms of 10 years. We're talking fines of a million dollars.  
17 And I'd like you to consider those things.

18           Thank you.

19          COHON: Thank you. Was that your way of saying welcome  
20 to the new Board members?

21           Thank you, Mr. Hudlow.

22           Rick Nielson.

23          NIELSON: Thank you. I'm Rick Nielson. I'm the  
24 Executive Director of Citizen Alert, and I have some just  
25 general comments on the issues covered today, and then I had

1 a specific question for the Board.

2           A little history about Citizen Alert. We are a  
3 grassroots citizen-based organization. We formed in 1975  
4 when the possibility of nuclear waste storage coming to  
5 Nevada first arrived on the scene. We also have besides the  
6 2,500 dues-paying members, we have about another 7,500 people  
7 that periodically receive information from us.

8           In that time period, we've had numerous  
9 opportunities to "participate" in this process, and that also  
10 has provided us with an opportunity to interact with numerous  
11 other grassroots groups across the country, and they have  
12 similar constituencies and similar make-ups, and many of them  
13 are in reactor communities.

14           And it was my experience that the general consensus  
15 among that community is that the public participation is more  
16 times than not a matter of a formality than a matter of  
17 genuine in the substance of the comments.

18           In regards to the issues today, I think a lot of  
19 concerns were raised in regards to transportation, safety,  
20 routing, privatization, the total system performance  
21 assessment and the guidelines' revisions. I think Judy  
22 Trinkle did a very eloquent job of accurately depicting the  
23 general public sentiment for our community, for the community  
24 that I represent, and I think a lot of issues were raised  
25 about the broader underlying public participation issue, and

1 particularly in the pre-NEPA level participation, and also  
2 the opportunity to comment on policy decisions or like, for  
3 example, the program plan or the total system performance  
4 assessment prior to the time it arrives in a NEPA document.

5           So it's important for me to convey to you the level  
6 of importance that these issues are--you know, the level of  
7 priority and concern these issues have in our community, in  
8 the public interest community.

9           And I think I'd like to convey to you also that  
10 besides your obvious responsibility as a technical review  
11 board, I'd ask you not to lose sight of your responsibility  
12 to also make yourself aware of these concerns, these public  
13 concerns, in the context of your conduct of business so that  
14 you're also--you know, you go beyond the technical aspect of  
15 your duty to consider some of the underlying public concerns.

16           And realize that the reason I'm asking you this is  
17 because in large part, the number of public people that are  
18 lucky enough to be informed about this process usually don't  
19 have--aren't informed enough or don't have the level access  
20 or are so far removed from, you know, the level of technical  
21 information and lack the understanding of that technical  
22 information, that they are, for the most part I would say,  
23 unable to act in their own best interest, and so that you  
24 have an additional responsibility to consider this when  
25 you're going about your business.

1           So those are the comments regarding today's agenda.

2           The other question I had is in response to this  
3 document, which is on the back table. In Chapter 3, you talk  
4 about suitability and the site suitability determination.  
5 And in the note that summarizes the letter sent to OCRWM in  
6 December of '94, at the end of your sort of concerns that you  
7 lay out, you say that "Given the difficulties associated with  
8 proving safe performance over many thousands of years, a site  
9 suitability decision would not be ironclad guarantee that the  
10 site could also be developed as a repository."

11           And I was wondering if someone could indicate to me  
12 under what kind of scenario, either real or imagined, where  
13 we would reach a site suitability determination and then not  
14 cite the repository.

15           COHON: Since all my colleagues are looking at me, I  
16 guess they expect me to respond to that. And I will try, and  
17 I'm sure they will then jump in and help me or correct me if  
18 I'm wrong.

19           Before I respond, though, let me respond to  
20 something that doesn't need a response, but just to  
21 underscore something.

22           You made the point that you requested of the Board  
23 that every member incorporate into its activities public  
24 involvement. Indeed, that's why we are here, and you can  
25 rest assured it won't be the last time we're in this area. I

1 won't promise we'll come back to Pahrump, though. If I had a  
2 vote, I would vote for it right now. You're such wonderful  
3 hosts.

4 NIELSON: I actually live in Las Vegas.

5 COHON: Oh, okay. Well, let me try to respond.

6 The Board has spent a lot of time, as you might  
7 imagine, talking about the issue of site suitability, not  
8 only the technical--the components to site suitability, which  
9 we've talked about in part today and we'll talk about again  
10 tomorrow, but just what the term means. What do we mean by  
11 suitability, and a recent discussion, of course, is how does  
12 that compare to viability? But we'll put that aside for a  
13 moment.

14 I think the best way to explain the context for  
15 that note is the following: That when we think about  
16 suitability, we recognize that there is a spectrum--continuum  
17 is a better way to put it--of, let's say, probabilities or a  
18 probability that the site could be suitable, or that the site  
19 is suitable.

20 Suitable, we make great pains to define quite  
21 precisely what we mean by suitability and how we hear about  
22 it, but I think it says a high probability that the site can  
23 provide isolation of the waste from the environment for a  
24 long period of time--whoops, I almost got quantitative there  
25 --a long period of time.

1 All right. So that's our definition of  
2 suitability.

3 When the time comes when DOE must make its  
4 determination and recommend to the President, find a site,  
5 suitable or not, what we believe is really happening is at  
6 that point--let's put it in a positive way. Suppose DOE has  
7 gotten to the point where it feels it knows enough and what  
8 it knows is positive enough to support a suitability  
9 determination? What they're really saying is, given all the  
10 uncertainties that we're dealing with, we as experts and  
11 based on with a lot of input from many, many other experts  
12 and the public have decided that there's a high probability,  
13 an acceptably high probability that the site is suitable.

14 Now, this gets rather confusing because that's a  
15 probability on a probability statement? Right? There's an  
16 acceptably high probability that the site will with high  
17 probability, et cetera, et cetera.

18 So since the suitability determination basically  
19 cannot be a crisp moment in time or defined by a clear  
20 threshold, above this you're suitable, below this you're not.  
21 Because there's always going to be that kind of fuzziness  
22 and this continuum, we think of this as a much longer  
23 process.

24 Okay. DOE has declared the site to be suitable.  
25 That's its determination. Let's say the president accepts

1 that and declares it suitable, and we move ahead. What  
2 really happens at that point? Suppose the NRC license--were  
3 way out front? What really happens? Well, we are talking  
4 then about a decade's long effort to build the repository,  
5 deface waste, which itself takes years. All the time what we  
6 were very concerned about is that suitability would somehow--  
7 a suitability determination would mean that would be the end  
8 of science at Yucca Mountain, that we'd stop collecting data.  
9 We've declared it suitable. Let's put the waste there. Get  
10 it in fast enough, close it up and go home.

11           Because of the uncertainties involved, because of  
12 the thousands of years, tens of thousands of years over which  
13 this site is supposed to be suitable effective, it always  
14 seems reasonable to us that this is going to be an ongoing  
15 process, that suitability represents a milestone, but not in  
16 any way the end of a process.

17           Now, it seems quite plausible, although maybe  
18 unlikely, that DOE could make a suitability determination,  
19 but for lots of reasons, given everything I just said about  
20 uncertainty especially, the President might decide not to  
21 declare it suitable, may decide not to recommend it to the  
22 NRC for licensing. It could happen. Indeed, viability  
23 anticipates a broader understanding of the site to include  
24 the design, to take into account cost issues, for example.

25           All right. How is that? How did I do? It's even

1 more confusing now than when I started. I did all right?

2 Leon said I did okay. Would you applaud?

3           Okay. Are there any other members of the public  
4 who would like to speak on the record? Yes? Please identify  
5 yourself.

6           SZYMANSKI: My name is Jerry Szymanski. I've been  
7 involved with this project for some time. I haven't been  
8 speaking for the last five years.

9           COHON: Excuse me. Just because you did not sign up,  
10 could you spell your name?

11          SZYMANSKI: S-Z-Y-M-A-N-S-K-I.

12          COHON: Thank you.

13          SZYMANSKI: I was very interested in your comment.  
14 First, define what is unsuitable. And in my judgment,  
15 clearly unsuitable site is one which offers large probability  
16 of life-threatening reasons. Probably everybody would agree  
17 with that.

18                 The question is, what will we consider in  
19 evaluating this. What I would like to share with the Board,  
20 as a result of our research over the last five years at Yucca  
21 Mountain. I think you members will find it interesting, and  
22 that's essentially the purpose of my statement.

23          COHON: Move back from the mike.

24          SZYMANSKI: What should I do with it?

25          COHON: Move back a little bit from the mike. No, no,

1 you're doing fine. You're doing fine. We can hear you.

2 Oh, I'm sorry.

3 SZYMANSKI: That's it. There's not much sense to talk  
4 about. It's quite an extensive research. There's no sense  
5 to summarize this in five minutes. However, what you will  
6 say, we are talking about catastrophic life-threatening, not  
7 usually fluxes and moistures and things like that. These are  
8 silly things.

9 Thank you.

10 COHON: Thank you very much for giving us your report.

11 I don't think I'll ask the question again about  
12 other members of the public who might want to comment because  
13 tomorrow is another day. We also have a public comment  
14 period at the end of tomorrow's session.

15 With that, I call today's session to a close. We  
16 will adjourn. We reconvene tomorrow morning at 8 o'clock  
17 here.

18 (Whereupon, the meeting was adjourned, to reconvene  
19 on Wednesday, January 29, 1997, at 8:00 a.m.)

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