

UNITED STATES
NUCLEAR WASTE TECHNICAL REVIEW BOARD

PANEL ON STRUCTURAL GEOLOGY & GEOENGINEERING
WORKSHOP ON THE EXPLORATORY STUDIES FACILITY (ESF)
DESIGN AND CONSTRUCTION STRATEGY

Plaza Suite Hotel
4255 South Paradise
Las Vegas, Nevada 89109

November 5, 1992

BOARD MEMBERS PRESENT

Dr. John C. Cantlon, Chairman
Nuclear Waste Technical Review Board

Dr. Edward J. Cording, Moderator
Nuclear Waste Technical Review Board

Dr. Clarence R. Allen, Member
Nuclear Waste Technical Review Board

Dr. D. Warner North, Member
Nuclear Waste Technical Review Board

Dr. John J. McKetta, Member
Nuclear Waste Technical Review Board

Dr. Garry D. Brewer, Member
Nuclear Waste Technical Review Board

Dr. Donald Langmuir, Member
Nuclear Waste Technical Review Board

Dr. Patrick Domenico, Member
Nuclear Waste Technical Review Board

ALSO PRESENT

Dr. Carl DiBella, Senior Professional Staff

Mr. Russell McFarland, Senior Professional Staff

APPEARANCESKEY PARTICIPANTS:

Carl Gertz, Yucca Mountain Project Office

William Simecka, DOE

James Allan, Morrison-Knudsen, M&O

Robert Pritchett, Reynolds Electrical & Engineering Co.

Dale Frasier, Reynolds Electrical & Engineering Co.

Joseph Sperry, NWTRB Consultant

Hugh Cronin, NWTRB Consultant

Robert M. Matyas, NWTRB Consultant

S.H. Bartholomew, NWTRB Consultant

I N D E X

<u>SPEAKERS:</u>	<u>PAGE NO.</u>
Opening Remarks Dr. Clarence R. Allen, NWTRB	293
Introduction of Consultants Dr. John Cantlon	293
Yucca Mountain ESF Design and Construction Program Management and Implementation William Simecka, DOE	301
Dale Frasier, REECo	318
Round-table Discussion	336
Wrap-Up Discussion Hugh Cronin, NWTRB Consultant	422
Joe Sperry, NWTRB Consultant	424
Bart Bartholomew, NWTRB Consultant	429
Robert M. Matyas, NWTRB Consultant	435
Dr. Edward J. Cording	437
Carl Gertz, Yucca Mountain Project	484
Round-table Discussion	444

1 commissioned to do, but nevertheless we get asked about that.
2 And, the second thing we get asked about is what are the
3 management and administrative repercussions of the recommend-
4 ations and assessments we make? And, so we feel that it's
5 extremely important that we hear from the DOE people some of
6 the information that we haven't really been able to master
7 fully. So, we'd like to have that as the output.

8 Now, the reason I'm chairing the session, I guess,
9 I used to think that every organization needs an SOB. I
10 spent six years managing the academic budget of a land grant
11 university which today is about a \$400 million operation.
12 And, I also spent about 15 years managing the research side
13 of the university which again today is around \$200 plus
14 million a year. So, I'm not unfamiliar with the kind of
15 challenges that a management organization runs into and a lot
16 of the shoal waters of making good management are things that
17 almost no one except the managers who are sitting in that
18 chair understand; the political realities, the regulatory
19 realities, and so on.

20 Now, the Board has as its intent coming out of this
21 and some of the prior sessions to generate a specifically
22 focused mini-report. It won't be part of our regular
23 reports. And, recall that we report dually to the Secretary
24 of Energy and to the Congress. After January, we're going to
25 have a brand new Congress. We have a brand new executive.

1 We have an opportunity here to essentially make a report that
2 focuses on what this process is all about. There's far too
3 much opinion around the country, both at the lay level and in
4 the technical circles, that what we're looking at is an
5 elegant dump, a multi-billion dollar dump. Nothing could be
6 further from the truth. We're looking at the infrastructure
7 and a very important infrastructure piece of this country's
8 energy base. And, if we don't begin to think about this as
9 the absolutely key infrastructure to the energy future of
10 this country, then we have undersold what we're about. And,
11 so getting a clear focus on what it is that we're doing, what
12 it is DOE is committed to do with a great deal of anxiety
13 broadly in the country, I think part of our difficulty is
14 that we have sort of walled ourselves off and gone about it
15 letting essentially the lay audience out there dictate what
16 the national image of what Yucca Mountain is all about.

17 Yucca Mountain, in point of fact, may be the
18 world's most valuable energy mine. Think about that. It
19 may, in fact, be the most valuable energy mine. And, so
20 let's think about now managing this thing in terms of what it
21 is, where we're headed, why we're headed that way, and if we
22 don't do that, we've got 49 other states that have got a hell
23 of a problem on their hands and those 49 states wield a lot
24 more political moxie than the opposition to Yucca Mountain.
25 So, it's extremely important then, I think, that we put this

1 in the right context.

2 Now, let me ask our consultants to give a sentence
3 about their background in administration. And, let me first
4 call on Bart Bartholomew.

5 DR. BARTHOLOMEW: Thank you, John.

6 As you say, my name is Bart Bartholomew. Current-
7 ly, I teach construction management at a state university in
8 California. Prior to that for the some odd 45 years of my
9 professional career, I've been engaged in various phases of
10 construction contracting, practically entirely as a member of
11 a construction contracting organization. I've managed over a
12 period of a number of years the heavy construction operations
13 of a major national contractor who also did other types of
14 work including nuclear related work. And, I might say that
15 much of that latter number of years was in underground con-
16 struction that my company primarily executed.

17 Since that time, since I've been teaching, I've
18 operated as a construction consultant which has given me the
19 opportunity to see quite a breadth of underground projects in
20 this country over the last eight or 10 years and form a
21 perspective into what some of the interfaces are between the
22 contractors that are attempting to make a profit in the con-
23 struction industry and achieve ends that the owners wish and
24 the wishes of the owners. I've had numerous opportunities to
25 see some of the conflicts that have evolved when those two

1 clash from the perspective of a third party observer rather
2 than being a participant. And, I think my point of view in
3 the comments I make today will come from that type of a
4 background.

5 DR. CANTLON: Thank you.

6 Bob Matyas?

7 MR. MATYAS: Good morning. I've had a career in manage-
8 ment and engineering. It probably breaks down into three
9 categories. I worked for Admiral Richover in the early days
10 of the AEC and built a lot of nuclear power plants for naval
11 use, worked on the Central Station Power Plant and Shipping
12 Port, went back to Cornell and I ended up retiring there in
13 1988 as the chief operating officer. And, the responsi-
14 bilities included that I was the contract authority for the
15 university. The university is a billion dollar plus budget a
16 year and it's a major research institution and acts as an M&O
17 for, I think, four national high-tech projects.

18 Since I retired, I've done a number of consulting
19 assignments for a number of Government agencies including a
20 year I spent in the startup of what is now known as a Super-
21 conducting/Supercollider laboratory in Berkeley. When the
22 project was assigned to Dallas, I then spent about 10 months
23 down there trying to start the project up and finally came
24 back home and started to take care of my lawn.

25 And, I'm just pleased to be involved in this thing.

1 I once wrote to Admiral Watkins, whom I knew way back before
2 he was an Admiral, saying if I can help in any way, I'd be
3 pleased to. And, he never answered, but here I am.

4 DR. CANTLON: Hugh Cronin?

5 MR. CRONIN: My management experience would include 15
6 years as an engineer and manager for one of the major con-
7 tractors in the United States. Following which, I've been 15
8 years as a consultant managing my own firm. And, in this
9 consulting work, I would estimate that probably somewhere
10 between a third and a half of the work that we do is involved
11 with management. Currently, we're working for a mine and
12 advising them on the best way to manage a major underground
13 development in the private sector.

14 DR. CANTLON: Okay, thank you. And, Joe Sperry?

15 MR. SPERRY: I've worked in tunnels exclusively for the
16 last 31 years. In 1984 and 1985, I was a consultant at
17 Parsons-Brinkerhoff and their work at Yucca Mountain. So, I
18 got familiar with your project there. I've hands-on oper-
19 ating experience with two tunnel boring machines. The first
20 20 years of my experience was pretty much with contractors.
21 The last 10 years has been almost exclusively with owners.

22 DR. CANTLON: Okay. Well, let's go now to the program.

23 DR. CORDING: I'd also like to just introduce the other
24 members or key participants at the head table here today.
25 Perhaps, we could have them just briefly state their back-

1 grounds.

2 We have Dale Frasier with the Reynolds Electrical
3 Company across from me.

4 MR. FRASIER: Thank you, Ed.

5 I'm Dale Frasier, President and General Manager of
6 Reynolds Electrical & Engineering Company. I've held that
7 position for about six years. Prior to that, for eight years
8 I was the deputy general manager. Prior to that, I was a
9 division manager for REECO since about 1970. My background
10 is in construction, engineering, and mining.

11 DR. CORDING: Thank you.

12 And then, Bob Pritchett, also with Reynolds Elec-
13 trical.

14 MR. PRITCHETT: Thank you, Ed.

15 I've been with REECO for 25 years associated with
16 the weapons testing program in the beginning. Background is
17 mining and geological engineering and mining engineering.
18 I'm presently a division manager within our company and
19 technical project officer for our company's support efforts
20 associated with the Yucca Mountain Project.

21 DR. CORDING: Thank you, Bob.

22 And then, also Jim Allan, Morrison-Knudsen.

23 MR. ALLAN: Thank you, Ed.

24 I'm a lifelong employee of Morrison-Knudsen &
25 Company. Been in the management side of the house, the

1 project management side, for more than 20 years. I've worked
2 on a large number of commercial large programs and this is my
3 fourth DOE program that I've been involved in in the last 10
4 or 12 years. I might just add that I worked for Mr. Cronin
5 when he was a manager of a major U.S. corporation.

6 (Laughter.)

7 DR. CORDING: All right. Two gentlemen you know very
8 well here, but I'll let them also speak. We have Carl Gertz
9 of DOE--you know him as the manager of the program--and Bill
10 Simecka. Bill, any comments that you would wish to make?

11 DR. SIMECKA: Well, I guess I can tell a little bit
12 about my background. I've had about 40 years of experience,
13 mostly in the Federal Government defense industry, and both
14 as a Federal employee at China Lake, California, as well as
15 10 years in the aerospace industry. And, I spent 12-1/2
16 years at Livermore in charge of all the engineering up there,
17 mechanical engineering, before coming to this project and
18 I've been in my position as the head of engineering develop-
19 ment division for nine months.

20 DR. CORDING: Okay, thank you. Carl?

21 MR. GERTZ: First of all, I'd apologize for being a
22 little bit late, but another one of my oversight groups had
23 me tied up this morning. Commissioner DePlank from the NRC
24 was in town. So, one of the five NRC Commissioners was
25 touring the mountain today and so we look forward to that.

1 I am the Yucca Mountain Project Manager. I've been
2 the project manager for five years here in Las Vegas. I'm a
3 civil engineer by my original degree. I have post-graduate
4 studies in various areas. I've been 30 years in the civil
5 engineering project management field and we're eager to
6 continue the dialogue we started yesterday.

7 DR. CORDING: Appreciate that, thank you.

8 Well, Bill Simecka, you're up.

9 DR. SIMECKA: I'd like to have two presentations today
10 to introduce this session. The first one that I will do has
11 to do with your question about how are we organized on ESF
12 design and construction management. I will present that and
13 then I think it's important because of some of the questions
14 that came up and noted in your agenda that Dale Frasier,
15 president and general manager of REECO, tell you about how he
16 operates at the NTS and answer questions that you've had with
17 regard to union standards, cost of doing business, sub-
18 contracting out on a fixed price or otherwise basis. And, I
19 think that kind of input would be very useful to you to maybe
20 answer a lot of your questions.

21 Okay. As I say, I'm Bill Simecka. I ought to
22 mention that I'm charge of the engineering and development
23 division of the Yucca Mountain Project and, in addition to
24 ESF, I have three other areas that I'm responsible for; waste
25 package, repository, and system engineering.

1 To handle the ESF, Ted Petrie handles all of the
2 ESF activities, design and construction, and you met him
3 yesterday. The organizations supporting me in this endeavor
4 are these. As we told you yesterday, we have transitioned
5 the ESF design from Raytheon to the M&O on the 1st of Octo-
6 ber. So, all of the ESF design from here on will be done by
7 the M&O. The M&O also is responsible for construction man-
8 agement support and I'll show you how that works in a moment.
9 The construction itself has been REECO and its
10 subcontractors and we're going to be awarding the--or REECO
11 is going to be awarding the subcontract to help with the
12 underground construction in the January time frame. And, of
13 course, procurement is also the responsibility of REECO.

14 This is the construction management organization.
15 As I said, I am responsible for this and Ted Petrie is
16 responsible to me for all the design and construction. And,
17 under him, there is a construction management office consist-
18 ing of an individual reporting to him who is a DOE person.
19 His name is Tom Fortner. And, supporting him is an M&O
20 construction management organization and Jim Allan is the
21 construction manager of that office. And, under him, he will
22 be responsible for all these activities. He will essentially
23 help Tom Fortner make sure that all of the activities asso-
24 ciated with getting the construction done in an efficient and
25 an effective and a safe manner and these people will be

1 working with all of the organizations involved; with the
2 safety people, with the environmental people, with the con-
3 struction people, with the design people, and so forth. And,
4 with regard to the construction activities, the constructor
5 and his people out in the field will report basically to Tom
6 Fortner.

7 Now, that's all I had to say about that. Are there
8 any questions?

9 MR. SPERRY: Bill, REECO reports to DOE, is that what
10 you're saying?

11 DR. SIMECKA: REECO is--as far as the construction
12 activities in the field, our DOE person out there manages all
13 that. This is from a management standpoint of making sure
14 all the activities are done as we'd planned to do them.
15 REECO itself is an M&O contractor with the Nevada field
16 office.

17 MR. SPERRY: And then, Jim Allan gets involved essen-
18 tially as an advisor to Tom Fortner?

19 DR. SIMECKA: That's correct.

20 MR. SPERRY: Okay.

21 MR. GERTZ: Just picking up a little bit on yesterday,
22 if it were a perfect world, I'd like to have a lot more
23 Federal employees and I only have about 70 distributed all
24 across the program. As a result, we use the M&O organization
25 to provide us advice, counsel, and help us carry out the

1 program.

2 MR. MATYAS: Bill, I think after sitting through this
3 yesterday and reading the material that I understand, some-
4 what, the matrix, but I think some of you in this room will
5 agree with me it's not a conventional matrix. I listened to
6 what I thought were very excellent presentations by the
7 Department of Energy representatives here. Mr. Gertz has an
8 unusually detailed knowledge of a large project. Project
9 managers, as I know, have flanks of people that answer all
10 their questions. He seems to be able to handle that.

11 MR. GERTZ: I wish I had more flanks yesterday.

12 MR. MATYAS: Well, I guess I wanted to say that this
13 management structure is an exception to the normal--what you
14 normally find in the construction process. Now, there was a
15 time when I used to teach in our graduate school of business
16 and all kinds of great innovations in how to manage all kinds
17 of entities, I always came down to a point by saying, look,
18 any system will work if everybody knows the rules. Or,
19 putting it another way, you can't have an effective choir
20 unless you're all using the same hymnbook.

21 I worry and I wonder if you could comment on how
22 this project is geared to handle the management control
23 aspects, the communications that must go to all parties, and
24 I guess I'd like to know who is the Hyman Richover of it if
25 there is such a person? Where is the leadership? Is it

1 diffused because it seems to me that it's currently diffuse.
2 And, as I say, it might work. It very may well work. There
3 are a lot of dedicated people here. As a matter of fact, I'd
4 like to also say that I gathered--it was pretty clear to me
5 that there's enormous amount of talent on this job. But
6 then, I wonder, you know, what's the effective use of that
7 talent? When I bought my first IBM PC, I was very thrilled
8 with it. But, I got very frustrated because I realized that
9 I could only use about 10% of its capability and I guess I
10 feel a little soft spot in my heart for some of the people
11 here who have ability and at least it isn't clear to me that
12 there's a way for it to be applied in a, you know, nice
13 strong vector.

14 DR. SIMECKA: Well, let me just mention that the way
15 Carl has organized, he holds me accountable for all the
16 engineering and construction activities at the site. And,
17 you know, that's design and construction. We have detailed
18 plans that we have made costed out and authorized each of
19 those people to do their part of that. And, we manage that
20 on a--especially in the construction, we have to watch over
21 that on a daily basis. You cannot let the construction
22 activities go without being managed on a daily basis. Now,
23 that solid line from REECO to the construction management
24 office is a oversight role. I mean, that line is DOE manages
25 the REECO contractor in an oversight role. REECO has

1 detailed construction plans and so forth that they manage as
2 a constructor and so it's just an oversight role. We're not
3 getting in the middle of what REECO is doing. They know how
4 to do these construction projects, but we do have to over-
5 sight it and make sure that everything else that has to feed
6 that system is there when it's needed.

7 MR. GERTZ: I think you're really asking a question that
8 I have an answer because, you know, you asked who is in
9 charge? And, unequivocally, I'm in charge. Let me tell you
10 how we go about managing that because we didn't spend time on
11 the management structure and that's another, you know, one
12 hour presentation that I'd be glad to do with you some time
13 about our cost schedule control system and who is respon-
14 sible.

15 But, I did put this chart up yesterday and that was
16 the participants and that shows my project office with the
17 M&O team to help us carry out the activities across the
18 program. Each of these entities has not only a nine year
19 plan to the end of the program, but a one year plan with
20 specific milestones. There's 6,000 activities that have been
21 scheduled, costed, and with milestones on them. We look at
22 the big picture, of course, to get to 2001, but we look at
23 the next year in very close detail, maybe 40,000 or 50,000.
24 We have the traditional integrated--it's not traditional, in
25 fact. It's probably one of the best systems I've seen for

1 integrating cost, schedule, and technical baseline.

2 MR. MATYAS: And, you folks manage that in your divi-
3 sion?

4 MR. GERTZ: We manage that right here, that's correct.
5 We have a monthly meeting that shows up variances across the
6 project. Let me show you what my office is broken out so you
7 can tell a little bit how we manage this entire suite of
8 contracts. I don't manage it individually myself. I have
9 people that manage different aspects of it. I do conduct a
10 monthly meeting that talks about the performance measurement
11 of the project, highlights variances with all my team mem-
12 bers, meaning my Federal staff and some of the M&O staff. I
13 also have a monthly meeting with these people on this chart
14 to express their concerns.

15 MR. MATYAS: Could I ask you with all the entities
16 there, will your integrated project control system--does that
17 communicate--the other people read that, can they get it on
18 the wire?

19 MR. GERTZ: Yeah, they've used it. Larry Hayes manages
20 with it. He has a stack of what we call PEX cost accounts
21 and summary accounts that lays out the trenching, the anal-
22 ysis he has to do by milestone, and he gets his monthly
23 variances and that's what he uses to plan and manage it.
24 Russ Dyer, who was up here yesterday, made a tremendous
25 impression on the OMB when they were out here. They said,

1 well, Dr. Dyer, you know, you're a fine scientist, a PhD in
2 geology, but how do you manage this? And, he brings out his
3 printout and says here's how I manage it. I know with the
4 USGS, it's off schedule or I know what Lawrence Livermore is
5 doing.

6 MR. MATYAS: How about REECo, SAIC--

7 MR. GERTZ: The same thing. They all have cost--every-
8 one on this chart is a participant in one of the 6,000
9 accounts--

10 MR. MATYAS: In that vernacular, in that system. They
11 don't each have systems of their own?

12 MR. GERTZ: No, they have their own--their systems is
13 compatible with rolling up into ours. Each one of them, they
14 all work on the same work breakdown structure. We have the
15 same reporting requirements. There's a little bit different
16 idiosyncrasies at the lower levels, 6th and 7th level of the
17 WBS, but they all roll up into our overall project management
18 system.

19 MR. MATYAS: Do you have any influence? Could you
20 suggest that the Supercollider Project do the same thing?

21 MR. GERTZ: Let me just tell you, people that were out
22 here from PR-25 which is DOE's office, I had eight people
23 last week reviewing the program. They said it's the best
24 they've seen. It should be applied DOE-wide. They don't
25 understand why it's not being applied DOE-wide. It's a very

1 disciplined approach to project management. I could spend,
2 you know, an hour on the approach, but it's discrete cost
3 accounts that have scope, schedule, and milestones for every-
4 body on here. Some are level of effort. You know, I won't
5 try to kid you. Some are level of effort, but others have
6 discrete milestones. But, you still know what's going on.

7 MR. MATYAS: Let me pursue that a little further. How
8 about the response time? I remember working with a group on
9 the west coast and they had this great computerized system,
10 but it took 30 days to get an answer.

11 MR. GERTZ: It depends on what question you ask. We get
12 reporting in about 12 days at the end of the month and then
13 that summarizes our variances and we have our meetings about
14 --

15 MR. MATYAS: Let me ask how you, as the leader of the
16 project, if you have a question, do you wait 12 days for a--

17 MR. GERTZ: I do one of two things as the leader.

18 MR. MATYAS: You can get it off the top.

19 MR. GERTZ: Yeah. I do one of two things. If there's
20 an immediate crisis, I get my person responsible and the TPO
21 responsible and say let's find out what's going on. Other-
22 wise, I do management by exception, how's it going?

23 MR. MATYAS: So, you publish the hymnbook?

24 MR. GERTZ: That's correct. I publish the hymnbook and
25 I get sent to me the monthly report that lets me know how all

1 my division directors are doing and how all the participants
2 are doing on that month's plan. And, I'll just--and, each
3 cost account has a responsible individual. I mean, it's not
4 just ambiguous. It's Russ Dyer responsible for this or Uel
5 Clanton responsible for 1.2.3.2 or whatever.

6 MR. MATYAS: So, you can measure their performance as
7 individuals?

8 MR. GERTZ: Measure their performances individually and
9 as an organization. You know, as I said, if I sound
10 enthused, I am because it's probably one of the best project
11 management systems that I've seen and everybody that's seen
12 it and spent time in the details of it really like it. Now,
13 I'll be as honest as I can, we originally--it was best used a
14 couple of years ago for our planning process. Just over the
15 last nine or 10 months, we're starting to use it in the
16 project control management process. We used it for planning
17 and budgeting and now we're using the same database and
18 starting to use it real hard for management. The reason we
19 weren't able to use it much for management before, our base-
20 line kept changing. We never knew how much money we were
21 going to have each year.

22 MR. MATYAS: Very well. Thank you.

23 MR. GERTZ: Okay. And then, just to get on, I need to
24 expand on this office up here because these are the people
25 doing the work. As I said, they all have cost accounts and

1 responsibilities. Larry, I don't know how many summary cost
2 accounts you have, but you probably have--

3 MR. HAYES: About 100 and some.

4 MR. GERTZ: 100 and some. And, I don't have that
5 presentation here because I didn't think we were going to get
6 in it, but I may even get it before lunch here.

7 Here is my office and it's not as untraditional as
8 you would think from a construction project. This is the
9 project team. I have, in effect, a couple line divisions.
10 This is Bill Simecka responsible for ESF, field engineering,
11 and systems. I have Wendy Dixon responsible for the environ-
12 mental programs that go on out there. I have Vince Iori
13 responsible for project control. I have Russ Dyer respon-
14 sible for the technical, scientific part of the program.
15 And, I have a representative in Washington and I have normal
16 support from information resources, a site manager who coord-
17 inates the site activities out at Yucca Mountain, and an
18 institutional staff with Ace Robinson and QC off to the side.
19 But, each of these have performance responsibilities and I
20 get a printout and say how did Mr. Dyer do with all his cost
21 accounts last month and they all have milestones.

22 MR. MATYAS: I agree with you that's a very sensible and
23 reasonable management organization.

24 MR. GERTZ: It's complex.

25 MR. MATYAS: Oh, of course, but when I said that the

1 management structure is an exception, I expected yesterday to
2 start off and we'd hear only from the official M&O. My
3 experience with Government agencies is they will hire some-
4 body to operate it. You may have the wrong label. I mean,
5 you are the M&O in a conventional sense.

6 MR. GERTZ: Well, not really. We rely on the M&O for a
7 tremendous amount of support and analysis and expertise, you
8 know. In my 70 people across here, I can't have experts like
9 Jim Allan and other people across from M-K and Duke Engineer-
10 ing. So, we have a Federal responsibility to carry out this
11 program though, you know. I believe I have a charter from
12 the Secretary of Energy to be responsible for the program and
13 I believe my staff has the same responsibility. And, while
14 we have a multitude of support and we're going to rely on the
15 M&O and the scientific contractors, the buck stops at the
16 Federal people. They're responsible.

17 MR. MATYAS: Let me ask you about the scientific con-
18 tract at the various laboratories. Do you buy their services
19 like somebody would in the private sector? Do they bid on
20 your scientific project?

21 MR. GERTZ: We do not, per se, bid on it. We chose at
22 the beginning what we thought was the best suite of national
23 labs, Federal agencies with the best expertise to do the job.
24 So, we chose that. Now, they do provide cost estimates. I
25 allocate all their funds. We've had great debates the last

1 two months as to how much money each person gets, Larry and I
2 and Tom and everybody. You may have sensed a little frustra-
3 tion yesterday. None of these people are getting exactly
4 what they want. I only had 244 million to distribute and I
5 had 300 million requested from this team. So, most people
6 didn't get what they wanted and everybody thinks their own
7 area is the most important in the near-term.

8 MR. MATYAS: How do you decide whether or not you're
9 going to renew one of their contracts?

10 MR. GERTZ: Well, we have a couple of ways that we do
11 business. One, it's my prerogative. So, if my scientific
12 staff says these people are not performing--and, I'll just
13 tell you, we had a little issue with the USGS two years ago
14 where we thought their geologic division was not being
15 responsive to the project. It was not carrying out the
16 program. Two, it was not under Larry Hayes' direct control.
17 It was a matrix support that I was unhappy with. I couldn't
18 get anybody to be responsible. I went to the USGS and, in
19 effect, said we need this direct responsibility management
20 part of our system or else I'm going to find someone else to
21 do the geologic studies. They indicated that they would
22 change their structure and provide Larry with the management
23 responsibility he needed so he could do it. So, if I'm
24 unhappy and my technical staff says things aren't going
25 right, I will find someone else to add to the chart.

1 MR. MATYAS: What you've said is you are clearly the
2 client. Then, I have to say, you know, again it may be a
3 matter of labels, but you have REECO and you have SAIC and
4 you have M&O which has seven or eight--does that add to the
5 difficulties?

6 MR. GERTZ: Of course, it adds to the difficulties, but
7 it's not unlike managing a major construction project. You
8 have a multitude of subcontractors. Someone does the dry-
9 wall, someone does the electrical, someone does the plumbing.
10 They even have subcontractors for suppliers for certain
11 parts of the plumbing. So, it's not unlike in my experience
12 of managing a major construction project. It's a little dif-
13 ferent since you have a lot more scientific disciplines.
14 It's not quite as hardware oriented. You've delivering
15 products that are intellectual products, reports, analysis.

16 MR. MATYAS: But, if I were a contractor trying to bid a
17 job here, I'd need a program to decide where it's coming
18 from.

19 MR. GERTZ: Yes.

20 MR. MATYAS: Between REECO giving me a contract and
21 somebody else handing me a machine and an M&O playing a role
22 and then, of course, your office so deeply involved in such
23 detail, you're going to have to have a floor manager when we
24 have a meeting.

25 MR. GERTZ: Almost, we do, but not quite. What you

1 described, once again, is not unusual when I was a project
2 manager on construction projects. I mean, you bring your
3 superintendent in, your project engineer in, you bring your
4 major subcontractors in and they're going to have subs to
5 them, and if you have an issue, you just go right down the
6 chain-of-command. Everybody has a responsibility. We've
7 tried to eliminate any overlapping responsibilities. As I
8 said, the M&O, in effect, helps us manage it. This happens
9 to have the number of FTEs and everything and their roles,
10 the role of each of these contractors on here, but in effect,
11 REECO is the constructor. They will have specific construc-
12 tion subcontracts and Dale will talk more about that. SAIC
13 is more of a support services running information offices,
14 tours, sample management facilities, providing support ser-
15 vices, and then the specific expertise at the national labs,
16 and then the M&O doing specific performing roles, as well as
17 helping us integrate.

18 MR. MATYAS: Okay. I understand that. One last ques-
19 tion and I'll let somebody else get onto this. Is it cost
20 effective to have all of these activities out there? I mean,
21 I would not be surprised if a lot of that happened just
22 historically.

23 MR. GERTZ: Some of it did happen historically, but
24 we've been evaluating and we've taken people off this chart
25 and we've added some people to the chart as to the project

1 needs. So, we are constantly evaluating that. Cost effec-
2 tive becomes very subjective after a point of view. What are
3 you paying for technical expertise and do you want the cheap-
4 est technical expertise or do you want the best and it may be
5 a little costlier? And, you know, that's what we're trying
6 to enforce, what is the best science?

7 MR. MATYAS: Thank you.

8 MR. GERTZ: We try to subcontract fixed price in con-
9 struction and Dale will talk about that where we can through
10 REECO, but a lot of it is not a definite scope of work and
11 we'll talk about it. I, as having some experience in the
12 construction field, do not want to get into prolonged litiga-
13 tion on construction contract claims. I'm not trying to have
14 a suite of lawyers handling those kind of issues for me.

15 The other thing we do with these people, this
16 contractor, REECO, SAIC, and the M&O all are on award fee.
17 So, my staff determines what kind of fee that they get based
18 on their performance. They are cost contractors. We pay
19 their costs because we're telling them the scope of work
20 that's cost reimbursable. But, their fee is determined in an
21 award fee process.

22 MR. MATYAS: Thank you very much.

23 MR. GERTZ: Did that answer some of your questions?

24 MR. MATYAS: A lot of them.

25 MR. GERTZ: Okay. Bill, you wanted to continue or it's

1 Dale's turn?

2 DR. SIMECKA: I was at Lawrence Livermore Lab. I worked
3 in essentially a matrix organization. And, this is sort of a
4 matrix organization. If it's managed properly and we think
5 we are doing that, we enjoy a tremendous benefit that other
6 organizations don't have and that is each of those organiza-
7 tions, we're only using a small fraction of the Lawrence
8 Livermore Lab and the Los Alamos Lab and the Sandia and the
9 USGS. If we need expertise for any issue that is now not
10 working on it, they can dig into their organizations and pull
11 those experts up at a moment's notice.

12 MR. MATYAS: So, you can go shopping for those services,
13 basically?

14 DR. SIMECKA: Well, we could tell them, you know, we
15 need this extra expertise, and out of those organizations,
16 they can pull almost any known expertise that you could think
17 of. So, it is really very cost effective to have that. We
18 don't have to go out and get another contract and et cetera,
19 et cetera. So, we feel it's very efficient.

20 Yes, Larry?

21 MR. HAYES: I just wanted to add something to what Bill
22 said. One reason that it's so cost effective, we might need
23 a group of experts only for a short time period. The way the
24 program is set up, we can do that. We can go into one of the
25 labs of the USGS and get together a group of experts for a

1 month, two months, get what we need, and then we go on. And,
2 it saves the project from having to keep a larger expertise
3 base.

4 DR. SIMECKA: Any other questions?

5 (No response.)

6 DR. SIMECKA: Okay. I'd like to ask Dale Frasier to
7 come up and give you a presentation on how REECO operates.

8 MR. FRASIER: Good morning. I'm Dale Frasier, a general
9 manager of Reynolds Electrical & Engineering Company. Rey-
10 nolds Electrical & Engineering Company, better known as
11 REECO, is a prime management and operating contractor to the
12 U.S. Department of Energy's Nevada field office. Our primary
13 mission is to support this nation's nuclear weapons testing
14 program and other programs on the Nevada Test Site and Tono-
15 pah Test Range. We presently have approximately 3800
16 employees, about half of which are craft people.

17 The major functions that we perform for the DOE
18 consists of construction. That would be both test construc-
19 tion for nuclear experiments and permanent facility construc-
20 tion. We perform virtually all the mining, drilling, heavy
21 equipment operations, fleet operations, utility and facility
22 maintenance, communications, power distribution, supply and
23 property management, housing and feeding, plant engineering,
24 medical operations, fire protection, health protection--
25 that's both health, physics, and industrial hygiene--waste

1 operations, and environmental management.

2 We're organized as follows. I have seven line
3 divisions that report to me, as well as my legal staff and
4 several other administrative functions. As Bill said, we've
5 been designated the constructor on the Yucca Mountain Project
6 and we do that through a division called the Yucca Mountain
7 Project Division headed up by Bob Pritchett over here. Up to
8 this point, Bob has gotten most of his construction support
9 through matrix from other REECO organizations because we
10 haven't had a sustained construction program to date.

11 A little bit of a historical data about REECO.
12 We've been a prime management and operating contractor to the
13 DOE and its successor agencies since 1952 beginning with the
14 AEC and then ERDA and later DOE. So, we have about 40 years
15 of experience supporting testing programs in a fairly highly
16 regulated environment. We've been working side-by-side with
17 scientists for the full 40 years we've been here. We
18 presently have an NRC approved QA plan for the Yucca Mountain
19 Project.

20 We've traditionally been a signatory with labor
21 unions for craft workers for our entire 40 year history.
22 Between 1952 and 1965, we used the Las Vegas area, what we
23 call, master labor agreements. These are agreements that are
24 negotiated by employer associations in Las Vegas like the
25 Associated General Contractors, National Electrical Con-

1 tractors, and so forth. Then, in 1965, we decided to break
2 away from the employer association downtown and we negotiated
3 our own project labor agreements. We presently have 26 labor
4 agreements, 14 of which cover the construction work or the
5 Davis-Bacon work and we have 10 maintenance agreements. And,
6 we have two other agreements, one with the culinary union to
7 provide housing and feeding support and one with the Team-
8 sters to provide firefighters.

9 One might ask why have labor agreements, why have
10 agreements with labor unions? And, there are some pros and
11 cons and some benefits and some drawbacks probably. But, at
12 least from my perception, I think the benefits to having
13 labor agreements is it's a damn good source of supply for
14 craftsmen. And, my experience says that generally your union
15 craft people are more specifically qualified than non-union
16 workers. If you want a dozer operator or a blade operator,
17 whatever, generally the guy you get out of the hall is going
18 to be more qualified than a non-union worker. That's what my
19 experience tells me. Also, the labor agreements we have
20 enables us to increase our work force rapidly. They have a
21 good pool of people.

22 There are several drawbacks in having union agree-
23 ments. One is that there are some restrictive work practices
24 and that would primarily be craft jurisdiction. And, what
25 that really means is you're not going to have a guy that's

1 going to be a painter one day, a tunnel worker the next day,
2 an electrician the next day, and a crane operator the next
3 day. They have specific jurisdictions. Another potential
4 drawback is occasionally when dealing with unions and union
5 agreements, you could have a work stoppage. This has not
6 been a major problem for us for a good many years. We've
7 only had two of them since 1970 and they were both at con-
8 tract negotiation time. Other than that, we've had no work
9 stoppage, at all, in 20 years.

10 DR. CANTLON: How long?

11 MR. FRASIER: 20 years.

12 DR. CANTLON: No, how long was the stoppage?

13 MR. FRASIER: One of them was about 90 days, the other
14 shorter.

15 DR. LANGMUIR: You didn't mention cost as a drawback.
16 Is there a cost factor that should be listed as drawback, as
17 well?

18 MR. FRASIER: I will get to that a little further down-
19 stream, if I may.

20 When I talked about our ability to build up rapidly
21 by virtue of having labor agreements, this is our work force
22 history over our 40 years here. And, as our program--

23 MR. GERTZ: Move it over a little to the scale? No, the
24 viewgraph.

25 MR. FRASIER: Excuse me. Does that do it, Carl?

1 MR. GERTZ: Yeah.

2 MR. FRASIER: So, those are thousands on the vertical
3 scale and the years.

4 So, as you can see, as our programs have changed
5 over the years, we've had to rapidly increase, rapidly
6 decrease. 1961, when we had a rapid buildup of almost 5,000
7 people, it was after the Russians broke the moratorium and
8 President Kennedy put us back in the nuclear weapons testing
9 business. So, we are able to adjust pretty rapidly, primar-
10 ily, by virtue of having labor agreements in place.

11 When I kind of look at our project labor agreements
12 versus the master labor agreements downtown, I believe that
13 ours are generally more favorable to the employer. In the
14 case of wage rates, for instance, operating engineers which
15 will play a big role in the site characterization phase, our
16 rates are about \$3.50 an hour lower than the master labor
17 agreements in the Las Vegas area. Our tunnel workers are
18 about 5.25 an hour less than compared to the California rates
19 which is our closest comparison for tunnel workers. Not much
20 tunnel work done in southern Nevada except for the Nevada
21 Test Site.

22 Subsistence rates, subsistence is a rate given each
23 employee each day to travel to a remote location. We pay
24 between \$5.00 and \$7.50 a day depending on the reporting
25 coordinate on the test site. Similar rates for similar

1 distances under the master labor agreement runs between
2 \$25.00 and \$30.00 per day. This is a little misleading
3 because in addition to the \$5.00 and \$7.50, we also provide
4 subsidized transportation and subsidized housing and feeding
5 which tends to close that up considerably.

6 I think work rules which are very important in
7 union agreements, I think ours are generally more favorable
8 than the Las Vegas agreements. And, I'll give you one
9 example. I see John Haslam from the operating engineers here
10 today. We're in the midst of negotiating 24 of our labor
11 agreements now. And, in our negotiation with the operating
12 engineer, one of the things that we figured was a very
13 uneconomic practice was the requirement to have a compressor
14 operator on compressors of over 900 cubic feet per minute.
15 You traditionally use compressed air in tunnel work and on
16 drilling. We were able to negotiate that requirement out in
17 this negotiation. So, that requirement goes away April 1
18 and, for instance, on a drill rig where you've got a four or
19 five man crew, one of which is a compressor operator, that
20 will cut the direct labor cost by 20 or 25%. So, we're
21 continually working on these, and with our relationships with
22 the unions here, we've been able to make a lot of those bad
23 restrictive practices go away. On balance, I would have to
24 say that our relationship with unions has been pretty darn
25 good.

1 Your question relative to price somewhat relates to
2 wage rates. And, I'll say this, that the construction hourly
3 rates including the fringe package would be the same for non-
4 union workers as for union workers for Federally funded
5 construction work by virtue of the Davis-Bacon Act. And,
6 essentially, what the Act says is that on Federally funded
7 work the contractor must pay the prevailing rate of that
8 area. And, our REECO construction rates actually set the
9 prevailing rates on the Nevada Test Site including the Yucca
10 Mountain Project. I don't know if that's responsive to your
11 question.

12 Relative to the construction support that REECO has
13 supplied to the project to date, the Yucca Mountain Project
14 has really not sustained a continuous construction program.
15 We've had a lot of short duration jobs building roads, drill
16 pads, things like that. Nothing very sustained. So, most of
17 that construction support has been matrix from other REECO
18 departments. Bob hasn't really built up to having a con-
19 struction cadre just yet, but he will be shortly.

20 I do believe that the matrix construction support
21 has been responsive and cost effective and I'll just give you
22 one little example here. Bob periodically has to call for
23 equipment and equipment operators out of other departments to
24 build these roads and these drill pads. I'll just take an
25 example; a 631 Cat scraper fully operated and maintained and

1 supervised has cost the project approximately \$60.00 per
2 hour. You take that same 631 scraper from an outside con-
3 tractor. The outside contractor would have to realize
4 revenues of \$150.00 to \$180.00 per hour to come out. A D-10
5 dozer fully operated and maintained furnished to Bob from
6 another department is costing \$60.00 an hour. The comparable
7 rate from a contractor on the outside would be \$200.00 to
8 \$220.00. The big difference here is the project has not had
9 to pay equipment ownership costs. On the Nevada Test Site,
10 we generally on the weapons side buy equipment with capital
11 equipment budgets. That's considered a sunk cost and those
12 ownership costs do not find their way to the individual item
13 of work. So, that is the biggest difference. So, from this
14 respect, I think the project has gotten a very good deal.

15 And, this just is a slide showing how I derived
16 those rates that the other contractors would have to realize
17 to come out. And, basically, it was from Cashman Equipment
18 here in Las Vegas who is the Caterpillar dealer. They ran me
19 a computer run out on this. A D-10 dozer would have to rea-
20 lize \$198.00 an hour; a 631, \$177.00 an hour. Another con-
21 tractor in town gave me some numbers of his. A D-10 dozer,
22 \$212.00 to \$222.00 per hour; 631 scraper, \$150.00 to \$160.00
23 an hour. That's the basis of my numbers from the outside
24 contractor.

25 There's been lots of questions over how REECO

1 burdens up its labor rates. In other words, what are the
2 adders that we put on labor for overhead, indirect burden,
3 and so forth? We start with our direct hourly rate here at
4 the bottom and that is the rate of the individual craftsman
5 and it's the amount he gets on his check with no fringes.
6 It's just if his paycheck amount is \$20.00 an hour, that's
7 the only thing we charge as direct labor. It would be the
8 direct craft labor including his foremen.

9 On top of that, we put a factor that we call labor
10 load. We apply that indirectly. That would include such
11 things as fringe benefits, payroll taxes, insurance, state
12 industrial insurance, department manager, supervisors,
13 engineers, clerical, and so forth, office supplies, small
14 tools, those sorts of things. We call that all labor load
15 that we apply to direct labor.

16 Then, on top of that, we apply a load that we call
17 G&A, general and administrative. The includes the allocation
18 for general management. It includes our fees; legal, labor
19 relations, accounting, those sorts of general and administra-
20 tive kinds of functions.

21 DR. CANTLON: What sort of percent are we talking about?

22 MR. FRASIER: Next slide.

23 DR. CANTLON: Okay.

24 MR. FRASIER: I'll just take that dozer operator, for
25 instance. Start at the top, his direct rate is probably

1 \$19.00 something an hour. We put a labor load on there and
2 this will vary with the individual department. The labor
3 load covers all those things I talked about; fringes, payroll
4 taxes, insurance, supervision, light vehicles and all that.
5 That can run anywhere from 80 to 100%. So, that would be
6 another \$20.00 or about 100%. On top of that, I apply a G&A
7 of 16% on both direct and indirect labor which comes to \$6.40
8 which gives me a total labor rate of \$46.40. Then, on top of
9 that on the weapons side of our business, we have what we
10 call an equipment load. This equipment load represents the
11 cost allocated to each department to pay the operations
12 equipment department who maintains and fuels the equipment.
13 So, for instance, if a department had a direct payroll for a
14 month of \$400,000 and he had rented \$200,000 worth of equip-
15 ment out of the operations equipment department, his load
16 rate would be 50%.

17 When Bob gets his permanent construction cadre at
18 Yucca Mountain, we'll cost much more discretely. The equiva-
19 lent load will not be a load as such; it will be directly
20 charged to the various pieces of work, whether it be a drill
21 pad or road or whatever. We do this on the weapons side
22 because it was very easy to do so and it lended itself very
23 well to our accounting system there and it did away with a
24 lot of equipment clerks and so forth.

25 DR. CANTLON: So, basically, you've got about a 200%

1 load, a factor of three, roughly; \$20.00 an hour going up to
2 roughly \$60.00 an hour?

3 MR. FRASIER: That is correct.

4 DR. CANTLON: Yeah.

5 MR. FRASIER: But, that includes equipment which is most
6 normally direct charge except on our weapons side where we do
7 this for ease.

8 DR. CANTLON: Right.

9 MR. FRASIER: So, it really goes to 46 if we just talk
10 about labor adders.

11 DR. CANTLON: Right. Now, since there is an interplay
12 between OCRWM's activity and the test site activity and if
13 one is looking ahead to a down-phasing in test site activity,
14 how sensitive will this calculation be to having to pick up
15 continued costs in a reduced area? This is after rise, not
16 fall.

17 MR. FRASIER: Not very dramatically, if anything,
18 because we will be cutting down on the other site. I think
19 what it says to me is we have a pretty good equipment fleet
20 on the NTS side. And, I've talked to DOE and they're willing
21 to let that equipment be rented out of the operations equip-
22 ment department to Bob's department at the normal rates that
23 we've been--for instance, a D-8 dozer would probably go for
24 about \$320.00 per day or about \$40.00 an hour and that \$40.00
25 an hour includes fuel, oil, grease, repair parts, and repair

1 labor which is right on the industry standard. But, you
2 know, as you shrink things, some costs do tend to creep up.

3 DR. CANTLON: Indirect costs would creep up.

4 MR. GERTZ: Let me just put down a little perspective.
5 While there is a nine month moratorium, they're planning for
6 a comprehensive three year test program of five tests a year
7 which is about the average they've had over the last year or
8 two.

9 DR. CANTLON: The present administration is planning
10 that.

11 (Laughter.)

12 MR. GERTZ: That's true. I think there is a law on it,
13 too, but laws do get changed, as we all know, including this
14 law.

15 MR. FRASIER: A few months ago, Joe Lacombe, who is the
16 local manager of the Defense Nuclear Agency, asked me to
17 compare our labor adders with that of other contractors in
18 the commercial arena. And, it's a little hard to do because
19 every contractor calls things a little differently, whether
20 it be direct labor, indirect labor, overhead, burden, or
21 whatever. So, I made a stab at it. And, our operation is
22 field operations department, DOD in the middle here, and that
23 covers the full fiscal year '91. In that department, we do
24 about \$60 million to \$70 million of underground work per
25 year.

1 The one on the left--I'll call Contractor A--is a
2 contractor friend I have in the mideast or in the middle west
3 on a job that he did in the southeast which was about a \$40
4 million job. And, Contractor B is a local general building
5 contractor on a \$20 million to \$40 million range job. And,
6 all I'm really trying to show here is the percentage of
7 adders you put on your direct labor. And, I'll go back to
8 kind of my discussion previously. Our direct labor wage
9 which is really just only our craft labor; on top of that I
10 put my labor load which was about the 100% for fringes, pay-
11 roll taxes, insurance, light vehicles, supervision, and all
12 that; and then, I put my 16% G&A on both. And, my adder
13 brings that up to 134%.

14 Contractor A is a general engineering contractor,
15 underground job in the southeast, calls things a little
16 different. But, he calls burden here and I'll describe that
17 later. And then, he calls field indirects and then G&A and
18 then profit. So, his total mark-up on labor was more than
19 mine.

20 Comparing against a general building contractor is
21 a little tougher because a general building contractor will
22 generally only do 10 to 20% of his work himself and sub-
23 contract the rest through several tiers of subcontractors.
24 So, I picked and discussed it with a contractor here in town,
25 picked the first tier down, and marked that up, and it came

1 up to 128% in terms of adders. And, it's probably really a
2 little greater than that because most of the work is done
3 beneath the first tier.

4 DR. CANTLON: How does that figure compare with your
5 prior slide where the percent was really in the order of 200?
6 Your labor load--

7 MR. FRASIER: This has no equipment.

8 DR. CANTLON: Oh.

9 MR. FRASIER: This is just purely my labor adder. And,
10 since most people charge equipment directly, I did not
11 bastardize this with equipment.

12 DR. CANTLON: Gotcha.

13 MR. FRASIER: My profit is within the G&A here. It's
14 called "fee" to us.

15 And, this just describes again a little better
16 between the one heavy contractor and us what's in each one of
17 these categories called direct labor, burden, field
18 indirects, G&A. It just describes some of the things I've
19 previously described.

20 MR. GERTZ: Dale, I don't want to get specific about
21 your fee, but certainly the DOE guidelines for fee for--is
22 significantly less than fee in the private sector right now.

23 MR. FRASIER: You noticed.

24 (Laughter.)

25 MR. GERTZ: Let's be honest, their risk is significantly

1 less, too. It's a cross contract and they don't have to
2 invest.

3 MR. FRASIER: Which kind of leads me up to the next
4 slide. There's been a lot of discussion as to whether the
5 construction, mining, drilling activities, should be--what
6 kind of contracting should be used? I think I heard that
7 mentioned a little this morning. And, so I just listed some
8 of my thoughts as to what might work and what might work
9 well. So, I've kind of taken some advantages and disadvant-
10 ages that I consider to be valid for cost reimbursable versus
11 fixed price contract. And, under cost reimbursable, I
12 believe this is a more flexible arrangement. You can pretty
13 well start, stop, and modify the operation with relative
14 ease. Less risk involved here which dictates, as Carl talked
15 about, less fee. It's been my experience that your quality
16 of the product done under this kind of contract is probably a
17 dab higher than in the fixed price.

18 MR. MATYAS: Sir?

19 MR. FRASIER: Yeah?

20 MR. MATYAS: How do you do that? I mean, what's the
21 motivation on the part of the employee? You just have a
22 sharp--you have good quality control on the job?

23 MR. FRASIER: Well, that, plus it's a little different
24 when you've having to make a buck every day on every item
25 than being viewed a little broader in terms of the cost plus

1 award fee in my judgment.

2 MR. GERTZ: While we're talking about that, I think I've
3 talked to some of my colleagues at M-K and I think Jim can
4 verify this, but 20 years ago, major contractors like M-K
5 were doing maybe 80% of their work fixed price and 20%
6 negotiated. Today, they're doing 80% of their work negoti-
7 ated cost reimbursable and 20 fixed price. Why? Because the
8 client wants to pick people he knows, doesn't want to hassle
9 with them, and will get a better quality product in the long
10 run. And, I think that's a trend in private industry across
11 the nation; at least, for the M-Ks and the P-Ks of the world.
12 Clients are looking for people they can depend upon to carry
13 out their job.

14 DR. BARTHOLOMEW: Just a comment, Carl, on that that I'm
15 very familiar with that company, as well, and I think, no
16 doubt, what you say is true, but that's not necessarily
17 typical of all underground construction contractors. There
18 are many whose philosophies are more along traditional lines.
19 I don't mean to be argumentative about it, but--

20 MR. GERTZ: Okay. Particularly if you narrow it to
21 underground, you're probably correct. I was speaking of the
22 broader general construction, above-ground buildings, those
23 kind of things, for commercial suppliers like General Motors
24 and things like that. You're very well--I defer to your
25 thoughts on that.

1 DR. BARTHOLOMEW: It's a point.

2 MR. GERTZ: Sure.

3 MR. ROBERTSON: Let me make a comment on that if I
4 would. It was referred to here, but I don't think many of
5 you have much of an appreciation for the small amount of
6 fees, that M&Os that are doing a fairly substantial annual
7 amount of business, are. As an example, if you get into the
8 \$150 million a year range, you're talking about fees that are
9 just a little over 2% on volume. Now, that's very small, but
10 the thing that you need to understand is that that's the base
11 fee. The award fee can double that amount. So, the incen-
12 tive that is available to the contractor is enormously lever-
13 aged under the award fee criteria. And, so while it's a
14 small amount of fee itself, the multiple is very large in the
15 award fee structure. So, you have a very heavy incentive to
16 produce, you know, to get an acceptable--

17 MR. FRASIER: I agree with you and I had a bullet there
18 on that.

19 MR. ROBERTSON: Right.

20 MR. FRASIER: You've explained that very well. I think
21 this kind of contracting lends itself very well to R&D and
22 testing kinds of work like we'll be doing on Yucca Mountain
23 because of the flexibility. And, the fee is dependent on
24 performance. You're rated and the percentage of your fee
25 pool you get is totally dictated by the performance point

1 rating given to you by the owner. Fixed price or unit price,
2 you generally need a well-defined scope, design, and
3 specification. It's a little less flexible. If you start
4 impeding progress or making significant changes, you're going
5 to pay a penalty. And, just the flop, I think the quality is
6 a little better on the cost reimbursable. Higher risk, more
7 mark-up. On the plus side, it provides competition which
8 certainly may have a financial aspect to it. And, another
9 thing, that they're generally not bound by the Department of
10 Energy acquisition regulations and the Federal acquisition
11 regulations like we, as the cost reimbursable, would be.

12 I guess if I had a comment, I would say it will
13 take a combination of both types of contracts to do this
14 program. You'd just the cost type contracts where flexi-
15 bility is needed and/or scope or general or special condi-
16 tions cannot be well-defined, and you'd use fixed price or
17 unit price contracting when all conditions can be well-
18 defined. As a matter of fact, we're getting ready to go out
19 on the street right now to lend a fixed price contract to
20 manufacture a couple hundred thousand yards of our first
21 aggregates that are going to be needed. We're getting close
22 to awarding a cost reimbursable type contract for the tunnel
23 boring. So, I think it takes a combination of both to really
24 have an effective program for a program like this.

25 And, Bill, that's about all I have.

1 DR. SIMECKA: Okay. Questions?

2 DR. CANTLON: All right. Any questions?

3 MR. SCOTT: Jim Scott with Raytheon on the cost
4 estimating. Relative to what Dale pointed out on the cost
5 adders, I see some of you taking notes. The construction
6 estimate associated with the ESF is not based on the adders
7 totally that Dale has pointed out. These are weapons program
8 adders that Dale has described. The main difference is the
9 102% that's described here for weapons is not applied to the
10 ESF. They were actually using the 65% figure.

11 As far as comparing contractors, this is a personal
12 remark, REECO shows low, but what doesn't show up in the
13 slide is the G&A as applied across labor material, as well as
14 equipment rentals, where perhaps the contractor maybe apply-
15 ing all his mark-up straight to labor and not to the other
16 categories.

17 MR. FRASIER: There's a mix on that kind of thing. Some
18 do it--

19 MR. SCOTT: Yeah, it's a hard thing to compare. But, I
20 thought the 65%--I noticed some people were writing down, I
21 think, 102% and really the estimate uses 65%.

22 MR. FRASIER: Bob will be costing a little more directly
23 with less loads than we do on the weapons side.

24 DR. CORDING: In that estimate, with 65%, what does that
25 total? I mean, what part of the project is it and what does

1 it total to? What are we--

2 MR. SCOTT: The 65% applies to the direct construction
3 labor cost. The same way that Dale described the function of
4 it, but it's 65.

5 DR. CORDING: For the subcontractors? Would the esti-
6 mate for the subcontractors work? Is this what--

7 MR. SCOTT: No. No, no. Subcontract costs with REECO
8 gets a different mark-up. It's handled differently. These
9 adders that were described are applied to REECO labor.

10 MR. FRASIER: The only mark-up we would put on sub-
11 contractor would be G&A and that could be anywhere from 2% up
12 depending on the size of the--

13 DR. CANTLON: Bill, did you have any more that you
14 wanted to say?

15 (No response.)

16 DR. CANTLON: Okay.

17 DR. BARTHOLOMEW: I just wanted, Dale, before you leave,
18 looking at your comparison of the pros and cons of various
19 kinds of commercial terms where you contrast the advantages
20 and disadvantages of cost reimbursable work to fixed price
21 work and then indicate that in your opinion a combination of
22 both is probably best for this project, I think all of us in
23 this room, regardless of our persuasions and past back-
24 grounds, would recognize that from what's been said here in
25 the last couple of days that the underground work is

1 undoubtedly going to have to be pursued on some kind of a
2 cost reimbursable basis as compared to a fixed price basis
3 where the contractor is going to carry all of the investment
4 on the job. The Government, essentially, is going to have to
5 bankroll the job. That doesn't necessarily mean that there
6 cannot be some elements of risk sharing introduced in that
7 through one type of arrangement that you may have had in
8 mind, but hasn't been discussed yet. And, that would be some
9 kind of a target estimate arrangement, particularly in tunnel
10 work or underground work where more definable objectives can
11 be more easily established and can be, you know, objectively
12 determined. That you either make the target or you don't
13 make the target, both with regards to time performance and as
14 regards to cost. And, that might be something that could be
15 considered. I'm not thinking so much insofar as REECO's
16 overall contract is concerned, but I'm thinking more in terms
17 of the subcontract work where you're talking about, after
18 all, 76,000 feet of underground work.

19 MR. FRASIER: And, I think we could do that very well.
20 We've--

21 REPORTER: Use the microphone.

22 MR. FRASIER: --time schedule and cost right into the
23 cost plus award fee evaluation process.

24 DR. BARTHOLOMEW: Well, by my understanding of the award
25 fee process--and, please, correct me if it's incorrect--it

1 does depend, does it not, more or less, on the subjective
2 judgment of a manager at some level that determines what in
3 his opinion the opinion of the performer has been and then
4 assigns a mark to it or a grade to it. Whereas, what I was
5 thinking of is something that's a little bit more--it's not
6 subjective. It's purely a question of attaining the target
7 or not attaining it which is a major type of thing.

8 MR. FRASIER: Our CPAF system is starting to mature now
9 and all of our priorities and objectives are pretty damn
10 objective right now. So, it's just not a matter of did you
11 do a good job or didn't you? There's a whole list of
12 criteria that says you either did or did not do a good job.

13 MR. GERTZ: In other words, we could put an award fee
14 criteria for a subcontractor as you average 50 feet a day or
15 75 feet a day over the period and you either did or you
16 didn't and you get so much more award fee for doing that or
17 not doing that. Or your costs were under, you know, \$5,000
18 per foot or whatever. That can be incorporated into an award
19 fee structure. We're trying to be more objective in our
20 process of that.

21 MR. PRITCHETT: Bart, what we're trying to do with this
22 major subcontract for the tunnel boring--perhaps, you've had
23 an opportunity to look at the RFP, I'm not sure, but we--

24 DR. BARTHOLOMEW: I've looked at the outside of it.

25 MR. PRITCHETT: We've broken that up into two stages.

1 The first stage being a technical support type of activity to
2 help us with constructability concerns and designery views
3 and get their program ready in a work procedure and other
4 procedural sets and get their quality assurance program
5 established in compliance with ours.

6 Then, we're going into a stage two aspect of the
7 subcontract which is the field implementation of the actual
8 tunnel work. And, it's divided up into nine or 10--Tom, help
9 me, is it 10 task orders--including the option shaft thing
10 which we don't know about yet today. But, as we mature to
11 field implementation and we've arranged these tasks which we
12 hope will be compatible with the staged design process as the
13 increments of the job come through the design shop, we'll
14 negotiate each one of those tasks individually and uniquely
15 based upon the criteria as it comes out. And, during that
16 negotiating process, we hope to be able to develop as part of
17 the cost plus award fee portion of the contract some very
18 measurable parameters that we can uniquely judge the progress
19 by and be able to measure it to try to remove as much of the
20 arbitrariness, if that's a good word, out of it.

21 DR. BARTHOLOMEW: I think it's a good word. I take it
22 from what you say that you regard that there's quite a little
23 level of flexibility available before this thing gets cast in
24 clay in that regard.

25 MR. PRITCHETT: Yes, sir. We maintain the option in our

1 request for proposal to either have our subcontractor do
2 these tasks or, depending upon future conditions that we may
3 not be able to anticipate right now, we may choose to do one
4 or more of those tasks ourselves.

5 DR. BARTHOLOMEW: Okay. I might make an additional
6 point that from what I've seen it seems to me that part of
7 your subcontractor's effort is conceived to be in terms of
8 technical support and assistance to the scientific testing
9 program to augment your efforts in that respect, as well. In
10 addition to purely--

11 MR. PRITCHETT: During the implementation stage, yes.

12 DR. BARTHOLOMEW: Yeah. In addition to purely driving
13 tunnel and also, as you pointed out, part of their scope is
14 in participation and technical support services to help you
15 in the initial stages of the program and then planning their
16 work.

17 MR. PRITCHETT: Yes, sir.

18 DR. BARTHOLOMEW: It seems to me that it might be--and,
19 maybe this would be accommodated by the fact that you've
20 broken this thing up into packages, but the evaluation
21 criteria, I think, have to be distinctly different for those
22 two different kinds of activities.

23 MR. PRITCHETT: Yes, sir.

24 DR. BARTHOLOMEW: One is pretty much going to be a
25 question of how good a job you think you're doing helping you

1 and the other is they either got there by a certain date or
2 they didn't. You know, they spent so much money or they
3 didn't.

4 MR. PRITCHETT: Yeah.

5 DR. BARTHOLOMEW: You've got the flexibility to reflect
6 that.

7 MR. PRITCHETT: There's a different approach required
8 for the two different stages of the contract.

9 DR. BARTHOLOMEW: And, you're saying you can accommodate
10 that.

11 MR. PRITCHETT: We think so, yes, sir.

12 DR. BARTHOLOMEW: Okay.

13 MR. GERTZ: In fact, Bart, just to give you a feeling,
14 in our existing award fees we accommodate that right now.
15 Some other are very subjective; you know, are you doing a
16 good job managing? And, the others are did you deliver
17 Report X or Report Y? Did you build this warehouse? Did you
18 do that? So, we combine both of those kind of approaches
19 into the overall award fee plan for the period. I mean,
20 we're doing it now; we're not doing it maybe as good as we
21 could do, but we're striving to be more objective.

22 MR. ALLAN: Yes. This is a lovely conversation, but I
23 strongly object. I've had the responsibility of managing a
24 large long-term incentive fee, cost reimbursable contract.
25 Mr. Cronin shared some of that with me. And, I would point

1 out firstly that it puts you into exactly the same mode of
2 contract administration as administering a fixed price con-
3 tract. Every change, every deviation has to be analyzed and
4 tracked exactly like a fixed price contract. So, your scope
5 of work has to be, to be successful, equally well-defined as
6 it would be to do fixed price work.

7 Now, as Bob says, there may be some very broad area
8 where that could be applied in the various work package
9 process as we work our way along. But, as an overall con-
10 cept, one of the things that I was most satisfied about to
11 see when I got to Carl's project was the fact that they had
12 chosen a cost reimbursable contract. I can't imagine doing
13 this any other way successfully and with certainly a minimal
14 of effort. I just can't say strongly enough that when you do
15 that, you have to have a defined program. You can't be
16 interfering with the program. When you put that contractor
17 on an incentive fee, he has to be allowed to go do his thing.

18 And, we all sat here all day yesterday and listened
19 to the degrees of uncertainties, of questions yet to be
20 answered over a very broad specter, and so I can't say it any
21 better than to say in summary, I object. Mr. Cronin, would
22 you dispute that?

23 MR. PRITCHETT: I'm not sure what you're objecting to,
24 Jim.

25 MR. ALLAN: My objection is if you're going to do that,

1 you might as well do it fixed price, Bob. You're going to
2 contract administer yourself in excess of any potential
3 benefit from the result in my opinion.

4 MR. GERTZ: But, I think what we're trying to strive--
5 and I think Jim will agree because I know M-K has done award
6 fee contracts in other DOE things--is we're trying to strive
7 for not making it a contract administrator's nightmare to
8 keep track of the changes so we can keep track of the
9 incentive fee. We're trying to provide incentives to a con-
10 tractor and maintain flexibility. And, I think a flexible
11 approach, the award fee process can do that; provide incen-
12 tives, but maintain flexibility.

13 DR. BARTHOLOMEW: What he's saying though, Carl, is on
14 those parts of the scope where you're going to fix some kind
15 of a target and what the contractor realizes in terms of his
16 net gain is going to be his ability to get there by a certain
17 date or to get there below a certain cost where he's going to
18 get some benefit from that. It's a matter of great impor-
19 tance to him how many roadblocks and impediments--

20 MR. GERTZ: And, how many changes we make to him along
21 the way because--

22 DR. BARTHOLOMEW: --and how many times you change the
23 plans and specs along the route.

24 MR. GERTZ: Absolutely.

25 DR. BARTHOLOMEW: I think that's what he's saying and

1 that you've got to track that in exactly the same way you do
2 as if it were a hard money contract.

3 MR. GERTZ: Okay. You absolutely do and I won't--I
4 guess I--

5 MR. PRITCHETT: Jim, I don't think I said that we--

6 MR. ALLAN: I'm sorry?

7 MR. PRITCHETT: I don't think I said that we were going
8 to do that or that we weren't going to do that.

9 MR. ALLAN: Weren't going to do what?

10 MR. PRITCHETT: What you're objecting to.

11 MR. ALLAN: Okay, good.

12 MR. GERTZ: I believe at least the concept--

13 MR. PRITCHETT: I don't think I said that.

14 MR. GERTZ: --implement is a flexible approach that has
15 incentives to it. If you give a contractor an award fee
16 criteria that says 2,000 feet in some days, if you start
17 messing with it, then you need to adjust your award fee
18 evaluation of that. That's all I'm saying.

19 MR. FRASIER: And, you don't get penalized for it.

20 MR. GERTZ: You don't penalize the guy if he didn't make
21 it if it's your fault because you're grading yourself. And,
22 in all due respect though, the award fee process has to be
23 managed appropriately. I was on the other side as a con-
24 tractor and, as a manager on the other side, we thought our
25 client was so unfair that we refused to participate in award

1 fee meetings or anything else and just went and did our work
2 and said I'm not going to waste time on award fee because
3 it's not fair and we'll just go do our job and give us what-
4 ever you think. And, we don't want to develop into that kind
5 of an acrimonious relationship, at all. It has to be a
6 combination. So, what Bart says is absolutely true. If you
7 give them a target and then you mess with that target, you'd
8 better compensate them accordingly like you would in a change
9 control process.

10 DR. BARTHOLOMEW: Well, yeah, it's essentially a ques-
11 tion of making a change order or adjustment to the target, a
12 different time or price and, you know, what's new in life.

13 MR. GERTZ: There's going to be changes--

14 DR. BARTHOLOMEW: I ran a target estimate contract once
15 on a major piece of work, and speaking just from a standpoint
16 of a contractor, we had as many battles with the owner over
17 changes as we did as if the contract had been a hard money
18 contract.

19 MR. ALLAN: That's my point.

20 MR. GERTZ: That's Jim's point. I don't want too many
21 of those battles, but I do want to have an incentive, too.

22 DR. BARTHOLOMEW: Well, but they're going to be there.
23 I think you've got to recognize them and identify them the
24 best you can.

25 MR. GERTZ: We have them right now with our four award

1 fee contractors even though it's not specifically under-
2 ground.

3 MR. FRASIER: But, it works.

4 MR. GERTZ: But, it works. I think it's an overall
5 incentive.

6 DR. CORDING: I'm sure there are many items that are
7 undefined and there's going to be a lot of changes on it and
8 there also is opportunities, it seems, in organizing the
9 portions of the project. For example, tunneling through a
10 major part of the repository, there may be some opportunity
11 there to minimize interference. And, even with--I say, the
12 interference due to other operations. And, it would seem to
13 me that there is opportunity there to utilize some sort of--
14 something a little bit better defined to utilize something
15 that would give incentive for efficient operation, costs, and
16 schedule.

17 MR. GERTZ: We totally agree with you--

18 DR. CORDING: The nature of these operations are such
19 that--the TBMs are such that you can get a wide range of
20 progress depending on what the interests are of the con-
21 tractor in achieving it. I'm interested in the conversation
22 here that you're making and I'd like to get a little bit-- go
23 a little further with the item. It seems to me that if you
24 don't put costs and schedule into this award fee or into some
25 sort of incentive, then what is the award fee to be composed

1 of? If it's, you know, how well you're keeping up the paper
2 chain, that may be important, but it's not--you've got to
3 make the progress, also.

4 MR. GERTZ: And, our award fees are very multi-faceted.
5 It's safety of operations, it's complying with environmental
6 rules. In fact, there's a DOE order that at one time 50% of
7 the award fee had to be on safety and environment, not on
8 production or cost. No matter how good you did in production
9 or cost, if you weren't taking care of safety and environ-
10 ment, you didn't get the award fee. And, so cost and
11 schedule is part of our award fee, technical excellence,
12 responsiveness to the customer, and you sort out two or three
13 pages of what you're asking a contractor to do and weight it
14 and provide milestones and/or guidelines for them.

15 DR. BARTHOLOMEW: Is that what you refer to as level of
16 effort when you used that term a little earlier?

17 MR. GERTZ: No, level of effort is where in our cost
18 schedule control system you have eight people in a procure-
19 ment department and you can't quite measure progress.
20 They're supporting you. So, that's a level of effort
21 activity. As opposed to eight people producing tunnels or
22 something you can measure. You get so much credit for 10
23 feet of tunnel, 20 feet of tunnel, 30 feet of tunnel.

24 DR. BARTHOLOMEW: Well, no, that's what I meant. I'm
25 talking about some of--you said multi-faceted. These facets

1 that you don't really--you can't measure in terms of a cer-
2 tain objective, amount of production per unit of time. That
3 really does amount to level of effort, does it not?

4 MR. GERTZ: Yeah, it certainly does. You have four
5 safety engineers or whatever. So, you have to subjectively
6 evaluate how they're doing. Now, if you have a lot of acci-
7 dents, that becomes an objective evaluation for man hour
8 used. So, you combine some of the two. How well is their
9 procurement department doing? Well, you know, you look at
10 that.

11 DR. CORDING: One other item I'm interested in hearing
12 your perspectives on is the award fee as a unilateral deci-
13 sion making process. I'm wondering to what extent that would
14 be used in this subcontract and is there some other oppor-
15 tunity for negotiation with a contractor or--and, of course,
16 with incentive fees sometimes the negotiations take place as
17 you select your contractor and the process of the award of
18 the contract itself. So, to what extent is this other
19 approach applicable? What's your feeling on that, the uni-
20 lateral aspects versus a negotiated type of operation?

21 MR. GERTZ: I'll defer to Bob because that procurement
22 is still under--in process and I don't know how much--and I'm
23 not very familiar with it because I'm trying to stay away
24 from it. I don't know what Bob can talk about because we
25 have, I think, three teams we're still negotiating with.

1 MR. PRITCHETT: Yeah. Is your question, Ed, how are we
2 evaluating the proposals that we've received?

3 DR. CORDING: It's not directed at that quite so much,
4 although it might apply to that. But, I guess, my question
5 is is how would you determine with a subcontractor the incen-
6 tives or the award aspects to the fee? How do you work that
7 out with the contractor and develop an understanding on that?
8 Is it going to be a unilateral process or is it a process
9 where you negotiate with a contractor? At what stage do you
10 do it?

11 MR. FRASIER: I'll answer that, Ed. What we tradition-
12 ally do and it's pretty well governed by the DEAR's, is
13 you'll sit down--

14 MR. GERTZ: DEAR's is an acronym from DOE acquisition--

15 MR. FRASIER: Yeah. You'll sit down with the con-
16 tractor. You'll negotiate what's called a fee base and
17 that's a dollar volume of work. And, you'll convert that to
18 what we used to call fixed fee. And then, if you're going to
19 award fee, you'll get your multiplier for award fee. You'll
20 wind up with a pool called an awards pool. And then, you'll
21 probably negotiate by tacking maybe 10 or 20% of that on a
22 base fee which is the old fixed fee type which leaves 80% of
23 the pool at risk for him. And, depending on what grade he
24 gets, once you've established the dollar value of that pool,
25 the contractor would be rated either quarterly or semi-

1 annually on a scale. If you give him 80 performance points
2 which is maybe in the satisfactory range, that means for that
3 period he gets 50% of the pool. It's pretty well structured.

4 MR. GERTZ: Let me follow up with another thing that Bob
5 had said and maybe you didn't pick up on. I think he said,
6 as they negotiate certain packages of work, they then are
7 going to negotiate an award fee performance for that package
8 of work. We do it now on a time frame. We say for the next
9 six months, we'd like to see X, Y, and Z products, we'd like
10 continued safety and continued environmental protection
11 performance, good QA, and we'd like some other products in
12 another area. And then, we evaluate them in that six months
13 and set up another--at the end of six months, we say here's
14 your charge, so to speak, for the next period.

15 DR. NORTH: I'd like to ask essentially the same ques-
16 tion that I think Ed Cording has been putting to you, but
17 make it specific to the study plans. How is it that the
18 award fee structure will be arranged so that you have an
19 incentive to do good research as the opportunity may arise?
20 What concerns me, for example, is if you have award fee
21 criteria of so many feet per day of progress on the drift or
22 keeping the costs below some limit and then as the construc-
23 tion of ESF is proceeding and we find some particularly
24 interesting geology or perched water and the scientists want
25 to stop and study it for good reason, that the contractor

1 doesn't have a very strong incentive. Well, let's keep going
2 making so many feet per day. Stopping will cost us a great
3 deal of money. There ought to be an incentive to support
4 good scientific research when the occasion arises without
5 lots of management meetings.

6 MR. GERTZ: Yeah, I think that's very appropriate. The
7 only reason we're doing any of that is for the scientists.
8 So, if the scientists say stop, we're going to stop. We'll
9 then make an appropriate adjustment to whatever award fee
10 target we had with that guy.

11 DR. NORTH: So, you can assure me that that structure is
12 in place as opposed to the kind of thing that James Allan was
13 describing where it turns out to be very, very difficult to
14 operate under that circumstance because some of the scien-
15 tific reasons for stopping or slowing down haven't been
16 thought through in advance and aren't in the letter of the
17 agreement?

18 MR. GERTZ: Yeah, as we pointed out earlier, I think, we
19 have a Federal responsibility to manage the project. The
20 project is not to dig tunnels. The project is to evaluate
21 the mountain. So, when the scientists say let's stop and
22 evaluate, we stop and evaluate. Then, we'll have to make
23 appropriate adjustments if that affected an award fee target
24 for that time. And, that's not unlike we do now. If I tell
25 the M&O to get this product out in six months and then I say,

1 hey, wait, we have a new law, we have to pull you off this
2 product, you have to work on those standards, or something
3 like that, and he says, well, I can't do the product you
4 asked, and I'd say we recognize that, we will not evaluate
5 you on that product.

6 MR. PRITCHETT: That has to be part of the equation in
7 coming to a mutual understanding with the subcontractor on
8 the next package of work.

9 MR. HAYES: Where the question you asked is being
10 addressed. In the test planing packages and the job pack-
11 ages, we are putting in there for the construction people
12 down time to do just what you're talking about. So, that
13 will be part of the official formal test planing package
14 process.

15 DR. NORTH: But, is that an allocation that has some
16 flexibility in it or does it wind up being potentially a hard
17 constraint some time in the future? So many hours of down
18 time to do certain types of experiments, for example?

19 MR. HAYES: That's exactly how we're putting in--we're
20 making some estimates based on what we think we may
21 encounter, say, with perched water, say, with running across
22 faults, and we're putting in some time to deal with those
23 issues, as well as we're putting in a little bit of extra
24 time to deal with unanticipated events that we might run
25 into. So, the time is there and it would not count against

1 the construction people.

2 MR. GERTZ: But, if we need more time, we'll take it. I
3 mean, that's the management way of doing--

4 DR. NORTH: Good. And, you have a lot doing that with-
5 out getting into gridlock.

6 MR. GERTZ: Yeah. You have to estimate in order to
7 plan. So, you give it your best estimate, as Larry said.

8 MR. HAYES: Without penalizing the contractor.

9 MR. GERTZ: Yeah. First of all, that's why he's a cost
10 contractor. So, you're not going to penalize him. Secondly,
11 though, every contractor is a profit-making entity normally.
12 So, you don't want to penalize his opportunity to make prof-
13 it. You need just to be flexible.

14 DR. NORTH: Let me raise another issue that I think may
15 be related and this is the question of craft jurisdiction.
16 If some unusual things happen with respect to the science as
17 you're going along and suddenly you need to do some operation
18 that had not been anticipated as part of the base plan, do
19 you have a problem essentially from the craft jurisdictions
20 that either require you to keep people there in case of need
21 who are of the right craft or it's a violation of the rules
22 if some scientist whose not part of the union does something
23 that facilitates getting on with both the construction and
24 the scientific experiments? Are there problems of that kind
25 that would be useful for us to understand?

1 MR. FRASIER: I think you're going to have to explain
2 exactly a little more what you mean.

3 MR. GERTZ: Let me give you a couple of examples though,
4 Warner. Sure, you're going to have problems with that. We
5 can't have scientists running bulldozers to look at a trench.
6 They're not qualified to do that. On the other hand, with
7 John Haslam--I don't know if he's here right now--and Bruce
8 Crowe's excavation, smaller excavations, we worked out an
9 agreement that the operating engineers said, no, that is a
10 scientific operation and a scientific person can dig in a
11 small amount and do what he needs to do. Digging a trench,
12 that's something different. Digging a soil pit, that's
13 probably a scientific thing. So, that's part of a negotiated
14 process you work out with those crafts. I would assume as
15 you're doing a tunnel--

16 DR. CANTLON: We've got four people on microphones here
17 now. Let's just go counter clockwise here. Go ahead?

18 MR. TRENKLE: I'm with the labor unions in Las Vegas.
19 I'm a business agent for them. I just want to reflect on
20 some of Dale's comments.

21 We're happy to see REECo was chosen as the con-
22 structor because we have a very good working relationship
23 with REECo not only just as craftspeople, we represent miners
24 and construction and maintenance labors out there. But, our
25 people are also involved in their safety program. Some of

1 our people have come up through the ranks and they're in
2 upper supervision with Reynolds Electrical now.

3 As far as craft jurisdictional guidelines like you
4 just mentioned, we have very few problems in that area. We
5 generally work it out. We have a good relationship with Mr.
6 Gertz and Mr. Frasier, both, and very few problems in that
7 area.

8 As Dale mentioned, the labor rates on the Nevada
9 Test Site are generally less than the Las Vegas area,
10 northern California, southern California. That's just
11 through negotiations. We don't foresee any labor problems on
12 the Nevada Test Site or the Yucca Mountain Project. We're
13 currently bargaining on some of our contracts with REECo
14 right now. Some of us have signed off. So, we're very
15 anxious to see the project go on and, like I said again,
16 we're glad to see REECo involved in it because their safety
17 program is excellent.

18 MR. HASLAM: Yes, my name was brought up a few times
19 today. I am John Haslam and I am with the operating
20 engineers. And, what Carl said with scientific studies and
21 there's situations where the projects stop because the scien-
22 tists want to look at things, this has been going on right in
23 Trench 14. Our backhoe operators have been doing that work.
24 When the scientists and geologists ask us to stop, they wait
25 until they're ready to go again, I guess is the best way to

1 put it.

2 MR. GERTZ: Let me just go on. That part of the train-
3 ing program, the craftsmen who go to our QA training program,
4 to assure they can be responsive to the QA program.

5 MR. HASLAM: And, the other thing I'd like to add, as
6 far as quality people and that, we have apprenticeship pro-
7 grams in all the different areas out there not only with
8 equipment operators, surveyors, machinists, oil well
9 drillers--we have a program in the oil industry that's the
10 best in the country. As far as safety, I want to add that
11 Reynolds Electrical & Engineering has the Blue Safety Commit-
12 tee which is excellent. I've sat in on their meetings. I've
13 been invited to them and I've went in on their meetings when
14 I wasn't invited and I'm proud to say that our people are
15 part of that program and that program is put together with
16 workers that are working at the Nevada Test Site and they do
17 participate and they do get results.

18 So, if there's any questions you want to know about
19 the operating engineers, I'd be glad to answer them. Thank
20 you.

21 MR. WILDER: I want to make a couple of comments. One
22 is based on our experience at the spent fuel test at Climax
23 which I think is a pretty good example of the kinds of work
24 that we will be doing at Yucca Mountain. And, experience
25 there was that, yes, there were times when, because it was in

1 a construction phase, it was maybe a little bit painful to
2 get things stopped, but we were able to by discussing with
3 the contractor, with REECo, what the needs were to get the
4 scientific needs met, to slow down the construction at times.
5 And, so I think that it can work. But, critical to that is
6 having the scientists working intimately with REECo and the
7 people doing the work.

8 And, one of the cautions, I guess, or a note of
9 caution that I would throw out is that I note on the schedule
10 that there are a lot of construction activities that are
11 going to be ongoing to get ready to do scientific work. One
12 example is we're going to need a bunch of boreholes drilled.
13 If those boreholes are being drilled at a time when the
14 scientists are not given access underground because we don't
15 have two accesses and so forth, then I think it's going to be
16 a lot more cumbersome than if we can work directly with the
17 people doing the construction.

18 And, secondly, I wanted to just address the issue
19 of whether or not you have better skills sometimes being
20 brought to bear. I think, in general, that probably is true.
21 We had very good working relationships. There were a couple
22 of times when it was a little bit painful and I guess,
23 specifically, I look at the drilling. Because they come out
24 of an operating engineer pool, there were some times when,
25 frankly, I felt that the people that were "drillers" were not

1 as expert as others, but we were able to work the problem and
2 they brought the people on board that needed to solve the
3 problem. So, in general, I think it's worked fairly well.

4 MR. GERTZ: Dale, you were speaking though of the Climax
5 experience, specifically, 10 years ago.

6 MR. WILDER: That's correct.

7 MR. GERTZ: Things have changed in 10 years in this
8 program, too.

9 MR. WILDER: Well, Climax and G-Tunnel.

10 MR. GERTZ: And, G-Tunnel.

11 MR. WILDER: And, you have to admit we were really stuck
12 at G-Tunnel for a while.

13 MR. GERTZ: No doubt about it, we were, but once--

14 DR. CANTLON: Dale Foust and then we'll go to Hugh.

15 MR. FOUST: I wanted to point out that there's a some
16 time overlook provision of an award fee contract that applies
17 to the kinds of issues that I think Warner and others have
18 brought up. And, that is a rollover provision which says
19 that you give the contractor a second shot at the unawarded
20 fee. And, that means that at the end of a contract period,
21 you can look at the overall or the integral of the work that
22 they did, considering the conditions under which they did
23 that work, and if these unanticipated scientific delays may
24 have caused them to get a lower grade, strictly looking at
25 the award fee plan that you had negotiated, you can recompen-

1 sate them for work well done under those conditions. And, I
2 just think that's something I wanted to bring to your atten-
3 tion as being very applicable to this case.

4 DR. CANTLON: Thank you.

5 Hugh?

6 MR. CRONIN: Carl, for your next fiscal year here, I was
7 just curious. We're talking about all this award fee busi-
8 ness and I guess that's directed primarily to the construc-
9 tion contractor?

10 MR. GERTZ: No, it's also directed to SAIC and the M&O.

11 MR. CRONIN: That's exactly my question. How much of
12 the work or how much of the dollars you're going to spend in
13 the next year is direct cost? Can you give us some rough
14 percentages? Direct cost versus some type of a fixed price
15 contract either lump sum or unit price versus cost plus a
16 flat fee versus a cost plus an award fee. Maybe four cate-
17 gories of breakdown of all the fiscal expenses?

18 MR. GERTZ: Yeah, but it will take a little time to do
19 it. But, offhand, the laboratory work--and I guess speaking
20 now, we must have about 25--20 at your place, Larry, or
21 something and 10 at the other labs--about 50 million is at
22 the laboratories and that's strictly cost reimbursable. We
23 provide an evaluation of how they're doing to keep their
24 contract, but there's no fee on it. So, there's no fee; it's
25 just cost reimbursable with the national laboratories. So,

1 that's about 50 million. Oh, 62, okay, good.

2 The M&O contractor and SAIC have about 80 million
3 of work and that's under award fee. REECO, what's your
4 number next year? 52 million and that's under award fee.
5 Raytheon has got a small amount, 10 million under award fee.
6 And, I'm trying to see--I think that covers it.

7 MR. CRONIN: That's about 300.

8 MR. GERTZ: Pardon me?

9 MR. CRONIN: That's about 300.

10 MR. GERTZ: 300 million? It shouldn't be that high.

11 MR. CRONIN: No, 200. I'm sorry, 200.

12 MR. GERTZ: Yeah. There's 40 more spread across some-
13 where that I was not able to give you.

14 MR. CRONIN: So, the answer, I guess, the bulk of the
15 work is under award fee?

16 MR. GERTZ: That's correct. Some of REECO's contracts
17 will be fixed price. So, not only is their 50 million under
18 award fee, part of that 50 million, they will subcontract
19 like the aggregate as fixed price. And, I don't have a
20 number of how much of their award fee portion is also going
21 to be a fixed price contract.

22 MR. CRONIN: Can you give us an answer on that, Bob?

23 MR. PRITCHETT: I don't have those numbers in my head.

24 MR. CRONIN: I guess Dale is not in the room here, but
25 he mentioned--

1 MR. GERTZ: We'll get an estimate. It's not much next
2 year.

3 MR. CRONIN: Dale mentioned something before and I
4 didn't really understand it. At first, he mentioned that a
5 typical contract in the \$150 million a year range would have
6 a 2% base fee and a 2% award fee.

7 MR. PRITCHETT: I think that was Robby Robertson.

8 MR. CRONIN: Oh, was it? Okay. Robby, maybe, you
9 could--

10 MR. ROBERTSON: Yeah, let me respond to that, yeah.
11 And, these are available, by the way. I can get you a chart.
12 The fees are plotted just like a tax table only they are
13 lower percentages. The higher the annual volume, the higher
14 the base--the lower the base fee. So, when I used a number
15 like 150 million, it is approximately a 2% base fee.

16 MR. CRONIN: And, 2% award fee, was that--

17 MR. ROBERTSON: Pardon?

18 MR. CRONIN: Was that your statement?

19 MR. ROBERTSON: No. And then, there's a 2% upper on the
20 award fee and a 1% downer. In other words, at a fixed--at a
21 fee of about 70--a grade of about 70%, you get the 2%, and
22 then as you go on up to 95, you get the other 2%. If you go
23 below 75 and go down to 55, I believe is the right number,
24 you get only 1%. So, there's a stick and a carrot, if you
25 will, built into that. Now, that's for M&O contractors.

1 The subcontract that REECo is going to let isn't an
2 M&O subcontract. I mean, that will be a separate contract
3 negotiable within the DEARs. That could be all the way from
4 a zero base fee, 100% award fee contract, to any range that
5 you wanted to depending on what you wanted to incentivize.
6 So, I think you need to understand that you've got a great
7 deal of flexibility within the upper limits of what fee can
8 be paid on a Federal contract under the DEARs. But, he has
9 the opportunity to make it 100% award fee if he and the
10 contractor with whom he is negotiating is so amenable.

11 There's another question that I really want to
12 direct to Dale, I guess, as to whether it's been thought
13 about yet. And, again, I'm encouraged about the breaking it
14 up into packages because I think that gives you a great deal
15 more flexibility for the different phases of what you're
16 doing. But, there is an allowability exercise under the
17 DEARs and the FARs that allow for cost incentive contracts,
18 as well. In which case, if you have set up--this is under a
19 cost reimbursable type contract even--in which you have
20 established a cost baseline or cost criteria against which
21 you can judge the subcontractor, and then on a ratio typic-
22 ally of 20/80, the contractor gets 20% of the cost savings
23 that occur. The Government then would, of course, incur an
24 80% saving of that cost. But, the contractor then is incent-
25 ived because he has 20% of those costs which can accrue to

1 him, having all of those never exceed, of course, the statu-
2 tory limit on the fee on the upper end. But, in any event,
3 those are mechanisms that can also be applied and, in par-
4 ticular, with this particular kind of project where certain
5 cost elements could be fairly well-defined, I suspect, in
6 certain of the operations. It's something that seems to me
7 we ought to think about at some point. I don't know whether
8 you've examined that, but I just raise that as a point.

9 DR. CANTLON: Could we get Dale to respond and then
10 we'll take a 15 minute break?

11 MR. FRASIER: Yes, sir. We have looked at that.
12 Presently, we're not under the accountability rule part of
13 the DEAR. I expect we will be come October 1, next year.
14 And, we will have the ability to pass that same philosophy
15 down to the--the same condition down to the subcontractor.
16 That's a part of our RFP with the contractor, that he will
17 accept it if we have to accept it.

18 MR. GERTZ: Our only caution on that--my caution is the
19 same as Jim's, that pretty soon then you get--if it's real
20 money like that, you get into the contract change process of
21 he's saying, gee, I could have made that 20%, but you caused
22 me to slow down here or you didn't respond to approve my
23 drawing in time and you get into a lot of that.

24 DR. BARTHOLOMEW: You are, anyway.

25 MR. GERTZ: The award fee is just a little more flexible

1 than that.

2 MR. FRASIER: It's much more flexible. I think, gentle-
3 men, the most important thing that you can have between the
4 contractor and the subcontractor in this case is mutually
5 agreed upon expectations. And, once you get that, you can
6 deal with all the rest with relative ease.

7 DR. CANTLON: Okay. We're recessed for 15 minutes.

8 (Whereupon, a brief recess was taken.)

9 DR. CANTLON: Hugh Cronin? Well, Hugh wanted to start
10 off, but I guess he hasn't returned to the room yet. Let me
11 push off to a slightly different approach to the issues on
12 management and administration. Oh, here, he is. Hugh,
13 you've got the chair. Finish your questions and then we'll
14 switch gears a little here.

15 MR. CRONIN: Thank you, John.

16 That last discussion got so interesting that every-
17 body wanted to participate and I hadn't finished the rest of
18 the questions. Now, let me see if I can get back to where I
19 was.

20 One of the gentlemen got up and also--when we were
21 talking about the two plus two, somebody else got up and said
22 that normally these award fees are about 20% base fee and 80%
23 award fee. I don't really remember who said that. Was that
24 your statement, Dale?

25 MR. FRASIER: It could have very well been mine. That's

1 a very negotiable thing. Generally, the way it works--

2 DR. CANTLON: Could you use the microphone?

3 MR. FRASIER: The higher base fee that you take, then
4 your multiplier for award fee goes down. So, if you're
5 willing to take the risk and go 100% award fee, then your
6 award fee multiplier is higher. So, if you're willing to go
7 more at risk on award fee than base fee, you can get a higher
8 pool.

9 MR. CRONIN: Okay. There was another--

10 MR. GERTZ: Let's make it clear. That's 20 or 80% of
11 the 2 or 4%.

12 MR. CRONIN: Right. Right.

13 MR. FRASIER: No 80% fees.

14 MR. CRONIN: Just in general, what is the maximum allow-
15 able?

16 MR. GERTZ: It depends upon the type of contractor. The
17 DOE regulations say that for a construction contractor it's
18 in the, I don't know, 3 or 4%. For a different operating,
19 it's different. So, I don't--10%? 10%.

20 MR. CRONIN: Total fee, base plus award, 10%?

21 MR. FRASIER: And, that would generally be where the
22 volume is pretty small. As your contract gets larger, it's a
23 regressive curve.

24 MR. CRONIN: Yeah, I understand that.

25 I believe, Dale, you mentioned something about a

1 change in the regulations that are now going to allow you to
2 issue incentive type contracts, as well?

3 MR. FRASIER: No, there's a new accountability regula-
4 tion in the DEAR which we're not under yet. But, basically,
5 what it says is there's a provision there which improved the
6 fee schedules, but put part of even your base fee at risk.
7 In other words, some of the items that we've always been
8 reimbursed for like fines and penalties and damage of equip-
9 ment have always been covered by the Government. Under the
10 accountability rule, while your fee schedules may go up, some
11 of that may be at risk. It's called the accountability rule.

12 MR. CRONIN: So, am I understanding you correctly then
13 now that under the procurement guidelines, you're not allowed
14 to issue incentive type contracts?

15 MR. FRASIER: I don't say that we're not allowed to.
16 I'm just not sure. We've always been under the CPAF and it's
17 worked well and that's what we chose for the type of con-
18 tract.

19 MR. GERTZ: They're allowed to issue a CPAF, but not
20 strictly--

21 MR. CRONIN: I'm sorry, I didn't hear that?

22 MR. GERTZ: Okay. I'm sorry. They're allowed to issue
23 a CPAF award subcontract and that's different. That provides
24 incentives, but it's not an incentive contract as we might
25 have discussed what an incentive contract--

1 MR. CRONIN: Well, that's the whole problem from my
2 perspective. There truly is no incentive for a contractor to
3 reduce costs.

4 MR. GERTZ: Well, he gets more fee.

5 MR. CRONIN: He gets more fee, yes. When you talk about
6 1 and 2%, I'd have to draw a couple of curves and see where
7 the break even and the marginal return is and all that. And,
8 I'm sure they all do it and they have curves that are a lot
9 more better defined than I'll ever do. And, they're in
10 business to maximize their returns.

11 MR. GERTZ: And, that's in fee because cost doesn't
12 maximize their returns.

13 MR. CRONIN: That's the problem. That's exactly the
14 problem and I don't know, maybe you have a restriction in not
15 being able to give an incentive type contract. But, if you
16 have the mechanism, that's certainly one thing that I would
17 suggest you look at is if--I think, Jim was alluding to it
18 before--if you can define under any scenario, if you can
19 define the scope of work and then negotiate and agree on a
20 target estimate--that's the normal vernacular that I'm
21 accustomed to--and then if the contractor through his
22 ingenuity, his motivation, whatever, can reduce that cost by
23 X number of dollars, that he should be able to directly
24 participate in that savings. And, one of the gentlemen was
25 talking about in some of these Government type contracts

1 where the contractor would actually get 20% of the savings
2 and the Government would get 80% of the savings. Now, there
3 is a big incentive. The problem though if you're going to be
4 limited to the guidelines where they can only make 4% or 6%
5 or whatever and he starts bumping up against that with this
6 incentive type payment, then again as soon as he gets to the
7 maximum again, he loses any incentive to further reduce
8 costs.

9 MR. ROBERTSON: Let me clarify a point on that.

10 MR. CRONIN: Yeah, please, Robby?

11 MR. ROBERTSON: All of that is not with regard to the
12 limit. First of all, the numbers that we're talking about in
13 the 2 to 3% range, these are for M&O contracts. These are for
14 M&O contracts. This is not an M&O contract that we're let-
15 ting. This is a construction subcontract, it won't be under
16 the M&O provisions. Therefore, the regressive fee curves do
17 not apply to that. Now, the point is though that the incen-
18 tives that are--let's see, the award fee that you obtain
19 under these kinds of contracts, plus any cost incentive that
20 you might obtain, i.e. if it were a 20/80 share arrangement,
21 those cannot exceed the statutory limit of 10%. Those com-
22 bined. But, again, to pull back a little bit on what was
23 being said earlier, if you give a contractor a zero base fee,
24 you typically give him an opportunity for a 10% total award
25 fee if he got a score of 95 or 100 or whatever it is. If

1 he's got a 2%/4% base, you might only let him go to 7% max.
2 See? So, it depends again on how much of that the guy wants
3 to play at risk as opposed to what part is safe.

4 Let me also caution though on the other side of
5 that, cost sharing, because--let's separate clearly into two
6 things. Award fee is one thing and cost incentive sharing is
7 another thing. Those are two separate things. Typically,
8 there's a down side that goes with the cost sharing. That is
9 if you overrun those costs, you pay 20% of those overruns
10 until you've exhausted your fee.

11 MR. GERTZ: And, I think, as Jim cautioned and certainly
12 as I cautioned the project managers, before I get into an
13 incentive contract or allow my subcontractors to, I want to
14 have a defined scope of work. I don't want to spend time on
15 contract changes and claims and lawyers because it becomes
16 just as aggressive in an incentive contract, as Bart points
17 out, as it would be on a fixed price contract because now
18 they're talking about real money.

19 MR. CRONIN: But, you have the same thing in the
20 straight award fee. You have the same thing in the straight
21 percentage of cost fee.

22 MR. GERTZ: Not necessarily.

23 MR. CRONIN: As the scope of work changes or there are
24 changes made in the work of any type, you have to have a
25 basis of renegotiating.

1 MR. GERTZ: Of course, but it's a little more different
2 than the litigious process that construction claims go
3 through. The award fee is an arbitrary process not subject
4 to appeal. You have to have an understanding with your con-
5 tractor as to what you expect from him and they have to
6 understand your expectations.

7 MR. CRONIN: Yeah. You say not subject to appeal, but
8 it is subject to litigation.

9 MR. GERTZ: I don't know. I'm not a lawyer in that
10 area. I know of nobody who has litigated an award fee
11 analysis.

12 MR. CRONIN: Okay. Well, and obviously the reason is is
13 that if a contractor has no risk and he starts off from a
14 baseline of zero or break even, so to speak, then he has to
15 look again at return on his investment and he has costs to go
16 to the next step and so forth. So, yes, it definitely is
17 different. But, the final question on this subject, what
18 mechanism do you have to adjust the target estimate or some
19 such number? When you change the scope of the work and the
20 contractor comes in and he says, yes, you're going to shut me
21 down for three days. That's going to cost \$50,000. What
22 mechanism do you have to adjust his evaluation on that basis?

23 MR. GERTZ: In the award fee process or in the--

24 MR. CRONIN: The way that you plan to do it. I don't
25 know.

1 MR. GERTZ: Okay. I'll let REECo respond to the
2 specific, but I'll tell you how we do it now with the four
3 contractors we have. We just write a letter and they say
4 we'd like to change our award fee milestones because you've
5 changed our scope of work. Or, when we gave them a new scope
6 of work, we said and, oh, by the way, your award fee mile-
7 stones will be changed to X, Y, and Z. And, they'll say
8 that's reasonable or unreasonable and we'll negotiate.

9 MR. MATYAS: Carl, do you have the authority to approve
10 those increases in costs at your level?

11 MR. GERTZ: Yeah, I control the funds that have been
12 allocated to me by John Bartlett. So, I control \$244 million
13 worth of funds and I can give REECo 50 and the M&O 50 and
14 USGS 30, and if somebody says we got lots of big problems we
15 need to study at the USGS, I have to shuffle those funds or
16 allocate them at the beginning of the year. But, I do have
17 authority within that range.

18 DR. CANTLON: Are we about finished with this category?
19 Yes, Bart?

20 DR. BARTHOLOMEW: One point and Ed Cording brought it up
21 originally and then you alluded to it again, Carl. In that
22 the decision of what percentage of the award fee is going to
23 be awarded to the contractor is a unilateral decision on the
24 part of an official in the administering organization. And,
25 as you said, it's a unilateral decision and it's not appeal-

1 able. My understanding is that the basis of evaluation is a
2 matter that is negotiated with the contractor.

3 MR. GERTZ: That's correct.

4 DR. BARTHOLOMEW: And, in the event that those negotia-
5 tions become deadlocked, the owner's authority unilaterally
6 establishes the evaluation procedure and the contractor has
7 the right to demand AAA arbitration if he thinks that's
8 unfair. That does not apply to the evaluation of how much of
9 that fee he's going to get after the job is done. Is the
10 fact that one is subject to arbitration and the other not a
11 requirement of the Department of Energy acquisition regula-
12 tions or is that something that administratively you've
13 decided is the best approach for this project or what? Could
14 you enlighten us?

15 MR. GERTZ: I don't know to tell you the truth.

16 DR. BARTHOLOMEW: It's there. I know it's there. Does
17 someone wish to comment on that?

18 MR. GERTZ: Who is our contract experts--

19 MR. FRASIER: I think it's the latter. I think it's the
20 administratively.

21 MR. GERTZ: Are you subject to arbitration on the--your
22 M&O contract is not subject to arbitration for the--not for
23 the evaluation, but for the negotiation of the criteria?

24 DR. BARTHOLOMEW: I think your documents do state that
25 the setting of the criteria for the award of the fee is a

1 negotiable matter and that that is subject to arbitration.

2 MR. FRASIER: But, if we disagree, they can implement
3 whatever they want unilaterally and there's no dispute mech-
4 anism.

5 DR. BARTHOLOMEW: On the award of it after it's been
6 set.

7 MR. FRASIER: As well as the criteria and the perfor-
8 mance evaluation plan.

9 MR. CRONIN: Just one further comment on that then.
10 There was a gentleman who stood up earlier in the audience
11 and he said that he did have this kind of a problem with some
12 agency that he was working with on an award fee basis.

13 MR. GERTZ: Me, yeah.

14 MR. CRONIN: Oh, it was you, sure. Okay, right.

15 MR. GERTZ: That's right.

16 MR. CRONIN: Okay. You were walking around, I guess,
17 then. And, so you have the firsthand knowledge of how that
18 works if there is no mechanism for negotiation.

19 MR. GERTZ: Yeah, we just went and did our work and the
20 Government gave us what they thought it was and we spent time
21 building facilities as opposed to arguing about award fee.
22 And, that didn't work out very good and they changed both the
23 management of the contract or the management of DOE after a
24 while. But, that was where we came to absolute--couldn't
25 agree on anything.

1 DR. CANTLON: Okay. Before we leave this category then,
2 anybody in the audience have a burning desire to make a
3 comment or raise a question on this issue?

4 MR. HAYES: On the issue of funding, is that what we're
5 talking about?

6 DR. CANTLON: No, this is the fixed price contracts, the
7 costs, the dynamics.

8 (No response.)

9 DR. CANTLON: I want to move now to another one of the
10 other categories on our discussion list. This would be on
11 the equipment and material acquisition and mark-ups. Who
12 would like to comment on that? Bill, are you the appropriate
13 kicker-off/off-kicker?

14 DR. SIMECKA: Well, I guess I'm not. I don't know what
15 the issue is.

16 DR. CANTLON: Ed?

17 DR. CORDING: I think one item here is that the process
18 of trying to get projects started and get underground and
19 start the boring machines. There's a lead time on acquisi-
20 tion of the machines and it's a situation that, I think,
21 people in the underground industry find themselves in occa-
22 sionally of trying to get a machine started and acquired and
23 at that point not having the subcontractor on board. And,
24 that's a situation that exists at this point here and I
25 thought it would be interesting to learn a little bit first

1 about what the status is of the RFPs that are out now for
2 TBMs and what the anticipation is on that and some discussion
3 on how that's going to interface with the contractor that
4 comes on board perhaps after a machine is acquired. At
5 least, that's my understanding at present of what some of the
6 planning is.

7 DR. SIMECKA: Okay. We are pursuing with--I mean, REECo
8 is essentially in the process of the procurement action
9 necessary to put out an RFP. They are not waiting for the
10 underground subcontractor to put that out because we're doing
11 it as fast as possible. When the underground subcontractor
12 comes on board, their job is to assist REECo in managing the
13 underground activities. But, REECo is the procurement agent,
14 if you will. And, Bob, can you add to that?

15 MR. PRITCHETT: Yeah. I'd like to make sure that
16 there's no misunderstanding on one aspect here, Ed. An RFP
17 for a TBM has not been issued yet.

18 DR. CORDING: All right.

19 MR. PRITCHETT: It's in the stages of preparation. The
20 specifications that that RFP will convey to potential pro-
21 posers are in the final stages of preparation and we're
22 trying to work those documents in parallel. When the speci-
23 fications are released to us, we should be able to issue the
24 RFP within a relatively short period of time. I'm not sure I
25 can state an exact date that we might anticipate that now,

1 but I'm hopeful it will be before the end of this month.

2 Bill, can you help me with the specification status update?

3 DR. SIMECKA: Well, my understanding is that we're
4 hopeful to get that out around the middle of this month.

5 DR. PETRIE: It's really germane to the discussion. We
6 are still aiming towards getting the RFP on the street by the
7 16th of November. But, it's nip and tuck and it will be two
8 days when we have the other--well, it won't be earlier than
9 that, I can almost guarantee you that, but it will be pretty
10 close.

11 MR. PRITCHETT: Now, to the other aspect of that, Ed,
12 admittedly, we're a little bit behind our time line with
13 respect to obtaining the subcontractor. We had originally
14 hoped and it was our plan to have had our subcontract awarded
15 so that there might be some technical participation by the
16 subcontractors expertise in the development of the specifica-
17 tions. We've been somewhat overcome by that. I'm quite
18 confident though that we will have our subcontractor in place
19 in time to help us evaluate the proposals and work with us
20 during the manufacturing or reconditioning process.

21 MR. GERTZ: I think that's the question. We're here
22 with the issue of the TBM RFP. We hope to receive TBM pro-
23 posals. In an ideal world, you would have had your sub-
24 contractor do the TBM. We're not in an ideal world. We need
25 to get underground as quick as we can, I believe as the

1 project manager. We hope--now, you give me your best date
2 for awarding the subcontract for underground construction.
3 Best guess?

4 MR. PRITCHETT: I think probably end of January/early
5 February.

6 MR. GERTZ: Okay. In this time frame where he will then
7 help us participate in the evaluation of the TBM proposals,
8 provide major input because he's the guy that's going to use
9 it. And, you know, it's not beyond belief that he says he
10 doesn't like any of the proposals and maybe we need to start
11 over or something. But, we hope that we had enough expertise
12 in developing the specs that he will buy into it because if
13 he's going to be responsible for the underground construc-
14 tion, he's going to have to have some kind of buy-in on it
15 and we're going to have to reach that kind of agreement.

16 MR. MATYAS: Question, Carl or maybe Bob.

17 MR. GERTZ: Yes?

18 MR. MATYAS: Let's say that he did get aboard and par-
19 ticipated in the procurement. Supposing at the point in
20 time, he wanted to change the nature of the machine or, say,
21 the diameter. What kind of time is involved in moving from,
22 say, your--what is it, 25 footer to a smaller? Do you have
23 requirements that will take several months to readjust that
24 or do you just strike out the diameter--

25 MR. GERTZ: Now, you get into the procurement law that

1 if it's a major change do you have to go out and follow so
2 much procurement and so much--yeah, you know, if it's a
3 major--if it's a major change, now you may have new people
4 who would have been available to bid and you probably got to
5 start the procurement process over which is cumbersome.

6 MR. MATYAS: What you've said repeatedly is you want to
7 get into the ground and I think everybody here wants you to
8 get into the ground. And, it may be a strategy for getting
9 into the ground which requires changing that TBM.

10 MR. GERTZ: It may be and that's certainly some of our
11 thoughts.

12 MR. MATYAS: I guess my question is how many months would
13 it be to make a major change to that procurement thing?

14 MR. PRITCHETT: I don't really anticipate a major change.

15 MR. GERTZ: If you were to start a new procurement, it's
16 about two months for them to prepare, preparations, and on
17 the order of three to four months to evaluate. So, if you
18 started a new procurement, you start with a six month delay
19 before a guy even starts to get on board to build anything
20 for you.

21 MR. MATYAS: Okay. That's what I wanted to know.

22 MR. GERTZ: I mean, that's kind of off the top of my
23 head, but that's why we've--right now, we didn't want to wait
24 that six months even right now.

25 MR. MATYAS: Thank you.

1 MR. GERTZ: And, once again, before we as a manager
2 would agree to something like that, we'd have to have a good
3 analysis and a good case for it because our ESF alternatives
4 said we needed a 25 foot ramp. Our analysis, be it ventila-
5 tion or traffic or conveyors, all point to a 25 to 27-1/2
6 foot diameter.

7 MR. PRITCHETT: Carl, I would like to note that some
8 months ago, we did issue in the Commerce Business Daily a
9 source advertisement for a generic kind of machine and we
10 were very pleased to have received eight different responses
11 to that.

12 MR. GERTZ: Eight responses of interest.

13 MR. PRITCHETT: And, so the commercial industry, the
14 manufacturers, and the rebuilders, and so forth, they kind of
15 know what we're up to and I think they're anticipating it.

16 DR. CORDING: I recall there was some design work cer-
17 tainly that has been done on a machine specification for both
18 an 18 and 25 foot machines. And, the TBM RFP, is that going
19 to be for--there's going to be an RFP for one machine, two
20 machines--

21 MR. PRITCHETT: One machine.

22 MR. GERTZ: One machine. I think I showed you yesterday
23 the diameter in meters, whatever it was, 7--

24 DR. CORDING: Well, yeah, 7 to 9 something.

25 MR. GERTZ: Yeah.

1 DR. CORDING: That's ranging from 25 to 30 feet, as I
2 recall.

3 MR. PRITCHETT: The advertisement in the Commerce Busi-
4 ness Daily, at that time we merely indicated a size range to
5 --

6 MR. GERTZ: But, our specs will be more specific.

7 MR. PRITCHETT: We will have, I believe, a specific size
8 when we go out with the RFP for the machine. Is that
9 correct, Ted?

10 DR. PETRIE: Within the spec, we are going to put in a
11 range from a minimum that we can use to a maximum that we can
12 accept in our starter column. And, that will be--let's see,
13 in feet, it's about 27-1/2 to about 31.

14 MR. PRITCHETT: I'm sorry. Then, I stand corrected on
15 that.

16 DR. CORDING: Now, that's a range that--that means you
17 would be at some point telling them what the actual diameter
18 is. So, how are you going to give them the flexibility?

19 DR. PETRIE: We're leaving the option open that there
20 might be a machine available. The schedule is very important
21 to us, okay? If there were a machine available that were a
22 30 feet machine, but I only need 27-1/2, but I can get that
23 30 foot machine in two weeks, the likelihood is that I will
24 go with the 30 foot machine.

25 MR. GERTZ: And, the costs are advantageous and its

1 performance or response.

2 DR. PETRIE: Again, if I were able to save \$5 million by
3 going to a machine that was available and happened to be the
4 larger size, I would go with that. In other words, we need
5 to get our proposals in on that basis and then make our
6 assessment and whatever is most advantageous to the Govern-
7 ment, that's where we're going.

8 DR. CORDING: Certainly, there's a lot of experience in
9 situations where a tunnel contractor chooses to go to a
10 larger size because it is--he can use equipment that's a
11 better cost. But, that cost is not just the cost of the
12 equipment; it's the cost of the entire project, the entire
13 tunnel. So, if you save \$5 million by going to a larger
14 machine, you may not be saving and probably will not be
15 saving \$5 million in the tunneling costs. So, it's the
16 overall costs, I think, that one would look at in a situation
17 like that.

18 DR. PETRIE: We concur. On the other hand, you know, it
19 costs us so much a month to run this project and if we can
20 save six months in the project, that really is a substantial
21 amount of money. So, again, all these things have to be
22 considered.

23 DR. CORDING: Sure. And, certainly, I think we're all,
24 as we've said, interested in getting underground in the most
25 efficient schedule possible.

1 MR. GERTZ: Ed, your point is exactly right. That's
2 part of the evaluation process. What is the total systems
3 cost? If you save \$2 million or \$3 million on a machine
4 cost, but does it cost you more to do the five miles of
5 excavation? Your second point about the second machine, I
6 would like to think our plans are for the subcontractor we
7 bring on to procure a second machine when the time comes. At
8 least, that's my view of it right now.

9 MR. SMITH: I guess I've got a comment about the con-
10 tractor contributing to the specifications for the machine
11 because the Stillwater machine in the Central Utah Project is
12 a classic example where the machine was specified by the
13 Bureau of Reclamation and it had a great deal of problems.

14 There's a glaring anomaly up here when I relate to
15 what I'm doing right now in Chicago to what's there. Our
16 predicator is the backup systems and we are--our tunnel
17 machine is being rebuilt right now. We started the first of
18 the month. And, we will not see first delivery of our con-
19 veyor systems until May or June of next year. And, they are
20 operating under a normal schedule--I mean, actually, an
21 aggressive schedule to produce that. Interestingly enough,
22 is that the costs of our conveyance system are in excess of
23 the tunnel boring machine, too, as well. So, we have about a
24 \$7 million to \$8 million investment in the backup system, and
25 a tunnel machine, we purchased in the 3 to 4 range. And, by

1 rebuilding, it will be the 7 or 8 range. But, I don't see up
2 here where your backup systems are being included in your
3 schedule.

4 MR. GERTZ: I don't know where you're starting your TBM,
5 but we fortunately don't need a whole bunch of conveyor
6 early-on, but we will need it as we get further.

7 MR. SMITH: We're starting our TBM exactly as you're
8 starting your TBM. So, we need the conveyor right from the
9 very moment.

10 MR. GERTZ: Yeah, okay. Right, okay. Ted, do you want
11 to address--

12 DR. PETRIE: Well, as a matter of fact, we will be
13 addressing that. We had decided to look at the conveyor
14 system in conjunction with the selection of the TBM. As I
15 said, until we get a TBM selected, although we can do a lot
16 of preliminary work, I'm not sure we can do much in the way--
17 we can't start the procurement action.

18 MR. SMITH: The conveyor system really is the nucleus of
19 the operation. It's an extremely important part.

20 DR. PETRIE: I absolutely agree. Absolutely agree.
21 But, as you pointed out, you can get them in about six
22 months. Okay? And, we feel that the six months is consis-
23 tent with our needs.

24 MR. SMITH: That's correct. But, it took some time to
25 make a very selective process to get what was the best for

1 the situation.

2 DR. PETRIE: We concur. We concur.

3 DR. CANTLON: Yes?

4 MR. SANDIFER: I'm afraid that the perception has come
5 across yesterday and today possibly that we are doing just-
6 in-time spec writing, just-in-time decision making on the
7 ramp size, and I would like to address and clarify that, at
8 least from M&O's perspective.

9 The 25 foot that was mentioned was a product of
10 Title I. That was an RSN activity. That is a conceptual
11 design phase. The purpose of Title II is to confirm the
12 design. In the Title II activities that RSN just concluded,
13 one of the activities was a ramp sizing study which came up
14 with a 27-1/2 as opposed to a 25. What may appear to be
15 just-in-time design is not that, I would contend. It's the
16 re-sequencing that we had to do to get the accelerated ESF
17 schedule. If we had left the schedule without the acceler-
18 ation, there would be have been lots of time between the ramp
19 sizing determination and the ultimate TBM spec preparation.
20 So, I wanted to make that point and clarification.

21 MR. BEALL: Carl, has there been any consideration for
22 putting an option in for a second or a third TBM so that we
23 could save somewhat of the up-front time?

24 MR. GERTZ: Not, I think, in this contract.

25 MR. BEALL: That's assuming that we might get some

1 unexpected additional funds.

2 MR. GERTZ: I think not in this contract. I think that
3 the concept, Ken, that we're now pursuing from the project's
4 point of view is the once through loop with the major TBM and
5 then a second TBM for Calico Hills down the line when that
6 time comes. And, I would like to think our underground
7 constructor, the subcontractor to REECO, will bring the
8 expertise to the table to help us choose that second machine,
9 essentially, and choose whatever--you know, we had a great
10 discussion, Ed, with all your staffs about what do we do on
11 the add-it, so to speak, and our underground constructor, we
12 hope, will add significantly to those kind of decisions and
13 choices, much like you all added to our knowledge yesterday
14 on it.

15 DR. CANTLON: Other questions or comments on equipment?

16 MR. PRITCHETT: If we're talking equipment generically,
17 I would call your attention to the green part of the summary
18 schedule which is the site preparation work for the north
19 portal and associated things. Most of the equipment neces-
20 sary for those activities is planned to be matrixed over from
21 the NTS. It's already being arranged. Most of that equip-
22 ment will begin to be mobilized the week of November 23.
23 There are a few items of a minor nature and perhaps one of a
24 major nature that we may have to lease, but the rest of that
25 stuff is pretty well under control.

1 MR. GERTZ: John, I guess I'd like to point out one
2 other thing since we're talking of schedule. When you bring
3 up a great point about, well, we have all the back end of the
4 TBM at this time and ready to go. You know, this is aggres-
5 sive, as I think we all agree, even to get a TBM here. But,
6 once again, we will have started drill and blasting. At this
7 point in time, we're going to have an indication of what the
8 rock is like right there. We want to continue drill and
9 blasting a little further. Is our TBM going to be delayed?
10 And, the project management team is going to have to make
11 some decisions. Do we stop at 200 feet with drill and blast?
12 Do we continue to 300 or 400 while we're waiting for the
13 TBM? All those decisions yet to be made. Our only firm
14 decision is to try to get 200 feet into the mountain by mid-
15 September and get a TBM here as soon as possible, and once we
16 fill in some of the blanks, we'll be able to make some of the
17 next decisions.

18 DR. CANTLON: Other questions on the equipment?

19 MR. GERTZ: The other thing I guess I need to say for
20 those who are aware, the drill and blast activity is still
21 well away, almost a mile away, from the repository block.
22 There was concern about drill and blasting. Well, if we go
23 another 200 or 300 feet, we're still not very close to the
24 repository block. We have to assure that it doesn't com-
25 promise the scientific ability to map or, as we go through

1 the Bow Ridge Fault, compromise any of those studies.

2 DR. CORDING: Well, the situation is if the TBM is on
3 the critical path, then you can make--you go further with the
4 drill and blast, you're not interfering with that operation.
5 In other words, you've got time where you can do that before
6 the TBM is mobilized.

7 MR. GERTZ: Exactly.

8 DR. CORDING: So, once you can mobilize the TBM, you
9 want to get it in as quickly as you can.

10 MR. GERTZ: I didn't want to leave a false impression.
11 We want to put the TBM in the start tunnel as soon as we can
12 get it. But, in the meantime, if there is a lag in schedule
13 due to waiting for a TBM, due to getting at the right con-
14 veyor system, or whatever, we do have an opportunity to make
15 a choice to continue drill or blast or not and still be
16 making progress as we're waiting for the TBM.

17 DR. CANTLON: Okay. That brings us, I guess, then to
18 another category on the list which is the disputes review
19 board. Ed?

20 DR. CORDING: If I might make a comment on that topic,
21 many of the people here and the consultants have been
22 involved with disputes review boards principally on contracts
23 that are fixed price construction contracts. And, we've seen
24 increasing use of this vehicle in the underground construc-
25 tion industry to take care of disputes that arise during the

1 course of the contract between contractor and owner.

2 There had been some talk about certain items in the
3 project here can be fixed price; in some cases, it may be
4 situations where you're working with purchase of materials
5 and equipment. But, one of the things we presented yesterday
6 was the possibility of tunneling through the facility with a
7 separate--through the Calico Hills with a separate portal.
8 The possibilities in a situation like that or in a situation
9 where you can define the construction and to the point that
10 you can specify a product provides at least a possibility
11 that one could consider that type of a contract. But, one of
12 the things that we've found very useful and the concerns I
13 know that Carl has very validly expressed is the problems
14 that one gets into with litigation and having to go through
15 those sorts of situations.

16 And, I thought we'd just briefly comment on our
17 experience with the disputes review process and Joe Sperry
18 has been a person who has been instrumental in developing
19 that within the construction, particularly underground,
20 industry and thought he could give us a few comments on what
21 it is and how it works.

22 MR. SPERRY: The American Society of Civil Engineers
23 published a booklet. It's in its second edition now. I
24 think it's the third printing. This is sort of the handbook
25 of the thing. I notice Bob Matyas has a copy also in case

1 any of you would like to look at a copy of it. I guess what
2 you'd say, it's a unique form of alternate disputes resolu-
3 tions. The unique part is that it works throughout the
4 construction of the project to solve disputes. They typic-
5 ally meet every three months on the job site and I think the
6 beauty of this process is that you establish rapport between
7 the owner and the board and the contractor and the board. In
8 other words, between the parties and the group that is going
9 to advise on settlement of your disputes. This is non-bind-
10 ing. They're just recommendations. They're recommendations
11 are admissible in any future litigation or arbitration or
12 wherever you take the dispute after the disputes board.

13 There's a lot of details to it. I'm sure any one of the
14 consultants here and Dr. Cording can answer questions on it.

15 I'll just go over some of the background of the
16 thing and the success. The success has been--I don't know,
17 I'd take anybody's correction on this, Bart, but the success
18 has been outstanding. There has never been a case, save one,
19 taking the litigation after the parties received a recommend-
20 ation from the disputes board. Now, I must point out what
21 that save one is. There was a \$2.5 billion dispute--that's
22 billion with a B--on the English Channel Tunnel. The English
23 Channel Tunnel had a disputes board. It was organized a bit
24 differently than what the SAIC book recommends, but it's
25 essentially the same thing. Well, they had a \$2.5 billion

1 dispute and the recommendation went against the owner and the
2 owner took it to arbitration and the arbitrators came down
3 and recommended for the contractor and I think the owner--
4 correct me if you know the right figure--but I think the
5 owner was ordered to pay a quarter of a billion or something,
6 that's 250 million, a month to the contractor or 150 million,
7 something like that. So then, the owner took it on to the
8 Chamber of Commerce Board of Arbitration in The Hague and
9 it's there now. So, except for that, the record has been
10 perfect. Now, I should also mention on the English Channel
11 and this input is almost two years old. But, they had set-
12 tled 12 disputes before this big one came up without any
13 problems.

14 There's about \$3 billion worth of completed work on
15 about 50 projects to date. I don't know how many disputes
16 have been settled, but there's been no litigation on that \$3
17 billion worth of projects that use disputes boards. I think
18 the underground construction industry has been somewhat
19 remiss, but we're seeing the hole in the doughnut, I think,
20 and we, I believe, implied that this was especially applic-
21 able to tunnels. I totally disagree with that, but the
22 process came up through the tunneling facet of the construc-
23 tion industry. I think it's just as applicable to all types
24 of construction and I think in the past year probably as many
25 projects on other than tunnels have incorporated dispute

1 review boards and their documents. But, it's almost
2 ubiquitous on tunnels now. Very few tunnels go to bid with-
3 out a disputes board.

4 MR. GERTZ: Joe, excuse me, was it mostly for fixed
5 price contracts or could you find an application to a con-
6 tract like we have? Because we still have arguments between
7 ourselves and our contractors and perhaps it would be even
8 applicable to our type of operation.

9 MR. SPERRY: Absolutely, all types of construction con-
10 tracts. The people down in Phoenix, you know, they built a
11 new stadium for the Phoenix Suns. Now, I don't know what
12 type of contract it was. But, those people were just totally
13 enamored of the process. I understand now they have it on a
14 large office building they're building at the--the state of
15 Arizona is building. But, it was used on a \$250 million
16 paper mill in Jackson, Mississippi some years ago and very
17 successfully. And, that was a cost plus and they had incen-
18 tives in that and they had to guarantee the process. It was
19 a design constructor and in the process they had some prob-
20 lems. They weren't outputting as much paper as they origin-
21 ally wanted, but that was all settled. It's been very suc-
22 cessful.

23 Now, there's two things I want to point out. If
24 you're going to really get in and handle disputes with this,
25 you see there's no discovery as part of this because this

1 isn't a process that goes through the legal system. But, you
2 have to be able to determine what the contractor had in mind
3 when he bid the job. And, so we used what's called escrow
4 bid documents and that's very important to the process in
5 order to--and the board very seldom accesses the escrow
6 documents, but there are provisions again in this booklet on
7 handling of the escrow documents and that is a substitute for
8 discovery when you use this process.

9 The latest thing that's happened in this and I
10 believe this has happened up in the state of Washington prob-
11 ably on a dozen jobs and otherwise on perhaps half a dozen.
12 They incorporate partnering which, I'm sure, if you're read-
13 ing the *Engineering News Record* and the trade documents, you
14 see references recently to partnering. That's incorporated
15 in addition to disputes boards and that appears to be very
16 successful and it's interesting. It's sort of--I've heard it
17 referred to as a bit of a touchy-feely exercise, but it gets
18 the contractor and the owner to establish rapport much better
19 than without the partnering. It's something I think that
20 used to be done 20 or 30 years ago just in the normal course
21 of contracting and contracting has gotten so litigious now
22 that perhaps that doesn't happen. But, so several contracts
23 are using partnering and I'm recommending that on a contract
24 that goes out next spring in San Francisco, to be incor-
25 porated, as well as disputes boards.

1 I think there's a lot of people around the table
2 here that can answer any questions on this.

3 DR. CANTLON: Bart, did you have a comment to make on
4 this area?

5 DR. BARTHOLOMEW: Not particularly, John. Perhaps, one
6 point. Carl, I don't think there's anything in the typical
7 dispute review board provisions that would make it par-
8 ticularly applicable to a fixed price contract as distinct
9 from a cost reimbursable contract. It could be applied to
10 either. Probably, the feature that Joe alluded to, the
11 escrow bid document provision wouldn't have the same applica-
12 bility in a negotiated contract that it would a fixed price
13 contract where there's no negotiation that's involved when
14 the contract is entered into. That probably, in my opinion
15 at least, would be something that you would not probably want
16 to incorporate into a situation such as this. And, boards
17 have been set up with essentially comparable provisions in
18 all other respects with the exception of that.

19 MR. GERTZ: Yeah, I appreciate those comments because,
20 as the project manager, we're always looking to find a way to
21 make the team work together and I've showed you the team that
22 we have now and we'll have other people coming on as part of
23 that team. And, certainly, a subcontractor is going to come
24 in and he's going to be a little skeptical about the whole
25 process because this is a little different program and per-

1 haps he would feel more comfortable if there were an impar-
2 tial disputes board that were available to him. So, you
3 know, I think it's a good idea not necessarily for just
4 construction contract claim disputes, but just the ordinary
5 disputes that go on in the management of a cost type contract
6 with some type of incentives to it.

7 DR. BARTHOLOMEW: Yeah. If you have a disputes clause
8 in your contract, if there is a disputes clause there, then
9 the concept of a disputes review board would be applicable if
10 you would consider it.

11 MR. GERTZ: Yeah, I'm sure we have a disputes clause.

12 DR. CORDING: Of course, one of the major advantages is
13 not just keeping out of litigation, but getting the project
14 done. You know, that you litigate it rather than everybody
15 working for the next few months to develop their claim and
16 the project just goes down the tubes.

17 MR. GERTZ: Yeah, or you don't want the situation that I
18 described where the owner and the contractor just didn't talk
19 and they just left and went to their work. I mean, that's
20 not appropriate.

21 DR. CORDING: I've seen projects where they had plenty
22 of time to look at the problem and they went on through and
23 they basically destroyed the underground the way they built
24 it because they couldn't come to an agreement and it ended up
25 in the Courts years later. You know, those sorts of things,

1 I think, the disputes review board came on as a result of
2 that type of experience.

3 MR. MATYAS: Carl, I'd like to add to that. You've
4 heard my concern for the complexity of the job that you're
5 shouldering, whether your disputes review board ever heard a
6 claim. From your standpoint, as the leader of the project,
7 it would be a very great comfort to you and a very user
8 friendly device. The key issue--

9 MR. GERTZ: Certainly, I'm sensing that just sitting
10 here listening to you all.

11 MR. MATYAS: You're going to be a lot more comfortable
12 when you go home in the evening if you have one.

13 MR. GERTZ: Impossible in this job.

14 MR. MATYAS: Well, every little bit helps.

15 MR. GERTZ: You're right.

16 MR. MATYAS: But, one thing that hasn't been brought out
17 and that's the timeliness of response of a DRB. They know
18 what's going on from the beginning and the way it's been
19 practiced for the last four or five years is these people who
20 are really--they're not professionals in the--their business
21 is not arbitrational like members of the AAA. These are
22 people who--there are a number of them sitting in this room
23 who have been sufficiently concerned over contract practices
24 that they willingly serve and are really committed to partic-
25 ipating. Most of them can make a lot more money doing their

1 jobs than sitting on a disputes review board. But, so far, I
2 think the success is due largely to the fact that they were
3 --you know, they'll show up within days. They'll just change
4 their calendars and show up and hit the problem as hard as
5 they can before memories get foggy and adversarial relation-
6 ships develop, emotions flare. These people will come on it
7 and work with the leadership in both sides and the record has
8 been perfect except for our friends in the Channel.

9 DR. CORDING: And, they schedule regular meetings, but
10 they keep up on things and can encourage parties to discuss
11 things. Sometimes, things come up at the meeting that don't
12 otherwise come out.

13 DR. CANTLON: Okay. Well, let's shift then. We've got
14 two more items that we'd like to discuss. One would be
15 shifting from looking at optimizing the sub-units within the
16 system to looking at the general systems optimization. And,
17 Carl, it would be useful maybe for you to describe for the
18 Board and its consultants the procedures that you have, the
19 tools that you have to sort of look at optimizing the total
20 objectives of the system, so that you can overcome the ten-
21 dency of every organization to sub-optimize the world for
22 itself.

23 MR. GERTZ: Let me just think about that a second, but
24 that's a battle we go through every day in managing a project
25 and I need to narrow it. You know, I'll provide you

1 with some of the guidelines that we use to manage the pro-
2 ject, not necessarily how it fits into the overall transpor-
3 tation system or the MRS system, but just assuming we're
4 going to receive spent fuel and/or glass logs at the reposi-
5 tory if Yucca Mountain is suitable. Then, how do I trade off
6 what Larry Hayes needs, what Dale Foust needs, what Bob
7 Pritchett may need? How do we do that?

8 And, I think it comes down to, one, establishing
9 some goals and where we're going in the long run and where we
10 need to go in the short run. They may not always be compat-
11 ible, but we do have a goal of determining the suitability,
12 providing a license application. I think you've seen the
13 chart we use, the convergence type chart. All our studies
14 need to converge and get some answers and get some results.
15 As you heard John Bartlett talk to you, we're looking for
16 results and answers and doing what is necessary.

17 In the meantime, we need to have constituent sup-
18 port and by that, I mean, the Congress, the utilities, or
19 whatever for what we're doing now because 2001 is way out.
20 People can defer their answers to that. So, essentially, our
21 process is what is the most important thing we need to do in
22 the next year or two to meet the 2001? We develop that and
23 our budget process is the one we use because everybody--I'll
24 set some priorities based upon the Secretary of Energy's
25 direction passed down through John Bartlett.

1 Right now, they include getting underground as soon
2 as we can and doing some balanced surface-based. I'll then
3 sort out those priorities and distribute them to my team, my
4 management team within DOE, who then goes to the people who
5 do the work, the contractors, and they develop a program to
6 meet those goals. As I pointed out last time, that program
7 that they provided to me was \$300 million and I said I didn't
8 want it. I only had \$244 million and how could it be \$300
9 million just to start a ramp and continue surface-based
10 testing. And, we went through a long, arduous process of
11 what's in and what's out and what's necessary to support it.
12 And, it's an interactive process with not only my
13 management, but the management of the contractor and
14 scientific organizations. Nobody is usually totally happy in
15 that kind of a process.

16 The project manager has to make some decisions. I
17 listen to the appeals or impacts, we change some of those
18 decisions, and as we go through the year, we'll probably even
19 change some more.

20 So, how do I optimize the parts? I think, we use
21 the prioritization similar to what Russ set up or what he
22 thinks is important to science. I have to then add to that
23 what's important from an institutional point of view. You
24 know, I've obviously testified, as your former Chairman has,
25 in front of Congress. We've had the senators out here. We

1 deal with OMB to what is important. We deal with the under-
2 Secretary. Things change, but I guess I try to optimize what
3 I think is the best road for the project in light of the
4 given objectives.

5 And, I don't know--you know, I didn't give you any
6 specifics because it becomes a gut feel after a while for a
7 project manager. I know all the things are important, but I
8 can't do all the things next year. So, I have to make a cut
9 with input from my staff on what things I do.

10 As Larry pointed out, part of the process didn't
11 include some seismic studies. Well, we think because of the
12 recent earthquake it's important to be out studying seismic
13 issues. So, we put that up front. Even though there may not
14 be a scientific basis for it and even reading Dr. Allen's
15 comments in your quarterly report may not lead to a scien-
16 tific reason for it, but there certainly is the public per-
17 ception.

18 DR. CANTLON: Larry?

19 MR. HAYES: I think, Carl has given me an opening to
20 express something I very strongly feel about if I could come
21 up and throw up one viewgraph.

22 DR. CANTLON: Sure.

23 (Pause.)

24 MR. HAYES: Carl, I'm going to say some things that I
25 don't want perceived as criticism of you. It's my concern

1 with the system that you're working within. And, that system
2 goes way beyond DOE. It's everybody here. It's all of those
3 outside forces that keep asking you to do conflicting things.
4 So, your comment yesterday, you can't win, I understand
5 where you're coming from. I would like to say in the five
6 years I've worked with you, somehow you have won and we've
7 won because of the things you've done. You have kept the
8 program going. You have maintained critical work. So, I
9 want to preface my talk with that. Also, it's my hazy view,
10 okay? I don't have the information you have. I don't have
11 the knowledge you have. I'm looking at this from the
12 perspective of my concern over how science is funded in this
13 program and, frankly, some of the criticism that science gets
14 for driving up the cost of this program.

15 This is an overhead Carl showed yesterday and he
16 offered to let me use it so I could complain against him.
17 You look at the four blocks down at the bottom, the Survey,
18 the national laboratories. We are charged with doing most of
19 the scientific work that will identify whether or not Yucca
20 Mountain is a suitable place to store high-level waste. Yet,
21 62 million of this 244 is all that goes to that effort. I
22 think the laboratories would support me when we feel that's
23 probably not the kind of breakout we'd like to see.

24 Carl, you have often stated that we're here to see
25 if the mountain is safe. I believe that, the Survey believes

1 that, or they would not have reorganized as they did to
2 continue to support you. So, we believe that. But, I think
3 the scientific community, in general, also feels that they
4 are constantly being asked to cut their costs, to do with
5 less testing, to do with less information. Yet, we're not
6 proportionally the big cost in the program. And, yet, what
7 we're doing, I think, is critical to why we're here.

8 Dr. North, it's comforting to hear your gentle
9 reminder of why we're building this facility. All right, we
10 are doing it to collect scientific information. And, yet,
11 sometimes, it seems the construction, design, those sort of
12 things are the driving factors, not the science. And, I have
13 to express concern that sometime it appears that way. The
14 scientific community is being asked to almost rethink how we
15 do work. We're being asked to look at the very basics of
16 what's important to us in order to reduce costs and the
17 scientific community is doing that. An example is what was
18 discussed yesterday, the need for the Busted Butte facility.
19 I obviously came down against that facility because I felt
20 we can't afford it. We cannot afford it. And, we're being
21 pushed to go underground. We'll probably be underground by
22 the time that facility can be built. So, we might as well do
23 our work underground. That still leaves some people like
24 Sandia and Los Alamos in a very difficult position either
25 meeting schedules or really doing their work in the manner

1 that they're going to be comfortable with. So, maybe Dale
2 would like to respond to that. I have one more thing to say
3 and then Dale might want to say a few words.

4 The scientists are doing a lot to try to cut costs
5 in this program. And, all I'm charging you with, Carl, again
6 and again when we talk almost weekly, is just to make sure
7 the rest of the community takes a look at not only justifying
8 how they have done business, but also looking at ways to redo
9 business to give us some more money for science.

10 MR. GERTZ: Larry, I just need to point out in this
11 debate that we continually have I enjoy it and certainly I'd
12 like to reminisce about an activity three or four years ago
13 when the scientific community expressed a great concern about
14 QA and how that was restrictive and they couldn't do their
15 job and it was hampering good science. And, perhaps, we had
16 been a little too restrictive at the point. But, when your
17 scientists were asked to write the procedures, they were too
18 busy to write those and then they found they couldn't follow
19 them. Certainly, through your efforts and Don Horton's in
20 leading the quality integration group, we got the scientists
21 writing the procedures. The QA professional says that's
22 great. That looks like it meets our needs and your needs and
23 we were then able to come to a sound quality assurance pro-
24 gram that met the majority of the scientific needs and the QA
25 regulatory requirements. And, you led that group. And, I

1 think that was enlightening for both you and the people that
2 participated on it on both sides. And, certainly, you've set
3 yourself up for this activity where I've asked you now to
4 lead a group to look at those other costs.

5 I mean, while it's true that science occurs on the
6 bottom, you couldn't do one iota if you didn't have a permit.
7 We couldn't get a permit if we didn't have an environmental
8 program. Probably, OMB wouldn't fund us if we didn't have a
9 good cost schedule control program. You couldn't do tests in
10 the ESF if we didn't design and build an ESF or a trench.
11 And, while, you know, you somewhat talked about 62 versus
12 244, a lot of that 244 is essential. The remainder of the
13 244 is essential for you all to do your work. It's not a new
14 discussion that we've had, but since you put out your side of
15 it, certainly I was going to offer my side of that. And,
16 that comes back to, John, what you said, how do we make
17 decisions and I'm going to expand on that a little bit with a
18 couple of viewgraphs that went back to project control
19 because we use that project control system to help identify
20 what decisions need to be made.

21 MR. HAYES: I agree with everything you said, Carl, and
22 that's why I started this with saying it's a system I'm
23 concerned about and how you can change the system, I don't
24 know. I'm asking you for another miracle. Either that or
25 people have to give you money, okay?

1 MR. GERTZ: The system is difficult to change in these
2 days of environmental concerns. As I said, when I was in
3 Golden last week, Colorado School of Mines, I heard a private
4 contractor doing private drilling saying it was becoming
5 extremely expensive and he just had to pay \$10,000 to clean
6 up five gallons of diesel fuel oil in a desert environment
7 and get all the proper buy offs from EPA and everybody on it.
8 And, that's not an NRC regulation; that's a national
9 environmental regulation.

10 DR. CANTLON: Dale?

11 MR. WILDER: Yes, I would like to follow up with what
12 Larry has just led into. And, I guess, it comes back to a
13 comment that has been around the project for some time about
14 the importance of perception. And, once again, of course,
15 I'm approaching this with a rather strong set of blinders and
16 those blinders relate to the work that Livermore is involved
17 in. But, given those blinders and realizing that Carl and
18 other project managers certainly see the bigger picture than
19 I do, there is a perception which I think sometimes does get
20 in the way of my feeling that the distribution of funding is
21 perhaps what it should be. And, I'll use an example, the
22 comment that was made yesterday about the reason why the G-
23 Tunnel was closed down. And, it was stated that one of the
24 reasons--and, of course, there was some discussion on this--
25 but one of the reasons was to be able to keep the scientists

1 at the national laboratories and the USGS on board and that
2 there was not sufficient funds to keep G-Tunnel open and keep
3 the scientists on board. We lost all of the people except
4 one who had done the G-Tunnel experiment and they are not
5 available. I've asked Abe Ramirez who was a leader of that
6 effort on several occasions if he would come back and Abe is
7 involved at Savannah River. He just is not available. At
8 that same time period, I was asked to participate in what I
9 thought was a total wasted effort, along with I don't remem-
10 ber how many, but it was so large that we had to rent a
11 convention center to house everyone, for a month long looking
12 at engineering design of a facility we knew would never be
13 built because the requirements had already changed.

14 So, from my perspective, I guess, what I see hap-
15 pening time and time again is that when we're told we can't
16 do this particular technical work unless we shut down other
17 technical work, it does not appear that the tradeoffs are
18 looked at up higher. It's always, well, you either have to
19 shut Busted Butte down and go underground to do your tech-
20 nical work or you have to close G-Tunnel down to keep the
21 technical people on board. And, it certainly seems that the
22 technical is not where most of the money is being spent.

23 DR. CANTLON: Max?

24 MR. BLANCHARD: John, I sense that part of your question
25 was asking what kind of management tools are available to try

1 to implement in controlling the program. And, despite what
2 some of the other people are saying, I don't want to leave
3 the impression to either the Board or the consultants that
4 we're without management controls. And, I want to tell you
5 right off the top of my head in about 10 seconds I wrote down
6 10 management tools that I think you all use and I know we
7 use in a very formal way. And, even though some people in
8 the program may think that some decisions are made on an
9 arbitrary and capricious basis, I assure you that that's not
10 the case.

11 Now, let me list some of these controls. We have
12 quality assurance audits, audits of all our contractors
13 including the DOE office, four times a year and the audits
14 are one week long. And, those audits are conducted in strict
15 compliance with 10 CFR 50. They verify by objective evidence
16 that the plans and the procedures are there and that the work
17 that the people do meet not only the intent, but the letter
18 of the law. Verbatim compliance is a process. And, those of
19 you that have worked with Admiral Richover know what verbatim
20 compliance means. We do that and we pass those audits and
21 our contractors pass those audits and the Civil Service
22 people in Carl's office pass those audits. The last one we
23 had was last month and we received only one CAR, corrective
24 action request.

25 Another one is we have an internal control system

1 driven by a DOE order called vulnerability assessments.
2 Every area in our program that spends a million dollars or
3 more goes through one or more vulnerability assessments which
4 is a focus of a part of a waste, fraud, and abuse audit.
5 These are done by people who are specialists in these kind of
6 audits. And, we have audit teams that look at property, they
7 look at contracting, they look at every area where things
8 associated with waste, fraud, and abuse can occur. They've
9 been ongoing, they're still ongoing, and we have DOE people
10 that manage these and we have a pickup team of specialists
11 that go around and visit each one of the facilities to see if
12 we can account for all of our property or whatever it is that
13 we're auditing.

14 We have a financial management system that follows
15 DOE orders, but we also have a separate waste fund auditor, a
16 contractor named Peat-Marwick. They audit the close-out of
17 all of our contracting activities, whether it's the national
18 labs or individual contractors. We also have in our office
19 every day almost, certainly every week, a group of auditors
20 from GAO that come from San Francisco and Washington and
21 they're going through all of our financial accounts and our
22 work plans.

23 We also have program reviews from some of the
24 interested parties and you're one of them and you know that
25 the NRC is one of them, but other groups of interested par-

1 ties that we give multi-day program reviews which includes
2 not only the technical work, but the management aspects and
3 the cost accounting from the Edison Electric Institute and
4 various utilities, also NARUC, the utility commissions that
5 oversee the individual states that operate nuclear utilities
6 within.

7 We also have a project management system that Carl
8 mentioned to you which is a form--

9 MR. GERTZ: I'm going to expand on that in a second.

10 MR. BLANCHARD: He's going to expand on that, but it's a
11 formal system whereby we implement a cost schedule control
12 system with a series of WBS elements. We've got about 15
13 now. They go down to about the 7th level of the WBS. We
14 have cost accounts, tiers, a hierarchy of cost accounts that
15 go down to summary accounts, as well as individual work
16 packages that overlay work scope, milestones, and dollars.
17 Those are created at the beginning of the year and they're
18 monitored by the DOE staff and the M&O staff that are part of
19 our product management control system. We keep the work
20 scope, the milestones, and the dollars coincident throughout
21 the year, and if there's a change to one of those, we modify
22 the work scope, the milestones, and the dollars.

23 We have monthly project management reviews with the
24 DOE people, aided by the M&O cost performance people, go
25 through a cost performance measurement system where we look

1 at grants analysis on schedule and cost to see if anybody is
2 under-schedule or over-schedule and under cost or over cost
3 on these cost accounts down to and including 4th and 5th
4 level. This includes all of the work that's being done by
5 each of the contractors and the TPOs.

6 We have a formal, separate, independent management
7 assessment that's done by a contractor this year elected
8 outside and identified by the director of OCRWM, John Bart-
9 lett. They come out and they conduct a programmatic audit by
10 interviewing all of the people in the management levels to
11 see if we're following either DOE orders, or if there are no
12 DOE orders, other regulations or general management prac-
13 tices. And, the current team that we're experiencing audits
14 now from this management assessment has lasted one week and
15 they'll be back in two or three weeks to do it again. And,
16 they've interviewed every single management person in the
17 system within DOE.

18 We also have monthly TPO meetings where Carl has
19 all of his managers at and we spend one or one and a half
20 days in discussions where we focus on the technical work, the
21 regulatory work, as well as the cost and the schedule and the
22 financial management.

23 Finally, as an aid as a management tool, we apply
24 total quality management concepts. We've been involved with
25 the Federal Quality Institute on that. We've had a number of

1 seminars. We've had people from industry come in, give us
2 lectures and seminars and lessons learned on how they apply
3 those circles. We have our own quality circles. They are
4 making changes and are streamlining things or are addressing
5 things from within the management system that aren't working.

6 So, I would not want to leave you with the idea
7 that's there's not a plethora of management tools that we use
8 every day, every week, and every month. They're effective
9 tools. We've got records. We've survived the audits. We're
10 not blown away by any of these audits. We do well with them,
11 and so far as I know, almost always we come back--we receive
12 information back in letter form that compliments the ability
13 of our records system and our management people to account
14 for the work and the cost.

15 DR. CANTLON: Thanks, Max. Let me just make a comment.
16 What we're talking about really is a combination of two
17 questions. One is how well is the OCRWM program system
18 optimized as opposed to subsystem optimized. That's one
19 question. And, what management tools do you have to make
20 certain that the system management rules, not the subsystem
21 management.

22 Now, Max has just given an iteration, almost mind
23 boggling, of the management tools to look at the subsystems
24 and to make sure that every nickel and dime and decision is
25 in place. Those of us that come from university life have

1 just lived through a couple of years of really tough inter-
2 action. We've got a guy named John Dingle who has made a
3 career out of pointing out that overhead rates of 50% are
4 obscene. Well, now, we're looking at a project in which the
5 scientific operation is about one-fourth of the cost. In
6 other words, if John Dingle were here looking at your
7 indirect costs, the universities would be going scott-free.
8 Now, what we're looking at--

9 MR. GERTZ: I just need to interject a touch. We have
10 been reviewed by Mr. Dingle's committee and we've gone
11 through our cost control system.

12 DR. CANTLON: I understand. But, what I would say is
13 that we have an opportunity now and our Board and this panel
14 have an opportunity in putting together this specific report
15 for entering a situation in Congress and with the change in
16 the executive in which the efficiency of the operation of the
17 Federal bureaucracy is really going to be a focal point from
18 both places; the Federal Government isn't working very well.
19 It's costing too much. We've over-regulated ourselves.
20 It's like the medical system in this country. We have
21 essentially designed our system to protect ourself from
22 litigation and litigiousness rather than getting the work
23 done. And, here, we have a group of scientists and everybody
24 has said the ESF is really a scientific machine. It's a
25 scientific facility to find out what in the world is going on

1 in that mountain that will make a difference in putting the
2 repository together.

3 Now, the question is have we so overburdened this
4 system to make sure that every auditor is content and happy
5 and go home claiming credit for having done things, have we
6 done that so severely that we now have a trickle of work
7 going out to ask this fundamental question which is critical
8 to this nation's future energy policy?

9 So, that's really the context in which I raise the
10 question and I think we've got to really address that with
11 more vigor.

12 MR. CLANTON: Once again, there's no free lunch. And,
13 when G-Tunnel was closed, again the attempt there was to save
14 as much of the staff as possible. We realized when we shut
15 it down that there would be some hits through the labs,
16 through the GS, but realized that most of that hit occurred
17 in the contractor, in the REECo area. The cost of keeping G-
18 Tunnel operational and not doing any work in there, but just
19 where it could be worked was \$3 million a year. To do any
20 work at all in there and to do the ventilation, the environ-
21 mental cleanup, we would be 5 million plus to continue to
22 work in that facility. And, rather than spending that money,
23 we saved as much as we could, put it back into the labs, but
24 yes, the labs did take a hit. Someone would have taken a
25 much larger hit in some other programs had we kept it open.

1 Thanks.

2 DR. CANTLON: Thanks. Jim?

3 MR. ALLAN: I would just like to reinforce your most
4 recent comment with an example. In June of this year, I had
5 the opportunity to accompany Robby Robertson and several
6 other staff members on a tour of three different countries in
7 Europe to look at their programs and procedures. And, that's
8 one thing that was made very clear to us, the fact that one
9 of the major differences in those programs, as compared to
10 ours, was the fact that our society does require in this
11 country a major effort simply to protect ourselves from
12 ourselves. And, they recognized that, and in one case, they
13 made it very clear to us that you folks over there are
14 causing us a lot of perception program back here at home.
15 So, what you say is real in the eyes of our compatriots
16 across.

17 DR. CANTLON: Carl, you wanted to--

18 MR. GERTZ: Let Russ go first.

19 DR. CANTLON: Oh, okay.

20 DR. DYER: Okay. I'd like to agree and disagree with
21 some of the things that have been said before.

22 First off with Uel's comment, yes, we did retain
23 scientists, but like Tom Statton said yesterday it's not
24 because we're a welfare program. Those people were moved to
25 other projects. We're not the National Science Foundation.

1 We have a discrete set of investigations to conduct and
2 questions to answer. We can't do all of it at once. We have
3 to reallocate depending on the circumstances and that's part
4 of the frustration is that circumstances seem to always
5 change. I think part of my frustration and certainly Larry's
6 frustration is that if--I suspect Carl is going to show a
7 graph in a little while that will demonstrate this--if you
8 look at the technical staff on this project who are also the
9 front line of communicating in the Outreach Program--Larry's
10 people, Dale's people--these are the people that need to
11 communicate with the public, with the oversight boards.
12 We're pretty much--we feel we're overburdened, if you will.
13 I'm sure that many of Larry's people would prefer to be doing
14 most of their work in a lab instead of spending one or two
15 days a week on public tours communicating with the public;
16 yet, that's also a very essential part of this project. And,
17 part of the frustration is that--I guess, I'll take a middle
18 ground here--I sympathize with Larry somewhat, but also this
19 is a large project which has many facets to it and it's
20 really hard to keep all the balls in the air at once.

21 DR. CANTLON: Thank you, Russ.

22 Let me just say a couple of logistical things. We
23 want to break in about, oh, seven minutes here to go to lunch
24 and we're going to convene at 1:30 rather than the 1:00
25 o'clock or 1:15. So, let's convene at 1:30 for the wrap-up

1 discussion. So, you're setting the stage.

2 MR. GERTZ: Right. We'll be back at 1:30.

3 DR. CANTLON: Yeah.

4 MR. GERTZ: And, let me just reiterate what Larry said
5 and Russ, you know, I keep this chart because while I agree
6 with what Larry says, there are a lot of science--

7 REPORTER: Microphone.

8 MR. GERTZ: Microphone, thanks.

9 DR. CANTLON: I would just say remember the buffet
10 luncheon is--if we get in there at 11:45 we can get through
11 and out.

12 MR. GERTZ: This chart shows what Larry was talking
13 about. That's the scientific. That's millions over here, a
14 total cost per year on one of our schedules, and the science
15 is not a big driver, but it's one of the drivers that
16 requires an ESF and ESF support. There's payments and over-
17 sight for the state. There's repository waste package.
18 We've not even talked about part of our responsibility is
19 design a waste package, an EBS, you put it in your fifth
20 report, and design a repository. So, it is a multi-faceted
21 program with lots of demands.

22 The question you ask maybe starting out is how do I
23 make my tradeoffs in those demands? And, we really go right
24 back down to a couple baselines. But, first of all, let's
25 remember the entire program is regulatory driven. We're

1 answering regulatory requirements. Our basic regulatory
2 document is the SCP which requires a waste package design, a
3 repository design, and a plethora of scientific studies in
4 order to answer questions. Not just to answer science, in
5 general, but to answer questions. That plan is our baseline.
6 We put it out. It's been reviewed. We know it's 6,000
7 pages long. NRC, EPA, USGS found the site plan to be
8 adequate. Detailed study plans follow up and we go ahead and
9 lay out our process for that.

10 DR. CANTLON: Before you leave that, Carl, that essen-
11 tially was true until the 1992 Energy Act passed. Do we now
12 have an opportunity maybe to simplify?

13 MR. GERTZ: We have two opportunities to simply the
14 plan. First of all, I do not know what the National Academy
15 will recommend and what will come down and that will change
16 our final plan. No doubt about that. But, there are con-
17 trols in place to revise this plan as it is right now. Right
18 now, we're looking at elements of that plan we'd like to
19 eliminate. Larry's people have taken the lead in erosion.
20 There's four studies we may not need if we can solve the
21 erosion. Volcanism may be another area that we'd like to
22 reach issue closure. But, there is a formal process and we
23 can't just arbitrarily pull it out of the plan. We've got to
24 do an analysis, meet with the NRC, and then remove it from
25 the plan. That plan will change probably by the existing

1 law. It will also change as we gather data. It's an interim
2 process.

3 But, how do we make our tradeoffs? This is back to
4 our project control that I alluded to a little earlier and
5 I'm just going to expand on it just a touch. We have a 15
6 element work breakdown structure that goes down to the 4th
7 level and I'm going to expand on geology which is under
8 1.2.3. All these elements down at a lower level have cost,
9 schedule, and work scope tied to them and milestones not only
10 for the next year, but for the next nine years. And, if you
11 expand on geology, it will go down to work breakdown struc-
12 ture and some of you have seen this before. That's the
13 project.

14 Russ Dyer is responsible for site activities. Uel
15 Clanton was responsible for 1.3.2 and then it goes down--we
16 have three contractors that happened to work in that area;
17 RSN designing, engineered structures for the scientists like
18 Rick Spangler to do his tests, and REECo constructs the
19 trenches and stuff, and they all have their own work scope
20 and activities. And, Rick Spangler, you've heard him talk
21 before. He then has other PIs and himself who do some of the
22 activities and each of these at this level in the summary
23 account. This one happens to have 10 activities with a total
24 cost of 521; 14 activities with 100k. Maybe those activities
25 aren't open next year. So, that's why it's so small. But,

1 the whole work is laid out, scheduled.

2 And then, when I give people their budget and they
3 say, gee, I was supposed to have 500,000 next year and you've
4 only allocated 200,000, here's the things I'm not going to do
5 in the schedule. And then, I have to accept that or reject
6 that or find them funds to do it and then replan the
7 schedule. So, when we allocate the budget, the process that
8 we go through is just one of looking at what we planned to
9 do, what effect will it have on critical paths, what effect
10 it will have on scientific tests, what effect will it have on
11 our oversight boards.

12 And, as I said, I could show you and you know they
13 exist, the planning packages. They list the deliverables and
14 when they're due and what's the scope of it. It's almost
15 like a contract we have with everybody working on the pro-
16 ject. Someone is responsible both from the contractor side
17 and from my side.

18 So, that's how we kind of manage the project and
19 that's the tools we use to make tradeoffs at this level.
20 Now, how John Bartlett makes his tradeoffs, I can't respond
21 to those. I participate in some of those discussions. It's
22 not as formalized as this by any means at this time. Robby
23 can tell you about how the M&Os look at systems tradeoffs and
24 what kind of containers are appropriate and should we have a
25 multi-purpose container or canister and how will that work in

1 the system. But, regardless of those decisions, there's
2 still a basic amount of work that needs to be done and I
3 believe including getting a ramp down to the repository
4 horizon.

5 So, that's how we focused this year's activities.

6 DR. CANTLON: Where does the M&O operate in this sort of
7 overall optimization?

8 MR. GERTZ: Okay. They have--I guess I don't have that
9 chart. But, first of all, for the work they do, they have
10 their own accounts. Much like USGS, they have their own
11 accounts. But, back to my other chart, they aid in the
12 analysis of all these results, aid in monthly meetings, aid
13 in helping suggest to us how the program should be focused.
14 I pointed out, it is a Federal decision, but the M&O provides
15 us the support, the backup, the analytic capability to
16 analyze variances, analyze priorities, provide those recom-
17 mendations to the Federal team and the Federal team makes the
18 decision.

19 So, for the work they do, be it level of effort
20 meaning people just doing activities and discrete work they
21 do producing a repository design, producing ESF design,
22 they're all in this system. Every dollar on the project is
23 in this system one way or another.

24 MR. BLANCHARD: Carl, put the viewgraph of the WBSL up.
25 There's a management account at the top line and the M&O

1 doing management and integration for us writes their work
2 scope, their milestones, or we write them in and accept them
3 and fund them.

4 MR. GERTZ: Coordination and planning.

5 MR. BLANCHARD: It's like 1.2.4.1, 1.2.3.1, that's
6 management and integration. We charge to that, the M&O
7 charges to that, and some of the TPOs may charge to some of
8 that.

9 MR. GERTZ: But, it's a fairly structured process
10 because our milestones and deliverables are laid out. It's
11 based essentially on the SCP and what we decided was--how we
12 were going to answer those questions in the SCP.

13 DR. CANTLON: All right. Well, we'll return here at
14 1:30 and continue the discussion.

15 (Whereupon, a luncheon recess was taken.)

16

17

18

19

20

21

22

23

24

25

1 Joe Sperry's observation that I've learned a lot I didn't
2 know before about this program in the last day and a half
3 here and I think probably one of the biggest things I've
4 learned is just how complex it is and how little I fully
5 appreciate all the various ramifications. But, with that
6 disclaimer, let me go forward and give you my very simple
7 observations.

8 My first is that a smaller tunnel than the 27 foot
9 currently contemplated would certainly be beneficial in many
10 respects: the first being cost; the second, scheduled produc-
11 tion; and, the third, safety. I think all those are major
12 concerns on my agenda.

13 The second is in the area of contracting practices,
14 management, however you'd like to classify it. If there is a
15 way that incentive contracts could be worked into any of
16 these construction contracts, in particular, since that's my
17 area, I know that you would be gratified by the results at
18 the end of the day.

19 The third is it's quite obvious to me that schedule
20 optimization is the key to this whole program. And, whatever
21 has to be done and needs to be done to improve on the
22 schedule of the work has to be probably the first criteria.

23 And, finally, the test area, I think it deserves a
24 very careful consideration to a reconfiguration of the test
25 area in order to use some kind of a tunnel boring machine to

1 excavate all those areas. The nine months currently contem-
2 plated to build, as I understand, 9600 feet of test area is
3 just not the best use of your funds.

4 Thank you.

5 DR. ALLEN: Okay. Next, Joe Sperry?

6 MR. SPERRY: Yeah, I just have a few points here. Some
7 of them are going to duplicate what Hugh said.

8 I suggest that you consider using a smaller tunnel
9 boring machine and to complete the loop without stopping.
10 That first loop down the north portal and across the reposi-
11 tory and up the south portal, do that without stopping, do it
12 as fast as possible. Compared to a 27-1/2 foot machine, an
13 18 foot machine is going to excavate 20 to 25% faster. Now,
14 we've heard some discussion about there's a lot more cutters
15 to change on a bigger machine and I'm convinced it's 20 to
16 25% faster.

17 That's without considering the other risks that are
18 involved with a larger tunnel boring machine. And, I don't
19 know if you want to look at risk, consider more rock support
20 as a risk, but you're going to have more support in the fault
21 zones. I don't personally think you're going to have a lot
22 of trouble with the fault zones, but they're going to take
23 more time to excavate the bigger tunnel you're in. Your
24 pattern rock support, I would recommend that you look at a
25 four bolt pattern in an 18 foot tunnel. I think you're

1 surely looking at a six bolt pattern for a 27-1/2 foot tun-
2 nel.

3 In addition, you run the risk of additional main-
4 tenance on the larger machine and I won't elaborate on that,
5 but we can discuss it some time if somebody wants to. As I
6 mentioned already, it's going to take more time to check the
7 cutters and to change the cutters. You are in a hard rock.
8 This is much different, as far as cutters go, down in the
9 Calico Hills. But, you're in a very hard rock and it's not a
10 short jointed rock. It's going to be hard to cut this rock
11 in the Topopah Springs.

12 Larger machine, the more risk of contamination you
13 have from spills. This is all the spills that you have; the
14 heat exchanger, water, the hydraulic fluid, the water in the
15 scrubber, all those are larger reservoirs, higher quantities.
16 If you spill, your quantity is larger.

17 You also have a schedule risk and you can--you
18 know, when things go wrong, it takes longer to correct them
19 on a bigger machine. It takes longer to assemble a bigger
20 machine, to move it around. Okay. So, to summarize that
21 one, I strongly suggest that you consider a small machine, an
22 18 foot machine.

23 We talked about rail haulage at some length yester-
24 day and I won't say much more about that. Just to reiterate,
25 use rack-rail haulage. It's done extensively. You have a

1 lot of experience in your M&O organization on rack-rail
2 haulage or knowledge of it and it's there. It's going to
3 simplify your life a lot.

4 A third point, minimize this ventilation. Now, I
5 have one set of calculations on the ventilation from UNR and
6 so I've been able to look at those and analyze those a little
7 bit. My idea on ventilation, what I would recommend to a
8 client is if you want to operate one tunnel boring machine
9 and one drill and shoot operation, I think at 600 feet per
10 minute ventilation velocity--which is what you're designing
11 the tunnel diameter for--I think you need a 17-1/2 foot
12 excavated tunnel. If you want to operate two tunnel boring
13 machines and one drill and shoot operation which I don't
14 think is necessary, but then you need a 19 foot tunnel. So,
15 I think you're somewhere around an 18 foot tunnel as a good,
16 economical, practical size.

17 And, there's a terrific risk here. It's the scien-
18 tific effort that's accomplished during this initial excava-
19 tion. And, I don't understand the scientific effort that's
20 required here and perhaps I haven't listened well enough.
21 But, anyhow, I understand that water sampling and fault
22 probing and putting in some instruments to measure the mois-
23 ture in the faults is necessary and I say fine. But, it
24 seems to me that should be a maximum of some fraction of a
25 delay per incident. I can't see that this should be a big

1 delay. And, by setting some ground rules like that, you'd
2 certainly minimize your risk.

3 I don't think there should be any delay for geo-
4 logic mapping. We haven't heard much about how extensively
5 that's going to be met. We map all our tunnels today, in
6 general. Maybe, I shouldn't say all, but generally when we
7 build a tunnel, we map it. And, this is a fraction of a
8 shift per week when the tunnel is going well. Maybe up to a
9 day per week, if it's going exceptionally well, but there
10 shouldn't be a lot involved. But, there again, I don't know
11 the level of mapping that you require. But, it shouldn't be
12 allowed to delay the excavation.

13 I think that you should redesign the main test
14 level for a mechanical excavation method. My suggestion
15 would be then you're going to procure a tunnel boring machine
16 and that's going to start pretty soon. While that tunnel
17 boring machine is being fabricated, I think you should be
18 designing your machine that's going to make your turnouts and
19 also excavate your main test level. Then, while you're
20 excavating with the tunnel boring machine, your loop, you
21 could procure that machine. And then, after that loop is
22 excavated, after that's complete, then put the machine in and
23 excavate your turnouts, your alcoves, and your main test
24 level. And, I assume that you'd do the main test level
25 first, but you need to design it and configure it for mech-

1 anical excavation before you can even talk to many people.
2 And, I hear some ideas around the room on how to do it. I
3 presented an idea. Jim Friant seems to have a better idea.
4 But, you know, get these ideas together. But, you have to
5 design what you want in that main test level. Then, make the
6 machine do the alcoves, the turnouts, and the main test
7 level.

8 It's a method of doing that. Maybe, you can take
9 the tunnel boring machine that does the first loop and make
10 some minor modifications. Maybe, you have to put some extra
11 hydraulics on it. Maybe, you have to put some vertical grip-
12 pers on it. But, it doesn't have to be a whole new machine.
13 It's just a method that you have to come up with. There's a
14 lot of talent in the group and I'm sure you can come up with
15 a great method to do it.

16 I guess the last thing I want to mention is this--
17 as you negotiate the award business of your contract and I'm
18 not the expert at that business, but it sounds to me like you
19 can have a lot of--I read just a little bit over lunch, the
20 RFP you put out. There could be a lot of contentious discus-
21 sions on trying to negotiate that award fee every time.

22 It seems like a disputes review board--you don't
23 have to get fancy with a board. It can be a one man thing if
24 you can both agree on the one person. But, that could help
25 you a lot and I would suggest that you consider a disputes

1 review board. The partnering, it seems to work. You should
2 also consider that. I feel more strongly about the disputes
3 board.

4 Thank you.

5 DR. ALLEN: Thanks.

6 The next, Bart Bartholomew.

7 DR. BARTHOLOMEW: Well, thank you, Clarence. I'm not
8 going to echo, I don't think, too much what my predecessors
9 have said; although my views, in part, are very similar to
10 theirs.

11 Regarding tunnel size, I'm really not going to
12 comment on it particularly except to say that I was surprised
13 at the size of the tunnel that's being proposed. Considering
14 the fact that this is essentially an access tunnel for
15 exploratory purposes, tunnels of 25, 27 to 31 foot in
16 diameter are very surprising to me. I heard the arguments on
17 both sides of the issue. No doubt that's going to be
18 resolved one way or another. It probably largely already has
19 been resolved. Nonetheless, I just would like to register my
20 comment that that does seem to be an excessive size for
21 exploration considering the budgetary restraints and other
22 problems that face you. Certainly, everything that Joe and
23 Hugh have said, I think, regarding tunnel size are true.
24 With a bigger machine, there is more risk of a main bearing
25 failure. It takes more time to change cutters. There's a

1 greater potential for delays for that reason. Certainly, the
2 tunnel is more difficult to support, and if you do have
3 trouble with any of the fault zones, it's just going to take
4 longer to get through. Having said that, I'll leave that
5 subject.

6 One primary concern that struck me was the one of
7 construction phasing. I understand the desire to develop the
8 test area just as rapidly as possible so that the scientific
9 tests can get underway. And, I understand the desire also of
10 the project to eliminate risk. I've got to say that purely
11 from a construction standpoint, I see great risk in the
12 concept of starting to mine the laterals, mine out the cross
13 passages concurrently with the main TBM excavation, com-
14 pleting the first loop. That just does not work very well.
15 There are many problems that ensue; particularly, when you
16 consider the fact that there may be shutdowns for scientific
17 tests mixed up with the conflicts that are inevitably going
18 to arise when you have a second major excavation operation
19 being fed into a heading that is actively in progress.

20 It seems to me in looking at the schedule that,
21 regardless of what machine size that you eventually choose,
22 that if you procure one machine--and I certainly subscribe to
23 the idea of going out and getting a machine underway just as
24 rapidly as possible, the concept and the plan of involving
25 the group that is eventually going to be the tunneling sub-

1 contractor in that procurement process at the earliest pos-
2 sible time. We certainly subscribe to that. That's all very
3 sound thinking.

4 Once that machine is underground, however, it would
5 be my view that everything that should be done that is pos-
6 sible to do to maximize the advance of that machine so that
7 that loop can be completed at the earliest possible date,
8 understanding that there is a need for certain scientific
9 tests, certain tests of opportunity that can only be done at
10 that time and certainly to the extent that those tests are
11 necessary, there will have to be shutdowns to accommodate
12 them. Even with those occurring and provided that they don't
13 turn out to be too expensive, it would seem to me that with
14 any reasonable size machine that it would be possible, if you
15 do not hinder the operation, slow down the operation by
16 starting anything else of a major excavation nature back
17 behind the machine until the machine has completed the loop,
18 it would be possible to mine out the loop in about a year.
19 Now, that would be predicated. It would take advance rates
20 of somewhere--an average rate on a five day week of something
21 like 100 feet a day which I do not think would be an unrea-
22 sonable expectation in the kind of ground that you apparently
23 are in.

24 My view, once that point is reached and that
25 machine pulls through, is somewhat different than my col-

1 leagues. I would think that the thing to do at that point
2 would be to utilize that machine, particularly if it were not
3 an unreasonably large size, for the access to the Calico
4 Hills formation and to count on procuring a separate indepen-
5 dent piece of equipment to mine the laterals in the Topopah
6 Hills formation and to mine out the chambers for testing.
7 You'll have about a year after the first machine goes under-
8 ground to perfect the design and to obtain a properly
9 designed TBM, which I would lean to.

10 From what I've heard from several persons the last
11 couple of days, I think it certainly would be feasible to
12 develop a short main beam machine that would have the capa-
13 bility of making the right angle turns much more readily than
14 a standard TBM. To procure the machine with that in mind,
15 that second machine would then do the 9600 feet of lateral
16 tunnels and chambers. Certainly, concentrating on the test
17 area first and then moving down to the other two chambers.
18 The machine could then eventually be used for that same
19 purpose in the Calico Hills formation or it probably could be
20 done by a road header, as well. But, the machine would be on
21 hand and would be a natural thing to me to use it for that
22 purpose, as well.

23 I, thus, would visualize one TBM operation until
24 the loop is completed. Then, starting the second TBM opera-
25 tion to the Calico Hills formation, but through a separate

1 portal. And, I thought that the idea that Joe presented
2 yesterday had a lot of merit. It would have to be modified,
3 I understand, for the scientific reason that you want to have
4 the footprint of the alignment of the lower tunnel directly
5 beneath the upper one. And, my belief is that that alignment
6 could be adjusted so that would be achieved. And, also, the
7 other objection where it completes the loop coming back in to
8 the main drift from the Topopah Hills formation, that could
9 be altered so that that intersection of completing the loop
10 in the lower tunnel is back up in the ramp area for the upper
11 tunnel.

12 So, what you would have is that the second main
13 ramp excavation for the TBM would be occurring at the same
14 time that the specially adapted machine is operating in the
15 upper formation with the lateral tunnels and the chambers for
16 the tests. I think it clear that the configuration of those
17 laterals and the test chamber will have to be given thought
18 and undoubtedly designed to accommodate what can be accomp-
19 lished with a short radius TBM. The configuration that
20 appears now apparently is a very old one that was visualized
21 to be what might be required if access was by shafts. I
22 understand that there's a lot of flexibility in how that
23 could be done and there is time, of course, to make those
24 studies and to get that configuration laid out that would fit
25 a TBM operation.

1 With the modified TBM doing the 9600 feet of
2 laterals, even though you do not start it until some seven
3 months later than your present schedule indicates that those
4 laterals would start, with the faster capability of doing the
5 laterals and the chambers, you would complete all of the
6 excavation work necessary for the scientific excavations at
7 about the same time or perhaps a little bit earlier, actu-
8 ally, than what you show in your schedule now in my view.

9 Finally, with regard to contracting arrangements
10 and commercial terms, I'd simply like to reiterate on my
11 earlier expressed view that certainly, although contractors I
12 think tend to often prefer fixed price contracts, I think
13 they feel that generally where the scope can be identified
14 that that's the greatest opportunity they have to do their
15 thing. But, clearly, in this case, the work is going to have
16 to be done under some form of a reimbursable cost contract.
17 No question about it.

18 I would prefer to see you find some way--and, I'll
19 just characterize it that way--to find some way to create
20 within the cost reimbursable framework a mechanism where you
21 really provide a goals oriented incentive to the contractor
22 that can be measured in terms of reaching a certain objective
23 by a certain date and achieving it at a certain cost level
24 based on mutually agreed estimates with the participation and
25 overruns and underruns in that estimate that would benefit

1 the contractor or that could penalize him to some extent in
2 the event that his performance did not come up to expecta-
3 tions. Broadly speaking, I think that would summarize my
4 view on the subject.

5 One last thing I just thought of. I do subscribe
6 to the rail concept. I think that certainly from the stand-
7 point of mining operations, safety, lack of interference,
8 control, that a properly designed rail access system, even
9 though you're using conveyors for muck disposal, would be
10 much superior. And, I would think also that it would have a
11 very marked advantage or the ability to safely regulate and
12 control traffic in the underground work during the scientific
13 investigation phase.

14 That summarizes my view.

15 DR. ALLEN: Thank you, Bart.

16 And, finally, Bob Matyas.

17 MR. MATYAS: I'd like to share with you my own observa-
18 tions of the last two days in the management systems area.

19 As I said earlier today, I'm positively impressed
20 with the amount of talent that's on this project. I'm
21 pleased to hear that you've got effective management tools in
22 place. But, I'd like to offer you some suggestions or chal-
23 lenge you.

24 I think that you ought to consider examining the
25 very complex management matrix that exists here. Not unlike

1 the General Motors organization that's going through at the
2 moment, I think it might be a good exercise, whatever the
3 result, if for no other reason, to give you a cleaner per-
4 spective on it and perhaps relieve undue anxieties in your
5 day-to-day work. For example, I'd like to see the DOE assume
6 the role, which I've seen them in earlier days when they were
7 called AEC, wherein they collected, they sorted information,
8 scientific data on the facility, and they did one thing very
9 important; they took all these data and they converged them
10 and then they flowed them to an M&O. The M&O then goes out
11 and has the work executed from both a design and a construc-
12 tion point of view.

13 To the M&O, I would urge you to delegate authority
14 to the lowest possible level. I also suggest, because of the
15 complexity of this situation and just the history of it, an
16 M&O might want to look into, if you don't already have some-
17 thing, kind of an executive review board that serves manage-
18 ment on a continuous basis. The M&O, of course, executes
19 through the construction group, REECo and their subcon-
20 tractors.

21 On the matter of contracting, I believe that there
22 are some contracting practices that were developed in the
23 70's and the 80's by the USNCTT. It's a tunneling technology
24 committee of the National Academy. There's some excellent
25 contracting practices that are given in a group of publica-

1 tions. I suggest to you at least look at them and see if
2 there's an opportunity to refresh your contract; not just the
3 contract that you're about to release, but other acquisition
4 devices and strategies. I believe if you at least go through
5 these exercises, if only intellectually, that you may have a
6 yield in less absorption of critical budget dollars into
7 indirect areas, releasing more of it for the main mission of
8 this project, the scientific mission.

9 And, another thing occurs with a large, complex,
10 almost arthritic system--I don't mean that you're arthritic,
11 you're still working and producing--but, there's a creep that
12 kind of builds into the time for execution of things. The
13 things I've heard in the last two days are on the longer
14 exaggerated side of what I have experienced it takes to do
15 underground construction. I think you're on the high end of
16 the number of weeks and months it takes to do some of these
17 things. Now, given I'm not at all knowledgeable about the
18 constraints and various parameters you have to deal with, but
19 for what it's worth, that's my observations.

20 Thank you.

21 DR. ALLEN: Thank you, Bob.

22 And, now, Ed, if you'd be willing to sort of sum-
23 marize for the sub-panel.

24 DR. CORDING: I was going to talk about my background in
25 instrumentation, couldn't handle it. Mechanical engineering,

1 and that's another interface that's very important, we find
2 that the geotechnical part of the project and the mechanical
3 engineering of the machines and all, put those together right
4 and you might be able to do the project right, but you also
5 are always predicting what's going to happen. And, so being
6 able to be on projects over the years where you see the
7 results of your predictions is a very humbling experience.
8 As a graduate student, I started out wondering why all these
9 people couldn't figure out what the problem was and get it
10 done right and realized that it's easy to look at things
11 after the fact.

12 So, underground construction to me is a fascinating
13 area and we see so many things underground that are not--in
14 fact, I think almost without exception, we find things under-
15 ground that we did not anticipate. Some of them may be major
16 problems; in other cases, they're relatively minor. But, we
17 do see something different. And, the Ghost Dance Fault,
18 we've all got a view of what that's going to look like. It's
19 going to be somewhat different. No matter what view you
20 have, it won't be quite the same underground. So, that's one
21 of the reasons we, as a Board, have been concerned about
22 getting underground early and seeing what's there and
23 improving the models and being able to understand how the
24 parameters that we see underground fit into the models and
25 the testing that needs to be done to understand it gets done.

1 A lot of it, I think, is a matter of getting down there and
2 looking and then we note that there are some high priority
3 tests and the heater tests have become of even more impor-
4 tance than they were several years ago in terms of finding
5 out what's going on underground--excuse me, finding out what
6 the behavior is under the thermal conditions that could exist
7 in the future.

8 So, I see that as somewhat of a--there's some
9 change in emphasis here as to what high priorities may be in
10 an exploration underground. And, one item, I would say, is
11 that there needs to be some continued work in defining some
12 of those objectives. I think that is leaving up in the air
13 at this point some of the directions that one goes in, in
14 terms of, almost literally, the direction you go and in terms
15 of; where do you start the first cross drifts, and where do
16 you go in to find out the information? Do you go for the
17 heater tests as a prime priority or are you looking to get
18 across certain faults?

19 We are very supportive of the effort to obtain
20 early access to the underground. We think that the schedule
21 you're on presently, you couldn't improve on that much in
22 terms of bringing it up much shorter. It seems like that
23 you're moving as rapidly as you can to the point of getting a
24 tunnel boring machine in place and we are much in favor of
25 that and supportive of it.

1 We are concerned, as we have discussed, about size
2 of the machine and our own review of it would say that the
3 possibility of being able to use rail, particularly the
4 possibility--well, certainly, we think the ventilation
5 requirements are such that even with more than one heading
6 operating, that you could handle it with a smaller diameter
7 tunnel. Certainly, though, the opportunity to get through
8 the facility initially with a TBM and then come back in and
9 do other work would even further reduce ventilation require-
10 ments.

11 I think my perspective, as I was going to start to
12 say about instrumentation, it has my whole research technical
13 life, educational, the work I've done at the university has
14 been focused, a lot of it, on testing and exploration under-
15 ground and we've done a lot of measurements and so we are
16 always dealing with this interaction between the construction
17 and the instrumentation. In some projects, we cannot stop
18 the machines and we simply get targets of opportunity. In
19 other cases, we have projects where we specified certain
20 amounts of delays to be able to go in and do certain pieces
21 of work. In other cases, we can work around it or put in
22 instruments before we get there. And, so I recognize that
23 interface is a very important point and certainly the science
24 and getting the information is a key thing.

25 I do agree, however, that I think we're going to

1 get the science in the most efficient way if we can get
2 through the facility and establish the second portal. Get
3 the second portal in place and then the people can go down
4 and do the work as you free up areas of the project, so that
5 they can get into it. You'll free up those areas and you can
6 basically turn them over to them and at least make it access-
7 ible to the testers and not just to a few people coming down
8 in the accompaniment of the miners because you're in a mining
9 environment.

10 It would seem to me that one of the possibilities
11 is to come through the facility. As you come out the south
12 portal, getting through this perhaps in a period of a year,
13 stopping as you need to with a careful program worked out
14 with the science to find out what is there in terms of these
15 targets of opportunity, making that efficient so that the
16 project can get through. In some areas, coming back and even
17 putting in later perhaps even side drifts into an area where
18 you want to find out more about what happened to that water
19 back into the rock or put in more drill holes and things like
20 that.

21 But, the point I was making was that as you get
22 through and get through the south portal, as you come back,
23 one possibility then is you come back against your lifeline
24 and against the conveyor line and the support from the north
25 portal, collapse that back, and as you do that, bring in

1 perhaps the machines that can do the side drifts, and then to
2 turn those over to the other experimenters. Perhaps, Alcove
3 8 could be on the south side of the repository. I'm not sure
4 of exactly what your requirements are on that, but certainly
5 you want to be in the Topopah Springs. But, that could be
6 one of the early ones and that becomes a site for some exper-
7 imental heater tests just outside the repository boundary.
8 Coming back and perhaps the next priority is the main test
9 level and moving in there and doing that.

10 I agree with the idea that's been expressed by the
11 consultants of organizing the layout for tunnel boring
12 machine construction. Certainly, a lot of the drifts that
13 are laid out for shops and storage and those sorts of things
14 can be modified. It may be that you have to have other
15 systems to flatten the invert and to make some cross drifts.
16 Perhaps some drill and blast would be appropriate there.

17 I do think that one point that is of importance to
18 me in terms of my interest in rock mechanics and some of the
19 testing that would be done in the heater test is that I would
20 much prefer to see a TBM mined excavation for the heater test
21 than one that's drilled and blasted because I think you're
22 going to see much different behavior in the first few feet of
23 the rock if you're in a TBM type shaped and excavated opening
24 than if you had a more irregularly shaped drilled and blasted
25 excavation. So, some of the priority test areas, we're

1 trying to understand the characteristics of rock for future
2 repository, if it is licensed, that would have much of it
3 mechanically mined. Then, it would seem appropriate to do
4 that to have that opportunity in that main test level to do
5 that type of work against the TBM mined excavation perimeter.

6 We've talked about the size issue. From reviewing
7 the size, it would seem that using rail for the operations of
8 the facility, as well as the support of the TBM operation,
9 that you have an ability to move men and material in and out
10 of the facility in a way that's even safer than putting in
11 the wide roadways. And then, in addition, we've talked about
12 ventilation. It seems that many of the things that we've
13 heard about the requirements for the ESF, one could look at a
14 smaller opening for that. We are interested again in seeing
15 the project getting started.

16 For some time now, you've been talking about the 25
17 foot size and now it's gone up to the 27-1/2 to even to 31.
18 There is a big difference even between--as you go from 18 to
19 25, certainly that's a jump. But, going from 25 to 31 is
20 another significant jump, as well. And, I think that one
21 needs to look at being as efficient as possible in terms of
22 the size of this opening. In regard to fitting this opening
23 into the future repository, you're trying to put it in a
24 location that the future repository will be. It seems to me
25 that you could look at over-excavation if one needed to to

1 enlarge. I know that can be difficult to do, but there are
2 techniques available to do that. If we're talking about a
3 matter of a few foot difference where things could--not much,
4 but with one or two feet, you could accomplish many other
5 objectives and then you look at the larger size.

6 I think that the key thing at this point is to make
7 sure that we do get the project started, that it can go
8 forward, and the tunnel boring--to me, the size is not the
9 crucial overriding issue to the entire project. It's getting
10 the project started with good equipment and a proper approach
11 to the construction. But, it's something that we are con-
12 cerned with.

13 Those are the primary comments that I had and there
14 will be other things that Board members will be wanting to
15 discuss, I'm sure, later.

16 DR. ALLEN: Okay. Thanks, Ed.

17 I'd like now to turn it open to everyone and any-
18 one, but let's start with Bill Simecka.

19 DR. SIMECKA: Well, first of all, I would like to
20 express my appreciation for having these discussions. I
21 think that I've learned a lot and it will affect what we take
22 a look at. And, so I am very appreciative and certainly the
23 door is open for anybody else that would like to call and
24 offer new ideas and concepts because we will use them if,
25 indeed, we can.

1 First and next, I would say that contrary to a view
2 expressed yesterday, I've been viewing this ESF as truly an
3 R&D laboratory. And, it may not be a laboratory that you can
4 push things to destruction every place you want to do that,
5 but I think within the block and the MTL we will have oppor-
6 tunity to do that. So, because we've accelerated ESF, I
7 believe that we ought to make this our basic scientific
8 laboratory and hope that we can conduct the necessary tests
9 in the MTL.

10 To that extent, I believe we've got to provide as
11 much flexibility as we can in the laboratory because I am not
12 sure what we're going to be asked to do. And, the thing that
13 I am most concerned about is to incur a major delay because
14 the science tells us that we have to do something that I'm no
15 longer able to support without waiting for something else to
16 get done. So, I understand the reasons why a large diameter
17 may be less cost effective, more risk, and et cetera, but I
18 believe we ought to be very careful that we don't build a box
19 for ourselves.

20 We will re-examine the ventilation requirements
21 because, as you saw yesterday, the ventilation requirements
22 are based on some assumptions. And, there were a lot of
23 diesel-powered equipment in there. I'm going back to look at
24 those assumptions to make sure that they truly do demand
25 something in the 25 plus category.

1 Now, we have not settled on a rubber-tired set of
2 vehicles. That was used as an input to the ventilation
3 thing, but we have not settled on that nor have we settled on
4 diesel-powered vehicles. There's an issue on diesel-powered
5 vehicles that have to do with hydrocarbons and how it might
6 pollute the underground. And, so we're not sure we're going
7 to be allowed to use diesel-powered. And, further, I am very
8 interested in the rail approach. We will look at the rail
9 transport because of all the reasons that were brought up,
10 safety being one of them. Also, transporting equipment into
11 that 6.5% down ramp. Maybe rail is a better way to go going
12 down there. I don't know, but we will look at that.

13 Further, we fully intend to use mechanical excava-
14 tion wherever and whenever we can because--for a lot of the
15 reasons that were discussed, I agree with those. As a result
16 of needs for expediency, maybe we'll use some drill and
17 blast. If we are allowed to reconfigure the test area to
18 make use of mechanical excavation, of course, we will do
19 that. If it's a complicated test that doesn't lend itself to
20 mechanical excavation or it takes too long for a machine to
21 be made available, we will go ahead with drill and blast
22 because we need to get these tests done.

23 Now, we didn't get to talk about it yesterday, but
24 there is some new technology that the Colorado School of
25 Mines has been pursuing on a five inch cutter. And, it turns

1 out that five inch cutter reduces the thrust requirement per
2 cutter significantly for this hard rock. So, this lends
3 itself to--well, the reason it's being worked on is for
4 drilling, but those same cutters might be useful to us in
5 making road headers much more capable or mobile miners much
6 more capable for hard rock and we will be looking at those
7 because those may be able to be used for these alcoves and et
8 cetera. But, that's something we didn't get to talk about,
9 but it looks very promising.

10 And, finally, in response to John's statement about
11 sub-optimization, I can't leave without mentioning this. In
12 my view, we have been sub-optimizing on this project and the
13 basis for that view are two statements. Site suitability is
14 not system suitability and site suitability is not indepen-
15 dent of system suitability. And, therefore, we can't prove
16 site suitability before we've proved system suitability.
17 They must go together. And, the reason for that is it--the
18 emplacement of the waste significantly alters the ambient
19 environment. So, it doesn't do a hell of a lot of good to
20 examine the ambient environment if you know that ambient
21 environment is going to be altered significantly. So, there-
22 fore, I think we must give equal priority, equal vigor sup-
23 porting those things that we know will cause an alteration to
24 the environment and examine the performance of that. That's
25 why the heater test is so critical. I believe the thermal

1 loading option decision is super-critical for this project
2 because it has tremendous ramifications on cost reductions or
3 increased cost, depending on which way you go, for the repos-
4 itory design and construction and operation. So, I think we
5 are--to answer the question about sub-optimization, I feel we
6 are doing this and I encourage all of us to begin thinking
7 from an overall system standpoint and not just in the sub-
8 optimization areas.

9 Thank you very much for allowing me to summarize my
10 views.

11 DR. ALLEN: Let me ask if there are other of the key
12 participants, first of all, who would like to make some
13 comments or questions. Tom, you raised your hand first, but
14 --okay.

15 MR. GERTZ: I do, but I prefer to summarize at the end.
16 So, just don't let me out at the end.

17 DR. ALLEN: Okay.

18 Okay, Tom?

19 MR. STATTON: Yeah, I had just a couple of things sort
20 of sitting around after yesterday. As we talked over the
21 lunch break, I felt like for a while yesterday we gave every-
22 body a knob on the radio and somebody had the knob that was
23 the AM/FM button and somebody had the gross tuning knob and
24 somebody had the volume and the fine tuning knob. And, for a
25 while there, I wasn't clear we were getting a radio station

1 that we could listen to and I thought maybe part of the
2 message that we tried to convey didn't get across.

3 I, too, come from a little bit different back-
4 ground, Ed, where my focus is more on building things and my
5 charter here is not that. And, I want to make sure, while
6 I'm speaking for a softer part of the community, while I'm
7 speaking for maybe the softer sciences here not necessarily
8 focused on construction, that we not sort of lose sight of
9 where we are. I know I tried that a couple of times yester-
10 day.

11 But, by and large, we sort of plan our work and
12 then we work our plan. And, we have an elaborate plan for an
13 underground facility and for an underground testing program.
14 We probably had, at the time that was constructed, every
15 test known to man somehow organized and thought out and
16 partitioned into what one might do in a maximum diet
17 underground. Because of our costing considerations, we have
18 to cost all that stuff. So, rather than saying what is the
19 maximum one could ever think about doing, that maximum
20 becomes the plan because the plan has to go into a cost
21 control system. So, the sequencing of that plan necessarily
22 wasn't worked out in the finest of details.

23 We're not working that plan, per se. We're looking
24 at a '93 that's a very different '93 than the way that plan
25 was initially conceived of and laid out. I think we've added

1 a phase to what the ESF is all about and that phase, I think,
2 is not inconsistent with some of the remarks we heard this
3 morning that an upper loop be constructed that provide this
4 sanity check on our understanding on the model of that
5 mountain. You know, we're not just telling the mountain to
6 turn its head and cough, we're crawling down the tonsils of
7 that turkey to find out what the inner workings look like.

8 First off, we need to sort of get our bearings and
9 say does the model we've conceived of have any truth in what
10 it is I'm looking at and I think our '93 plan suggests that
11 that's the way we're headed here. That, in fact, the idea is
12 to slow down the progress of that upper loop to the minimum
13 degree possible. There are clearly, as we talked about, a
14 couple of reasons one might need to stop, but by and large,
15 the program that we've laid out said we don't want to stop
16 either. The first thing we want to do is to take our little
17 walk in the woods and say what I see looks like what I
18 expected or looks like something within the bounds of what I
19 expected. So, I think the '93 plan, while it's not different
20 than our original elaborate plan, it is a subset and sort of
21 a Phase I that's identified and I believe it's consistent
22 with what the advice of the consultants have been.

23 I guess the only other thought that sort of came to
24 mind was we need to remember that this is an investigative
25 program and there are some peculiar things about an investi-

1 gative program as opposed to a prescriptive program. When
2 I'm constructing a vehicle and I'm watching it work down an
3 assembly line, I can count four tires and I can count seats
4 and I can see it has an engine and has a steering wheel, and
5 when I get to the end, I've got an automobile.

6 Here, we're working down an assembly line and we
7 don't know whether we're putting tires on or wings on. We're
8 not quite sure whether it's a railed vehicle or a boat and we
9 need to be prepared for the kind of surprises you were talk-
10 ing about; that things don't look exactly as one might have
11 anticipated. And, I think in large part there what that says
12 is that planning in greater detail in the testing community
13 than what we're talking about for the walk-through in the
14 upper loop probably isn't appropriate right now. That what
15 we need to be doing is sequencing the plan that we've written
16 before in accordance with observations.

17 And, maybe that's a rather non-theoretical
18 approach, but observationally I think some of the simple
19 things need to get done first before we get into an elaborate
20 sequencing of either test layout, test plan, or whatever.
21 And, I think that the testing community, by and large, has
22 taken that approach. I believe it has its act together in
23 understanding how to sequence our first walk through the
24 mountain and I didn't want to leave the impression that we
25 have left some of those details from being laid out on the

1 table accidentally because there are some that, in fact, are
2 left out on purpose up until we get our little walk-through.

3 DR. ALLEN: Okay. Thank you.

4 Jim, did you have some comments?

5 MR. FRIANT: I guess I have an advantage here in that I
6 had all these other opinions expressed, all of which overlap
7 mine, but not every one the same.

8 But, at any rate, just to conclude, I'm glad to
9 hear people pushing about a loop which goes all the way
10 through with a minimum amount of stoppage. However, I'm also
11 sensitive to the importance of conducting those studies and
12 also that the people running this program are faced with an
13 unstable budget that could be renewed every year. So, for
14 all I know, by the time this tunnel boring machine hits the
15 bottom of the north slope, it will be decided that there's
16 not enough money to do anything except throw up a quick raise
17 for a second egress and begin to develop this test area. So,
18 I think this idea of flexibility is really required.

19 I certainly agree with this idea of having suffi-
20 cient size and sufficient ventilation to not work yourself
21 into a box. I saw that ventilation study yesterday and
22 commented to John. There's a picture shown of this 27 foot
23 tunnel boring machine going up this 4.7 slope plus and 44,000
24 FCFM to that machine. Now, if I'm backfilling this tunnel
25 and I have a dirt road, I have--with 44,000 FCFM divided by

1 125 per horsepower, I'm only allowed 360 horsepower to supply
2 that machine with, what, one truck or so up this steep hill
3 and, frankly, that can't be done.

4 So, there's two ways to get better ventilation.
5 One, make the tunnel bigger, but two, also think about ways
6 of conserving the requirement for the air. And, again, a
7 large percentage of the cross section of the tunnel is taken
8 out by filling the invert and the ducts that we're going to
9 need for return, two 88 inch ducts. So, if I replace that
10 bottom with just kind of a low trestle, I get a considerable
11 amount more area to pass air. I'm not emotionally involved
12 either way with the size of the TBM, but I'd sure like to see
13 that some flexibility is kept.

14 I am a real proponent, I must admit, of rail.
15 First of all, the tunnel stuff coming off the belt is lousy
16 backfill. You can imagine wheeled vehicles driving on that,
17 the amount of dust that that would stir up with 400 or 500
18 feet a minute in the tunnel, and 25% quartz material that
19 we're throwing around in the air just doesn't sound feasible.
20 So, that means you're going to have to pave that and you're
21 going to have to do it right behind a TBM. I've never seen
22 that done, but we have proposed it--oh, sorry about that.
23 I'm a graduate of the Robbins Company, class of '91. So, we
24 never did it, but we did propose it and that requires a
25 large, large bridge for this concrete or whatever paving is

1 being put down to be put down and then cure before anything
2 can run on it. So, it makes a whale of a difference in the
3 backup system.

4 Mechanical excavation of the test area, a couple of
5 people have said that that is favorable and I agree. And,
6 again, that's another means of preserving or conserving
7 ventilation requirements. There's short stubby TBMs that
8 have been mentioned and mobile miners. And, you know, that
9 our WIPP Program, by the way, invested in getting a tunnel
10 boring machine just to do 300 feet of tunnel to do the heater
11 studies on for the reasons that were brought up here. Prob-
12 ably, the most expensive per foot tunnel ever built.

13 So, that pretty much concludes except I'd like to
14 show you a couple of lines of data since this five inch
15 cutter was brought up. Everybody would like, I think, to be
16 able to take mobile miners or road headers and get into that
17 test area. I can show you that it looks kind of feasible at
18 this point.

19 Take a look at the second bunch of data down where
20 the spacing is an inch and a half in that range and you'll
21 see--this shows that to get a tenth of an inch penetration on
22 that small cutter was only around 8,000 pounds of force. Our
23 computer program estimated that it would be 20,000 pounds and
24 we were delighted to see that the effect of a small cutter is
25 really outstanding. We did some testing for HDRK up in

1 Canada. They have an Eimco with a four foot head on it and
2 we will be putting these cutters on that and we're also going
3 to do some endurance testing on it with an independent
4 driller that we're working on a bid for right now. So, we're
5 very excited.

6 Now, this really came from Uel's group and problem
7 in order to be able to bore more rapidly collecting core and
8 reaming the hole up at the site. This is just a real crude
9 depiction and a real design is almost done. In our next
10 phase, we will build and test. But, it uses the mini-cut-
11 ters. Now, again, that one-tenth of an inch penetration at
12 65rpm means we--I want to back off there. There was one that
13 was 075. It was about 8,000 pounds. That equates to 45 feet
14 an hour on a 60rpm drill. And, if we put six cutters at
15 8,000 pounds apiece, we've got enough weight to do that. So,
16 this gizmo will pick up the core that's being cut, will ream
17 this in one operation. We will blow air down this way and
18 suck the material up this way, bringing out the cuttings.
19 And, bring out the core with a wire line, so that that bit
20 can stay at the face and never have to be pulled. And, these
21 cutters will both cut core and ream in one step. So, we're
22 really excited about that.

23 DR. ALLEN: Okay. Thank you.

24 Ray, you've had your hand up for a while.

25 MR. BULLOCK: This is to set one thing straight. There

1 was several remarks made about using mechanical excavation in
2 the main test level. By the way, this was baseline in the
3 project. Title I ended with a mobile miner type machine
4 excavating the MTL and this was still baseline in the pro-
5 ject. So, they have thought about that before.

6 Secondly, if DOE and the project does decide to go
7 straight through the mountain with the U-shape excavation, it
8 makes Busted Buttes all that more important because that
9 heater test has got to get started.

10 Thank you.

11 MR. SMITH: Dr. Bartholomew really covered very well, I
12 think, in detail what should be done and what should be done
13 as far as tunnel boring size and optimization of the machine.
14 But, there are a couple of things I'd like to just
15 reiterate. It's the interferences in tunnels, they're
16 external to your testing. Drill and shoot interference, as
17 far as the conveyor belt operation to the high voltage
18 cables, the conveyor, add significant delays. So, the
19 concept of moving forward as rapidly as possible is, I feel,
20 the best program.

21 The optimization of the tunnel boring machine in
22 terms of bearing longevity and performance, I would say about
23 10 years ago in an equivalent length tunnel, it would have
24 been more beneficial for the contractor to have run with two
25 tunnel boring machines. The Calavaras (phonetic) Tunnel

1 which was done in '85 which is a Robbins tunnel machine was
2 one of the first of the Long Beach tunnels. It was a large
3 diameter machine with a very large bearing. So, in this
4 case, it optimized; the machine performance is optimized to
5 reach out into the last part of the job where the bearing
6 reaches a critical point. Other components of the machine
7 are reaching, you know, maxing out.

8 The very conditions on the tunnel boring machine--I
9 was kind of equating this at lunch today. We go out on a
10 cruise liner and we go out there and we have lunch, we look
11 at the ocean. A tunnel boring machine is really like going
12 around Cape Horn. It's a world that is just--where you're
13 faced with--your machinery is taken practically failure on a
14 day-to-day basis based upon the thrust pressures and the
15 performance, you know, the activity that goes on mechanically
16 with the machine. So, I feel that the optimization of size
17 is very, very important within this realm of 18, 20, 25 feet.

18 The other thing that came up was in terms of design
19 for the machine. For example, the curve radius. It's very
20 important to identify as to the performance of the machine.
21 For example, in Chicago, there was a 19 foot machine. She
22 was handling a 210 foot radius turn which worked out
23 extremely well. The first turn was a 90 degree. The tunnel
24 machine went out 6,000 feet. The next turn was 90 degrees
25 and it accommodated the system. You will be employing a

1 conveyor system. So, it would be much more efficient to have
2 your conveyed system and your curve radius be in balance.
3 So, that's an aspect of future design.

4 In the middle 70's inside a mountain for--it was a
5 hydrologic project headed by Duke Power. Everything was done
6 inside the mountain. So, the machine would back up, do
7 another corner, and then they'd move her up to another level.
8 So, you know, this concept has been done quite often. In
9 Chicago, the same problem. We have a 30 foot diameter tun-
10 nel, but our 10 foot machine is up in the crown. We in two
11 occasions are going to have to raise--after the tunnel is
12 completed, raise our 10 foot machine, the starter, in the
13 crown of the 30 foot tunnel. And, this has been done by
14 Healey on another project down there.

15 So, these are all--they're not state-of-the-art.
16 These are things that happen on a day-to-day basis. And,
17 we're in an industry that does a billion dollars worth of
18 activity a year and, hopefully, that in this managerial team
19 you've put together--for example, your M&O, Morrison-Knudsen,
20 has been a pioneer in this business and I just hope that you
21 don't kind of restrict the experience level of the contractor
22 because the need is to do the job in their manner and get it
23 finished.

24 Thank you.

25 DR. ALLEN: Thanks.

1 Yes, Larry Hayes?

2 MR. HAYES: Yucca Mountain is not isolated from the
3 surrounding earth/science environment. There are a lot of
4 issues that, going underground at the potential repository,
5 issues that won't be answered. For example, volcanism, steep
6 hydrolic gradient, mineral resources, groundwater travel
7 time, a number of other issues that we have to answer in
8 order to characterize this site.

9 I think that the majority of the scientific com-
10 munity supports getting underground, getting underground as
11 quickly as possible. But, we don't want to do that at the
12 cost of failing in our other activities. I ask the Board to
13 consider the more Carl is pressed to get underground, the
14 more he's pressed on schedules in a limited budget environ-
15 ment, the less he has left for these other studies. I know
16 you're working very hard, Carl, to come up with a balance and
17 somehow you have, so far.

18 My concern is this constant pressure to get under-
19 ground, it seems a constant emphasis that underground is
20 going to give us most, if not all, of our answers. That's
21 very much of a worry to me because the underground facility,
22 what we learn there, is only part of what we need to do and
23 somehow Carl is given the task of funding everything without
24 the funding he needs. I just ask that the Board consider
25 what it may cost in other areas when you continually press to

1 get underground, get underground quickly, and so forth.

2 Thank you.

3 DR. ALLEN: Thank you.

4 Yes?

5 MR. PETERS: I appreciate that if we take apparently the
6 Board's recommendation that we go all the way through the
7 mountain before opening up any of the other areas that this
8 opens up a lot of different avenues for study, but our
9 approach was that we need to get into do such tests as the
10 heater test and those as rapidly as possible. I believe if
11 we go all the way through, we are extending that schedule.

12 And, I believe to do that, my estimates yesterday
13 may have been quite conservative in the 25% leakages and the
14 number of diesel units. But, to the area of flexibility, I
15 think we would limit ourselves if we take away the flexi-
16 bility of being able to drill and blast, to use diesel equip-
17 ment until we have truly identified other viable means to do
18 these things. Well, basically, I think we're dealing with a
19 question of flexibility and we talked a lot about risk. I
20 think that maintaining the flexibility to change schedules,
21 to change types of equipment is one way of considering
22 reducing risk.

23 DR. ALLEN: Thank you.

24 Steve Frishman?

25 MR. FRISHMAN: I'd like to make a fairly simple obser-

1 vation. There are a lot of things that I guess I'd be inter-
2 ested in talking about, but I don't feel sufficiently com-
3 pelled to right now.

4 The last couple of days has been mostly talk of how
5 to build the underground facility. What I hear at least from
6 some of the Board members and staff is still considerable
7 concern about what the underground facility is, what to build
8 as opposed to how to build. And, I'd like to go back even
9 one more step and maybe just issue a reminder that the real
10 case that we're still facing is why we're building anything.
11 And, Carl, yesterday I think faced that question and his
12 answer was partly because the Board had said get underground,
13 partly because the Congress said get underground. Well, the
14 real reason that you're even doing this is because it is part
15 of site characterization and a part and a part of site char-
16 acterization that is required for licensing if you're going
17 to go to licensing. It's also required if you don't make a
18 suitability determination from the surface, you may have to
19 go underground to begin evaluations.

20 Now, throughout its history, I think the Board has
21 been building a more and more firm position and we heard it
22 just as recently as about 20 minutes ago from Ed, that you
23 must get underground and get underground quickly to get a
24 handle on site suitability parameters and how these para-
25 meters affect some of the fundamental models. Now, what are

1 these parameters you're talking about? You're talking about
2 things such as the nature and character of fault zones.
3 Things such as how water travels through the fractures, as
4 well as through the matrix of the rock. And, on and on.
5 There are a lot of fundamental characteristics of the site,
6 many of which are at least partially and in some cases may be
7 sufficiently observable from the surface.

8 Now, if you go and look at the approach that Russ
9 took yesterday with his integrated test evaluation model,
10 what you see is a prioritization of tests that speaks primar-
11 ily to most of the characteristics and parameters that can be
12 investigated at least to some extent from a surface-base
13 program and maybe to a sufficient extent.

14 Now, what I'd like to point out is that the Board
15 throughout time has laid out maybe not in great detail, but
16 at least sufficiently I think for us to understand why you
17 think getting underground very rapidly is an extremely high
18 priority, and my thinking is following up somewhat on what
19 Larry Hayes was talking about. You have laid out in very
20 general terms why you think getting underground is very
21 important and important ultimately to an early site suit-
22 ability evaluation in an effort to at least maybe do a con-
23 demnation type survey.

24 Well, what I would submit to you is looking at the
25 approach Russ took yesterday, which I think we have to assume

1 is a growing approach since he's in charge of the testing
2 program to the extent that we're concerned here today, I
3 think you're in a situation where you have to now say the
4 Department of Energy in its evaluation of its test priorities
5 and scheduling for testing, importance of testing for site
6 suitability, regardless of whether for licensing or not, the
7 Department of Energy has not given you a single piece of
8 basis for your reason why you want to get underground early
9 and very fast and move fast through the system. They haven't
10 provided you with a technical basis to get underground to do
11 what you want to do.

12 Now, I think this is critical in the sense that
13 it's the Department of Energy's program and it's the Board
14 who is to evaluate the validity of that program. Well, I
15 would submit right now that your concerns should be much more
16 for what the Department thinks are important tests relative
17 to what you think is the reason for getting underground very
18 fast. And, if the Department can't come up with reasons very
19 similar to what you think are the correct reasons, then
20 certainly your premise that getting underground very fast has
21 a significant problem with its own validity.

22 So, I'll leave you with that thought. I think it's
23 something of a challenge for the roles to be straightened out
24 here, and if the Department can't provide you with a basis
25 that you then can subject to an evaluation of validity, then

1 imposing your own basis and the Department not doing it
2 certainly is not a reason to get underground very rapidly.

3 DR. ALLEN: Yes, Ted Petrie?

4 DR. PETRIE: I just have a couple of things to say.
5 We've had a lot of good suggestions, I think, over the past
6 couple of days on ways in which we can improve our plans and
7 our techniques and designs, if you like. And, all of them
8 need to be considered. May I just point out to you though
9 that an improvement which is cost effective at conceptual
10 design may not be cost effective when you're in final design
11 and it will be less likely to be cost effective when you're
12 actually in construction.

13 As time goes by, I think we will always find that
14 there are better ways of doing the things we're doing. I
15 don't think I've ever been on a project yet where some
16 designers could not come in after we'd been working on it for
17 a couple of years--I could come in after a couple of years.
18 Sometimes, I've done the same thing and I could find better
19 ways of doing things, but at the time, what they were doing
20 is sufficient and is certainly okay and it's not cost effec-
21 tive to make a change. So, although many of these things
22 need to be evaluated, we may well find that some of them are
23 not cost effective at this time in our project.

24 Thank you.

25 DR. DOMENICO: We're all aware that in the early 80's an

1 awful lot of drill water was introduced in the mountain.
2 We're aware that there may be some perched water, as well.
3 And, so we're aware that some target of opportunity might be
4 the occurrence of water during the boring. And, I think I
5 heard the gentleman from Morrison-Knudsen say that some of
6 the shutdowns to test these target of opportunities may take
7 as much as two weeks. I think I heard that. Can I have a
8 little expansion on that? I find it difficult to understand
9 what would take two weeks, what sort of target would afford
10 two weeks for shutdown to do the necessary sampling?

11 DR. ALLEN: You don't know who made the statement?

12 DR. DOMENICO: A gentleman from M-K.

13 DR. ALLEN: M-K.

14 DR. DOMENICO: No?

15 MR. SPERRY: Is it possible that you can shut down for
16 two weeks?

17 DR. DOMENICO: That's what I'm asking.

18 MR. HAYES: Russ, correct me, but I know of no scien-
19 tific testing reason why we'd shut down two weeks. We're
20 talking about maybe a day.

21 DR. ALLEN: Russ, did you want to say something?

22 DR. DYER: Since I got referenced here, I just went back
23 and looked at my slide and I find for the unsuitability test
24 of the top 20, seven of them take place either entirely or
25 partially within the ESF. And, we have always recognized

1 that this is an integrated program. You need information
2 from both the surface-based and the underground program.
3 Anybody that's been underground, you can see things down
4 there that you can, at best, get hints of from the surface.
5 If you're trying to understand what the characteristics of
6 the underground are, there is no substitute for being down
7 there and being able to field a test in that environment.

8 DR. ALLEN: Other comments? Yes?

9 MR. SANDIFER: I would like to reiterate what Bill
10 Simecka said earlier about the rail vehicle consideration.
11 Again, the rubber wheeled vehicle approach is what's in the
12 Title I design. Our intention has always been to do a trade
13 study in Title II to evaluate rail versus rubber wheeled or
14 whatever. So, clearly, that's on our agenda and we under-
15 stand that.

16 Also, Bill Simecka pointed out yesterday an advant-
17 age that the labs offer. The fact that we have this large
18 talent base that we can draw from and matrix to our project.
19 Clearly, that same advantage applies to the M&O
20 organization. For example, Fluor-Daniel to surface design
21 and M-K would subservice, very large talent pools that we can
22 draw on for the best possible people.

23 And, finally, this morning, there was some discus-
24 sion on our construction management organization. We have
25 had to bring that organization into a full functioning mode

1 in the past six to eight weeks. And, in part of that was a
2 review of what was required to accelerate the ESF and I'd
3 like to report to you that I feel that that has gone very
4 well. I think that organization is functioning precisely
5 like we had hoped. We don't have all the kinks out of it,
6 but certainly it's working and we've met our objectives to
7 date.

8 Thank you.

9 DR. ALLEN: Other comments?

10 DR. CANTLON: Well, since the Board makes its report
11 both to Congress and to the Secretary of Energy and since we
12 all know there's going to be a new Secretary of Energy come
13 January, it would be useful to us to get some input from some
14 of you about what kinds of opportunities exist to do two
15 things. One, to improve the total system optimization
16 approach which Bill Simecka addressed earlier. What kinds of
17 things would improve that dimension of the project. And, the
18 second one is that since the balance of the funds is so
19 skewed away from the R&D, per se, and is in this very massive
20 oversight, which I understand and I'm not--I'm critical of it
21 as a citizen and having to operate in the university, I know
22 the problem--but there does seem to be, if one listens to the
23 political rhetoric of the last six months, there seems to be
24 an intent on the part of the new administration to aggres-
25 sively press on that. I would also like to have some sugges-

1 tions about what this Board might say, might do in the way of
2 using this DOE and this urgent problem as a way of taking a
3 test case for improving the effectiveness and the responsive-
4 ness and the cost effectiveness of a Federal agency.

5 So, Robby, particularly on the systems area, I'd
6 like to hear your thoughts.

7 MR. ROBERTSON: Let's see, this program has a long
8 history, as I think all of you are aware. This is an odd M&O
9 that we need to kind of understand. I was careful about my
10 choice of language as to odd versus other, but in any event,
11 classic M&Os are, in fact, the principal instrument of execu-
12 tion of a program under the guidance and direction and policy
13 oversight by the Federal agency with which they're involved,
14 whether it be DOD, or in this case, DOE.

15 Our M&O contract is different from most of the
16 classic M&Os that exist at the moment. I think you observed
17 the differences in the charts that Carl had up there. We are
18 assigned certain responsibilities that are cross-cutting of
19 the programs and are integrating. But, what's significantly
20 different is that we have a large suite of what I will best
21 characterize as associate contractors with us on this pro-
22 gram. So, in the classic sense of, let's say, Westinghouse
23 at Savannah River, we don't serve as the prime contractor for
24 that function with these other contractors being subcon-
25 tractors with us. They're all associate contractors. This

1 is a situation that has evolved over a period of time and I
2 believe the validity of the relationship and use of RSN and
3 the role that they were in and REECo and the role they were
4 in, given that this is part of the nuclear test site and the
5 staging of all of that and the labor pool and all, was a
6 valid reason for having gone that way and evolved to this
7 point. The heavy involvement of the national labs and the
8 USGS in terms of the heavy intellectual content of this
9 program adds another dimension that has to be dealt with.

10 So, we have inherited a particular situation. I,
11 as the M&O, might have preferred the classic arrangement
12 where you could say, you know, it's my nickel, it's my watch,
13 you hold me responsible for the thing, and you know, if I do
14 it wrong, then--you know, if the various players are not in
15 the right mix, at least at first order, I have some option to
16 do that. But, I believe the situation that we have here is
17 workable. I think there's an evolving of roles. I think we
18 also have to accept the fact that the M&O, where it is today
19 is perhaps just beginning to reach a level of maturity both
20 in staff and bringing itself up to speed on a program that
21 has been underway very actively for over 12 years here, so
22 that we're in a position to begin to do that integration.

23 I believe that if you look at the construct that
24 Carl had with regard to Yucca Mountain--and, let me parch
25 this into two pieces because I think it is important to

1 recognize that the M&O has responsibilities beyond just Yucca
2 Mountain. We are doing the MRS work, we are doing the trans-
3 portation work, and we are doing much of the system engineer-
4 ing integration, specifications, configuration management,
5 and things on a program level out of headquarters. But,
6 again, returning to Carl's project, per se, I think the
7 construct under which he has laid it out up here is a work-
8 able one. You know, you may say it would be better if you
9 could just beat up one person, but in fact, the way it's
10 constructed right now is workable and I think the dual split
11 that we have in the sense of trying to bring the program
12 together in an integrated sense and yet execute certain line
13 functions such as the design and the Title III inspections,
14 that sort of thing, and the construction management support,
15 give rise to a slight complexity of that. But, I do believe
16 it can be worked.

17 I think that the frustration perhaps that I feel
18 personally and that I know my M&O teammates feel is that we
19 are going to be held accountable one way or the other.
20 There's just no question in my mind if this program does not
21 succeed successfully who is going to be first on the block.
22 There isn't any question about that. That's already evident
23 from the kind of political flack which we have taken as the
24 M&O even in the early formative stages of this. So, you
25 know, we are the big target and, regardless of whether we

1 have the handle or whatever, we're going to be called to
2 accountability.

3 I believe that the challenge that we have under the
4 construct that we have here is that we're going to have to
5 operate with a great deal of finesse in order to make sure
6 that we get advice to Carl that he can operate on that is in
7 the best interest of the program, that we can feel comfort-
8 able with that's going to get us there, and assist him in the
9 process of communicating that and selling that in a persua-
10 sive manner on its merits to the rest of the participants in
11 this program. I think that's the challenge that we've got.

12 I don't believe that we have been at a stage of
13 either staffing or at a stage of maturity yet to where we can
14 really say why haven't you integrated all this? I think
15 we're arriving at that point now. I think the integrated
16 kinds of looks that we've taken in like the 2001 exercise, I
17 think in looking at the integrated schedules and linkage of
18 all of that are important. I think we're beginning with Tom
19 and his team to bring linkage between the site characteriza-
20 tion program and the design functions that are on the other
21 side. And, as we evolve the licensing strategies and the
22 performance assessment strategies together, I think we'll
23 further link those up.

24 So, I think that we don't have a perfect world. We
25 don't have an analog. This is the first M&O for a program,

1 not a facility. This is the first M&O managed out of head-
2 quarters as opposed to the field. So, it's odd in a number
3 of constructs. So, I feel challenged by this. I think that
4 we are up to it. I think we've got a good team. I think the
5 associate contractors that we have here are, without ques-
6 tion, in terms of the talents and the expertise that they
7 have to bring to bear on the problem. The perhaps plea that
8 I would make to them as a part of this process is to work
9 with us, try to let the M&O be involved in those functions
10 that will provide the integration and the glue. You do
11 integration of large complex programs by that integrating
12 entity performing certain crucial functions that allow that
13 to happen. And, with that means that some of the partici-
14 pants will come back to their niche, technical capabilities,
15 where we can, in fact, get them focused on their principal
16 investigator roles and let us assume those roles of program
17 integration and management support to Carl.

18 And, I believe, with that and the mutual respect
19 that we have a good opportunity to make this succeed.

20 DR. ALLEN: Just one question I don't understand. If
21 the project, the Yucca Mountain Project is not successful,
22 you say you're going to be the culprit. I should hope that
23 it's not successful. That is if it's not suitable, Mother
24 Nature will be the culprit.

25 MR. GERTZ: I'll just defer one question. I think I'll

1 be the culprit.

2 MR. ROBERTSON: Yeah, Carl and I will be pretty close to
3 the--except he's got a fallback for referring. I don't. I
4 just type. But, I think the point if it doesn't succeed--I
5 don't mean in the sense of--I don't characterize success as
6 meaning Yucca Mountain is a suitable site. I mean, my defi-
7 nition of success is that this program culminates in a con-
8 vergence of the engineering and science into some decisions
9 that will allow us to systematically resolve this issue and
10 then get on with life and solving this long-term problem of
11 what are we going to do with this waste that we've got here.
12 So, I don't mean it in that sense. But, if we fail for
13 inability to control costs, for doing things that are perhaps
14 inappropriate in the way of the overall system, and so forth,
15 at first order, you know, we're going to be looked at the
16 biggest entity to which that blame is going to be shifted.

17 DR. ALLEN: Other comments? Warner, you look like
18 you're about ready to say something.

19 DR. NORTH: Larry had his hand up.

20 MR. HAYES: Just my view as to what might help Carl
21 manage his program more efficiently. Each year, we develop
22 optimistic plans. Each year, we don't get the budget we
23 developed. We then spend a lot of time and energy going
24 back, replanning, doing things partly here and there. Carl
25 makes the best decisions he can to keep everything going, but

1 he doesn't have the opportunity to manage effectively by
2 doing what should be done when it should be done. That's a
3 yearly process.

4 It seems to me what I guess I feel, Carl needs is a
5 long-term budget. He's got a five year budget. He knows
6 what it is. He can plan to it. It seems to me that's how we
7 can effectively move ahead.

8 MR. GERTZ: I'm not ready to do my big time summary yet,
9 but I want to respond to John. I'm still listening. But,
10 John, in specifics, Larry hit right on it. There's one thing
11 I, as a project manager, would like and that is some kind of
12 certainty about funding and not being jerked around by the
13 appropriation process or the whims of Congress. I mean, it's
14 very difficult to plan a project. And, there is talk within
15 the Department of--and off-budget isn't the right word, but
16 revolving funds. There's \$3.6 billion in the fund. It
17 earned more money in interest than we spent studying Yucca
18 Mountain. So, that's not, you know, an idea. So, that is
19 one thing.

20 Certainly, many of the others, we're trying to work
21 with in the Department. Am I subject to all these DOE
22 orders? Can I try to be relieved from some of the DOE orders
23 due to the fact I'm being regulated by the NRC and the only
24 DOE facility to have to be regulated by the NRC? Certainly,
25 I think in some areas we've been over conservative in some of

1 our approaches to management, to property control. You know,
2 we spent a lot of money keeping track of small amounts of
3 property. But, whatever, there's a bureaucratic system out
4 there and I support making it easier to do business.

5 But, do we have some specifics? I don't have a
6 whole bunch of specifics, but there's one. It's getting us
7 into a point where we can move forward with some kind of
8 certainty in the budgeting process.

9 DR. ALLEN: Warner, are you ready?

10 DR. NORTH: Let me pick up John Cantlon's theme, the
11 first one, the need for the total systems perspective. And,
12 I think a number of people have articulated that with various
13 specific examples as we've gone through the last two days.

14 I'd like to underscore the urgency of this and
15 relate it to Steve Frishman's question. I think we clearly
16 need better articulation of what are the goals, why are we
17 going underground, and what do we expect to get in what time
18 frame? Are we concerned about site suitability and resolving
19 issues such as what is the character of Ghost Dance Fault
20 which goes back to the first meeting I attended with the TRB
21 a number of years ago where we were asking that question,
22 looking at specific documents and responses from DOE. And,
23 at that time, developed some enthusiasm to the effect that we
24 were really only going to find out about Ghost Dance Fault by
25 going down there and taking a look at it. And, that judgment

1 didn't come from me; it came from primarily others that you
2 can readily identify within the TRB cast of characters.

3 But, I think we've got to distinguish, as we think
4 about the scientific goals of the underground exploration
5 problem, what issue are we trying to resolve in what time
6 frame? Finding out about Ghost Dance Fault in the context of
7 site suitability is very different from heater tests to find
8 out about the thermal consequences of various thermal loading
9 strategies that might apply to repository design if we decide
10 we have a suitable site.

11 And, we have another decision point coming up after
12 the license application, assuming that goes well, which is
13 the decisions on repository closure. And, I think what we
14 really need at this point, what I'm dissatisfied with in
15 terms of what I've seen, is a better long range systems plan-
16 ning as to how all these decision issues fit together and
17 what information we need when, in order to support the deci-
18 sions on the program. We don't want to go from one near-term
19 decision to another near-term decision. We want to recognize
20 that some of the information, that it would seem we need, has
21 a very, very long lead time to get it. I really think on the
22 heater test issue, the question is not three years versus
23 four years versus five years to have information for the
24 license application stage; it is what do we need to know to
25 make the thermal loading decision at the point that that's

1 really committed. And, if you go to drift emplacement in
2 such a way that you can move the containers around, that
3 commitment might come at the time that you backfill drifts
4 and work toward closing the repository.

5 So my urge, and it's primarily at you and the M&O,
6 Robby, is get on with this and do these studies even if all
7 you can do is the quick and dirty version, so that we have
8 good answers to these questions and in you're in a position
9 to iterate on the planning; not just look at the near-term
10 decision, but look at an overall strategy for going forward
11 with the program. And, within that, of course, we have the
12 problem of the lack of a long-term budget commitment and so
13 there clearly has to be some contingency. If Congress
14 decides not to provide the money for the picture Carl showed
15 us, what do you do? What makes sense to do? And, I would
16 hope that as the M&O comes up to speed, we're going to get a
17 lot more help collectively in grappling with those very
18 difficult issues.

19 MR. ROBERTSON: Let me respond a moment to that. One of
20 the difficulties that we have had with this program--and I
21 believe you've articulated it very well--we have stated as
22 much, is we tried to build a site characterization program by
23 top down/flow down of the 960.60 requirements. The truth of
24 the matter is the heuristic, scientific view of "let me dis-
25 cover everything I could ever want to know about this

1 mountain from the bottom up" never really converged between
2 those two things.

3 Now, it appears to us and I think we've spent a lot
4 of time--Carl and I were in a number of meetings with Bart-
5 lett and his senior staff, as well as senior M&O staff and
6 others, attempting to articulate the basic issue of what
7 drives this program in terms of a framework. And, I believe
8 that we are not at a construct in which this framework can
9 begin to articulate the elements.

10 There are really only four reasons for which you
11 are collecting data on this site to evaluate it. One is
12 suitability determination and the construct of the require-
13 ments of both 60 and 960. Secondly, the licensing require-
14 ments that are attendant with Part 60. Thirdly, the EIS
15 requirements that are attendant associated therewith. And,
16 lastly, the design data that is needed to ultimately design
17 the system that is in place.

18 Now, if you had surrogates for each individual--
19 who, by the way, we are on a path to build those into Carl's
20 organization--and, you got these four people in the room and
21 you asked them a question, what is enough data? Do you have
22 enough data? When the answer of all four of those people is
23 yes, then you are through with the site characterization
24 program. You know, assuming again that that suitability
25 determination and some of the licensing arguments are less

1 than precise in terms of judgment.

2 To follow my scenario for a moment and assume that
3 that's a correct one, what's been missing is a lack of clear-
4 ly articulated strategy for each of those elements of the
5 program for their satisfaction of that argument. And, this
6 point has been made by several people here that you may not
7 decouple the licensing issue from the suitability issue
8 because much of the suitability determination of the site in
9 the long-term--not necessarily for the disqualifiers, but for
10 the ultimate qualification--involves the proof that the
11 strategy which you are intending to rest your licensing case
12 on is supportable by the underpinning data.

13 Now, in the next few months, we had hoped to artic-
14 ulate strategies in these areas, integrate them to provide
15 the framework against which to test this, and then establish
16 a sequence of milestones and periodics that will be done. In
17 parallel with that, there are a whole series of system level
18 studies that are ongoing that are being laid out against
19 program milestones in which they have to be made. You've
20 heard a mention made of this business of the thermal loading.
21 There's a classic case of where that touches virtually
22 everything that we deal with and it's getting time critical
23 with regard to our decision with regard to how we're going to
24 do that. It's one thing, as I think Pat made the comment one
25 time, it's beautiful to make an argument that we can boil

1 this mountain and keep the water off that cask, but do you
2 want to rest your licensing strategy on that, a subset of
3 which is to convince the public that boiling that mountain is
4 okay. You know, in that sense. So, I think as a part of
5 your licensing strategy, we have to converge on that.

6 And, so that framework needs to be in place for
7 those sort of trades to occur. Granted, lots of pieces are
8 around. They don't yet have the coherence that we can lay
9 out for you as an analytic process that can give you that
10 comfort factor, but I think we are converging on it. We have
11 seen pieces, lots of pieces, and you kind of say, well, yeah,
12 that piece sounds okay. This piece sounds okay. And, we are
13 reaching a point within the next year that we've got to pull
14 that fabric together where you see it as the integral. And,
15 I think that we're making good strides with that and the team
16 that's beginning to form here is beginning to drive more
17 specifically at the things as they see the trades that have
18 to be made as a part of the design process and, in par-
19 ticularly, the ACD, the advanced conceptual designs. Bear in
20 mind, we're dealing with a very, very outdated set of concep-
21 tual designs. So, those have be brought to test, also. So,
22 I hope we're up to the challenge and to test it as we go.

23 DR. NORTH: Well, you encourage me, but I'd like to
24 encourage you. The next three months, I think, is going to
25 be quite critical in terms of where all this program goes

1 because there's a new management coming on board. And, it
2 would be useful to get a lot of that picture out there within
3 three months so we can all work at it.

4 Then, on your four point list, it seems to me the
5 over-arching consideration is something that came into your
6 phraseology toward the end and that is having to do with
7 convincing the public that it's okay. Boil the mountain or
8 the whole thing taken together. I go back to Scott Sinnock's
9 slide. Are we doing systems engineering in the narrow to try
10 to satisfy the details of those very complex requirements or
11 are we setting up something basically where we have the
12 pieces with which to convince the public that what we're
13 doing is okay? And, I think the point Scott makes, which I
14 would heartily endorse, is looking at the right hand side of
15 that diagram and considering what do we need over there, is
16 very, very important and we shouldn't let it wait until the
17 end as we're packaging the licensing application and the EIS.

18 We should rather be thinking about now. What is it
19 we're going to need there? What is it in terms of detail?
20 What is it in terms of a good story that can be supported all
21 the way from five minutes on morning television which some-
22 body is going to need to be able to do very articulately to
23 include all the data, and all the quality control, and all
24 the backup, that you need to survive all the challenges that
25 are undoubtedly going to be thrown at this program as you go

1 through the license application and the EIS process.

2 MR. HAYES: Maybe I'm being too sensitive, Robby, but I
3 have to take exception to something you said, that the bot-
4 toms-up approach from the scientists resulted in everything
5 we might want to do at Yucca Mountain, simply not true. The
6 site characterization program we now have is not the program
7 that the Yucca Mountain Project scientists originally came up
8 with. It has been reviewed at many stages. At each review
9 stage, it has been added to by outside reviewers. The
10 scientists who developed the original program did show fiscal
11 responsibility. They did realize they couldn't do everything
12 they wanted to do. So, I'd simply have to make that state-
13 ment. They were people who care.

14 The other statement I want to make is these very
15 people, it's their credibility, it's their work that's going
16 to develop the public confidence.

17 DR. ALLEN: Who else? Ron Ballard, did you want to say
18 something? Nuclear Regulatory Commission.

19 MR. BALLARD: Yeah, I would just like to make a couple
20 of little bit broader observations from a regulatory perspec-
21 tive.

22 First of all, the NRC regulations, as they are now
23 written, do require a site characterization program. They
24 also require the program be conducted in a manner that would
25 limit any potential impacts on waste isolation. In keeping

1 with that, the regulations do note also a--they identify and
2 perhaps even endorse the potential co-location of exploratory
3 shafts and tunnels with repository structures in keeping with
4 this desire to minimize impacts.

5 One point I would like to make and DOE is certainly
6 very well aware of these is that the GROA conceptual design
7 should be kept updated to be consistent then with the explor-
8 atory study facilities primarily because if there is a co-
9 location, which seems to be an objective here, that we will
10 be--at the license application, we will have to be sure that
11 there's a strict regulatory or QA controls on those. I've
12 made these points before and certainly I think that they're
13 pretty well understood.

14 The other point for the Board perhaps is that NRC's
15 role in this pre-licensing stage is strictly a review in
16 terms of looking for deficiencies in the scope of the pro-
17 grams. DOE has full responsibility for the design and for a
18 design that they can demonstrate meets the performance objec-
19 tives.

20 And, just one other last point on the site charac-
21 terization plan, I think you all know, but I just want to
22 remind you that we have reviewed the plan. And, I think, Joe
23 Halonish would have liked for me to say this. We have
24 reviewed the site characterization plan. We had a couple of
25 objections and many comments. The objections have been

1 resolved to date and so we are fully tracking that program
2 and I think that the interactions we have are working well.
3 So, I just thought the Board might want to keep in mind the
4 regulatory context under which we're working.

5 DR. ALLEN: Other comments?

6 (No response.)

7 DR. ALLEN: Do you want to do your big thing?

8 MR. GERTZ: Sure. It follows very closely.

9 DR. ALLEN: I can't guarantee you'll be last, but okay.

10 MR. GERTZ: That will be fine. That would be no prob-
11 lem. It should generate some additional discussion.

12 I think this is an important aspect to follow right
13 after our regulators because with all due respect, the group
14 that you brought together, I think they did a commendable job
15 of getting up-to-date on a very complex program in a very
16 short time, but I've not once heard the regulatory impacts of
17 anything they talked about. It appeared that you didn't
18 recognize we're working in a regulatory environment with 10
19 CFR 60 that controls our design control, our analysis, and
20 everything else. And, while your recommendations were abso-
21 lutely on line for perhaps a normal commercial operation,
22 we're doing something just a little bit different here. And,
23 I need to just articulate some of those things, but in sum-
24 mary, most of the things I totally think were appropriate and
25 I agreed with. But, let's just talk about some of them, as I

1 go through them.

2 If we left you the impression that we already
3 designed the main test level, that was wrong. We're just in
4 Title I and we're working on designing the main test level
5 and we may not even do that next year. I don't have funds in
6 the budget right now next year. It may be the year after
7 before we design the test level. Maybe, we'll do some of it
8 next year.

9 I like the idea of disputes review board. Anything
10 that could help us move forward a little quicker would be
11 great with a little more cooperation. So, I think that's
12 good. We do need to look at rail versus rubber. There's no
13 doubt about that. That's a very important decision to make.
14 I'm not sure about if we go the main loop all the way
15 through and then go back and do other things or stop during
16 the main loop to start, be it a drift towards the Ghost Dance
17 Fault which we all thought is important to get at or be it
18 test level. And, that's an analysis that we're going to have
19 time to do and have time to optimize.

20 But, the key thing I think I'm responsible for as
21 the project manager--and someone brought it up--is to keep
22 flexibility. To keep flexibility in the program so we can do
23 what is necessary when the time comes. Now, Steve and I, of
24 course, debate a lot and I think the question answered is, in
25 effect--the answer is, you know, why are we going under-

1 ground? Well, we have a set of regulations and a plan in
2 place that's been approved by everybody that says you have to
3 have in-situ testing and that's the purpose of the ESF. And,
4 we articulated that well before. So, I won't go over that.
5 But, that is the purpose of the ESF.

6 But, another thing, I think, that was perhaps
7 missed in some of your analysis is when we do these things,
8 we have to do an impact analysis on waste isolation. We have
9 to assure that since it will be co-located, the repository
10 design is considered in the design of the facilities we do.
11 And, I guess I would ask your consultants if they thought in
12 10 years or 15 years the diameter had to be moved from 18 to
13 22 or 25 or 26, would they still do 18 the first time and try
14 to go back later or would you do it 25 or 27 or what you need
15 when you have a chance to do it this time? We would have to
16 redesign the aspect of the program now to do a complete
17 impact analysis of what enlarging that diameter would do to
18 waste isolation. That takes time. Those of you that are
19 familiar with the Calico Hills Risk Benefit or ESF alterna-
20 tives know how long those kind of activities take.

21 While there are many good ideas and I pointed out
22 that I think most of the things that were brought up cer-
23 tainly were either new to us or we had been thinking about
24 the periphery and we are glad you were able to articulate and
25 help us focus on some of those things, there's some other

1 things that I think we just have to make a programmatic
2 decision as a project management team and maintained flexi-
3 bility and, in effect, move forward. And, one of those is
4 the diameter of the shaft. I mean, I could redesign it in
5 five months and come up with maybe 18 feet and reduce flexi-
6 bility, but then we'd be a year again before we get below
7 ground and have we really gained anything in our ability to
8 understand the mountain because I think the sooner we get
9 underground, the sooner we'll be able to narrow our uncer-
10 tainty on some of the big picture items. We can get down and
11 look at the faults, look at the rock properties, and either
12 expand or narrow our test program.

13 It's a success on this project if we each say the
14 mountain is not suitable. Our sole goal is to come to an
15 answer and to come to that answer as soon as possible.
16 Sometimes, there are other things that drive the answers that
17 we're coming to. As I said, my only slight disappointment is
18 that I didn't hear the regulatory perspective from your team
19 as they looked at it and I think that is important because
20 that's what we operate in is a regulatory environment. That
21 involves a lot of interactions. The design that we put
22 forward, the large 25 foot diameter, has been on the table
23 for two years. We had 20 meetings with the NRC on that
24 design, including a design review activity. We have what I
25 think and my team thinks and the M&O team, including the M-K

1 people and the Fluor-Daniel, is a good solution to getting
2 underground short-time with a limited budget and finding some
3 answers.

4 I could go through some of the other stuff we've
5 learned, but I think that we've covered it all before. Let
6 me just go through quick for discussion points. As I said,
7 we did have a lot of analysis. We did comprehensive evalua-
8 tions over the years on Calico Hills and wide as possible
9 ranges of factors so we could document the design; you know,
10 licensing environment. We did have to look at these regula-
11 tory requirements. Minimize impact on waste isolation. Need
12 to consider the design criteria applicable to repository.
13 Coordinate ESF and repository designs. Need to apply QA
14 controls to all this. Right now, the ramp design, the portal
15 design will become part of the repository, subject to exten-
16 sive QA controls. And, of course, we have the safety aspects
17 and the regulatory requirements for environmental protection.

18 Where do we stand? We did have a design that
19 evolved from the Title I. We're committed to proceed in
20 phases; if not for any other reason, because of the budget
21 limitations. We now have a Title II package completed. We
22 have ramp specs done. We will be starting our ramp design
23 shortly. We have, as I said, the Title I accepted by every-
24 body. We told you about the ramp sizing study. That was
25 what the team, including the M&O team, the Raytheon team

1 concluded that was the appropriate diameters for the ESF.

2 So, in summary, we are ready to proceed. I've
3 talked to you about those things. We've got the RFP on the
4 street. We're ready to move right now with what I think is a
5 good, firm, solid design. We've talked about it before. The
6 enemy of a good solution is a potentially better one and
7 nothing gets done. The enemy of good is better. And, as
8 project manager, I constantly deal with those kind of deci-
9 sions and some of those decisions and constraints, Larry has
10 addressed.

11 We need to maintain a balanced program, surface-
12 base and underground. Construction sequence and testing
13 priorities, is it Topopah Springs? I think I've come to the
14 conclusion that once through the--Topopah Springs is probably
15 the most--is the best approach right now. A while ago, we
16 thought maybe early access to the Calico Hills. Or do we
17 start in ramp for long duration tests or do we start at the
18 test level?

19 But, funding limitations, we've changed our
20 approach to come to where we are. We've explained our pro-
21 gram to you. We think it's a sound program. I've heard some
22 concerns about larger diameters, smaller diameter, and cer-
23 tainly they're genuine concerns. They're concerns that we
24 dealt with and talked with for a year or two. But, we've
25 come to the conclusion that we need to get underground. We

1 want to focus on site suitability when we get there.

2 We want to maintain a flexible program because who
3 knows what regulations will change and what will bring in the
4 future and we need to demonstrate progress to insure con-
5 tinued Congressional support. That's not a technical line
6 there. I mean, that's the realities of the situation. We've
7 had senators out here. They've told me what they think the
8 program should do. I've been in hearings and they've told me
9 what they think the program should do. And, so I'm not
10 trying to over-emphasize one over the other, but there's a
11 range of reasons for doing things, some of which are tech-
12 nical and some of which are programmatic, some of which
13 involve constituent support.

14 I think you and I collectively, the Board and the
15 DOE team, believe getting underground soon is important. I
16 think most people do that right now. I think we believe the
17 tunnel boring machine is the right way to do it. I think
18 most all the things you brought up are elements we need to
19 study and to look at. And, we've got plans to do those, but
20 I think it's essential right now that we move forward with
21 the design that's on the table and modify it in the future,
22 as necessary.

23 Once again, I think you all--most of you do know
24 that because this particular ramp may be a large diameter
25 does not mean that the hundreds miles of tunnels for waste

1 emplacement or additional drifts have to be large diameters.
2 They could be whatever is appropriate. This does not tie in
3 or force us to a large diameter for any other parts of the
4 program. All it does is allow flexibility right now to carry
5 out what we think is important short-term aspects of the
6 program.

7 So, once again, I do commend your team because it
8 is a complex program. I've been on it five years and I'm a
9 quick learner and, boy, I'm still learning a lot. And, for
10 them to come up to speed and recognize some of the short-
11 comings of it, some of the complexities of it in two or three
12 days is a tremendous undertaking. So, I would really like to
13 compliment their ability to assimilate a large amount of data
14 in that short time.

15 DR. ALLEN: Carl, before you leave, could we get you to
16 comment on Robby's thoughts on system optimization and so on?

17 MR. GERTZ: Yeah. I think that's one of the short-
18 comings of our program up to now. We've not had--I, as a
19 project manager, I can kind of focus on studying the moun-
20 tain, is it safe or not, and move myself maybe a step away
21 from the total systems. But, on the other hand, what is
22 right for the country? I think we need to determine what is
23 the--do we need an MRS, will we have an MRS or not, should we
24 be planning on that? Should we planning on some kind of on-
25 site storage until a repository is ready? Should we have

1 multiple use containers that we can load at a reactor, put an
2 overpack on it and store it, put another overpack on it and
3 ship it, and then put an overpack on it and then place it in
4 a drift? Should we do those kinds of things?

5 No, I think we'd better, as a program, get our act
6 together and get those questions answered or else we won't
7 have any Congressional support, at all. So, no, I support
8 that. I work on that in only a big picture activity when
9 John asks me to be involved.

10 Right now, I consider my responsibility of carrying
11 out the site characterization program that Congress has
12 indicated and said study Yucca Mountain. Last year, they
13 said focus your activities, DOE, on Yucca Mountain. And, we
14 have a plan that's been accepted by the regulator and we're
15 trying to implement that plan.

16 DR. ALLEN: One question. You were very critical of the
17 Board's suggestions for not seemingly recognizing the regula-
18 tory framework in which we all have to operate. Yet, you
19 gave no specifics. In what way would the suggestions we made
20 violate the regulatory framework?

21 MR. GERTZ: I don't know if they violated, but it was
22 perhaps the consideration that what we have offered certainly
23 has to be part of the repository design considerations and
24 should we have to, let's just say, over-size the ramp, what
25 is the extensive analysis that would go into that to assure

1 that making a ramp bigger would not affect waste isolation?
2 From a construction point of view, it might be easy to do,
3 but to prove that on an analysis towards waste isolation and
4 how that would affect waste isolation, the main drift which
5 is 10,000 feet across the repository block, those kind of
6 considerations, I think, Clarence, were probably not
7 addressed in any detail. Those are considerations that we've
8 gone through for two years when we went through the design of
9 the ESF and the commitment to the conceptual design of the
10 repository.

11 I didn't mean to be critical of it. I just said
12 that that was an area I didn't hear covered.

13 DR. CORDING: No, and I believe that it is not--
14 enlarging the ramp would--enlarging the drift size would not
15 prove to be a problem to do it in terms of the repository.
16 If you change the size of the ramp, you can do it with equip-
17 ment and means that would not disturb it any more than any
18 initial construction would or to any significant extent.

19 I understand the point that you have to go through
20 the process and get this approved. I don't think that we
21 feel in any way that it--I haven't felt in any way that going
22 through and enlarging the drifts even relates very strongly
23 to site suitability or to the repository requirements except
24 that you do have to go--we recognize you do have to go
25 through these processes. And, one of the points we made, as

1 we started some of our discussions and as we've continued, is
2 that we feel our priority is to continue the progress. We
3 recognize that in engineering, as you go further down the
4 line, you become more limited in the decisions you can make
5 and that you have to set what you've already developed and
6 you proceed with that. And so, you may not have the best
7 solution at the time you're looking for adequate solutions as
8 you go further. In earlier stages of design, you have more
9 flexibility.

10 You're getting very close to trying to go under-
11 ground and so we recognize--and, in fact, some of the com-
12 ments that have been made by the consultants is recognizing
13 that your options are becoming limited. I think one point,
14 however, is that when we looked at the ESFAS about December
15 or November of 1990, we at that time commented on our concern
16 for the size of the opening. And so, we have very consis-
17 tently in the past years been asking about that and I don't
18 think we've ever had resolution. I think it's partly because
19 there wasn't a lot of development in a certain portion of
20 that period. Funding and continued development of some of
21 these issues or design because of funding problems and that,
22 as you came to this last--this FY-93 budget, you said we are
23 going to go underground and that was partly at our urging or
24 recommendation. So, you're in a process where things have
25 gotten somewhat compressed and we recognize that.

1 I think one other point, though, that I would like
2 to make is that the design that has been coming through has
3 been 25 feet. And, now, we are hearing 27-1/2 feet and even
4 up to 31 feet. And, that the 31 foot could be an option
5 based on what machine is available. Now, to me, that is
6 starting to get into issues that are different than what your
7 baseline configuration was. And, so I think that's an area
8 that I would have a continuing concern on.

9 MR. GERTZ: And, I would, too, if it increases program
10 costs because I think you made a very salient point. What
11 good does it do to save \$1 million or \$2 million on a machine
12 if you spend \$15 million more on excavation or operations.

13 DR. CORDING: True.

14 MR. GERTZ: So, that has to be evaluated as part of the
15 process.

16 DR. CORDING: And, other impacts in regard to suit-
17 ability with regard to changing the size from 25 to 31. You
18 went through the process basically for 25 feet. So, is there
19 something else involved? If you go to a larger size, does
20 that have suitability--

21 MR. GERTZ: How much more analysis do I have to do for
22 that.

23 DR. CORDING: To go even larger. So, I think this cuts
24 both ways.

25 MR. GERTZ: I think you're absolutely--

1 DR. CORDING: One other point is that it does--I know
2 there are backfilling approaches and all and, as you go
3 through this repository and you go through it at what you
4 intend to have as a repository level, is there a potential
5 that you may have to change the level of the repository?
6 And, if that occurs and you have a drift through there and--
7 your exploratory drift in that area, is there an approach to
8 handling that and changing the level if you have to? In
9 other words, although with the best efforts you've tried to
10 stay right in the area of the future repository, you have
11 moved it and you no longer have the drift in the place you
12 would like to have it.

13 MR. GERTZ: Certainly, we're looking at sealing
14 approaches right now which is--further on, after 50 years, we
15 would have to seal it and we have some conceptual designs
16 about sealing those kind of things. And, should we happen to
17 change repository design, we'd have to assure the NRC our
18 sealing approach would not affect waste isolation, would not
19 create preferential pathways, and we'd have to go through
20 that analysis. And, I guess, my frustration with the system
21 is those analysis take time and money, and while you're doing
22 that, nothing else gets done for some things.

23 So, when we were talking about the ability of waste
24 isolation, it can be done, but even simple things like a
25 sewage pond, we can't put a sewage pond out there right now

1 without an analysis that it won't affect waste isolation by
2 infiltration or anything like that. Not a difficult analysis
3 to do, but something that has to be done in a QA program,
4 approved, and accepted. That's our commitment to insure
5 anything we do does not affect waste isolation. And, the
6 program I guess I still lean on right now as the project
7 manager is let's make it as flexible as we can early-on and
8 let's get started. We've been just kind of laying back too
9 long. Congress has said let's get started and we're ready to
10 get started.

11 DR. ALLEN: Okay. Thanks, Carl.

12 Let me finally ask here as we approach the end if
13 any members of the Board would like to make any final state-
14 ments? Don or Garry or Pat or anyone else?

15 DR. CANTLON: I would just make a closing statement
16 which I hope will be the end of the whole--

17 DR. ALLEN: Okay. Let me thank you all, but I'll let
18 John Cantlon make the final statement.

19 DR. CANTLON: Well, on behalf of the Board, let me thank
20 all of the participants that are here. I think this has been
21 a very fruitful exchange. It's certainly helped the Board in
22 contending with what are some very, very difficult issues and
23 we're hopeful that our report will be arriving on the scene
24 at a very propitious time and I think you've given us a lot
25 of insight that will make sure that what we recommend is

1 doable, reasonable, contributes to the resolution of the
2 problems.

3 So, thank you all for attending. It's been useful.

4 (Whereupon, at 3:45 p.m., the meeting was adjourned.)

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

1

2